

PROCESS EVALUATION  
OF THE  
CENTERS OF BIOMEDICAL RESEARCH  
EXCELLENCE (COBRE) PROGRAM

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by  
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## SECTION 1:

### EXECUTIVE SUMMARY

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The Centers of Biomedical Research Excellence (COBRE) program is a major initiative to establish multidisciplinary research centers in states with “historically low aggregate success rates” in obtaining NIH grants. The program was initiated in FY 2000 by the National Center for Research Resources (NCRR) as an expansion of the Institutional Development Award (IDeA) program which had been legislatively mandated in 1993 to broaden the geographic distribution of NIH research funds. In September 2000, 19 centers received five-year COBRE awards (which ranged from \$1 to \$2 million per year), followed by 10 centers in FY 2001 and 19 centers in FY 2002. Institutions receiving COBRE awards are expected to have a thematic area of scientific focus and to conduct 3 to 5 research projects in that area over a 3- to 5-year period, with each project supervised by a junior investigator. The institutions are also required to have a plan for mentoring the junior investigators and replacing them when they obtain their own research grants, working with an external advisory committee (EAC) to enhance scientific oversight. COBRE funds may also be used to establish and renovate core facilities and to provide startup packages for new faculty.

#### EVALUATION DESIGN

The evaluation of the COBRE program, sponsored by NCRR, was primarily a process evaluation aimed at determining the extent to which specific goals were achieved by the initial cohort of centers and junior investigators during their first six years (FY 2001-2007). The study was based on a conceptual framework of specific baseline characteristics and program activities that were hypothesized to influence the achievement of program goals (see [Exhibit 1](#)). Six study questions were addressed:

1. What were the characteristics of the 18 COBREs when they joined the program?
2. How did the COBREs implement the major program activities recommended by NCRR?
3. How successful were the COBREs in achieving the process goals for centers?
4. What were the characteristics of the COBRE junior investigators when they joined the program?
5. How successful were the COBRE junior investigators in achieving specific program goals?
6. Did any COBREs experience positive or negative events over which they had no control? If so, how were they addressed?

To answer the study questions, information was needed with respect to two target populations: (1) the centers that were awarded a COBRE grant in Sept 2000; and (2) the junior investigators at these centers who received substantial COBRE support during Years 1-3. Although there were 19 centers in the initial cohort, the final target population consisted of 18 centers because the two Wyoming COBREs shared some personnel and organized joint activities during this period and were therefore

regarded as one center. An overview of the 18 COBREs is presented in [Exhibit 2](#) (which includes the unique ID for each center used throughout this report). The second target population consisted of the 107 junior investigators at the assistant/associate professor level who had never received an R01 or other major grant before joining the program and who received substantial COBRE support for at least one year during FY 2001-2003.

Most of the information relevant to the two target populations was obtained from secondary data sources, and a variety of data collection strategies and standard statistical tests were employed to answer the study questions.

## **OVERVIEW OF THE MAJOR FINDINGS**

### **Study Question 1: What were the characteristics of the COBREs when they joined the program?**

Most of the COBREs structured their centers as collaborative partnerships involving a lead institution and at least one other organization; the overall average was 2.1 institutions per center. Fifteen of the 18 COBREs had a formal affiliation with at least one medical school and/or major medical center (see [Exhibit 3](#)). To encourage multidisciplinary research, the COBREs enlisted researchers from several departments (the average was 4.8 departments per center in Year 1 which increased to 7.3 departments over the next five years). Approximately two-thirds of the COBREs included both basic science and clinical departments, and one-third included only basic science departments. All of the 18 COBREs in the initial cohort were focused primarily on basic research, and a large majority of the centers included animal studies among their subprojects (see [Exhibit 4](#)). Seven COBREs were interested in conducting clinical research that did not involve clinical trials, and none of the COBREs were planning to pursue epidemiologic or behavioral research involving human subjects. All of the centers had a variety of research facilities, equipment, and related services available to COBRE participants at the start of Year 1, however, some of these facilities needed renovation and upgraded instrumentation, and most of the COBREs needed additional shared facilities to pursue their research agenda, encourage multidisciplinary collaborations, and attract new faculty.

The COBRE program directors (PDs) were very accomplished researchers with one exception (in this case, a plan was presented to recruit an experienced permanent director as soon as possible); 84% of the PDs had administered research programs and about half of them emphasized their previous mentoring experience in their COBRE grant application. The average COBRE had 6.2 experienced investigators at baseline, 87% of whom had received at least one R01. Of those who were in mentorship roles, 94% had research project grant experience. A large proportion of the initial group of 111 experienced investigators (83%) had a PhD degree (with no clinical degree), 13% had an MD degree, and 4% had an MD/PhD. The average COBRE had approximately 900 graduate science students and 75 postdoctoral fellows at their participating institutions at baseline, but there was great variation among the centers (see [Exhibit 3](#)).

### **Study Question 2: How did the COBREs implement the major activities recommended by NCRR?**

The PDs and other COBRE participants used a variety of approaches in carrying out their program activities. Many demonstrated scientific and administrative leadership by identifying clear goals and

benchmarks to track the progress of junior investigators and the center as a whole, working closely with their IAC and EAC to ensure that the center's subprojects were complementary, and/or meeting with state legislators and senior administrators to find ways to leverage COBRE funding to obtain additional support. Regarding recruitment strategies, there was substantial variation in the size of the startup packages offered by the different centers, with the largest being in the \$300K-\$400K range; the large startup packages received substantial funding from institutional and other sources since COBRE funds to recruit additional faculty were limited to \$100K per year during Years 1-6. Seven centers focused on recruiting only junior investigators and the others actively recruited both junior and senior investigators. Several centers offered one- to two-year pilot project awards (ranging from \$8K-\$100K) to encourage junior and senior faculty to pursue research in relevant areas. There was also a great deal of variation among the COBREs with respect to the amount of attention given to mentoring junior investigators. A few centers placed a high importance on mentoring from the start but most of the others found that they needed to strengthen their mentoring program after two or three years. Strategies included being more careful in the selection of mentors, recruiting external mentors when needed, clarifying the roles and responsibilities of mentors and mentees, and holding mentoring workshops. Many mentors volunteered their time and others were compensated from the COBRE grant, usually at between 5 to 15 percent level of effort. In addition to mentoring, all 18 COBREs offered their junior investigators many opportunities to advance their research skills and careers by holding annual retreats or symposia, organizing monthly or bi-monthly work-in-progress meetings, and holding workshops on a variety of topics (e.g., grantsmanship, scientific writing, presentation skills, research ethics, lab management, career development).

A commonly used strategy for expanding core facilities was to leverage COBRE funds to obtain matching funds from other sources. Most of the COBREs also submitted proposals for COBRE supplements and/or C06 construction grants to enhance their core facilities and equipment. All of the COBREs recruited an external advisory committee comprised of accomplished senior scientists with expertise relevant to the research focus of the particular center. The average COBRE recruited seven EAC members during Years 1-6 and 75% of them served on the committee for at least three years. Most of the COBREs held at least five in-person EAC meetings during Years 1-6 and approximately one-third also held EAC meetings via conference call. In most cases, the one- or two-day meetings included research presentations by the junior investigators which were critiqued by the EAC members, sometimes in great detail. Sixteen of the 18 COBREs also established an internal advisory committee which served as a steering/executive committee to assist the PD in achieving the center's objectives. The IACs varied in size, ranging from 3 to 7 members. Most IACs met quarterly or twice a year, and most reviewed the progress of the junior investigators at least once a year. Many of the PDs also reached out to senior administrators and other stakeholders; some met regularly with deans and department chairs to discuss how to phase in new faculty hires and address other research-related issues. Surprisingly, there was little mention in the COBRE annual progress reports of meetings between the PDs and senior administrators at the partner institutions, particularly the smaller institutions.

The most difficult unforeseen challenge was the loss of the PD or associate PD due to his/her unexpected death or departure from the institution, which was experienced by four COBREs. Transitioning to new leadership was not easy and it took time for them to get back on track. Other challenges included integrating the new center into the existing academic structure/culture, and coordinating a COBRE consortium that involved several universities and numerous department chairs. Many of the centers experienced difficulties recruiting graduate students and postdoctoral

fellows for COBRE labs, which some addressed by increasing the salary scale of postdocs and offering grad students higher stipends, fellowships, and/or reduced tuition to work on COBRE projects. Although the COBREs found many ways to support their junior investigators, a major challenge for several PDs was persuading department chairs to increase the amount of release time given to junior investigators to pursue research activities. Several PDs also had difficulty persuading senior administrators to institutionalize new core facilities, cover maintenance charges, and create permanent positions with salary support for core facility directors. In addition, lengthy delays in the hiring of new personnel and construction/renovation of facilities were experienced by many COBREs, requiring budget adjustments and patience in dealing with overcrowded conditions.

### **Study Question 3: How successful were the COBREs in achieving the process goals for centers?**

Several performance indicators were used to assess the extent to which the 18 COBREs achieved the process goals listed in the conceptual framework. To identify the centers that were most successful in achieving the different goals, algorithms were developed that compared the 18 centers with respect to their performance (see [Exhibits 5-10](#)). The evaluation found that, as a group, the centers were very successful. Their success was broad-based, with 13 of the 18 centers performing exceptionally well with respect to one or more of the six process goals. The study also found that there was considerable variation among the COBREs, partly because they differed in the amount of emphasis they placed on each goal.

As a group, the centers did an excellent job of recruiting and retaining new research faculty, core directors, and EAC members. Sixteen of the 18 COBREs recruited one or more faculty members from other institutions, and altogether, 86 researchers were recruited during the first six years (over 90% into tenured or tenure-track positions). As expected, most of the new recruits were junior investigators; of the 223 junior investigators who participated in COBRE during this period, 80% were still at their COBRE institution at the end of Year 6. The following factors were found to be most relevant to the centers' success in recruiting and retaining research faculty: (1) strong state support for research; (2) strong institutional support; (3) Proactive outreach to senior administrators; (4) effective use of websites and other outreach strategies; (5) enhancement of core facilities and resources; and (6) encouragement of COBRE graduates to mentor new junior investigators. Another positive finding was that the COBREs were quite successful in recruiting and retaining skilled directors and staff for their shared facilities. Although it frequently took longer than expected to recruit core directors with appropriate experience, the centers persevered and nearly always succeeded in their quest. As a group, the COBREs also did well in recruiting experienced researchers with relevant expertise to serve on their EAC. The retention rate was high for the group as a whole, with 75% of EAC members serving for at least three years.

Nearly all of the COBREs were also very successful in expanding their core facilities to meet the needs of COBRE investigators. Eleven of the 18 centers developed new shared facilities, with a total of 21 new cores created. In addition, 16 centers purchased major state-of-the-art equipment for their new and/or existing COBRE cores; a total of 39 core facilities were enhanced significantly. In addition to their COBRE funds, six centers received at least one C06 construction grant from NCRR to build new facilities and/or undertake major renovations, and 14 centers received one or more COBRE supplements to expand their research space. The following factors were found to be most relevant to the centers' success in expanding their core facilities: (1) strong state support for research;

(2) strong institutional support; (3) active involvement of senior administrators; and (4) effective monitoring of core facilities.

Regarding research projects, all of the COBREs met the goal of successfully implementing 3-5 research projects in areas relevant to the center's scientific focus. The average number of subprojects per COBRE was 10.9, which was much higher than expected. Looking at both subprojects and pilot projects, the study found that 81% of the junior investigators and 28% of the experienced investigators directed a subproject and/or pilot project during Years 1-6. The following factors were found to be most relevant to the centers' success in implementing research projects: (1) rigorous assessment of research progress; and (2) an emphasis on pilot projects.

All 18 centers established some type of program to mentor junior investigators that included recruiting experienced investigators to serve as mentors, however, there was considerable variation among the centers with respect to the importance they placed on mentoring. The average ratio of experienced investigators to junior investigators was 1.1 and 45% of the experienced investigators who were active in COBRE served as mentors. For the group as a whole, mentors could be identified for 81% of the 107 junior investigators who received substantial support during Years 1-3 and for 63% of all the junior investigators who participated in Years 1-6. A further examination of the 107 junior investigators found that their average percent effort on the COBRE grant during this period was 41%, with the percent of protected time ranging from 16% to 66% depending on the center. There was also substantial variation in the percent of junior investigators who received another important type of research support: a postdoctoral fellow in their laboratory. On average, 41% of the 107 junior investigators had at least one postdoc in their lab, with the percent ranging from 0% to 100%, depending on the center. The following factors were found to be most relevant to the centers' success in mentoring and supporting junior investigators: (1) careful selection of mentors; (2) formal mentoring program; (3) supportive environment with constructive feedback; (4) strong emphasis on career development; and (5) remuneration for mentors.

With respect to their external advisory committees, all of the COBREs were successful in recruiting a group of very experienced investigators to serve on their EAC but there was considerable variation in how closely they worked with the group. For example, the number of EAC meetings in Years 1-6 (including conference call meetings) ranged from 1 to 14, depending on the center, with a handful of program directors working very closely with their EAC members throughout the year. Although NCCR requested that EAC minutes be taken and included in the annual progress reports, the evaluation team was unable to find minutes for about 30% of the scheduled EAC meetings. Of those that did provide minutes, most centers provided short summaries although some provided extensive minutes that exceeded ten pages. The evaluation team concluded that nearly all of the EACs expressed considerable enthusiasm for their center, offered useful advice, and encouraged faculty development (primarily by assessing the progress of the junior investigators). Most EACs did not evaluate the center's progress in a rigorous and systematic way, although there were a few notable exceptions. The following factors were found to be most relevant to the centers' success in enhancing EAC involvement: (1) careful selection of EAC members; (2) fairly frequent communication between the EAC and COBRE leaders; and (3) major role given to EAC in assessing COBRE junior investigators.

Substantial evidence was found that the participating institutions were committed to enhancing their COBRE's research competitiveness. Eleven of the 18 centers were successful in creating new

permanent academic positions in COBRE departments (primarily tenure-track positions at the assistant professor level), and the overall average was fairly high (2.5 new positions per center). The number of senior administrators and experienced investigators serving on each center's internal advisory committee was also quite high (the overall average was 5.7), although there was substantial variation among the centers. Two-thirds of the centers were successful in leveraging their COBRE funds and research expertise to establish new doctoral degree programs (five PhD and two MD/PhD programs were launched). Several of the participating institutions designated their COBRE as a center of excellence and eight new multidisciplinary research centers were established at COBRE institutions. Nearly two-thirds of the COBRE institutions enhanced their center's research competitiveness by providing substantial amounts of their own funding to expand core facilities and equipment, hire additional researchers and technical staff, and/or offer improved startup packages to help with recruitment. Also, seven COBREs were successful in leveraging their COBRE funds to obtain strong state support for their centers. The following factors were found to be most relevant to the centers' success in enhancing state and institutional commitment to research: (1) fortuitous timing of the COBRE initiative; and (2) proactive outreach to senior administrators.

#### **Study Question 4: What were the characteristics of the COBRE junior investigators when they joined the program?**

The evaluation found that the 107 junior investigators who received substantial COBRE support during Years 1-3 had the following baseline characteristics, as shown in [Exhibits 11-18](#):

- There were considerably more males than females (72% vs. 28%).
- Most were PhDs (91%) + 5% MD/PhDs + 3% were MDs, and 1% were DVM/PhDs.
- The average time since completing their doctorate = 8.0 years. Nearly all (97%) had been postdoctoral fellows (average time since completing their postdoctoral training = 3.0 years), and 45% had some type of NRSA or K grant experience.
- 100% had published peer-reviewed articles since completing their doctorate (99% were first authors and 57% were senior authors). On average, they had published 13.0 articles (1.4 articles per year since completing their doctorate).
- 65% had applied for a PHS grant (30% had applied for an R01) since completing their doctorate and 42% had received a PHS grant (0% had received an R01).

#### **Study Question 5: How successful were the COBRE junior investigators in achieving the program's goals?**

The findings were very positive for the initial group of 107 junior investigators who received substantial COBRE support during Years 1-3. One-tailed paired *t*-tests and chi-square tests were conducted to assess whether, as a group, they improved their performance significantly after joining the program.<sup>1</sup> The results are shown in [Exhibits 19-24](#). With respect to publications, virtually all the junior investigators (99%) published at least one new peer-reviewed article in a scientific journal by Sept 2007. Specifically, 88% published at least one new senior-authored article, which was

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<sup>1</sup> The following convention is used to identify statistically significant results:  
\*\*\* indicates  $p < .001$ , \*\* indicates  $p < .01$ , and \* indicates  $p < .05$ .

significantly higher than the percent who were senior authors before joining COBRE.\*\*\* Their publication rates also improved significantly; their average number of articles increased from 1.4 to 2.0 per year\*\*\* and their average number of senior-authored articles increased from 0.1 to 0.8 per year.\*\*\* The study also found that fewer junior investigators published first-authored articles after joining the program, with the percentage dropping from 99% (pre-COBRE) to 60% (post-COBRE). This striking change in authorship patterns (from being a first author to being a last author) was one of the key findings of the evaluation. The junior investigators were also active in sharing their research findings through abstracts and presentations at major research conferences, averaging 1.4 abstracts per year and 1.2 presentations per year. With respect to abstracts, the study found that the junior investigators were much more likely to be co-authors than first authors, averaging only 0.2 first-authored abstracts per year.

A large majority of the junior investigators (88%) applied for a PHS grant after joining COBRE, significantly more than the pre-COBRE percent (65%).\*\*\* The types of grants they were seeking also changed, with a shift from NRSA fellowships to more competitive R-type grants. The percent applying for an R01 jumped dramatically from 30% to 80%.\*\*\* Also, a majority of the junior investigators (65%) succeeded in their quest for a PHS grant after joining the program, a significant increase over the pre-COBRE percent of 42%.\*\* Most importantly, their new awards were primarily R-type grants; the percent receiving an R01 jumped from 0% to 40%.\*\*\* In addition, 24% of the junior investigators received a large grant from a non-PHS funding source (e.g., NSF, USDA, DOE, AHA) and 36% received a smaller grant from a non-PHS source (e.g., foundation, private industry, state funds).

The junior investigators' *overall success* in achieving the program's goals was also assessed by using an algorithm to calculate a summary score for each individual (with scores ranging from 1 to 5), based on the person's grant success and peer-reviewed publications after joining the program. The evaluation found that a large majority of the junior investigators (83%) had achieved a reasonably high level of research success by Sept 2007, receiving a summary score of 3 or higher. Also, 79% had secured a tenured or tenure-track position. Only 7% had left research (at least temporarily). Of the 107 junior investigators who received substantial COBRE support during Years 1-3, 70% were still at their COBRE institution at the end of Year 6, and most were continuing to participate in the program. The 70% retention rate is quite good given the challenges of building a successful research career in an IDeA state. As a group, the initial group of junior investigators did exceptionally well in achieving the program's goals and the COBREs did an excellent job of retaining this group of investigators, particularly those who were R01 recipients; 43% of the junior investigators who stayed at their COBRE institution had received an R01 after joining COBRE, compared to 34% of those who left.

In addition to answering Study Question 5, additional analyses were conducted to see if "investigators with strong potential" could be identified from their baseline characteristics. These analyses were exploratory and a variety of statistical tests (Pearson correlations, *t*-tests, and multiple linear regression) were performed to assess which, if any, baseline characteristics were significantly related to the junior investigators' subsequent success in achieving the program's goals. Surprisingly, only one independent variable was found to be significantly related to subsequent success; junior investigators with at least one previous R01 application were more likely to have a higher summary score ( $p = .009$ ).\*\* A major finding was that a high proportion of the junior investigators who received substantial COBRE support during Years 1-3 were very successful in

achieving the program's goals regardless of their individual differences when they joined the program.

**Study Question 6: Did any COBREs experience positive or negative events over which they had no control?**

Several COBREs had to deal with unexpected challenges during their first six years. Two centers that experienced the premature death of a charismatic leader, and two other COBREs faced a major challenge when their respective PDs left in Year 2. Also, many centers experienced lengthy delays in the hiring of new personnel and construction/renovation of facilities. Although a few centers faced unanticipated state and/or institutional funding constraints which slowed their progress, other COBREs were fortunate to experience very positive events (e.g., the creation of a senior administrative position for overseeing research, the launching of an ambitious initiative to expand research and enlarge the faculty by over 100 positions; and the allocation of state funds to recruit 60 biomedical scientists and enhance the state's research infrastructure).

## **CONCLUSION AND RECOMMENDATIONS**

The findings that emerged from the present process evaluation illustrate how effective this exploratory program project grant program has been in strengthening the research infrastructure of institutions located in IDeA states. Although it is too early to assess how successful each center has been in developing the state-of-the-art facilities and critical mass of investigators needed for them to enhance their research competitiveness and become a center of excellence, the initial group has performed very well to date in achieving the program's process goals and many COBRE participants commented on how much they have benefited from the program.

The study found considerable variation among the 18 centers with respect to their baseline characteristics, their implementation of program activities, and the challenges they have faced in pursuing specific process goals. One of the most interesting findings was that the success of the centers was broad-based, with 13 of the 18 COBREs (nearly 75%) performing exceptionally well with respect to one or more of the six process goals. Instead of a few COBREs emerging as "super-stars", the evaluation found that a large proportion of the centers performed as "stars" in one area or another. Analyses were conducted to determine the centers that were most successful in achieving each goal and to identify factors relevant to their success. Several activities (strategies) emerged as "best practices" and are recommended for all COBRE centers. A major achievement was the centers' recruitment and retention of a cohort of junior investigators who have done exceptionally well. Their success is especially noteworthy given the current research grant environment and the challenges of building a successful research career in an IDeA state. The study's findings are expected to be helpful to NCCR administrators, COBRE program directors, and others interested in developing and evaluating multidisciplinary research center programs.

## SECTION 2: BACKGROUND

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The Centers of Biomedical Research Excellence (COBRE) program is a major initiative to establish multidisciplinary research centers in states with “historically low aggregate success rates” in obtaining NIH grants. The program was initiated in FY 2000 by the National Center for Research Resources (NCRR) as an expansion of the Institutional Development Award (IDeA) program, which was legislatively mandated under the NIH Revitalization Act of 1993 to broaden the geographic distribution of NIH research funds by (1) strengthening the infrastructure of institutions within states that traditionally have not received significant levels of NIH competitive funding, and (2) enhancing the research competitiveness of investigators and institutions in IDeA-eligible states.<sup>2</sup> From FY 1993 to FY 1999, total funding for the IDeA program grew from \$750,000 to \$10 million, which was used to help institutions plan for new programs, modernize their laboratories, and recruit more investigators. However, the awards rarely exceeded \$250,000 per year and the funding was not sufficient to have a major impact.

In FY 2000, a substantial increase in congressional funding (to \$38.5 million) permitted NCRR to expand the IDeA program to encourage IDeA states to develop COBRE centers within their universities, medical schools, and/or other nonprofit institutions. The COBRE awards, ranging from \$1 to \$2 million per year, were much larger than the previous IDeA awards. Nineteen centers received five-year COBRE awards in September 2000, followed by 10 centers in FY 2001 and 19 centers in FY 2002. These 48 centers were located in 34 different lead institutions, and each of the 24 IDeA states was successful in receiving at least one COBRE award. The five-year COBRE awards have been funded using the P20 mechanism (exploratory program project grants). Total NIH support for COBRE activities has increased from \$38.5 million in FY 2000 to \$145.1 in FY 2007.

The COBRE program is a comprehensive initiative designed to establish multidisciplinary biomedical or health research centers in IDeA states, with the scientific leadership at each center provided by an established investigator. Evidence of institutional commitment is required, although there is no matching funds requirement. Institutions receiving COBRE awards are expected to have a thematic area of scientific focus and to conduct 3 to 5 research projects in that area over a 3- to 5-year period, with each project supervised by a junior investigator. The institutions are also required to have a plan for mentoring the junior investigators and replacing them when they obtain their own

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<sup>2</sup> Eligibility for the IDeA initiative was initially limited to states participating in the National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCoR) and states that had received less than \$30 million in NIH grant funding in FY 1992. In subsequent years, the IDeA eligibility criteria were revised to include states that had experienced a relatively poor success rate over several years in competing for NIH grants (less than 20 percent of applications awarded). When COBRE was initiated in FY 2000, the following 23 states and Puerto Rico (hereafter referred to as 24 states) were eligible for COBRE funding: Alaska, Arkansas, Delaware, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Puerto Rico, Rhode Island, South Carolina, South Dakota, Vermont, West Virginia, and Wyoming.

research grants, working with an external advisory committee (EAC) to enhance scientific oversight. COBRE funds may also be used to establish and renovate core facilities and to provide startup packages for new faculty.

Because it is too early to assess the long-term impact of COBRE funding, the present evaluation was designed to document and analyze how the different centers implemented the major activities recommended by NCCR, to assess the extent to which specific process goals were achieved during the program's first six years, to identify the factors that seemed to be most relevant to the centers' success in achieving each goal, and to assess the success of the junior investigators who received substantial COBRE support during Years 1-3.

## SECTION 3:

# STUDY DESIGN AND METHODOLOGY

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The evaluation of the COBRE program was primarily a process evaluation aimed at determining the extent to which specific goals were achieved by the initial cohort of centers that received a COBRE award in Sept 2000. The final target population consisted of 18 centers; the two Wyoming centers were treated as one because they had shared some personnel and organized joint activities during this period. The study also examined the extent to which the junior investigators at these centers who received substantial COBRE support during Years 1-3 were successful by September 2007 in achieving a set of outcome goals relevant to their becoming independent investigators.

An overview of the 18 COBREs is presented in [Exhibit 1](#), which lists each center's program director (principal investigator), participating institutions, and research focus. [Exhibit 1](#) also shows a unique ID for each center based on the two-character abbreviation of the state in which the COBRE resides and the number of COBRE awards the state received in 2000 (e.g., AR1, KY1, KY2). The two Wyoming COBREs were identified as WY1/2 and treated as one center. These IDs are used throughout this report to identify each center.

The conceptual framework for the evaluation (shown in [Exhibit 2](#)) identifies seven baseline characteristics of the COBRE centers and six major program activities that were hypothesized to influence the subsequent success of the centers and their junior investigators in achieving the program's goals. NCCR contracted with Carlyn Consulting to design and conduct the evaluation. Marcia Carlyn, Ph.D. served as project director and Jane Manahan served as research analyst.

**Study questions.** The following six study questions were addressed:

1. What were the characteristics of the 18 COBREs when they joined the program?
2. How did the COBREs implement the major program activities recommended by NCCR?
3. How successful were the COBREs in achieving the process goals for centers?
4. What were the characteristics of the COBRE junior investigators when they joined the program?
5. How successful were the COBRE junior investigators in achieving specific program goals?
6. Did any of the COBREs experience positive or negative events over which they had no control? If so, how were they addressed?

To answer the study questions, information was needed with respect to two target populations:

- The centers that were awarded a COBRE grant in Sept 2000. Although there were 19 centers in the initial cohort, the final target population for the evaluation consisted of 18 centers because the two Wyoming COBREs were regarded as one center.

- The junior investigators at these centers who received substantial COBRE support during Years 1-3 (n =107). The target population was restricted to COBRE participants at the assistant/associate professor level who had never received an R01 or other major grant prior to joining COBRE and who received substantial support for at least one year during FY 2001-2003 (those who were recruited with a COBRE startup package, directed a COBRE subproject, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort for at least one year).

Most of the information needed to answer the study questions could be obtained from secondary data sources. Data were collected on each of the variables in the conceptual framework using a set of the operational definitions approved by NCCR (see [Appendix A](#)). The following strategies were employed:

- Analyzing the content of NCCR program documents, particularly COBRE grant applications, summary statements, and specific sections of the centers' annual progress reports (including the 2590 forms and the electronic APR supplements).
- Performing queries of two related NIH databases (CRISP and IMPAC II) to obtain information on the Public Health Service (PHS) grants awarded to COBRE center participants before they received COBRE funding (to assess their previous research experience). CRISP and IMPAC II were also used to obtain information on junior investigators' PHS grant applications and awards after they received COBRE funding.
- Performing searches of the PubMed database to obtain an unbiased count of the number of the research papers published by junior investigators in peer-reviewed journals before and after they received COBRE funding. Separate counts were calculated for first-authored, senior-authored (last-authored), and co-authored publications.
- Reviewing NCCR and COBRE websites.
- Obtaining additional information from other secondary data sources (e.g., NSF/NIH Survey of Graduate Students and Postdoctorates in Science and Engineering).
- Asking the COBRE program directors and junior investigators in the target populations to share their personal perspectives on the program and offer any recommendations they may have for improving it. Their responses were kept strictly confidential and followup telephone discussions were held as needed for clarification. In-person and telephone discussions were also held with NCCR administrators and program staff. Many of the respondents' comments have been included in this report; in a few cases, minor editing was performed for clarity and consistency.

Information on each variable in the conceptual framework was collected by the evaluation team in a standard way using instructions developed by the project director. Quantitative data were transferred to Excel spreadsheets and qualitative data were summarized on data collection coding sheets. Quality control measures were used to ensure that the information collected was as accurate and complete as possible. [Appendix B](#) provides technical notes on the procedures used to count scientific publications, categorize academic positions, and identify the COBREs that were most successful in achieving the process goals for centers.

After the data collection was completed, key information on the 18 centers was summarized in draft Center Snapshots and key information on each of the 107 junior investigators was summarized in

draft Junior Investigator Snapshots. The center directors and junior investigators were given an opportunity to review their respective snapshots, correct any errors, and suggest any additional information to be included. The revised snapshots were shared with NCCR administrators and the 18 Center Snapshots are presented in [Appendix C](#). Because the 107 Junior Investigator Snapshots contained personal information, they are not included in this report. However, a sample Junior Investigator Snapshot is presented in [Appendix D](#) to illustrate the type of information collected for each junior investigator who received substantial COBRE funding in Years 1-3.

Following data collection and verification, descriptive analyses and standard statistical techniques were employed to answer the study questions. The analyses included converting raw data to standard z-scores and performing *t*-tests, chi-square tests, Pearson correlations, and multiple linear regression analysis. Wherever possible, graphs and tables were used to summarize the results (see [Exhibits 5 - 24](#)).

## SECTION 4:

# EVALUATION FINDINGS

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The process evaluation of the COBRE program was based on a conceptual framework of specific center characteristics and program activities hypothesized to influence the achievement of program goals. Six study questions were addressed.

### Study Question 1: Baseline Characteristics of the COBRE Centers

*What were the characteristics of the 18 COBREs when they joined the program?*

- 1a. Number of participating institutions and departments*
- 1b. Affiliation with a medical school and/or health sciences center*
- 1c. Type of research to be pursued by the centers (basic, clinical, behavioral)*
- 1d. Existing facilities and resources supporting this type of research.*
- 1e. Research, administrative, and mentoring experience of the program directors*
- 1f. Previous research experience of the senior investigators and mentors*
- 1g. Number of graduate and postdoctoral students in scientific fields*

**1a. Number of participating institutions and departments.** The evaluation found that most of the COBREs structured their centers as collaborative partnerships involving a lead institution and at least one other organization (e.g., academic institution, research institute, health science center); the overall average was 2.1 institutions per center as summarized below:

- 5 COBREs involved only one institution.
- 8 COBREs involved 2 institutions.
- 3 COBREs involved 3 institutions.
- 2 COBREs (KS1 and OK2) involved 4 institutions.

The names of each COBRE's participating institutions are shown in [Exhibit 2](#).

To encourage multidisciplinary research, the COBREs enlisted researchers from several departments, with the lead institutions usually having the highest number of participating departments (the average was 3.5 departments per lead institution in Year 1, which increased to 5.0 over the next five years). Overall, the average was 4.8 departments per COBRE in Year 1, which increased to 7.3 departments over the next five years. Approximately two-thirds of the COBREs included both basic science and clinical departments, and one-third included only basic science departments. Of the 132 departments actively involved in these centers during Years 1-6, approximately one-third were clinical and the remainder were basic science departments. The specific departments associated with each COBRE are shown in the Center Snapshots (see [Appendix C](#)).

**1b. Affiliation with a medical school and/or health sciences center.** Fifteen of the 18 COBREs (83%) had a formal affiliation with at least one medical school and/or major medical center (see

**Exhibit 3).** Of the other three COBREs, two of them (MT1 and WY1) did not have a college of medicine (allopathic, osteopathic, or veterinary medicine) or medical center located in their respective states. They each participated in a regional medical education program (WWAMI) affiliated with the University of Washington, but the absence of an in-state medical school and/or major medical center reduced the likelihood of their conducting clinical studies. At the other end of the spectrum, two COBREs (OK1 and WV1) had two medical schools/centers among their participating institutions and one COBRE (OK2) had three medical schools/centers.

***1c. Type of research to be pursued by the centers (basic, clinical, behavioral).*** All of the 18 COBREs in this initial cohort were focused primarily on basic research, and a large majority of the centers (89%) included animal studies among their subprojects (see **Exhibit 4**). Seven COBREs (39%) proposed clinical research studies that required IRB approval and informed consent from human subjects, but none of these studies involved clinical trials. Specifically, five centers proposed research that required human serum and/or tissue to be collected, and three centers (KY2, VT1 and WV1) included studies that involved more direct patient contact. None of the COBREs were planning to pursue epidemiologic or behavioral research involving human subjects.

***1d. Existing facilities and resources supporting this type of research.*** All of the centers had a variety of research facilities, equipment, and related services available to COBRE participants at the start of Year 1, including facilities that were not directly funded by the COBRE grant but were relevant to the type of research they would be conducting. For example, all 18 COBREs had computing facilities and shared laboratories that were fully equipped to perform standard operations. Based on the information provided in their grant applications, a majority of the COBREs had the following resources at baseline:

- Microscopy (available at 94% of the centers), specifically fluorescent (71%), EM (59%), confocal (53%), TEM (35%), scanning electron microscopy (24%)
- Oligonucleotide/peptide synthesis, PCR, and/or DNA sequencing (88%)
- Animal facilities (89%), with five centers (28%) having transgenic facilities
- Image analysis (82%)
- Tissue culture (82%)
- Spectrophotometry (76%)
- Scintillation counter (71%)
- Flow cytometry, FACS (59%)
- Histology (53%)

Other existing resources that were mentioned included:

- Electrophoresis (47%)
- Mass spectrometry (47%)
- Chromatography, HPLC, FPLC (41%)
- NMR (35%)
- Genetic analysis (29%)
- Molecular modeling (18%)
- Electrophysiology (12%)
- X-ray crystallography (12%)
- Biochip analysis (6%).

Most of the COBREs also mentioned having access to a machine shop and medical library.

Although the centers had access to many shared facilities, most reported that their proposed research agenda required additional facilities and equipment. Some existing facilities were in need of renovation to increase productivity and make more efficient use of space, and additional state-of-the-art instrumentation was needed to encourage multidisciplinary collaborations and attract new faculty.

***Ie. Research, administrative, and mentoring experience of the program directors.*** The evaluation found that the program directors (who also served as the principal investigator for their COBRE grant) were very accomplished researchers with one exception (in this case, a plan was presented to recruit an experienced permanent director as soon as possible). Of the 19 initial PDs, 16 had received at least one R01 grant and their overall average was 5.1 R01s each. Two of the other three PDs had received equivalent large grants from other funding sources (e.g., NSF, HHMI) and the third was to serve as an interim director until an experienced researcher could be recruited. Overall, approximately half of the PDs had exceptionally strong research experience; many had chaired NIH study sections, served on editorial boards, received an NIH Merit Award, and received other awards from professional associations for their research accomplishments. Nearly all of the program directors (95%) had a PhD degree, one director (OK2) had an MD degree, and there were no MD/PhDs.

The study also found that a large proportion of the program directors (84%) had experience administering research programs, with half of this group having very strong administrative skills as evident by their experience serving in senior administrative positions (e.g., president of a research foundation, vice chair for research), directing large multi-center research programs, and/or leading program project grants. In fact, two COBRE PDs had recently been recruited by their respective COBRE institutions (ME1 and VT1) to develop a major research center. Only three of the 19 program directors had little previous administrative experience .

Regarding the mentoring experience of the program directors, an analysis of the COBRE grant applications and summary statements found that about half of the program directors emphasized their previous experience mentoring graduate students, postdoctoral fellows, and/or junior faculty and four of the 19 PDs had strong track records developing mentoring programs (KS1, KY1, KY2, and OK2). Of that group, only one program director (KY2) had served as the principal investigator of an NIH training grant.

***If. Previous research experience of the senior investigators and mentors.*** The evaluation found that, on average, each COBRE had 6.2 experienced investigators listed as key personnel at baseline and a high proportion of them (87%) had been awarded at least one R01 or equivalent research project grant from NIH or another organization prior to COBRE. Of those who were in mentorship roles, 94% had research project grant experience. A large proportion of the initial group of 111 experienced investigators (83%) had a PhD degree (with no clinical degree), 13% had an MD degree, and 4% had an MD/PhD. Half of the COBREs had at least one MD or MD/PhD in their initial group of experienced investigators and two centers (OK2 and RI1) had at least three with medical degrees. Specifically, nearly half of OK2's 11 experienced investigators and RI's 10 experienced investigators had an MD or MD/PhD. The percentages were similar for the subset of 58 mentors, with 83% having a PhD degree and no clinical degree.

***Ig. Number of graduate and postdoctoral students in scientific fields.*** The evaluation found that the COBREs had a median average of 916 graduate science students and 76 postdoctoral appointees in science and health fields at their participating institutions at the start of the COBRE program in 2000 (see [Exhibit 3](#)).<sup>3</sup> However, there was great variation among the 18 centers in both areas. The three COBREs with the largest number of graduate students (KS1, OK1, and OK2) each had access to over 2,000 grad students and NE1 had access to nearly 2,000 grad students from which they could recruit research assistants for COBRE subprojects. In contrast, the four COBREs with the least number of graduate students (SD1, VT1, ME1, and WY1/2) had access to only 435 grad students, on average. The variation was even greater with respect to postdoctoral fellows, with two COBREs (KS1 and KY2) having access to over 200 postdocs and five COBREs (NE1, OK1, OK2, KY1, and DE1) to between 100 and 200 postdocs. In contrast, three COBREs (NV1, SD1, and PR1) had 0, 4, and 7 postdocs, respectively, at their participating institutions in 2000.

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<sup>3</sup> National Science Foundation, Division of Science Resources Statistics, Graduate Students and Postdoctorates in Science and Engineering, Fall 2000. <http://www.nsf.gov/statistics/nsf02314/>

## Study Question 2: Implementation of Program Activities

*How did the COBREs implement the following major activities recommended by NCRR?*

- 2a. Providing scientific and administrative leadership to implement the center's overall research plan*
- 2b. Recruiting additional researchers and support staff*
- 2c. Selecting and supporting promising junior investigators and appropriate mentors*
- 2d. Establishing and enhancing core facilities and resources to support COBRE research projects*
- 2e. Working with an External Advisory Committee (EAC) to improve the center's effectiveness*
- 2f. Encouraging the active involvement of senior administrators.*

**2a. Providing scientific and administrative leadership to implement the center's overall research plan.** The evaluation found that a variety of strategies were used by the COBRE program directors and other senior investigators to promote high-quality science and manage the day-to-day needs of COBRE participants. To reduce the burden on the program director, several COBREs initially structured their administrative core to include an associate program director (AR1, ME1, NE1, NV1) and others added this position later to enhance program management (KS1, MT1, OK1, VT1). Three program directors also adjusted their COBRE budgets to give the program director more flexibility in offering incentives and adjusting to unforeseen events (OK1, OK2, VT1). Other strategies included the following:

- Identifying clear goals and benchmarks for tracking the progress of junior investigators and the center as a whole (KS1, NE1).
- Finding effective ways to communicate clearly to a broad range of participants by establishing a COBRE website in Year 1 and updating it on a regular basis
- Ensuring that all annual progress reports include a current organizational chart, EAC minutes, and the other information recommended by NCRR (KS1, WV1)
- Working closely with an internal advisory committee (IAC) as well as an EAC to ensure that the center's subprojects were complementary and its research agenda was compatible with the lead institution's strategic plan (DE1, MT1, NV1, OK1, RI1, WY1/2).
- Preparing summaries of issues raised by the IAC and EAC along with agreed-upon action items (KS1, MT1, NE1, RI1).
- Reaching out to researchers in other departments and other institutions in the state (including COBRE and INBRE administrators) and local pharmaceutical and biotechnology firms to develop mutually beneficial collaborations (ID1, KS1, WV1, ME1, MT1, OK2).
- Meeting with state legislators, senior administrators, industry leaders, trustees, and others to find ways to leverage COBRE funding to obtain additional support from the state, participating institutions, members of the business community, foundations, and/or private donors (AR1, ID1, KS1, KY1, KY2, ME1, MT1, NE1, VT1, WV1).

The most difficult unforeseen challenge was the loss of the program director or associate program director due to his/her unexpected death or departure from the institution, which was experienced by four COBREs (ME1, NV1, KY2, WY1/2). Transitioning to new leadership was not easy and it took time for them to get back on track. Other challenges included:

- Ensuring that COBRE subprojects were compatible with the center's research focus as well as the junior investigators' research interests.
- Integrating the new center into the existing academic structure/culture.
- Addressing interdepartmental conflicts resulting from the program director's decision to change departments.
- Coordinating a COBRE consortium that involved several universities that had different administrative requirements and numerous department chairs who had their own plans for hiring new faculty.
- Dealing with the lead institution's accounting software problems and excessive paperwork requirements, which required the program director to hire a full-time accounts manager to assist COBRE investigators.
- Resolving billing and intellectual property issues involving one of the COBRE cores.

In each case, it took a great deal of time for the program director and other COBRE participants to understand the underlying issues and see if a satisfactory solution could be found.

**2b. Recruiting additional researchers and support staff.** The evaluation found that a variety of strategies were used by the program directors and other COBRE participants to identify and recruit high-quality junior and senior investigators. Seven centers focused on recruiting only junior investigators (DE1, ID1, KY2, RI1, SD1, WV1, WY1/2) and the others actively recruited both junior and senior investigators. The evaluation found that there was substantial variation in the size of the startup packages offered by the different centers, with the largest being in the \$300K-\$400K range (AR1, NE1, OK2). The large startup packages received substantial funding from institutional and other sources since COBRE funds to recruit additional faculty were limited to \$100K per year during Years 1-6. Offering one- to two-year pilot project awards (ranging from \$8K-\$100K) was also used by several centers to encourage junior and senior faculty to gather preliminary data and pursue research in areas relevant to COBRE (DE1, ID1, KS1, NE1, OK1, OK2, RI1, SD1, WV1, WY1/2). Other common recruitment strategies included:

- Placing advertisements for junior and senior researchers in leading journals (AR1).
- Publishing a COBRE brochure and distributing it widely to other researchers in the field, with special emphasis on the center's state-of-the-art COBRE core facilities and equipment (ID1, KS1, WV1).
- Working with senior administrators to ensure that hiring decisions addressed their needs as well as those of the COBRE (KY2, ME1, MT1).

About one-third of the centers (DE1, NE1, NV1, OK1, PR1, SD1, WY1/2) experienced difficulties in recruiting the types of researchers they were seeking. In most cases this was because they were not able to offer as attractive a startup package as larger institutions, they were operating in a very competitive job market (e.g., neuroscience, virology), and/or they had difficulty adding new tenure-

track positions. Many of the centers also found it difficult to recruit graduate students and postdoctoral fellows for COBRE labs. To address this challenge, several PDs worked with senior administrators to increase the salary scale of postdocs (RI1, WV1) and offer graduate students higher stipends, scholarships, fellowships, and reduced tuition to work on COBRE projects (AR1, DE1, ID1). In one case (DE1), the COBRE was able to offer a full tuition waiver (\$35K) to graduate students. Innovative recruitment strategies for graduate students included the following:

- Awarding a pilot project to a faculty member at an undergraduate institution to recruit more graduate students to COBRE (SD1).
- Improving the COBRE website to help recruit graduate students and technicians as well as faculty (MT1).
- Offering summer fellowships to undergraduates to train in COBRE labs and encouraging them to continue their COBRE experience as graduate students or technicians (MT1).

**2c. *Selecting and supporting promising junior investigators and appropriate mentors.*** The evaluation found that 17 of the 18 COBREs offered their junior faculty an opportunity to serve as the principal investigator of a COBRE subproject. In most cases, they were encouraged to identify at least one senior investigator who would be willing to serve as their mentor if their proposal was approved. A different model was used by two centers (KY2 in Years 1-6 and RI1 in Years 1-5) where senior investigators directed the subprojects and served as mentors for the junior investigators who were selected to oversee different components of the project. Ten of the COBREs also allowed junior investigators to compete for smaller pilot project awards, again being encouraged to work with a mentor. Many mentors volunteered their time and others were compensated from the COBRE grant, usually at between 5 to 15 percent level of effort.

The strategies for selecting junior investigators for COBRE subprojects and pilot projects and for approving their mentors were generally not described in detail in the COBRE grant applications or annual progress reports. Only a few COBREs (DE1, ID1, KS1, OK1) apparently set up a formal process using external reviewers (EAC members or other established researchers). In one case (KS1), each project proposal was reviewed by two NIH-funded senior investigators outside Kansas who had expertise in the proposed research area and were given an honorarium. The written reviews were shared with the applicants as well as their mentors and department chairs. The EAC then rank-ordered the proposals and made the final selection decisions.

The evaluation found that there was a great deal of variation among the COBREs with respect to the amount of attention given to mentoring junior investigators. A few centers placed a high importance on mentoring from the start (OK2, VT1), but most of the others found that they needed to strengthen their mentoring program after two or three years. Strategies included being more careful in the selection of mentors to ensure that mentees' needs were met, recruiting external mentors when needed, clarifying the roles and responsibilities of mentors and mentees, requiring mentors to meet more frequently with mentees and participate in group meetings, expanding mentors' roles to focus on mentees' careers as well as their research skills, and emphasizing the importance of each mentee pursuing a field of inquiry that is independent of their mentor's research field. Several COBREs developed mentoring guidelines and/or held mentoring workshops to strengthen their mentoring programs (KS1, KY2, NE1, OK1, OK2, RI1, VT1, WV1). One center (OK2) paid for a psychological assessment of all its faculty to improve their skills as lab directors and promote the center's culture of mentoring. Although many new strategies were offered, some COBREs found it

challenging to persuade mentees on different campuses to travel to the lead institution to meet with their mentors, attend workshops, and participate in other COBRE activities (AR1, OK2). Five COBREs (NV1, OK1, OK2, RI1, WV1) encouraged their successful junior investigators who had ‘graduated’ from the program to mentor new junior investigators, which ensured their continued participation in COBRE activities.

In addition to mentoring, all 18 COBREs offered their junior investigators many opportunities to advance their research skills and careers. A majority held annual retreats or symposia with invited speakers which often included presentations by COBRE investigators. Most of the centers also brought their COBRE investigators together on a regular basis; a few groups met each week but most met on a monthly or bi-monthly basis to discuss the progress of their individual research projects, receive suggestions from the group, discuss grant proposal ideas, and address administrative issues (e.g., management of core facilities, budget issues). Other common strategies included sponsoring a monthly or bi-monthly seminar series with invited speakers, organizing journal clubs, and offering workshops on a variety of topics (e.g., grantsmanship, scientific writing, presentation skills, research ethics, lab management, career development, specific research issues). A few of the COBRE program directors (KY1, OK2) also met once or twice a year with individual junior investigators to discuss their research and review the progress that had been made. Innovative strategies for supporting junior investigators included the following:

- Encouraging junior investigators to establish contacts and collaborations with NIH staff and senior scientists at other institutions, to participate in NIH study sections, and to join academic committees relevant to research (ME1, MT1).
- Expanding the COBRE administrative core to include individuals with expertise in biostatistics, experimental design, and/or grants management to help junior investigators improve the design of their research studies and analyze their findings (KY1, KY2, VT1).
- Arranging for junior investigators to have their grant applications critiqued by one or two senior investigators before submission (KS1, ME1, MT1, OK1, VT1).
- Arranging rehearsals for junior investigators before they gave presentations at national conferences (OK2).
- Awarding travel funds to junior investigators to meet with NIH staff and/or be trained in other laboratories (SD1, WY1/2).
- Requiring COBRE participants to read preselected books on topics relevant to becoming an independent investigator (setting up a lab, grantwriting, and mentoring) (KS1, OK2, VT1).
- Encouraging junior investigators to attend a five-week ‘summer school’ program to improve their research skills (KS1).
- Developing a web-based database to track the progress of individual investigators (MT1).

Although the COBREs found many ways to support their junior investigators, a major challenge for several program directors was persuading department chairs to increase the amount of release time given to junior investigators to pursue research activities. Reducing their teaching loads and committee assignments was especially difficult when there was not strong support from senior administrators (NV1, WY1/2).

Approximately three-fourths of the COBREs (AR1, DE1, ID1, KS1, KY1, ME1, MT1, NE1, OK2, ME1, RI1, VT1, WV1, WY1/2) established a process for tracking the progress of their junior investigators, which generally included a timeline for achieving specific milestones (e.g., publications, presentations, grant applications, grant awards). In a few cases (DE1, MT1, RI1), specific criteria for ‘graduating’ junior investigators were also described. For example, one of the COBREs (DE1) introduced a ‘partial graduation’ program in Year 4 requiring junior investigators who were successful in receiving an external grant to use this funding to replace their COBRE-funded summer salary, allowing subproject funds to be allocated to new pilot projects. Another COBRE (RI1) established a simple graduation rule: ‘two R01s and you’re out.’

**2d. Establishing and enhancing core facilities and resources to support COBRE research projects.** The evaluation found that a variety of strategies were used by the program directors and other COBRE participants to expand their core facilities, equipment, and technical staff. The primary approach was to work with senior investigators and administrators at the lead institution and partner institutions as well as with community, state, and industry leaders to identify their research needs and find ways to work together to achieve mutual goals. COBRE funds were often able to be leveraged to obtain matching funds from other sources to enhance the research infrastructure. Most of the COBREs also submitted proposals for COBRE supplements and C06 construction grants to enhance their core facilities and equipment.

The following are examples of innovative strategies used by different COBREs to improve their core facilities and address specific challenges:

- Reorganizing core facilities to reduce costs, enhance instrumentation, and increase efficiency, which in one case involved dropping satellite cores at partner institutions (ME1, OK1).
- Holding a mini-grant competition to encourage more researchers to use the new cores (RI1).
- Evaluating each core facility on an annual basis by surveying users and reviewing usage, training, user charges, and repair records (AR1, MT1, RI1).
- Implementing a web-based system for scheduling the use of shared instruments (DE1).
- Holding an open house for potential users so they could see the facility first-hand and talk with the core director (RI1, WY1/2).
- Convening an advisory committee to resolve billing and intellectual property issues involving a core facility (KS1).
- Discontinuing technical services that could be conducted more efficiently by private firms (OK1).

Delays in the construction/renovation of facilities and hiring of new personnel were experienced by many COBREs, requiring budget adjustments and patience in dealing with overcrowded conditions (PR1, RI1, WV1). A major challenge for several program directors was persuading senior administrators to institutionalize new core facilities, cover maintenance charges, and create permanent positions with salary support for core facility directors. To help address these problems, several COBREs initiated user fees and developed charge-back procedures which usually included a separate pricing schedule for non-COBRE users (KS1, ME1, NE1, NV1, OK1, RI1, WY1/2). Program directors were also responsible for ensuring that core facilities were adequately staffed, that training courses were provided, and that the facilities were being used by a reasonable proportion of

COBRE investigators. Some PDs realized they needed to recruit core directors who were more experienced (OK1, SD1); others developed websites and other strategies to market core services to both COBRE and non-COBRE users (NV1, RI1). An unexpected problem faced by one center was the reluctance of the animal care staff to support the new transgenic animal core facility; the EAC was very concerned and urged senior administrators to commit more resources to the facility and require the staff to be appropriately trained (NV1).

**2e. Working with an EAC to improve the center's effectiveness.** All of the COBREs recruited an external advisory committee (EAC) comprised of accomplished senior scientists with expertise relevant to the research focus of the particular center. A large proportion of the EAC members were senior faculty at research intensive institutions in non-IDeA states. The evaluation found that the average COBRE recruited seven EAC members during Years 1-6 and 75% of them served on the committee for at least three years. In many cases, additional members were added during this period to reflect the center's evolving scientific needs.

Most of the COBREs held at least five in-person EAC meetings during Years 1-6 and approximately one-third also held EAC meetings via conference call. There was substantial variation among the COBREs with respect to the number of meetings (the range was from 1 to 14 EAC meetings per center). In-person meetings of the EAC were generally held once a year at the institution or at an annual research retreat (which usually included IAC members and other senior administrators). In most cases, the one- or two-day meetings included research presentations by the junior investigators which were critiqued by the EAC members, sometimes in great detail. In a few cases, the EAC met privately with individual junior investigators to provide them candid feedback (KS1, OK1, WV1). At least five EACs ended their meetings with an executive session to discuss their recommendations with the PD and co-PD (AR1, KS1, MT1, NE1, WY1/2). Several COBREs also held a shorter EAC meeting at an annual scientific conference (e.g., Society for Neuroscience).

In addition to critiquing the scientific progress of the COBREs, the EACs employed a variety of strategies to improve their center's effectiveness. Examples include the following:

- Reviewing subproject and pilot project proposals submitted by junior investigators (DE1, ID1, KS1, NE1, OK1).
- Mentoring one or more junior investigators (MT1, VT1, WV1, WY1/2).
- Recommending which junior investigators should 'graduate' from COBRE and/or be terminated, and helping the COBRE develop graduation criteria (MT1, NE1, OK2, RI1, VT1).
- Meeting separately with graduate students and postdocs to encourage them to attend major research conferences and access journals electronically (PR1).
- Answering specific questions posed by the program director on issues raised by the IAC (NE1).
- Providing advice on hiring decisions and core staffing (AR1, KS1, ME1, MT1, NE1, NV1, RI1, WV1)
- Setting annual goals for each core (NV1).

- Initiating occasional meetings with senior administrators at the institution to discuss serious problems they had identified and encourage the institution to take specific steps to enhance the center's research competitiveness (ME1, MT1, NV1, RI1).

**2f. Encouraging the active involvement of senior administrators.** Sixteen of the 18 COBREs also established an internal advisory committee (IAC) which served as a steering/executive committee to assist the program director in achieving the center's objectives. The study found that the IACs varied in size, with the number of members ranging between 3 and 7. Most of the IAC members were experienced investigators and/or senior administrators, although three COBREs (DE1, NV1, RI1) included at least one junior investigator on their IAC. In one case (RI1), COBRE mentors were required to serve on the committee.

One IAC (ME1) met monthly but most met quarterly or twice a year, and several met at least once each year with the EAC. Most of the IACs reviewed the progress of the junior investigators at least once a year, which sometimes included a session at which the junior investigators presented their research to the IAC and received feedback (KY1). Because most COBREs did not include in their progress reports the agendas or minutes of IAC meetings, it was not possible to determine all the topics that IAC members discussed. However, several centers reported that they discussed a broad range of issues, including unexpected problems that had arisen as well as ways to leverage COBRE funding to help the institution and state achieve long-term strategic goals involving biomedical research (KS1, NE1, KY2).

In addition to working with the IAC, many of the program directors were very proactive in reaching out to senior administrators and other stakeholders. Examples include the following:

- Holding regular meetings with other COBRE and/or INBRE program directors in the state (KS1, MT1).
- Holding discussions with the lead institution's Vice President for Research (or equivalent) and/or Board of Trustees to actively support the COBRE in becoming a center of excellence (NE1, WV1, WY1/2).
- Meeting regularly with deans and department chairs to discuss how to phase in new faculty hires so that research programs would be complementary, reduce teaching loads for junior investigators, ensure that publications remain a priority, plan for future program project and/or training grants, and encourage collaborations (KY2, MT1, NE1, OK2, WV1, WY1/2).
- Persuading a drug discovery firm to locate in a building adjacent to COBRE core facilities to enhance research collaborations (KS1).

Surprisingly, there was little mention in the COBRE annual progress reports of meetings between the program directors and senior administrators at the partner institutions, particularly the smaller institutions. Also, a majority of the multi-institution COBREs did not appear to have all of their partner institutions represented on their internal advisory committee.

### Study Question 3: Achievement of Process Goals for Centers

*How successful were the COBREs in achieving the following process goals for centers?*

- 3a. Successful recruitment of new research faculty, core directors, and EAC members*
- 3b. Expansion of core facilities and other resources to meet the needs of COBRE investigators*
- 3c. Successful implementation of 3-5 research projects in areas relevant to the center's scientific focus*
- 3d. Evidence that junior investigators are receiving adequate mentoring, protected time, and research support*
- 3e. Evidence that the EAC is offering useful advice, encouraging faculty development, and evaluating the center's progress*
- 3f. Evidence that the participating institutions are committed to enhancing the center's research competitiveness*

**3a. Successful recruitment and retention of new research faculty, core directors, and EAC members.** Several measures were used to assess the extent to which the 18 COBREs recruited and retained new research faculty (see [Exhibit 5](#)). The evaluation found that the COBREs as a group were very successful with respect to both recruitment and retention. A total of 86 new researchers were recruited from other institutions, 91% into tenured or tenure-track positions (or equivalent) and 9% into non-tenured research positions. As expected, most of them were junior investigators; 76% of the new recruits were hired as assistant professors, 15% as associate professors, and 9% as full professors. Looking at hiring patterns over the centers' first six years, it was found that the peak year for recruitment was Year 2 when 31% of the new researchers joined COBRE; Year 5 had the fewest recruits (only 8%).

Sixteen of the 18 COBREs were successful in recruiting one or more new research faculty during their first six years. The evaluation found that seven centers recruited only junior investigators and the other nine centers actively recruited both junior and senior investigators. The most ambitious recruitment program was conducted by MT1; 55% of the researchers who were active in its COBRE program during Years 1-6 were recruited from other institutions. WV1 and ME1 were also very successful in expanding their research faculty through external recruitment, with nearly 40% of their COBRE investigators coming from another institution. The evaluation also found that half of the centers used COBRE funds to offer competitive startup packages to promising candidates, and four centers (AR1, SD1, NE1, and OK2) hired most of their new researchers using COBRE recruitment packages.

Several program directors mentioned that the COBRE program played a major role in their recruitment of promising researchers. The following comments were typical:

*COBRE funding has made a huge impact on the quality of new investigators we can attract to our university.*

*I believe that without COBRE funding to offer as an enhancement to our recruitment package, we would not have been as competitive in hiring quality young scientists.*

*This program has allowed us to compete in an arena that is usually the purview of larger and more heavily funded universities and medical centers.*

The evaluation found that the average COBRE had 26 researchers participating in the program during Years 1-6. KS1 had by far the largest number of COBRE participants (N=61), about half of whom were experienced researchers and half were junior investigators. Five other centers (NE1, SD1, OK2, RI1, KY2) were also large, each with between 30 and 34 participants. The smallest programs were PR1 and ME1, with fewer than 15 participants each. The study found that of the 223 junior investigators who participated in COBRE during the centers' first six years, 107 received substantial COBRE support during Years 1-3 (they were recruited with a COBRE startup package, directed a COBRE subproject, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort for at least one year). An additional 116 junior investigators received some type of COBRE support during Years 1-6. The centers with the largest number of junior investigators in Years 1-3 were AR1, NE1, RI1, MT1, OK2, and WY1/2; each of these COBREs provided substantial support to between 8 and 9 junior investigators during this period.

Of the 223 junior investigators who participated in Years 1-6, the study found that 178 (80%) were still at their COBRE institution at the end of Year 6, nearly all of whom continued to participate in the program. The 80% retention rate is high, especially given the challenges of building a successful research career in an IDeA state. Six COBREs retained over 85% of their junior investigators (KY1, ME1, OK2, PR1, RI1, WV1). Of the 45 junior investigators who left their COBRE institution during Years 1-6, 31% had received an R01 after joining COBRE; of the 178 who did not leave, 29% had received an R01. These findings indicate that, as a group, the COBREs did an excellent job of retaining their junior investigators, including their R01 recipients. One PD explained how the COBRE program had helped with retention:

*By giving us the ability to enhance the research of local scientists who showed promise, the program allowed us to basically “grow our own” with the relative assurance that they could become nationally competitive for funding and that we would be able to keep those individuals in our state.*

The study also found that the COBREs were quite successful in recruiting and retaining skilled directors and staff for their shared facilities. Although it frequently took longer than expected to recruit core directors with appropriate experience, the centers persevered and nearly always succeeded in their quest. Approximately one-quarter (22%) of the 86 new recruits in Years 1-6 were hired to direct or co-direct a COBRE core facility. One of the most challenging problems, experienced by a few centers (ME1, KS1, WV1), was convincing senior administrators to support a full-time and/or tenure-track position for the director of a particular core facility.

As a group, the COBREs were also very successful in reaching out to experienced researchers with relevant expertise and recruiting them to serve on the center's external advisory committee. Two-thirds of the 18 centers had recruited at least three EAC members by the end of Year 1 and only three centers had not recruited any members by then. Altogether, 118 senior scientists served for one or more years on a COBRE external advisory committee during Years 1-6. The EAC retention rate was high for the group as a whole and 75% of the EAC members served on the committee for at least three years. The average COBRE recruited 6.6 EAC members during this period and the average tenure for an EAC member was 4.4 years.

In order to identify the COBREs that were most successful in recruiting and retaining research faculty, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Number of new COBRE hires.
- Number of junior investigators who received substantial COBRE support during Years 1-3.
- Number of other junior investigators who participated in COBRE during Years 1-6.
- Percent of junior investigators who left their COBRE institution during Years 1-6 (a lower percentage was viewed as being better) .

To compare the centers' *overall performance* in this area, an average z-score was calculated for each center (as described in [Appendix B](#)). The results (shown in [Exhibit 5](#)) indicate that the following COBREs were most successful in recruiting and retaining research faculty: KS1, MT1, RI1, AR1, and OK2. Further analyses revealed that the following factors were relevant to their success:

- Strong state support for research. Examples include the Kansas Economic Growth Act, which allocated \$500 million over ten years to recruit 60 bioscientists and enhance the research infrastructure (KS1) and the \$1 million allocated by Montana's legislature to fund startup packages for researchers (MT1).
- Strong institutional support. AR1's \$250-\$300K startup packages, OK2's \$250K startup packages, and KS1's competitive First Award program (offering investigators \$100K to pursue pilot projects) played a major role in their recruitment of high-quality faculty.
- Proactive outreach to senior administrators. For example, MT1's program director worked closely with deans and department chairs (who served on their IAC) to hire new faculty who would ensure that hiring decisions addressed departmental needs as well as those of the COBRE. AR1's EAC members played an active role in identifying and recruiting new researchers, contacting their colleagues and other researchers at major universities and reviewing the applicants' CVs.
- Effective use of websites and other outreach strategies. KS1 developed and distributed an 8-page brochure describing their center, MT1 used their COBRE website to help recruit graduate students and technicians as well as research faculty, and several COBREs (including AR1 and NE1) ran ads in major scientific journals to help with recruitment.
- Enhancement of core facilities and resources. RI1 and AR1 found that their new cores, staffed by skilled facility directors and technicians, were very helpful in recruiting high-quality faculty.
- Encouragement of COBRE graduates to mentor new junior investigators. OK2 and RI1 used this strategy to help retain their junior investigators and keep them involved in COBRE activities.

**3b. Expansion of core facilities to meet the needs of COBRE investigators.** Several measures were used to assess the extent to which the COBREs enhanced their core facilities, research equipment, and related resources (see [Exhibit 6](#)). The evaluation found that nearly all of the COBREs were very successful in this area. Eleven of the 18 centers developed new shared facilities, with a total of 21 new cores created by these 11 centers. Three centers (RI1, WV1, and WY1/2) were exceptionally

proactive in this area, with each developing three new cores. In addition, 16 of the 18 centers purchased major state-of-the-art equipment for their new and/or existing COBRE cores; a total of 39 core facilities were enhanced significantly (an average of 2.1 cores per center). In addition to using their COBRE funds to expand their core facilities, six centers (AR1, KS1, MT1, OK2, RI1, VT1) were successful in receiving a C06 construction grant from NCRN to build new facilities and/or undertake major renovations for their COBRE researchers, and one center (NE1) received two C06 grants for this purpose. Also, 14 of the 18 centers were successful in receiving a COBRE supplement to expand their research space; most of them received one supplement but RI1 received two and KY1 and VT1 each received three supplements.

Examining the types of new and expanded facilities, the evaluation found that microscopy and transgenic animal facilities were targeted by the most centers. Three centers (ID1, WV1, WY1/2) created new microscopy facilities and three centers (KY1, NE1, RI1) significantly expanded their existing microscopy cores. In addition, three centers (NV1, RI1, WV1) developed new transgenic animal facilities and three centers (ME1, OK2, VT1) significantly expanded their existing transgenic cores. Notable new cores included the following:

- Targeted and Transgenic Animal Core (NV1), the only facility of its type in the state.
- NMR Spectroscopy Core (AR1), which included several spectrometers ranging from 300-700 MHz.
- High Throughput Screening Lab (KS1), one of the only academic HTS laboratories in the nation.

Most of the COBREs expanded their research space significantly during their first six years by constructing new buildings dedicated to research and/or renovating existing buildings and laboratories. Four centers (AR1, DE1, ME1, VT1) moved into new buildings that were being completed near the start of the COBRE grant, and two centers (SD1, WV1) moved into new or expanded buildings near the end of Year 6. Three other centers (MT1, NE1, NV1) obtained funding for new research buildings that were not completed during their first six years. In addition to new construction, eight centers expanded their research space through renovations, with the largest projects being undertaken by RI1 (105,000 sq ft expansion), KY1 (10,600 sq ft), and KS1 (6,500 sq ft).

Comments from the junior investigators and program directors emphasized the importance of the core facilities. Examples include the following:

*The establishment of the core facilities by our COBRE has definitely facilitated the research efforts of junior and senior investigators.*

*The development of COBRE cores has been essential for the quality of the research done at this university.*

*The COBRE infrastructure has clearly helped senior investigators at our institution get R01s.*

*We have achieved significant progress in core facility infrastructure that would have been impossible without COBRE support. I cannot emphasize enough what an important program this has been to me and the members of my institution.*

To identify the COBREs that were most successful in expanding their core facilities, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Number of COBRE cores during Years 1-6.
- Number of COBRE supplements funded.
- Number of construction (C06) grants funded that were relevant to the COBRE.
- Amount of emphasis given to enhancing core facilities.
- Amount of emphasis given to expanding research space.

To compare the centers' overall performance in this area, an average z-score was calculated for each center. The results (shown in [Exhibit 6](#)) indicate that the following COBREs were most successful in expanding their core facilities: RI1, AR1, KY1, and NE1. Further analyses revealed that the following factors were very relevant to their success:

- Strong state support for research. A good example is the importance that Nebraska placed on creating a center of research excellence in virology as part of its statewide strategic plan, which required major infrastructure improvements (NE1). Another example is the Arkansas legislature's decision to contribute \$2 million in matching funds to renovate the chemistry building (AR1).
- Strong institutional support. For example, the decision by Brown University (RI1) to create two new research centers was in keeping with the institution's strategic plan, and the medical school agreed to cover most of the cost of renovating the Transgenic Core and a substantial portion of the operating costs of several cores. Similarly, the University of Arkansas (AR1) provided nearly \$1 million to support renovations, the cost of new NMR and crystallography equipment, and salary support for core technical staff. The University of Louisville's commitment to creating a new multidisciplinary research center was at the heart of its decision to undergo major renovations to bring COBRE researchers closer together and encourage research collaborations. The University of Nebraska (NE1) also emphasized multidisciplinary research and contributed nearly \$1 million to enhance its core facilities to address the lack of adequate space.
- Active involvement of senior administrators. For example, NE1's program director and two co-program directors worked closely with the new vice chancellor for research (a virologist) and other senior administrators serving on the IAC to discuss ways to expand research space and enhance core facilities. RI1's program director worked closely with the new university president, the dean of the Division of Medicine and Biological Sciences, and other senior administrators to obtain their support for expanding COBRE facilities.
- Effective monitoring of core facilities. AR1 conducted a comprehensive evaluation of its COBRE cores each year, examining their usage, training programs, and associated costs and user charges. RI1 also conducted formal reviews of each of its cores, held mini-grant competitions to encourage the use of the center's new core facilities, and developed a website describing the mission, research services, and user fees for one of its cores.

**3c. Successful implementation of 3-5 research projects in areas relevant to the center's scientific focus.** Several measures were used to assess the extent to which the 18 centers were successful in implementing COBRE subprojects (see [Exhibit 7](#)); the evaluation found that all of the centers met this goal and all but one implemented more than five subprojects during their first six years. There was substantial variation among the centers, with the number of subprojects ranging from 4 to 20; the average number of subprojects per COBRE was 10.9, which was much higher than expected. Interestingly, the study also found that the average number of subprojects per junior investigator was exactly 1.0 (one subproject per junior investigator). In most cases, the subprojects were directed by a junior investigator, but there were a couple of exceptions. In two cases (KY2 and RI1), senior investigators were listed as the subproject PIs with the understanding that they would mentor a team of junior investigators who each served as the lead investigator on a particular substudy. On average, 57% of the junior investigators and 19% of the experienced investigators directed a subproject during Years 1-6. Looking only at the junior investigators who received substantial COBRE support during Years 1-3, a higher percentage (77%) directed at least one subproject and 14% directed two subprojects.

In addition to subprojects, 11 centers used their COBRE funding to offer one- to two-year pilot project awards (ranging from \$8-\$100K) to assist faculty in gathering preliminary data in preparation for a larger subproject. Pilot projects were awarded to junior investigators at 10 centers and to senior investigators at eight centers (seven centers awarded pilot projects to both junior and senior investigators). On average, 32% of the junior investigators and 10% of the experienced investigators directed a pilot project. Looking at both subprojects and pilot projects, the study found that 81% of the junior investigators and 28% of the experienced investigators directed a subproject and/or pilot project during Years 1-6.

Many junior investigators commented on how much they have benefited from the COBRE subproject and/or pilot project awards. Examples include the following:

*I feel fortunate to serve as a participant in the COBRE program. It is difficult to obtain funding without preliminary data and it is difficult to obtain preliminary data without funding. COBRE funding has allowed me to obtain the type of preliminary data that will allow me to compete for other funding sources.*

*The COBRE program had an immense impact on my scientific career and helped me bring a number of critical technologies into my lab. The results generated from these studies are the foundation for my current and future grant proposals.*

*COBRE has allowed me to develop a maintainable research infrastructure in my lab that has permitted me to graduate 4 students plus several undergraduate students. It has also given me the time to develop better research proposals.*

*COBRE funding resulted in a marked increase in my research productivity.*

*I have benefited tremendously from the program. It has allowed me to obtain my first R01 and, as importantly, allowed me to explore a new area of research that I was interested in but could not explore without significant preliminary data. I would say that the COBRE program has been and still is critical to my scientific and career development.*

*The COBRE award was instrumental in helping me generate the data needed to be competitive for R01 funding. There is no question in my mind that the COBRE grant mechanism has been the best thing to help junior investigators that the NIH has ever done.*

*An important aspect of COBRE funding was that it was in a sufficient amount and for a sufficient duration to allow me to focus on the work rather than focusing on obtaining money to do the work.*

*The COBRE grant provided one year of seed funding for my lab. This funding was very helpful in obtaining preliminary data that was used in obtaining an R01 grant.*

*COBRE funding supported the remodeling of my laboratory and provided the appropriate infrastructure for conducting competitive research.*

One junior investigator was concerned about the process used to select the awardees for subprojects and pilot projects at this institution:

*Although it is clear that COBRE made a big difference for new investigators, I thought the process for deciding who was selected to receive different levels of COBRE funding was really opaque, including why established investigators were being funded.*

Although the COBRE funding was clearly helpful to the junior investigators who received it, several participants were concerned about the decline of NIH funding, the increasing age of R01 recipients, and the fact that it is becoming more difficult for new investigators to be successful in their quest for an R01. The following comments were typical:

*Our junior investigators have hesitated to submit NIH grants because they fear the three-strikes-and-you're-out process and because they don't need the money. They have five years of substantial COBRE support (unless they are unproductive) and there is little incentive for them to submit grants until they have to.*

*The best science is often surprising and unexpected, but the NIH peer-review culture has devolved from this ideal to the point where NIH no longer funds research, it funds development. The grant proposals that score well are at least two-thirds completed already. ...Some attempts have been made to fold innovation into the scoring system which I understand have had mixed success, but with tight budgets, review panels have reverted to a more conservative culture. The IDeA programs have been very helpful but they do not address the crux of the issue, which is that a grant has to be two-thirds done to make it through the NIH peer-review system.*

To identify the COBREs that were most successful in implementing research projects, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Total number of subprojects during Years 1-6.
- Ratio of subprojects to junior investigators.
- Percent of junior investigators directing a subproject or pilot project.
- Percent of experienced investigators directing a pilot project.

To compare the centers' overall performance in this area, an average z-score was calculated for each center. The results (shown in [Exhibit 7](#)) indicate that the following COBREs were most successful in implementing research projects: ME1, AR1, SD1, and WY1/2. Further analyses revealed that the following factors were very relevant to their success:

- Rigorous assessment of research progress. A good example is ME1 which required subproject directors to submit monthly progress reports in a standard format which were reviewed by senior investigators; all COBRE investigators met monthly to discuss new research findings and issues affecting their progress, and minutes were kept of these operational meetings. ME1's EAC was also very active in assessing research progress; its members received a packet of materials relevant to each subproject a month before the center's two-day annual retreat, which allowed them to give the junior investigators detailed feedback on their research. In the case of AR1, each subproject director was required to submit an annual progress report in a standard format which was evaluated by the PD, co-PD and EAC to determine if the project should receive continued funding, and if so, whether there should be changes in the management, scope, or goals of the project. WY1/2 also set specific milestones for assessing the progress of the subproject directors and evaluating their progress. The members of the new EAC appointed by WY1/2 in Year 3 also played a very active role in tracking the junior investigators' progress.
- Emphasis on pilot projects. Throughout its first six years, SD1 awarded \$8-15K pilot projects to enable junior investigators to gather preliminary data for future subprojects, to encourage senior investigators to pursue research relevant to the center's scientific focus, and to encourage collaborations. Pilot projects were selected each year following a competitive review by the PD and subproject directors; after a year of funding, a progress report was required from each investigator who received a pilot project award. During Years 1-6, 87% of SD1's junior investigators directed a pilot project and the center's Pilot Research Project Program was determined to be one of its most successful faculty development programs. OK2's starter grant program was also very successful and was expanded in Year 6.

**3d. Evidence that junior investigators are receiving adequate mentoring, protected time, and research support.** Several measures were used to assess the extent to which the junior investigators were mentored and supported during their participation in COBRE (see [Exhibit 8](#)). The evaluation found that all 18 centers established some type of mentoring program during their first six years and recruited experienced investigators to serve as mentors (in a few cases using external mentors from other institutions). However, the study also found that there was considerable variation among the centers with respect to the importance they placed on mentoring. On average, 45% of the experienced investigators who were active in COBRE served as mentors, with the percentage ranging from 0% to 86%, depending on the center. The average ratio of experienced investigators to junior investigators was 1.1, with the ratio ranging from 0.4 to 2.1. Of the 107 junior investigators who received substantial support during Years 1-3, the percent with assigned mentors (including external mentors) ranged from 13% to 100% depending on the center. For the group as a whole, mentors could be identified for 81% of the 107 junior investigators who received substantial support during Years 1-3 and for 63% of all the junior investigators who participated in Years 1-6.

The junior investigators' comments about their mentoring experiences were generally very positive, although there were some exceptions. Examples include the following:

*I think the COBRE program is absolutely fantastic. Its focus on the development of PIs has been perfect for me. My interactions with mentors have been quite helpful and bringing in outside experts has been a great benefit.*

*The mentoring I have received has been invaluable. This has come not only from my "mentor" on paper, but from people at all levels within the group. Without their help and input, I am not sure that I would have been able to be successful.*

*Being involved in COBRE was an extremely positive career changing event. The mentoring I received was a direct benefit and the day-to-day interaction with other members of the COBRE was also extremely positive.*

*Having a mentor was a definite plus at that stage of my career.*

*My only suggestion would be to enhance the mentoring with respect to manuscript writing and submission and provide advanced grantwriting tools.*

*I do not feel I had more "mentoring" than if I had not been in the COBRE program. In both cases, mentoring is usually viewed by senior investigators as, "I will read your grant proposal but I am really busy."*

*As the structure of the COBRE program changed over time, our established PIs were assumed to be simply mentors receiving no funding (which killed their incentive to help). These changes disrupted any consisting mentoring. ... Moreover, during the great decline in NIH funding, mentors went scrambling to preserve their own programs.*

Several junior investigators also mentioned how helpful the COBRE program had been in encouraging collaborations with researchers in other disciplines:

*I have found COBRE to be very important from the perspective of building a collaborative environment on our campus among senior and junior investigators.*

*The program has allowed me to interact with another research center at our university and, with their help, develop my scientific interests in this area.*

*The COBRE award system has helped fuel collaborations that would not have otherwise taken place.*

*Although my university is not yet a high profile research institution, COBRE support has allowed me to bring in eminent researchers of significant benefit to our department and potentially establish collaborative projects with these scientists.*

A further examination of the 107 junior investigators found that their average percent effort on the COBRE grant during this period was 41%, with the percent of protected time ranging from 16% to 66% depending on the center. There was also substantial variation in the percent of junior investigators who received another important type of research support: a postdoctoral fellow in their laboratory. On average, 41% of the 107 junior investigators had at least one postdoc in their lab (100% at DE1). Two centers (PR1 and RI1) did not provide postdoctoral support to any of their COBRE junior investigators.

One junior investigator emphasized the importance of a supportive environment to new investigators:

*I have concerns about COBRE because the program in which I participated failed to provide the necessary independent research support to allow an individual to hire technical assistance and step out of the role of supporting one of the institution's lead investigators. I found that I was an absolutely essential collaborator until I decided to be truly independent and leave. Nevertheless, I think the program has significant merit. I gained experience, insight, and a better position, so I can't complain.*

To identify the COBREs that were most successful in mentoring and supporting junior investigators, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Percent of junior investigators who were mentored during Years 1-6.
- Percent of experienced investigators who served as mentors.
- Ratio of experienced investigators to junior investigators.
- Average percent effort spent on COBRE subprojects by the junior investigators who received substantial COBRE support during Years 1-3.
- Percent of these junior investigators who had at least one postdoctoral fellow in their laboratory.

To compare the centers' overall performance in this area, an average  $z$ -score was calculated for each center. The results (shown in [Exhibit 8](#)) indicate that the following COBREs were most successful in mentoring and supporting junior investigators: VT1, OK2, and OK1. Further analyses revealed that the following factors were very relevant to their success:

- Careful selection of mentors. VT1's PD and co-PD reviewed each proposed mentor-mentee match to help ensure that the individuals would be compatible. At OK2, the VP of Research assigned a faculty mentor to every new hire after discussions with the program head, a strategy that the EAC concluded led to an excellent pairing of mentors and mentees. At OK1, the junior investigators were responsible for selecting their mentors but they could ask the PD or co-PD for recommendations if needed. Although research commonalities were clearly important, OK1 found that selections based on personal compatibility and respect were more likely to lead to productive mentoring interactions.
- Formal mentoring program. VT1 provides an excellent example of a structured program; their mentoring program included clear goals, written guidelines for mentors and mentees delineating their respective responsibilities and the frequency of mentor-mentee meetings, oral and written evaluations of mentors and mentees to assess their progress, oversight of mentors provided by a scientific advisory committee, and written policies for resolving problems that may arise between mentors and mentees. VT1's guidelines required both mentors and mentees to attend a workshop and read a guide on mentoring, and mentors were responsible for ensuring that mentees' research time was protected. OK1 also had a similarly detailed mentoring plan that required mentors to meet at least once a month with their mentees (weekly initially), participate in bimonthly group meetings of the COBRE investigators, and attend the center's annual research retreat held with the EAC. In the case of OK2, although the center did not develop written guidelines for mentors and mentees until

Year 6, it cultivated a culture of mentoring since its inception and expected all research faculty to participate in mentoring activities.

- Supportive environment with constructive feedback. VT1 arranged for its junior investigators to participate in a range of research-related meetings, including weekly laboratory meetings (informal discussions with their lab team), weekly research-in-progress seminars at which new ideas were presented and critiqued, and annual retreats at which they presented their findings in a formal format. Also, the junior investigators' research proposals were critiqued first by their mentors and later by other COBRE investigators. OK2 held two three-day scientific retreats each year where faculty presented their latest work to one another and had it critiqued in a collegial atmosphere. OK2 also sponsored "presentation sessions" prior to national conferences at which junior investigators presented their research orally to a COBRE "mentor pool" for the purpose of improving the clarity of the presentation. OK2's President and VP of Research also held a two-hour meeting each year with every faculty member (including the junior investigators) to discuss their research, with a followup meeting six months later if needed. In addition, OK2's EAC held 20-minute feedback sessions each year with individual junior investigators and their mentors. OK1's mentoring program included one-on-one meetings between mentors and mentees, bi-monthly group meetings, and an annual research retreat at which the EAC members met privately with each junior investigator, providing them with a written critique of their progress and recommending new approaches (if needed), possible funding strategies, and specific milestones for tracking their future progress. OK1 also held mock study section review sessions for investigators who were writing their first grant application to provide them valuable feedback and strip away the mystery of the grant review process.
- Strong emphasis on career development. VT1 offered their junior investigators several courses and workshops to help them develop specific career-related skills; topics included grant writing, scientific writing, ethics, and academic survival skills. Also, an individual development plan was formulated for their faculty members to help them navigate a successful career as a research scientist. OK2 provided a broad range of seminars relevant to career development, with topics including grantsmanship, budgeting for a lab, purchasing, team building, hiring and firing, selecting scientific meetings, and responding to grant critiques.
- Remuneration for mentors. OK1 mentors were given an annual stipend of \$5K to compensate for the additional time and responsibilities expected of mentors. Similarly, many of VT1's mentors received 10% salary support for serving in this role. OK2 used an innovative approach, distributing COBRE funds in such a way that each mentor-mentee dyad received a single budget to allocate as they wished (with approval by the PD), which sometimes included salary support for the mentor.

**3e. Evidence that the EAC is offering useful advice, encouraging faculty development, and evaluating the center's progress.** Several measures were used to assess the extent of EAC involvement (see [Exhibit 9](#)). The evaluation found that all of the COBREs were successful in recruiting a group of very experienced investigators to serve on their external advisory committee, however there was considerable variation in how often the different COBREs met with their EACs. For example, the number of EAC meetings (including conference call meetings) ranged from 1 to 14 depending on the center, and the average COBRE held six EAC meetings during Years 1-6. MT1 and KS1 held the most EAC meetings, averaging at least two per year. A handful of program

directors worked very closely with their EAC members throughout the year, seeking their advice as problems arose (ME1, MT1, NE1, NV1, RI1), and many of the EACs were actively involved in discussing and reviewing the COBRE's renewal application.

Although NCRR requested that EAC minutes be taken and included in the annual progress reports, some COBREs were more rigorous than others with respect to minutes. The evaluation team was unable to find minutes for about 30% of the scheduled EAC meetings. There was also substantial variation among the COBREs in the amount of detail provided in the minutes, with most EACs providing short summaries and others providing extensive minutes that exceeded ten pages (KS1, MT1, NE1). In the case of KS1, EAC members spent two hours over lunch on the last day of each EAC meeting summarizing their recommendations in the form of a written report to the program director. Based on the information provided in progress reports and EAC minutes, the evaluation team concluded that nearly all of the EACs expressed considerable enthusiasm for their center, offered useful advice, and encouraged faculty development (primarily by assessing the progress of the junior investigators). Most EACs did not evaluate the center's progress in a rigorous and systematic way, although there were a few notable exceptions (KS1, MT1, NE1, NV1).

Several junior investigators mentioned how much they appreciated their EAC's advice and some offered suggestions involving the EAC. Examples include the following:

*Another crucial aspect of the COBRE grant was the amazing support and guidance we received from the distinguished members of our external advisory committee. We were very fortunate to have leaders in the field who served as mentors and later colleagues.*

*We had an extremely good EAC. Although they did not fulfill some of the paperwork requirements in a timely manner, the guidance I received from one-on-one interactions was extremely beneficial.*

*One part of the program that was a bit of a challenge was communicating all of the pertinent information to the EAC within a limited amount of time. Given the time limits and the amount of activity during their site visits, I think it was easy for the EAC to develop a slightly inaccurate picture of the projects. It might make sense to rely more on our written progress reports.*

One program director emphasized the importance of a supportive administration:

*The success of individual COBRE programs depends on the cooperation of the institutional administration. Having an EAC is useful, but if administrators will not support steps to further COBRE development, we (and the EAC) have no leverage.*

To identify the COBREs that were most successful in enhancing EAC involvement, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Percent of EAC members who served for three or more years during Years 1-6.
- Number of EAC meetings during this period.
- Number of EAC meetings for which minutes or notes were prepared.
- Evidence of the EAC's enthusiasm for the center.

To compare the centers' *overall* performance in this area, an average *z*-score was calculated for each center. The results (shown in [Exhibit 9](#)) indicate that the following COBREs had the highest EAC involvement: KS1, MT1, and NE1. Further analyses revealed that the following factors were very relevant to their success:

- Careful selection of EAC members. The evaluation found that the external advisory committees of these three COBREs (KS1, MT1, and NE1) were composed of senior scientists with expertise highly pertinent to the goals of the particular center. In the case of MT1, the EAC members' experience with programmatic development was also appreciated by the study section that reviewed their renewal application. The members' expertise was frequently tapped by the MT1 program director; for example, one EAC member helped set up their BioSpectroscopy Core and another member helped to improve their mentoring program.
- Fairly frequent communication between the EAC and COBRE leaders. For example, KS1's EAC met three times a year, twice by conference call and once on campus for a two-day meeting that included a tour of the facilities and a special session with the PD, co-PD, and IAC. The last two hours of the meeting (over lunch) were used by the members to discuss their recommendations and compose a written report. After receiving the EAC report, KS1's program director responded quickly (in writing) to each of their recommendations. MT1's EAC met twice a year, once at a national conference and once at their two-day statewide neuroscience retreat, ending with a private session with the PD. Between meetings, the PD kept in close contact with EAC members by phone and email and made several visits to EAC members' institutions. In turn, the EAC helped the PD with strategic planning, in one instance communicating directly with senior administrators (a dean and department chair) to help keep a promising junior investigator from leaving the institution. NE1's program director enhanced communication by forwarding the center's IAC reports to the EAC along with specific questions to get their advice. The EAC members, in turn, communicated their recommendations in comprehensive reports to the COBRE PD and senior administrators.
- Major role given to EAC in assessing COBRE junior investigators. For example, KS1's EAC reviewed and selected the awardees for COBRE subprojects and pilot projects. Similarly, the MT1 EAC reviewed the curriculum vitae of potential recruits, examined the summary statements the junior investigators received in response to their grant proposals, and recommended which junior investigators should 'graduate' from COBRE and/or be terminated.

**3f. Evidence that the participating institutions are committed to enhancing the center's research competitiveness.** Several measures were used to assess the extent to which the 18 COBREs were successful in obtaining institutional support to enhance their research competitiveness during their first six years (see [Exhibit 10](#)). The evaluation found that 11 of the 18 centers (61%) were successful in creating new permanent academic positions in COBRE departments (primarily tenure-track or equivalent positions at the assistant professor level). The number of new permanent positions ranged from 0 to 6, depending on the center, and the overall average was fairly high (2.5 new positions per center); the most successful centers in this area were RI1, WV1, AR1, and ME1, with each establishing at least five new positions.

The number of senior administrators and experienced investigators serving on each center's internal advisory committee was also quite high (the overall average was 5.7), although there was substantial

variation among the centers. Two centers apparently had no such individuals on their IAC and two other centers (KS1, NE1) had at least 10 senior administrators and experienced investigators serving in this important role.

Two-thirds of the centers were successful in leveraging their COBRE funds and research expertise to establish (or at least launch) one or more new doctoral degree programs, including the following:

- The Maine Medical Center Research Institute (ME1) created a new graduate school (PhD program) in functional genomics;
- The University of Montana (MT1) and Montana State University launched a new PhD program in neuroscience;
- West Virginia University (WV1) also established a PhD program in neuroscience;
- The University of South Dakota (SD1) established an MD/PhD program to expand research in basic biomedical sciences and created a psychiatry residency program with a neuroscience research track;
- VT1's program director received a T32 grant to establish a new multidisciplinary MD/PhD predoctoral and postdoctoral training program in lung biology at the University of Vermont;
- The University of Wyoming (WY1/2) approved a new PhD program in neuroscience;
- The University of Delaware (DE1) began planning for a new multidisciplinary PhD program in biomedical science and engineering.

In addition to the doctoral degree programs, many new multidisciplinary centers were established (or launched) by COBRE institutions, including the following:

- The University of Kansas (KS1) developed a new Molecular Library Screening Center, Structural Biology Center, and Center for Methodology and Library Development (totaling over \$20 million);
- The Maine Medical Center Research Institute (ME1) collaborated with the University of Maine and Jackson Laboratory to create the Institute for Molecular Biophysics;
- The University of Nevada (NV1) established the Nevada Transgenic Center and begin planning for a new Molecular Bioscience and Biotechnology Institute;
- Brown University (RI1) created the Center for Computational Molecular Biology;
- The University of South Dakota (SD1) planned for a new Brain Research Center in partnership with Avera McKennan Hospital, the region's flagship mental health care provider.

Also, several of the participating institutions designated their COBRE as a center of excellence and provided substantial support to enhance the center's research competitiveness. Examples include the following:

- The University of Louisville (KY1) created the Kentucky Spinal Cord Injury Research Center;
- The University of Wyoming (WY1/2) created an interdisciplinary Center for Neuroscience.

- The University of Montana (MT1), University of Nebraska (NE1), Brown University (RI1), University of Vermont (VT1), and West Virginia University (WV1) designated their COBRE programs as centers of excellence.
- The University of Puerto Rico (PR1) agreed to create a multidisciplinary Research Institute with the COBRE serving as its foundation.

Nearly two-thirds of the COBRE institutions demonstrated a strong commitment to enhancing their center's research competitiveness by providing substantial amounts of their own funding to expand core facilities and equipment, hire additional researchers and technical staff, and/or offer improved startup packages to help with recruitment. Other examples of strong institutional support include the following:

- The University of Louisville (KY1) established endowed chairs;
- The Maine Medical Center Research Institute (ME1) created a new Office of Research Development;
- The University of Idaho (ID1) established a policy whereby 50% of indirect costs would be returned to center investigators, and the University of Puerto Rico (PR1) established a similar policy with 40% of indirect costs being returned.

In addition to institutional commitment, the evaluation found that seven of the 18 COBREs were successful in leveraging their COBRE funds to obtain strong state support for their centers, as exemplified below:

- The Kansas Economic Growth Act, passed by the state legislature in 2004, allocated \$500 million over ten years to recruit 60 biomedical scientists and enhance the research infrastructure at COBRE institutions within the state (KS1);
- Arkansas allocated \$2 million in state funds to renovate the chemistry building at the University of Arkansas (AR1);
- Montana allocated \$1 million in state funds for startup packages, technology training, and enhanced core facilities at the University of Montana (MT1);
- The state of West Virginia provided substantial funding to help implement an ambitious research plan for their health sciences center (WV1);
- The Kentucky governor's ten-year strategic plan for higher education included substantial state support for research (KY1, KY2).

One senior investigator summed up how important the COBRE program has been to enhancing the institution's research competitiveness:

*The COBRE grant and its subsequent renewal has made all the difference in a place like ours. Although our university is our state's flagship research institution, it is really a small school with an administration that is focused on undergraduate teaching in a state that does not support education. The COBRE allowed the biomedical faculty to flourish and it gave the program director the "power" that comes with money to influence the campus administration in faculty hires, laboratory funds, and infrastructure support. The COBRE gave the biomedical researchers the support and the environment that led several of them to become independent*

*investigators, building their own lab programs and influencing countless students. We hope that the COBRE program will be continued. It's the best thing since sliced bread!*

Several COBRE program directors and investigators commended NCRP for developing and implementing an excellent program. Recommendations for improving the program were also suggested:

*This is an outstanding program and the program staff at NCRP are really committed to its success and the success of its grantees.*

*My personal opinion is that all of the IDeA programs, when properly managed, have an enormous impact on the research and the research infrastructure in IDeA states.*

*The only weakness that I can mention is that COBRE funding is limited to a ten-year span. The driving force for having IDeA programs is to help states become more competitive in the research arena. The need persists and the lack of a follow-on plan for those of us cycling off funding is counter-productive. To continue to be successful, we need to have sustained input to our young centers.*

*One suggestion I have is to allow the investigators after they obtain funding for their research to remain funded by the COBRE, allowing them to expand their research and explore more opportunities (a change that may already have been implemented for the more recent COBRE awardees).*

*One suggestion is to make the COBRE budget more flexible. This is particularly important for new investigators who are setting up their lab and find that they have a bundle of money that they need to spend in a relatively short period of time.*

*The only negative comment that I can make regarding COBRE is the rather onerous paperwork associated with the annual reports.*

*The guidelines and intent of the COBRE program seemed to change over time, or at least that was my impression. The changes were disruptive, especially the new policy that junior investigators were to obtain an R01 and then rotate out.*

*The new rule implemented in Year 6 making program directors ineligible for research support is a big mistake. If they are not successful in getting their R01s renewed, their labs will be unfunded and they will be responsible for administering all of the COBRE projects without any funding of their own.*

To identify the COBREs that were most successful in enhancing state and institutional commitment to research, an algorithm was developed that compared the 18 centers with respect to the following performance indicators:

- Number of new permanent positions in COBRE departments during Years 1-6.
- Number of senior administrators and experienced investigators serving on the IAC.
- Evidence of the state's commitment to research.
- Amount of emphasis given to leveraging COBRE funds.
- Amount of emphasis given to improving startup packages for researchers.

To compare the centers' *overall* performance in this area, an average *z*-score was calculated for each center. The results (shown in [Exhibit 10](#)) indicate that the following COBREs had the highest state and institutional commitment to research: WV1, KS1, and NE1. Further analyses revealed that the following factors were relevant to their success:

- Fortuitous timing of the COBRE initiative. The evaluation found that the timing was fortunate in all three cases because it coincided with recent decisions by state and institutional leaders to significantly expand their research infrastructure and promote biomedical science in areas relevant to the respective COBRE grants. For example, West Virginia had recently developed a strategic research plan which identified neuroscience as one of its four research focus areas, and Senator Rockefeller announced in 1999 that a new Neurosciences Institute would be developed on WVU's health sciences campus. Similarly, the State of Kansas had selected human biosciences to be one of four strategic technologies to be promoted by the state, the Kansas Board of Regents had recently approved substantial increases in faculty salaries and funding for research infrastructure, and cancer researchers throughout the state had begun planning in early 1999 for a statewide Experimental Therapeutics Program. In Nebraska, the new UNL Vice Chancellor for Research had launched in early 1999 a university-wide Research Enhancement Initiative and virology research was identified as an existing strength that should be further developed.
- Proactive outreach to senior administrators. The study found that the program directors of all three COBREs (WV1, KS1, and NE1) had excellent administrative skills and they spent considerable time encouraging the active involvement of key stakeholders. For example, WV1's PD worked closely with the Associate Vice President for Research and Graduate Studies (a newly created position) to improve policies for promoting research and fostering collaborations; he also forged strong alliances with the radiology department chair and the director of MRI research. In addition to meeting regularly with a very committed internal advisory committee, KS1's PD worked closely with the KU Life Science Research Council to plan for a new bi-campus cancer center, and she also established a good working relationship with the three other COBRE program directors in the state by meeting regularly with them. NE1's PD worked closely with WVU's Vice Chancellor for Research and the other members of the center's very active IAC, and he was appointed as one of three faculty voting members of the university's Research Corporation Board of Directors. The center's two co-PDs and associate PD were also very helpful in reaching higher channels and communicating with senior administrators.

## **Study Question 4: Baseline Characteristics of the Junior Investigators**

*What were the characteristics of the COBRE junior investigators when they joined the program?*

*4a. Gender*

*4b. Type of doctoral degree*

*4c. Research training experience*

*4d. Previous scientific publications*

*4e. Previous research grants*

The evaluation found that the 107 junior investigators who received substantial COBRE support during Years 1-3 had the following baseline characteristics when they joined the program, as shown in [Exhibits 11-18](#):

### ***4a. Gender***

- More males than females (72% vs. 28%).

### ***4b. Type of doctoral degree***

- Mostly PhDs (91%) + 5% MD/PhDs + 3% MDs + 1% DVM/PhDs.

### ***4c. Research training experience***

- Average time from completing doctorate to joining COBRE = 8.0 years.
- Nearly all (97%) had been postdoctoral fellows.
- Average time since completing their postdoctoral training = 3.0 years.
- 27% had served on a National Research Service Award (NRSA) training grant (predoctoral or postdoctoral T32), 24% had received a NRSA fellowship grant (F32), and 3% had received a K grant.
- Altogether, 45% had some type of NRSA or K grant experience.

### ***4d. Previous scientific publications***

- 100% had published peer-reviewed articles since completing their doctorate.
- 99% were first authors.
- 57% were senior authors.
- Average = 13.0 articles (1.4 articles per year since completing doctorate).

### ***4e. Previous research grants***

- 65% had applied for a PHS grant (30% had applied for an R01) since completing their doctorate.
- 42% had received a PHS grant (0% had received an R01).

## Study Question 5: Success of the Junior Investigators in Achieving Program Goals

*How successful were the COBRE junior investigators in achieving the following program goals?*

*5a. Publishing research in peer-reviewed journals*

*5b. Giving presentations at scientific meetings*

*5c. Applying for research grants*

*5d. Receiving one or more research grants as an independent investigator*

*5e. Achieving overall research success*

*5f. Continuing to participate in COBRE activities.*

For the 107 junior investigators who received substantial COBRE support during Years 1-3, comparisons were made between their baseline performance (during the period from their doctorate through the year they joined the program) and their performance after they joined COBRE (through Sept 2007). Two-thirds of this group (67%) joined the program in 2001, 18% joined in 2002, and 15% joined in 2003. The average time from the year they joined COBRE to Sept 2007 was 5.5 years. One-tailed paired *t*-tests and chi-square tests were conducted to see if the junior investigators as a group improved their performance significantly after joining the program.<sup>4</sup> The results are shown in [Exhibits 19-24](#) and summarized below.

### ***5a. Publishing research in peer-reviewed journals***

- Virtually all the junior investigators (99%) published at least one new peer-reviewed article in a scientific journal by Sept 2007.
- Specifically, 88% published at least one new senior-authored article, which was significantly higher than the 57% who were senior authors before COBRE.\*\*\* The study also found that fewer junior investigators published first-authored articles after joining the program, with the percentage dropping from 99% (pre-COBRE) to 60% (post-COBRE). This striking change in authorship patterns (from being a first author to being a last author) was one of the key findings of the evaluation.
- The junior investigators as a group also improved their publication rates significantly; their average number of total articles increased from 1.4 to 2.0 per year\*\*\* and their average number of senior-authored articles increased from 0.1 to 0.8 per year.\*\*\*

### ***5b. Giving presentations at scientific meetings***

- In addition to publishing their research, the junior investigators were active in sharing their findings in abstracts and presentations at major research conferences, averaging 1.4 abstracts per year and 1.2 presentations per year. It is likely that these are undercounts since this information was not always provided in COBRE progress reports. With respect to abstracts, the study found that the junior investigators were much more likely to be co-authors than first authors, averaging only 0.2 first-authored abstracts per year.

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<sup>4</sup> The following convention is used to identify statistically significant results:

\*\*\* indicates  $p < .001$ , \*\* indicates  $p < .01$ , and \* indicates  $p < .05$ .

### **5c. Applying for research grants**

- A large majority of the junior investigators (88%) applied for a PHS grant after joining COBRE, significantly more than the pre-COBRE percent (65%).\*\*\* The types of grants they were seeking also changed, with a shift from NRSA fellowships to more competitive R-type grants.
- The percent applying for an R01 jumped dramatically from 30% to 80%.\*\*\*
- The percent applying for an R21 increased from 4% to 41%.\*\*\* Including R29s (which were phased out around 2001), the percent applying for an R21 or R29 increased from 20% to 41%.\*\*
- The percent applying for an R03 stayed the same at 9%.
- The percent applying for an R15 decreased slightly from 8% to 7%.

### **5d. Receiving one or more research grants**

- A majority of the junior investigators (65%) succeeded in their quest for a PHS grant after joining the program, a significant increase over the pre-COBRE percent of 42%.\*\* Most importantly, their new awards were primarily R-type grants.
- Specifically, the percent receiving an R01 jumped from 0% to 40%.\*\*\*
- The percent receiving an R21 or R29 increased from 7% to 11%.
- The percent receiving an R03 increased from 4% to 5%.
- The percent receiving an R15 decreased from 5% to 2%.
- In addition, 24% of the junior investigators received a large grant from a non-PHS funding source (e.g., NSF, USDA, DOE, AHA) and 36% received a smaller grant from a non-PHS source (e.g., foundation, private industry, state funds).

### **5e. Achieving overall research success as an independent investigator**

The junior investigators' *overall success* in achieving the program's goals was also assessed by employing an algorithm to calculate a summary score for each individual. The algorithm (approved by NCCR) was based on the person's grant success and peer-reviewed publications after joining the program through Sept 2007. Summary scores ranged from 1 to 5 (with 5 being the highest possible score).<sup>5</sup>

- A large majority of the junior investigators (83%) had achieved a reasonably high level of research success by Sept 2007, receiving a summary score of 3 or higher.
- Specifically, 40% had a summary score of 5 indicating they had one or more R01s.

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<sup>5</sup> Algorithm for calculating each K22 awardee's overall goal achievement as of Sept 2006 (summary score):

5 = One or more R01s

4 = One or more non-R01 research project grants (e.g., P01, N01, R21, R03) or large non-PHS grants

3 = One or more non-RPG PHS grants (e.g., R15s, subprojects) or small non-PHS grants

2 = No grants but at least 1 article/year

1 = None of the above achieved by Sept 2007.

- 25% had a summary score of 4 indicating they had one or more non-R01 RPG grants OR they had one or more large non-PHS grants.
- 18% had a summary score of 3 indicating they had one or more smaller (non-RPG) PHS grants (e.g., R15s, subprojects) OR they had one or more small non-PHS grants.
- 10% had a summary score of 2 indicating they had no grants but had published at least 1 article/year.
- Only 7% had a summary score of 1 indicating they had achieved none of the above by Sept 2007.

The evaluation also found that a large majority of the junior investigators (79%) had secured a tenured or tenure-track position (or equivalent) by Sept 2007, which served as another measure of overall research success.

- 28% were assistant professors.
- 42% were associate professors.
- 9% were full professors.
- 14% were working in non-tenure-track research positions.
- Only 7% were no longer in research positions.

#### ***5f. Continuing to participate in COBRE activities.***

Of the 107 junior investigators who received substantial COBRE support during Years 1-3, the evaluation found that 75 (70%) were still at their COBRE institution at the end of Year 6, and most were continuing to participate in the program. Of the 32 investigators who left, 12 accepted an academic position in a non-IDeA state (a tenured or tenure-track position in most cases), 9 accepted a tenured or tenure-track position at another institution in the same state or another IDeA state, 3 accepted a non-academic research position at a pharmaceutical or biotechnology company, and 8 left research (at least temporarily). The 70% retention rate for this initial group of junior investigators is quite good given the challenges of building a successful research career in an IDeA state. In fact, 79% were continuing to pursue an academic research career in an IDeA state, a major accomplishment for the COBRE program.

Of the 32 junior investigators in this initial group who left their COBRE institution, 34% had received an R01 after joining COBRE and not surprisingly, 9 of these 11 R01 recipients accepted a position in a non-IDeA state. Of the 75 junior investigators in the initial group who stayed at their COBRE institution, 43% had received an R01 after joining COBRE. These findings indicate that, as a group, the COBREs did an excellent job of retaining their initial group junior investigators, particularly those who were R01 recipients.

In addition to answering Study Question 5, additional analyses were conducted to see if “investigators with strong potential” could be identified from their baseline characteristics. These analyses were exploratory and a variety of statistical tests (Pearson correlations, *t*-tests, and multiple linear regression) were performed to assess which, if any, baseline characteristics were significantly

related to the junior investigators' subsequent success in achieving the program's goals (with summary score serving as the dependent variable). The following baseline characteristics were examined:

- Being male (Y, N)
- Having a PhD degree, including a combined clinical and PhD degree (Y, N)
- Number of years from first doctorate degree to joining COBRE
- Number of years from postdoctoral completion to joining COBRE
- Having served on an NRSA and/or K grant (Y, N)
- Average number of previous publications per year
- Average number of previous first-authored publications per year
- Average number of previous last-authored publications per year
- Number of previous PHS grant applications
- Number of previous R01 applications

The regression results were not significant (the independent variables predicted less than 10% of the variance in the individuals' future success). However, the *t*-test analyses found that one independent variable (whether or not the junior investigator had applied for an R01 before joining COBRE) was significantly related to subsequent success; those with at least one previous R01 application were more likely to have a higher summary score ( $p = .009$ ).\*\* The correlation analyses revealed that the following baseline variables were most strongly related to the investigators' subsequent summary scores (although all of the correlations were relatively low):

- Number of previous R01 applications ( $r = .21$ )
- Average number of previous publications per year ( $r = .18$ )
- Average number of previous first-authored publications per year ( $r = .18$ )
- Number of previous PHS applications ( $r = .17$ ).

To compare the success of the COBRE program as a training vehicle relative to other training venues at NIH, comparisons were made between the performance of the 107 junior investigators who received substantial COBRE support during FY 2001-2003 and a group of 146 junior investigators who received a K22 grant during FY 1998-2005 and completed the program by Sept 2005.<sup>6</sup> The performance periods of the two groups were similar; the average time from the year the COBRE participants joined their program to Sept 2007 (the cutoff date for the COBRE evaluation) was 5.5 years and the average time from the year the K22 participants joined their program to Sept 2006 (the cutoff date for the K22 evaluation) was 5.2 years. Also, the two groups of junior investigators had similar baseline characteristics; both groups had a high percentage of males (72% COBRE, 59% K22) and a high percentage of PhDs (91% COBRE, 72% K22), nearly all the participants had been postdoctoral fellows (97% COBRE, 99% K22), and their average time since completing their first doctorate was similar (8.0 years COBRE, 7.5 years K22). The primary differences were that (1) most of the K22 awardees had secured an academic position during the transition phase of the grant at a research-intensive institution in a non-IDeA state; and (2) the K22 awardees were given at least 75% protected time during the grant period (which averaged 2.9 years) whereas the COBRE junior investigators were given only 41% protected time, on average, when serving on the COBRE grant.

Despite these differences, the COBRE junior investigators had significantly better publication records than the K22 junior investigators: 88% of the COBRE participants published at least one new

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<sup>6</sup> National Institutes of Health, Evaluation of the NIH K22 Program, March 2008.

senior-authored article after joining the program, compared to 70% of the K22 participants\*\*; and the COBRE participants published an average of 2.4 articles per year, compared to 1.7 articles per year for the K22 participants (using mean averages in each case).\*\*\* The two groups performed equally well with respect to PHS grant applications, with 88% of their participants applying for a PHS grant after joining the program. Interestingly, the two groups also performed equally well with respect to R01 applications (with 80% of their participants applying for an R01). With respect to grant awards, 65% of the COBRE junior investigators and 59% of the K22 awardees succeeded in their quest for a PHS grant after joining the program; 40% of the COBRE participants and 42% of the K22 participants received an R01. The results of this comparison underscore the success of the COBRE program as a mechanism for training junior investigators.

In sum, the findings were very positive for the initial group of junior investigators. They improved their publication rates significantly after joining COBRE and were much more likely to be publishing as last authors than first authors. They were also more likely to have applied for and received one or more PHS grants (particularly R01s) after joining COBRE. Over 80% had achieved a reasonably high level of research success by Sept 2007, and nearly 80% had secured a tenured or tenure-track position. Surprisingly, the only baseline characteristic that was found to be significantly predictive of a junior investigator's subsequent success was their having applied for at least one R01 grant before joining COBRE, although it was not highly predictive. A major finding was that a high proportion of the junior investigators who received substantial COBRE support during Years 1-3 were very successful in achieving the program's goals regardless of their individual differences when they joined the program.

## Study Question 6: External Factors

*Did any COBREs experience positive or negative events over which they had no control? If so, how were they addressed?*

Several COBREs had to deal with unexpected challenges during their first six years, including two centers that experienced the premature death of a charismatic leader (ME1's program director and NV1's co-program director both died unexpectedly during Year 4). The ME1 COBRE addressed this problem by appointing the co-PD as program director, a solution which worked quite well because the co-PD had been involved in all of the administrative aspects of the center. ME1's external advisory committee helped them begin a process of reorganization and self-evaluation which was later judged to be successful in large part because the COBRE investigators were very supportive of each other and committed to building a strong research team. The NV1 COBRE addressed the untimely death of their co-PD by assigning the PD and two other investigators to oversee the two COBRE cores and subproject previously administered by the co-PD. Following the advice of their EAC, two new mentors were recruited to work with the junior investigator who had been mentored by the co-PD. Recruiting a senior investigator to serve as co-PD proved to be difficult due to the small size of the medical school and interdepartmental challenges following the death of the co-PD.

Two other COBREs (KY2 and WY1) faced a major challenge when their respective PDs left their institution in Year 2. In the case of KY2, a senior investigator and mentor who had been involved in writing their COBRE application was appointed to replace the PD without delay, and the initial PD stayed involved by joining their external advisory committee. The WY1 COBRE addressed the departure of their PD by appointing a senior investigator at the institution who had not been previously involved. Working closely with senior administrators at the institution, the new PD broadened the theme of the COBRE, enhanced the core facilities, and restructured the external advisory committee. When it became evident that four junior investigators would be leaving in Year 3 for a variety of reasons, the PD (with help from the new EAC) was able to recruit and fund four new junior investigators whose research interests were in keeping with the center's broader thematic focus.

Although a few centers faced unanticipated state and/or institutional funding constraints which slowed their progress, other COBREs were fortunate to experience very positive events. For example, West Virginia University's School of Medicine (WV1) created a new position, Associate Vice President for Research and Graduate Studies, and the person recruited for the position proved to be very helpful in implementing a new strategic plan for expanding biomedical research, providing additional faculty lines, and enhancing the university's research infrastructure. A second example occurred at Brown University (RI1), where a newly appointed university president launched an ambitious initiative to enlarge the faculty by over 100 positions and make substantial investments to enhance academics and expand research activities. Another positive event was the passage of the Kansas Economic Growth Act which provided state funds to recruit 60 biomedical scientists and enhance the research infrastructure at COBRE centers within the state (KS1). In addition, both of the COBREs in Kentucky benefited from the governor's decision to assign top priority to a statewide strategic plan for higher education which included substantial state support for research.

## SECTION 5:

# CONCLUSION AND RECOMMENDATIONS

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In summary, the evaluation of the COBRE program found that centers as a group were very successful in achieving the program's process goals, as were a high proportion of the junior investigators who received substantial support during Years 1-3. However, the study also revealed that there was considerable variation among the COBREs in the importance they placed on the different program activities recommended by NCCR as well as in the extent to which they achieved specific goals. For example, some centers placed a strong emphasis on recruiting additional researchers while others focused more on mentoring their junior investigators or enhancing their core facilities. One of the most interesting findings was that the success of the centers was broad-based, with 13 of the 18 COBREs (nearly 75%) performing exceptionally well with respect to one or more of the six process goals. Instead of a few COBREs emerging as "super-stars", the evaluation found that a large proportion of the centers performed as "stars" in one area or another.

The broad success of the centers may be largely due to the different interests and challenges faced by the institutions and researchers at the 18 initial COBREs. In addition to the differences that were totally beyond the centers' control (e.g., the population density of their region, their state's financial health), the findings for Study Question 1 showed that there was considerable variation in the characteristics of the centers at baseline. Although all of the COBREs structured their centers as multidisciplinary collaborative partnerships involving several departments, some included several institutions in their partnership and others did not, and some had a formal affiliation with one or more medical schools or centers and others did not. All of the centers in this initial cohort were focused primarily on basic research, but several were also interested in clinical research. In addition, all of the centers had a variety of research facilities and equipment at the start of the program but they had differing needs with respect to these resources; some needed to renovate existing facilities and others needed to undertake major construction projects to expand their research space. Another difference was that although nearly all of the program directors were very accomplished researchers with considerable administrative experience, only about half of them had substantial mentoring experience. There was also wide variation in the number of experienced investigators at baseline; two centers started the program with only two accomplished researchers; in contrast, two centers started with 11 experienced researchers. In addition, there was great variation among the 18 centers in the size of the pool of graduate science students and postdoctoral fellows at their institutions from which they could recruit research assistants and postdocs for COBRE subprojects.

In implementing the major activities recommended by NCCR, the COBREs used a variety of approaches (Study Question 2). A commonly used strategy was to offer junior investigators many opportunities to advance their research skills and careers by holding annual retreats or symposia, work-in-progress meetings, and workshops on a variety of topics. Other common strategies included establishing an IAC to serve as an internal steering/executive committee, asking their EAC to independently assess the progress of the junior investigators at least once a year, and leveraging COBRE funds to obtain matching funds to expand their core facilities. In many areas, however,

there were distinct differences among the COBREs. For example, some centers focused on recruiting only junior investigators and others recruited both junior and senior investigators. There was also substantial variation in the size of the startup packages offered by different centers and the extent to which the PDs reached out to senior administrators. Although all of the centers supported research subprojects, some also offered pilot projects. In addition, there was a great deal of variation in the amount of attention given to mentoring junior investigators. The evaluation found that in carrying out these activities, many COBREs experienced positive or negative events over which they had no control (Study Question 6). Major challenges included dealing with the loss of their PD or associate PD and facing lengthy delays in the hiring of new personnel and construction/renovation of facilities. Unexpected positive events were also experienced by some COBREs (e.g., a substantial increase in state funding for research, a decision by the institution to create more research positions).

The results showed that as a group, the COBREs were very successful in achieving the process goals for centers (Study Question 3). Specifically, most of the centers did an excellent job of recruiting and retaining new research faculty, core directors, and EAC members, however there was a surprisingly low percentage of females in the initial cohort of junior investigators. Only 28% were women, which is lower than the overall percent of women who received NIH career development grants during FY 2000-2004 (which averaged 36%, a relatively low percentage).<sup>7</sup> It is strongly recommended that the COBREs focus on recruiting more women scientists in the future. In addition to recruitment, nearly all of the centers were very successful in expanding their core facilities; a total of 21 new cores were created, 39 cores were enhanced significantly, and five new research buildings were constructed during Years 1-6. In addition, all of the centers met the goal of successfully implementing 3-5 research projects; the average number of subprojects per COBRE was 10.9, which was much higher than expected. Also, a high proportion of the junior investigators (81%) directed at least one subproject and/or pilot project, as did 28% of the experienced investigators. The evaluation also found that all of the COBREs were successful in recruiting a group of very experienced investigators to serve on their external advisory committee and nearly all of the EACs expressed considerable enthusiasm for their center, offered useful advice, and encouraged faculty development. Substantial evidence was also found that the participating institutions, as a whole, were very committed to enhancing their COBRE's research competitiveness. The process goal that appeared to be most challenging was providing junior investigators with adequate mentoring. All 18 centers established some type of program to mentor junior investigators, but mentors could not be identified for 19% of the 107 junior investigators who received substantial support during Years 1-3 and for 37% of all the junior investigators who participated in Years 1-6. Although the COBREs as a group were successful in achieving the program's goals, there was considerable variation in their performance with respect to specific goals, partly because they differed in the amount of emphasis they placed on each goal. These differences were most apparent in three areas: (1) the amount of mentoring, protected time, and research support personnel given to junior investigators; (2) the extent of the EAC's involvement with the center; and (3) the extent to which the institutions' senior administrators played an active role in enhancing the center's research competitiveness.

Study Questions 4 and 5 involved the 107 junior investigators who received substantial COBRE support during Years 1-3. With respect to their baseline characteristics (Study Question 4), the evaluation found that 72% were male, 91% were PhDs, 97% had completed their postdoctoral training, and at least 45% had previous experience working on a research training and/or career

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<sup>7</sup> NIH Office of Extramural Research, Sex/gender in the biomedical science workforce. October 7, 2005. [http://grants1.nih.gov/grants/policy/sex\\_gender/q\\_a.htm](http://grants1.nih.gov/grants/policy/sex_gender/q_a.htm).

development grant. Since completing their doctorate, they had all published peer-reviewed articles, two-thirds had applied for at least one PHS grant (30% had applied unsuccessfully for an R01), and 42% had received a PHS grant (usually an F32) before joining COBRE. All in all, they were very well prepared to embark on a career as a research scientist.

As a group, the initial cohort of junior investigators did exceptionally well in achieving the program's goals. They improved their publication rates significantly after joining COBRE and were much more likely to be publishing as last authors than first authors. They were also more likely to have applied for and received one or more PHS grants (particularly R01s) after joining COBRE. Over 80% had achieved a reasonably high level of research success by Sept 2007, and nearly 80% had secured a tenured or tenure-track position. These achievements are especially noteworthy given the short duration of the COBRE program and period of performance (the average time from the year they joined COBRE to Sept 2007 was 5.5 years). The evaluation also found that 70% of the junior investigators in the initial cohort were still at their COBRE institution at the end of Year 6, and most were continuing to participate in the program. Surprisingly, the only baseline characteristic that was found to be a statistically significant predictor of subsequent success was their having applied for at least one R01 grant before joining COBRE, although it was not highly predictive. A major finding was that a high proportion of these junior investigators were very successful in achieving the program's goals regardless of their individual differences when they joined the program.

Additional analyses were conducted to compare the success of the COBRE junior investigators and a group of junior investigators with similar baseline characteristics who received a K22 grant during approximately the same time period. Unlike the COBRE group, most of the K22 awardees had secured an academic position at a research-intensive institution in a non-IDeA state and they were usually given more release time. The analyses showed that both groups of junior investigators were very successful and performed similarly with respect to PHS grant applications and awards (including R01s), however, the COBRE junior investigators as a group had significantly better publication records than the K22 awardees. The results of this comparison underscore the success of the COBRE program as a mechanism for training junior investigators.

To further understand program processes and identify "best practices," analyses were conducted to determine the centers that were most successful in achieving a particular goal and to identify factors relevant to their success. The following activities (strategies) emerged as overall best practices and are highly recommended for all COBRE centers:

- Conducting rigorous assessments of research progress
- Monitoring core facilities
- Emphasizing pilot projects as well as subprojects
- Developing a good COBRE website and using other outreach techniques.

With respect to mentoring and supporting junior investigators, the following best practices were identified and are recommended:

- Establishing a formal mentoring program
- Selecting mentors with care
- Providing a supportive environment with constructive feedback to junior investigators
- Placing a strong emphasis on their career development
- Providing remuneration for mentors.

To increase EAC involvement, the following strategies were found to be most effective:

- Selecting EAC members with care
- Reaching out to EAC members and communicating with them on a regular basis
- Giving the EAC a major role in assessing COBRE junior investigators.

To increase institutional commitment to the program, the evaluation found that the most effective strategy was for the PD and other COBRE leaders to proactively reach out to the institution's senior administrators, communicate with them on a regular basis, and encourage them to serve on the center's IAC. It is also strongly recommended that all participating partner institutions be represented on the IAC, including smaller institutions.

In addition to the above strategies, center success was also found to be influenced by three factors over which the COBRE program directors and other participants had much less control:

- Strong state support for research
- Strong institutional support for research
- Fortuitous timing of the COBRE initiative.

Overall, the findings that emerged from the COBRE process evaluation illustrate how effective this exploratory program project grant program has been in strengthening the research infrastructure of institutions located in IDeA states and training junior investigators. Although it is too early to assess how successful each center has been in developing the state-of-the-art facilities and critical mass of investigators needed for them to enhance their research competitiveness and become a center of excellence, the initial group has performed very well to date and many COBRE participants commented on how much they have benefited from the program.

A major achievement has been the centers' recruitment and retention of a cohort of junior investigators who have done exceptionally well. Their success is especially noteworthy given the current research grant environment and the challenges of building a successful research career in an IDeA state. The COBRE program supports new investigators at a critical time in their career paths – the point when they move from a mentored environment to establishing their own research program and becoming an independent research scientist. Making a successful transition has never been easy but it has become even more challenging in recent years. The average age at which investigators first obtain R01 funding has risen by 5-6 years since 1980; the average age of a new R01 investigator is now 42 years for a PhD degree holder and 44 years for a MD or MD/PhD degree holder.<sup>8</sup> In addition, it has become increasingly difficult for researchers of any age (especially new investigators) to get an NIH grant given the tight budget environment (a flat NIH budget since 2003), the sharp rise in grant applications, and the resulting decline in grant success rates.<sup>9</sup> Many young scientists who have become discouraged in their quest for an NIH grant have decided to leave research altogether.<sup>10</sup> Although most of the junior investigators who received substantial COBRE support in Years 1-3 were successful, it is recommended that the centers give additional attention to ensuring that all of their junior investigators receive adequate mentoring, protected time, and research support.

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<sup>8</sup> NIH Office of Extramural Research, New investigators program: Resources for new investigators. October 1, 2007. [http://grants1.nih.gov/grants/new\\_investigators/resources.htm](http://grants1.nih.gov/grants/new_investigators/resources.htm).

<sup>9</sup> Epidemiologic Inquiry. Precipitous decline of NIH R01 success rates. December 6, 2006. <http://www.epidemiologic.org/2006/12/precipitous-decline-of-nih-r01-success.html>.

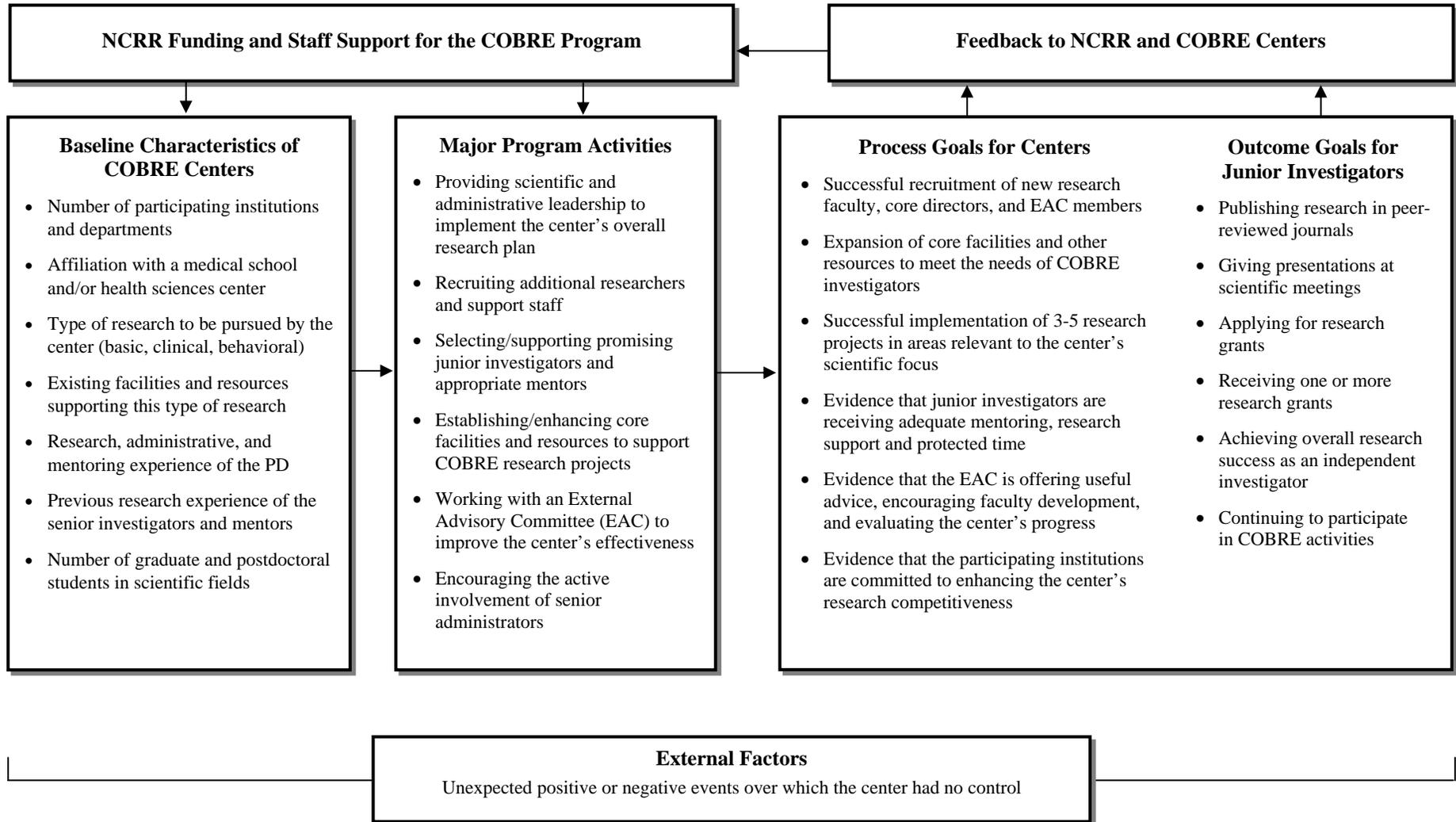
<sup>10</sup> Christopher Lee. *The Washington Post*. Drop in NIH funding could take toll on research, May 28, 2007, p. A6.

In conclusion, the present evaluation revealed the complexity of the COBRE program, the considerable variation among the 18 centers with respect to their baseline characteristics, their implementation of program activities, and the challenges they have faced in pursuing specific process goals. The findings were in most cases very positive and sometimes unexpected. In addition to helping NCCR administrators and COBRE program directors obtain a broader understanding of the progress that has been made and challenges that remain, the evaluation findings should be useful to members of Congress, NIH planning and evaluation officers, and individuals at other organizations who are interested in developing and evaluating multidisciplinary research center programs.

# EXHIBITS

Exhibit 1

# CONCEPTUAL FRAMEWORK FOR THE PROCESS EVALUATION OF THE COBRE PROGRAM



## Exhibit 2

### Process Evaluation of the COBRE Program

## Overview of the COBRE Centers Funded in FY 2000

<b>COBRE</b>	<b>Funding Period</b>	<b>Program Director (Principal Investigator)</b>	<b>Participating Institutions</b>
<b>AR1</b> – Center for Protein Structure and Function	Sept 2000 - present	Francis S Millett, PhD	University of Arkansas University of Arkansas for Medical Sciences (UAMS)
<b>DE1</b> – Membrane Protein Production and Characterization (formerly Structural and Functional Genomics)	Sept 2000 - present	Abraham M Lenhoff, PhD	University of Delaware Delaware Biotechnology Institute
<b>ID1</b> – Molecular and Cellular Basis for Host-Pathogen Interactions	Sept 2000 - present	Gregory A Bohach, PhD	University of Idaho Boise VA Medical Center
<b>KS1</b> – Center for Cancer Experimental Therapeutics	Sept 2000 - present	Gunda I Georg, PhD (Years 1-6)  Barbara Timmerman, PhD (Year 7 - present)	University of Kansas – Lawrence University of Kansas Medical Center (KUMC) Kansas State University Emporia State University
<b>KY1</b> – Mechanisms of Plasticity and Repair After Spinal Cord Injury	Sept 2000 - present	Scott R Whittemore, PhD	University of Louisville Murray State University
<b>KY2</b> – Center of Biomedical Research Excellence in Women’s Health (COBRE-WH)	Sept 2000 - present	Phyllis M Wise, PhD (Year 1)  Thomas E Curry, Jr, PhD (Year 2 - present)	University of Kentucky
<b>ME1</b> – COBRE in Vascular Biology	Sept 2000 - present	Thomas Maciag, PhD Years 1-4  Robert E Friesel, PhD Year 5 - present	Maine Medical Center Research Institute (MMCRI)

<b>COBRE</b>	<b>Funding Period</b>	<b>Program Director (Principal Investigator)</b>	<b>Participating Institutions</b>
<b>MT1</b> – Center for Structural and Functional Neuroscience (CSFN)	Sept 2000 - present	Richard J Bridges, PhD	University of Montana Montana State University McLaughlin Research Institute
<b>NE1</b> – Nebraska Center for Virology (NCV)	Sept 2000 - present	Charles Wood, PhD	University of Nebraska at Lincoln University of Nebraska Medical Center (UNMC) Creighton University
<b>NV1</b> – Function and Role of Chloride Channels in the Cardiovascular System	Sept 2000 - present	Joseph R Hume, PhD	University of Nevada Reno
<b>OK1</b> – Functional Genomic/Proteomic Analysis of Pathogen-Host Interactions	Sept 2000 - present	David W Dyer, PhD (Year 1) John J Iandolo, PhD (Year 2 - present)	University of Oklahoma Health Sciences Center (OUHSC) University of Oklahoma Oklahoma State University
<b>OK2</b> – Mentoring Immunology in Oklahoma	Sept 2000 - present	J Donald Capra, MD (Years 1-6) Judith A James, MD, PhD (Year 7 – present)	Oklahoma Medical Research Foundation (OMRF) University of Oklahoma Health Science Center (OUHSC) Oklahoma State University University of Oklahoma - Tulsa
<b>PR1</b> – Center for Molecular, Developmental and Behavioral Neuroscience	Sept 2000 – June 2007	Conchita Zuazaga, PhD	University of Puerto Rico - Medical Sciences Campus University of Puerto Rico - Rio Piedras Campus
<b>RI1</b> – Center for Cancer Signaling Networks (formerly Center for Genomics and Proteomics)	Sept 2000 - present	John Sedivy, PhD	Brown University Rhode Island Hospital / Lifespan
<b>SD1</b> – Neural Mechanisms of Adaptive Behavior	Sept 2000 - present	Joyce N Keifer, PhD	University of South Dakota School of Medicine Black Hills State University

<b>COBRE</b>	<b>Funding Period</b>	<b>Program Director (Principal Investigator)</b>	<b>Participating Institutions</b>
<b>VT1</b> – Translational Research in Lung Biology (Vermont Lung Center)	Sept 2000 - present	Charles G Irvin, PhD	University of Vermont College of Medicine
<b>WV1</b> – Sensory Neuroscience Research Center (SNRC)	Sept 2000 - present	George A Spirou, PhD	West Virginia University Marshall University School of Medicine
<b>WY1/2</b> – Neuroscience Center for Biomedical Research Excellence (formerly Biology of Spatiotemporal Nitric Oxide Gradients / Cellular Responses to Stressors in Cardiovascular Health)	Sept 2000 - present	Francis W Flynn, PhD (Year 1 – present) David S Bohle, PhD (Years 1-2) James D Rose, PhD (Years 3-5)	University of Wyoming

### Exhibit 3

Process Evaluation of the COBRE Program

## COBRE Centers' Access to Medical Centers and Graduate/Postdoctoral Students in Scientific Fields at Baseline (FY 2000)

<b>COBRE</b>	<b>Lead Institution</b>	<b>Med Schools and Major Medical Centers Participating in COBRE</b>	<b># Graduate Science Students<sup>1</sup></b>	<b># Postdocs in Science and Health Fields<sup>1</sup></b>
<b>AR1</b>	University of Arkansas	University of Arkansas for Medical Sciences (UAMS)	837	74
<b>DE1</b>	University of Delaware	None	994	100
<b>ID1</b>	University of Idaho	Boise VA Medical Center	715	24
<b>KS1</b>	University of Kansas - Lawrence	University of Kansas Medical Center (KUMC)	3,631	250
<b>KY1</b>	University of Louisville	University of Louisville School of Medicine	769	105
<b>KY2</b>	University of Kentucky	University of Kentucky College of Medicine	1,233	205
<b>ME1</b>	Maine Medical Center Research Institute (MMCRI)	Maine Medical Center Research Institute (MMCRI)	459	70
<b>MT1</b>	University of Montana	None	1,025	77
<b>NE1</b>	University of Nebraska at Lincoln	University of Nebraska Medical Center (UNMC)	1,971	193
<b>NV1</b>	University of Nevada Reno	University of Nevada School of Medicine	730	0

<b>COBRE</b>	<b>Lead Institution</b>	<b>Med Schools and Major Medical Centers Participating in COBRE</b>	<b># Graduate Science Students<sup>1</sup></b>	<b># Postdocs in Science and Health Fields<sup>1</sup></b>
<b>OK1</b>	University of Oklahoma Health Sciences Center (OUHSC)	University of Oklahoma Health Sciences Center (OUHSC) Oklahoma State University Center for Veterinary Health Sciences	2,042	153
<b>OK2</b>	Oklahoma Medical Research Foundation (OMRF)	Oklahoma Medical Research Foundation (OMRF) University of Oklahoma Health Sciences Center (OUHSC) Oklahoma State University Center for Veterinary Health Sciences	2,042	153
<b>PR1</b>	University of Puerto Rico - Medical Sciences Campus	University of Puerto Rico - Medical Sciences Campus	1,285	7
<b>RI1</b>	Brown University	Brown University Medical School	671	65
<b>SD1</b>	University of South Dakota School of Medicine	University of South Dakota School of Medicine	195	4
<b>VT1</b>	University of Vermont College of Medicine	University of Vermont College of Medicine	450	90
<b>WV1</b>	West Virginia University	West Virginia University School of Medicine Marshall University School of Medicine	1,442	44
<b>WY1/2</b>	University of Wyoming	None	643	69

<sup>1</sup> National Science Foundation, Division of Science Resources Statistics, Graduate Students and Postdoctorates in Science and Engineering, Fall 2000. <http://www.nsf.gov/statistics/nsf02314/>

**Exhibit 4**

Process Evaluation of the COBRE Program

**Research to be Pursued by COBRE Centers  
at Baseline (FY 2000)**

<b>COBRE</b>	<b>Research Focus</b>	<b>Type of Research</b>	<b>Animal Studies</b>	<b>Human Subjects</b>
<b>AR1</b> – Center for Protein Structure and Function	Structure and function of biomedically important proteins, including bacterial, viral, and membrane-associated proteins, with an emphasis on structure-based drug discovery and design	Basic	No	No
<b>DE1</b> – Structural and Functional Genomics	Expression, purification and crystallization of membrane proteins to determine their structures and characterize their functions at the molecular level and in larger biological systems	Basic	No	No
<b>ID1</b> – Molecular and Cellular Basis for Host-Pathogen Interactions	Molecular and cellular basis of host-pathogen interactions, with an emphasis on microbial pathogenesis in infection	Basic and clinical	Cattle, sheep	Human serum
<b>KS1</b> – Center for Cancer Experimental Therapeutics	Cancer-related research at the interface between chemistry and biology, with an emphasis on identifying novel bioactive compounds for use as basic biomedical research tools and new therapeutic agents	Basic	Mice	No
<b>KY1</b> – Mechanisms of Plasticity and Repair After Spinal Cord Injury	Molecular and cellular mechanisms of spinal cord injury and repair, with an emphasis on developing and characterizing clinically relevant animal models	Basic	Rats	No
<b>KY2</b> – Center of Biomedical Research Excellence in Women’s Health (COBRE-WH)	Role of female reproductive hormones in manifestations of health and disease, with an emphasis on the impact of hormones and gender on heart disease, brain function, HIV, reproductive tract physiology, and behavior	Basic and clinical	Rats, mice	Human subjects (fMRI, hormonal procedures), human tissue

<b>COBRE</b>	<b>Research Focus</b>	<b>Type of Research</b>	<b>Animal Studies</b>	<b>Human Subjects</b>
<b>ME1</b> – COBRE in Vascular Biology	Cell and molecular mechanisms regulating development and homeostasis of the vascular system including vascular remodeling, angiogenesis, and disease mechanisms	Basic	Mice	No
<b>MT1</b> – Center for Structural and Functional Neuroscience (CSFN)	Protein structure and function in the central nervous system, focusing on transport, membrane protein dynamics, and mechanisms of neurodegeneration	Basic	Rats	No
<b>NE1</b> – Nebraska Center for Virology (NCV)	Fundamental mechanisms and regulation of the replicative cycle of human viruses and host responses in disease pathogenesis	Basic and clinical	Rats, mice, rabbits, hamsters	Human tissue
<b>NV1</b> – Function and Role of Chloride Channels in the Cardiovascular System	Role of chloride channels in normal cardiac function and disease	Basic	Mice, guinea pigs	No
<b>OK1</b> – Functional Genomic/Proteomic Analysis of Pathogen-Host Interactions	Genome-scale analysis of bacterial pathogenesis, with an emphasis on functional genomic and proteomic analysis of bacteria-host interactions	Basic	Rats, mice, rabbits	No
<b>OK2</b> – Mentoring Immunology in Oklahoma	Molecular and cellular immunology in the context of human health and disease	Basic and clinical	Mice	Human serum and tissue
<b>PR1</b> – Center for Molecular, Developmental and Behavioral Neuroscience	Cognitive neuroscience using rodent models, with an emphasis on molecular mechanisms underlying neuronal injury, emotional memory, cocaine-seeking behavior, and the expression of maternal behavior	Basic	Rats	No
<b>RI1</b> – Center for Genomics and Proteomics	Multidisciplinary approach to molecular genetics research redirected to focus on molecular mechanisms by which cancer signaling networks are regulated	Basic and clinical	Rats	Human tissue

<b>COBRE</b>	<b>Research Focus</b>	<b>Type of Research</b>	<b>Animal Studies</b>	<b>Human Subjects</b>
<b>SD1</b> – Neural Mechanisms of Adaptive Behavior	Structural reorganization in neural pathways resulting in adaptive behavioral responses to novel sensorimotor experiences, with an emphasis on physiological, pharmacological, anatomical, molecular, and behavioral experimental approaches	Basic	Rats, primates, turtles	No
<b>VT1</b> – Translational Research in Lung Biology (Vermont Lung Center)	Translation of basic laboratory research into clinical applications to fight lung disease, with an emphasis on understanding the mechanisms of lung biology and disease (including asthma and cystic fibrosis)	Basic and clinical	Mice	Human subjects (bronchial procedure)
<b>WV1</b> – Sensory Neuroscience Research Center (SNRC)	Function and development of sensory systems, with an emphasis on the genetic basis and loss of function resulting from congenital sensory disorders and the development of treatments for human neurological diseases	Basic and clinical	Mice	Human subjects (fMRI assessment)
<b>WY1/2</b> – Biology of Spatiotemporal Nitric Oxide Gradients / Cellular Responses to Stressors in Cardiovascular Health	Nitrous oxide and cardiovascular research redirected to focus on cellular mechanisms underlying activity-dependent changes in central nervous system circuitry and functioning	Basic	Mice, rats, fish	No

Exhibit 5

PROCESS EVALUATION OF THE COBRE PROGRAM

**RECRUITMENT AND RETENTION OF RESEARCH FACULTY**

<b>COBRE</b>	<b># COBRE New Hires</b>	<b># Jr Invs in Yrs 1-3</b>	<b># Jr Invs in Yrs 4-6</b>	<b>% Jr Invs Who Left in Yrs 1-6</b>	<b>Avg Z Score</b>
AR1	7	9	5	21%	0.4
DE1	1	5	14	16%	0.0
ID1	4	6	3	22%	-0.3
KS1	3	6	23	17%	0.7
KY1	4	4	3	14%	-0.3
KY2	4	7	5	25%	0.1
ME1	5	5	2	14%	-0.2
MT1	11	8	2	20%	0.6
NE1	6	9	8	24%	0.4
NV1	4	5	5	30%	-0.5
OK1	0	3	7	40%	-1.3
OK2	8	8	4	17%	0.7
PR1	0	4	0	0%	-0.5
RI1	5	9	6	13%	0.6
SD1	8	3	12	20%	0.2
VT1	4	4	3	29%	-0.7
WV1	7	4	7	9%	0.3
WY1, WY2	5	8	6	36%	-0.2
<b>Average</b>	<b>4.8</b>	<b>5.9</b>	<b>6.4</b>	<b>20%</b>	<b>0.0</b>

**Most Successful:**                    **KS1, MT1, RI1, AR1, OK2**

Data sources: COBRE annual progress reports, renewal grant applications, summary statements.

Exhibit 6

PROCESS EVALUATION OF THE COBRE PROGRAM

**EXPANSION OF CORE FACILITIES**

COBRE	# COBRE Cores	# COBRE Supplements Funded	# C06 Grants Relevant to This COBRE	Emphasis on Enhancing Core Facilities <sup>1</sup>	Emphasis on Expanding Research Space <sup>1</sup>	Avg Z Score
AR1	7	1	1	3	3	0.7
DE1	6	1	0	2	1	-0.6
ID1	4	1	0	3	2	-0.1
KS1	3	1	1	3	3	0.7
KY1	5	3	0	2	3	0.2
KY2	4	0	0	1	1	-1.3
ME1	4	1	0	3	2	-0.1
MT1	6	1	1	2	3	0.0
NE1	5	1	2	3	3	0.7
NV1	4	0	0	2	2	-0.4
OK1	6	1	0	2	1	-0.8
OK2	6	1	1	3	2	0.4
PR1	2	1	0	2	1	-0.6
RI1	5	2	1	3	3	1.1
SD1	3	0	0	1	2	-1.0
VT1	3	3	1	2	2	0.3
WV1	5	0	0	3	3	0.3
WY1-2	4	1	0	3	3	0.5
<b>Average</b>	<b>4.6</b>	<b>1.1</b>	<b>0.4</b>	<b>2.4</b>	<b>2.2</b>	<b>0.0</b>

**Most Successful: RI1, AR1, KS1, NE1**

<sup>1</sup> 3 = Strong emphasis, 2 = considerable emphasis, 1 = not much emphasis was evidently given to this area.

Data sources: COBRE annual progress reports, center websites, renewal grant applications, summary statements.

Exhibit 7

PROCESS EVALUATION OF THE COBRE PROGRAM  
**IMPLEMENTATION OF RESEARCH PROJECTS**

COBRE	Total # Subprojs	Subproj / Junior Inv Ratio <sup>1</sup>	% Jr Invs Directing a Subproj or Pilot Proj <sup>1</sup>	% Experienced Invs Directing a Pilot Proj	Avg Z Score
AR1	20	1.4	79%	0%	0.6
DE1	11	0.6	95%	13%	0.0
ID1	10	1.1	100%	0%	0.0
KS1	13	0.4	79%	6%	-0.3
KY1	12	1.7	86%	0%	0.3
KY2	8	0.7	20%	6%	-1.2
ME1	14	2.0	100%	0%	0.8
MT1	10	1.0	90%	0%	-0.1
NE1	13	0.8	76%	18%	0.1
NV1	8	0.8	50%	0%	-0.9
OK1	10	1.0	100%	0%	0.0
OK2	8	0.7	67%	16%	-0.4
PR1	4	1.0	100%	0%	-0.4
RI1	10	0.6	94%	44%	0.6
SD1	11	0.7	100%	26%	0.4
VT1	11	1.6	86%	0%	0.2
WV1	10	0.9	73%	0%	-0.4
WY1, WY2	15	1.1	93%	18%	0.6
<b>Average</b>	<b>10.9</b>	<b>0.9</b>	<b>81%</b>	<b>10%</b>	<b>0.0</b>

**Most Successful: ME1, AR1, SD1, WY1/2**

<sup>1</sup> All junior investigators who participated in COBRE during years 1-6 were included in this analysis (N=223).

Data sources: COBRE annual progress reports, center websites, renewal grant applications, summary statements.

Exhibit 8

PROCESS EVALUATION OF THE COBRE PROGRAM

**MENTORING AND SUPPORT FOR JUNIOR INVESTIGATORS**

COBRE	% Mentored Junior Invs <sup>1</sup>	% Experienced Invs Who Were Mentors <sup>1</sup>	Experienced Inv / Junior Inv Ratio <sup>1</sup>	Avg % Effort on COBRE Subprojects of Junior Invs <sup>2</sup>	% Junior Invs with a Postdoc in Lab <sup>2</sup>	Avg Z Score
AR1	93%	71%	1.0	33%	33%	0.2
DE1	32%	63%	0.4	16%	100%	-0.4
ID1	100%	25%	0.9	51%	67%	0.3
KS1	100%	72%	1.1	21%	50%	0.2
KY1	57%	20%	2.1	43%	25%	0.1
KY2	100%	33%	1.5	46%	0%	0.1
ME1	43%	43%	1.0	49%	80%	0.1
MT1	60%	50%	1.0	45%	25%	-0.1
NE1	41%	18%	1.0	66%	22%	-0.2
NV1	70%	67%	0.9	57%	40%	0.3
OK1	80%	62%	1.3	35%	67%	0.4
OK2	83%	47%	1.6	55%	25%	0.5
PR1	25%	0%	1.3	44%	0%	-0.8
RI1	100%	56%	1.0	17%	0%	-0.3
SD1	13%	20%	0.7	25%	33%	-1.1
VT1	86%	58%	1.7	51%	75%	0.9
WV1	64%	86%	0.6	47%	25%	0.1
WY1, WY2	36%	36%	0.8	44%	75%	-0.2
<b>Average</b>	<b>69%</b>	<b>46%</b>	<b>1.1</b>	<b>42%</b>	<b>38%</b>	<b>0.0</b>

**Most Successful: VT1, OK2, OK1**

<sup>1</sup> All junior and senior investigators who participated in COBRE during Years 1-6 were included in this analysis (N=223).

<sup>2</sup> Only the junior investigators who received substantial support during Years 1-3 were included in these analyses (N=107).

Data sources: COBRE annual progress reports, center websites, renewal grant applications, summary statements.

Exhibit 9

PROCESS EVALUATION OF THE COBRE PROGRAM  
**EXTERNAL ADVISORY COMMITTEE INVOLVEMENT**

COBRE	% EAC Members Serving ≥ 3 Years	# EAC Meetings in Years 1-6 <sup>1</sup>	# EAC Meetings with Minutes <sup>1</sup>	EAC's Enthusiasm for Center <sup>2</sup>	Avg Z Score
AR1	60%	6	5	3	0.3
DE1	29%	8	6	2	-0.2
ID1	60%	6	5	3	0.3
KS1	80%	12	7	3	1.2
KY1	67%	6	6	2	0.1
KY2	50%	1	1	1	-1.4
ME1	100%	2	2	2	-0.3
MT1	64%	14	7	3	1.1
NE1	100%	6	5	3	0.7
NV1	100%	4	2	3	0.2
OK1	100%	6	4	2	0.2
OK2	100%	4	3	3	0.3
PR1	100%	4	4	2	0.0
RI1	38%	5	5	2	-0.4
SD1	71%	2	0	1	-1.3
VT1	75%	4	2	2	-0.5
WV1	100%	3	2	2	-0.3
WY1, WY2	54%	8	6	2	0.1
<b>Average</b>	<b>75%</b>	<b>5.6</b>	<b>4.0</b>	<b>2.3</b>	<b>0.0</b>

**Most Successful: KS1, MT1, NE1**

<sup>1</sup> Includes EAC conference call meetings.

<sup>2</sup> 3 = Strong enthusiasm, 2 = considerable enthusiasm, 1 = some enthusiasm was evident.

Data sources: COBRE annual progress reports, center websites, renewal grant applications, summary statements.

Exhibit 10

PROCESS EVALUATION OF THE COBRE PROGRAM

**STATE AND INSTITUTIONAL COMMITMENT TO RESEARCH**

<b>COBRE</b>	<b># New Permanent Positions in COBRE Depts</b>	<b># Sr Admins &amp; Experienced Invs Serving on IAC<sup>1</sup></b>	<b>State's Commitment to Research<sup>2</sup></b>	<b>Emphasis on Leveraging COBRE Funds<sup>3</sup></b>	<b>Emphasis on Improving Startup Packages<sup>3</sup></b>	<b>Avg Z Score</b>
AR1	5	3	3	3	3	0.7
DE1	0	5	1	1	1	-1.2
ID1	2	0	1	3	1	-0.8
KS1	0	15	3	3	3	0.9
KY1	4	7	3	2	1	0.0
KY2	0	8	3	3	2	0.2
ME1	5	5	1	3	2	0.0
MT1	2	7	3	3	3	0.6
NE1	0	10	3	3	3	0.6
NV1	0	3	2	2	1	-0.8
OK1	0	0	2	2	2	-0.7
OK2	4	6	2	3	3	0.5
PR1	0	4	1	2	2	-0.7
RI1	6	8	1	3	2	0.3
SD1	4	6	2	2	2	0.0
VT1	4	7	1	3	2	0.1
WV1	6	3	3	3	3	0.7
WY1, WY2	3	5	2	1	2	-0.5
<b>Average</b>	<b>2.5</b>	<b>5.7</b>	<b>2.1</b>	<b>2.5</b>	<b>2.1</b>	<b>0.0</b>

**Most Successful: KS1, AR1, WV1**

<sup>1</sup> IAC = Internal advisory committee (e.g., COBRE steering committee).

<sup>2</sup> 3 = Strong commitment, 2 = considerable commitment, 1 = not much commitment was evident.

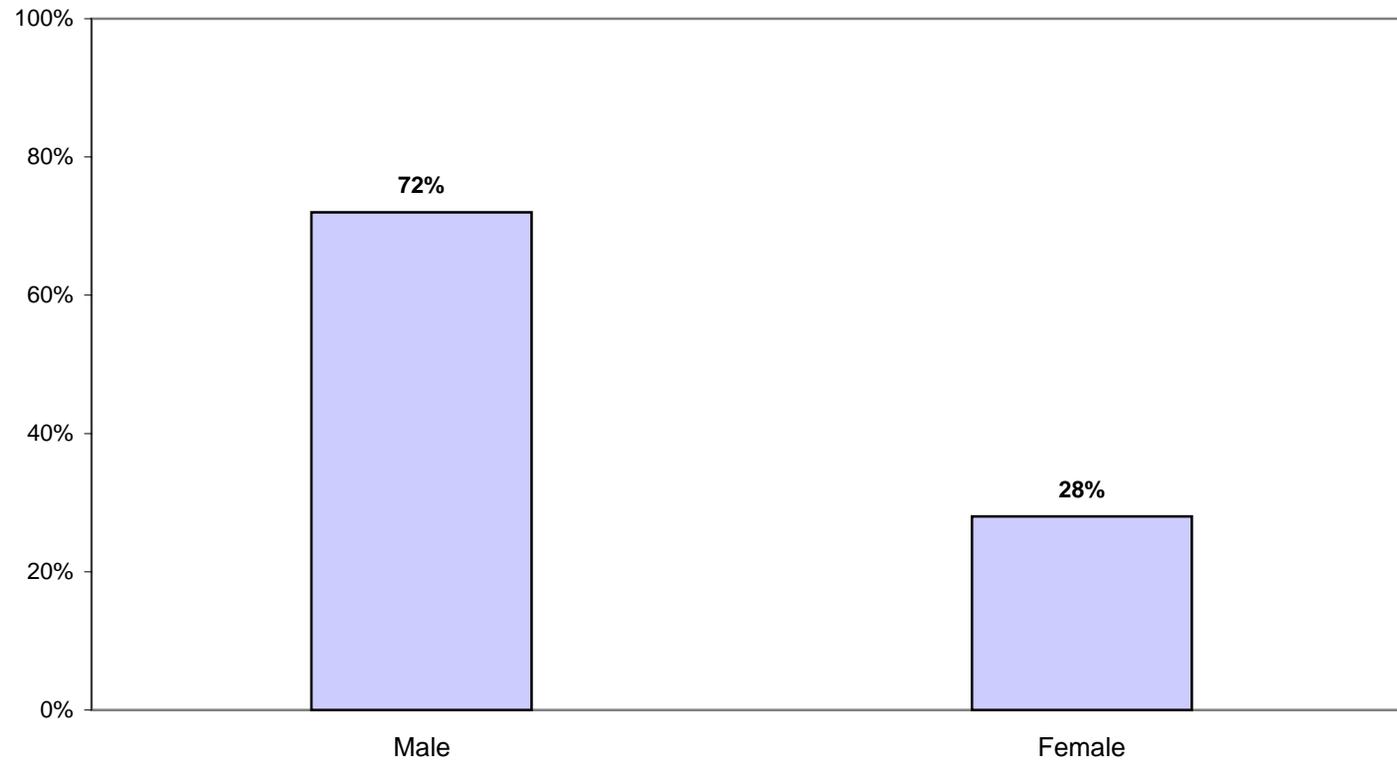
<sup>3</sup> 3 = Strong emphasis, 2 = considerable emphasis, 1 = not much emphasis was evidently given to this area.

Data sources: COBRE annual progress reports, center websites, renewal grant applications, summary statements.

Exhibit 11

Process Evaluation of the COBRE Program

**Gender of Junior Investigators Funded in Years 1-3**

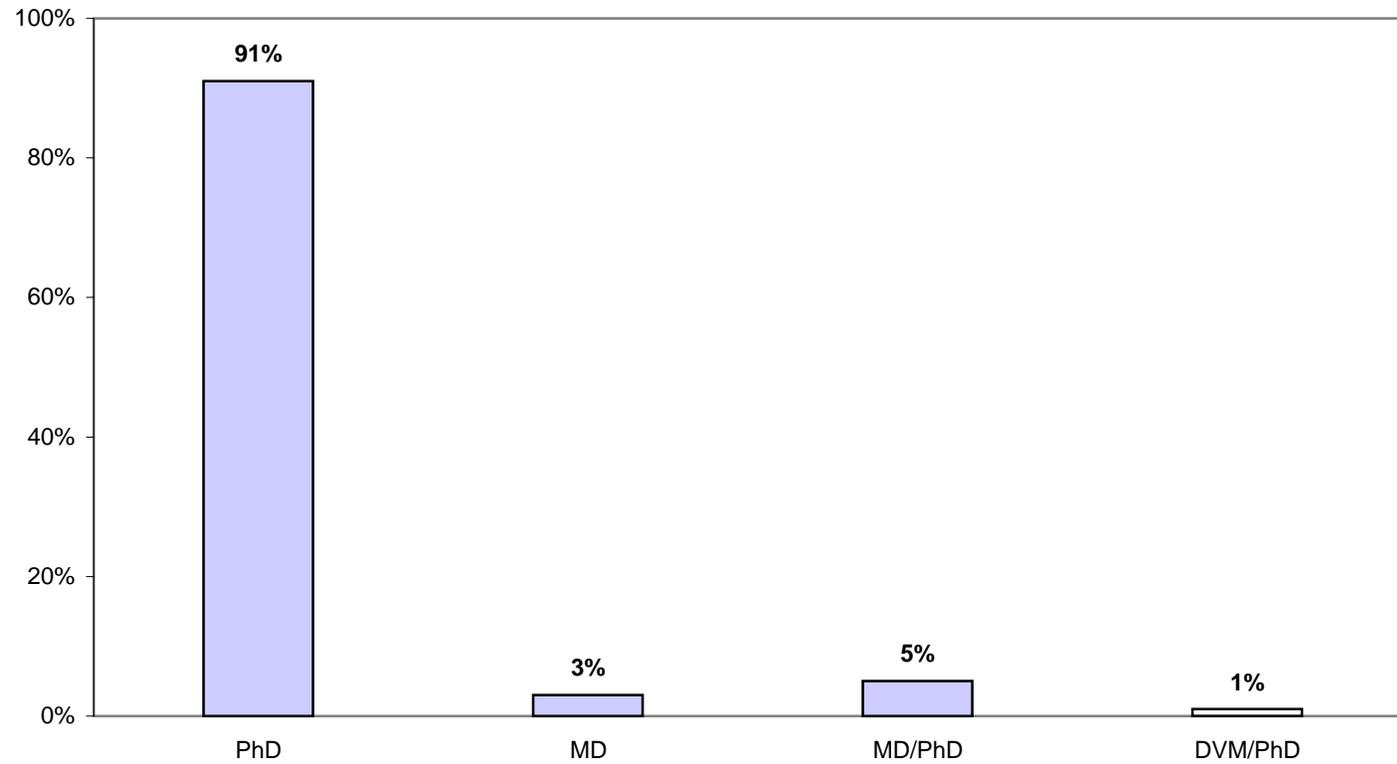


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Data sources: COBRE annual progress reports, web searches.

Exhibit 12

Process Evaluation of the COBRE Program

**Junior Investigators' Type of Doctorate Degree**

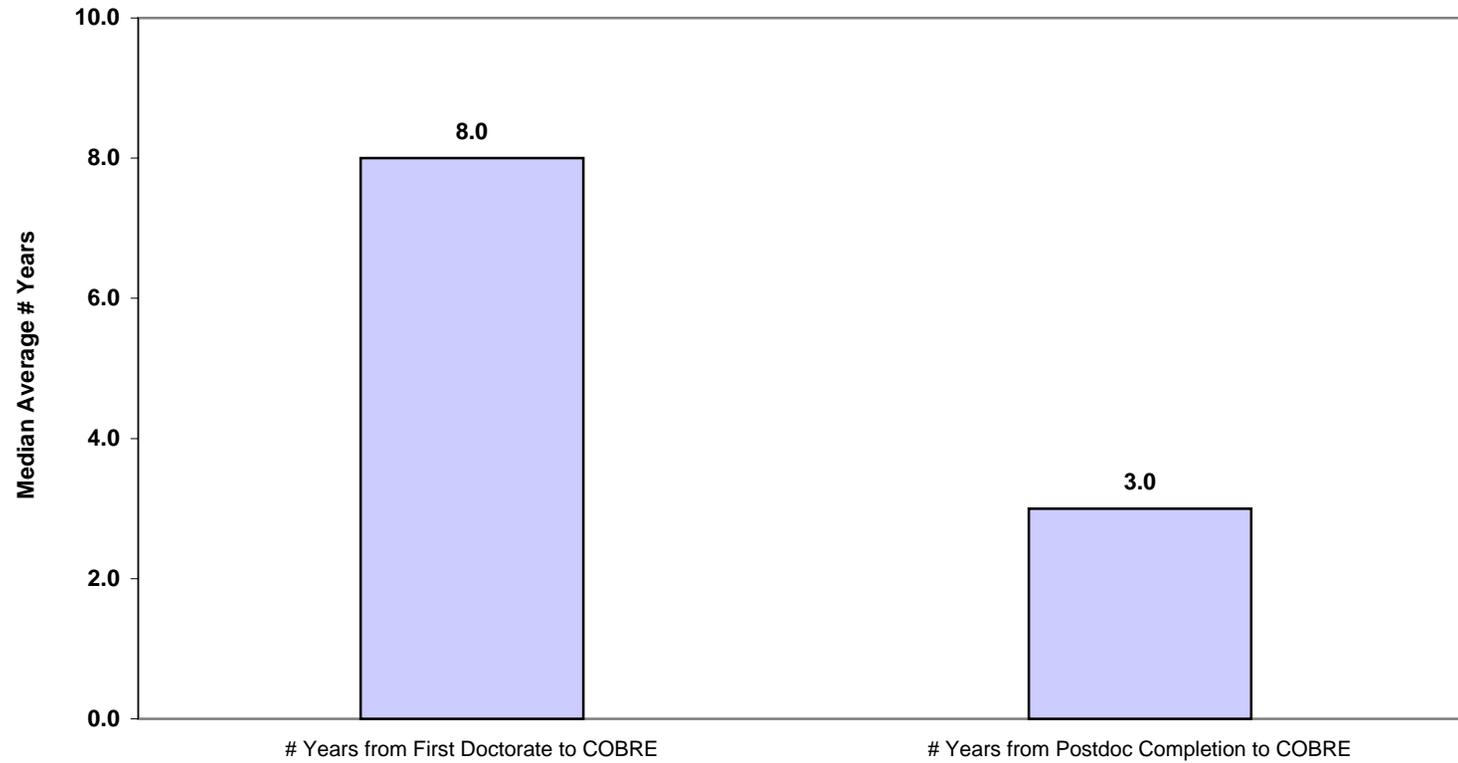


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). The first 2 columns do not include combined degrees (e.g., MD/PhD, DVM/PhD). Data sources: COBRE annual progress reports, web searches.

Exhibit 13

Process Evaluation of the COBRE Program

**Years Since Junior Investigators Completed Doctoral / Postdoctoral Studies**

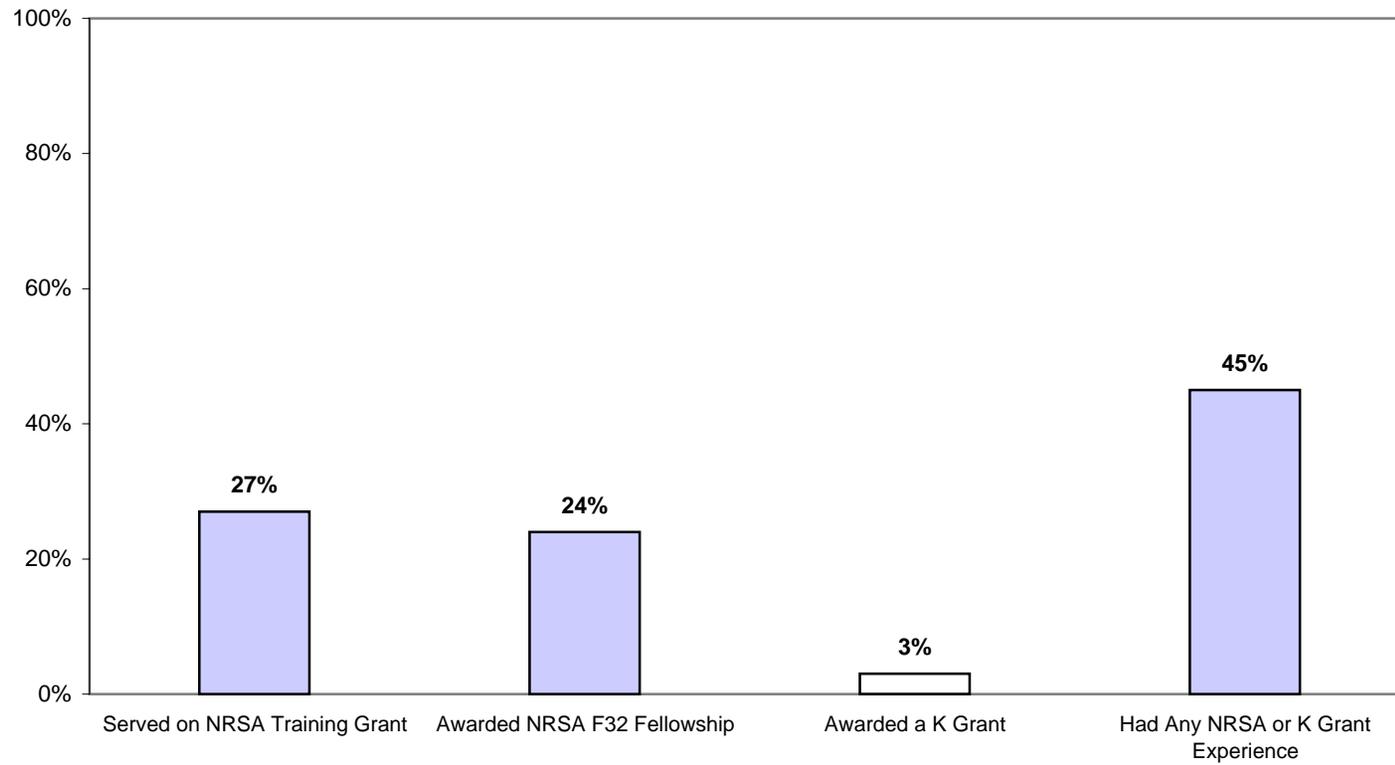


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3. 100% had completed a doctorate (N=107) and 97% had completed postdoctoral studies (N=104). Data source: COBRE annual progress reports.

Exhibit 14

Process Evaluation of the COBRE Program

**Percent of Junior Investigators with Previous NRSA or K Grant Experience**

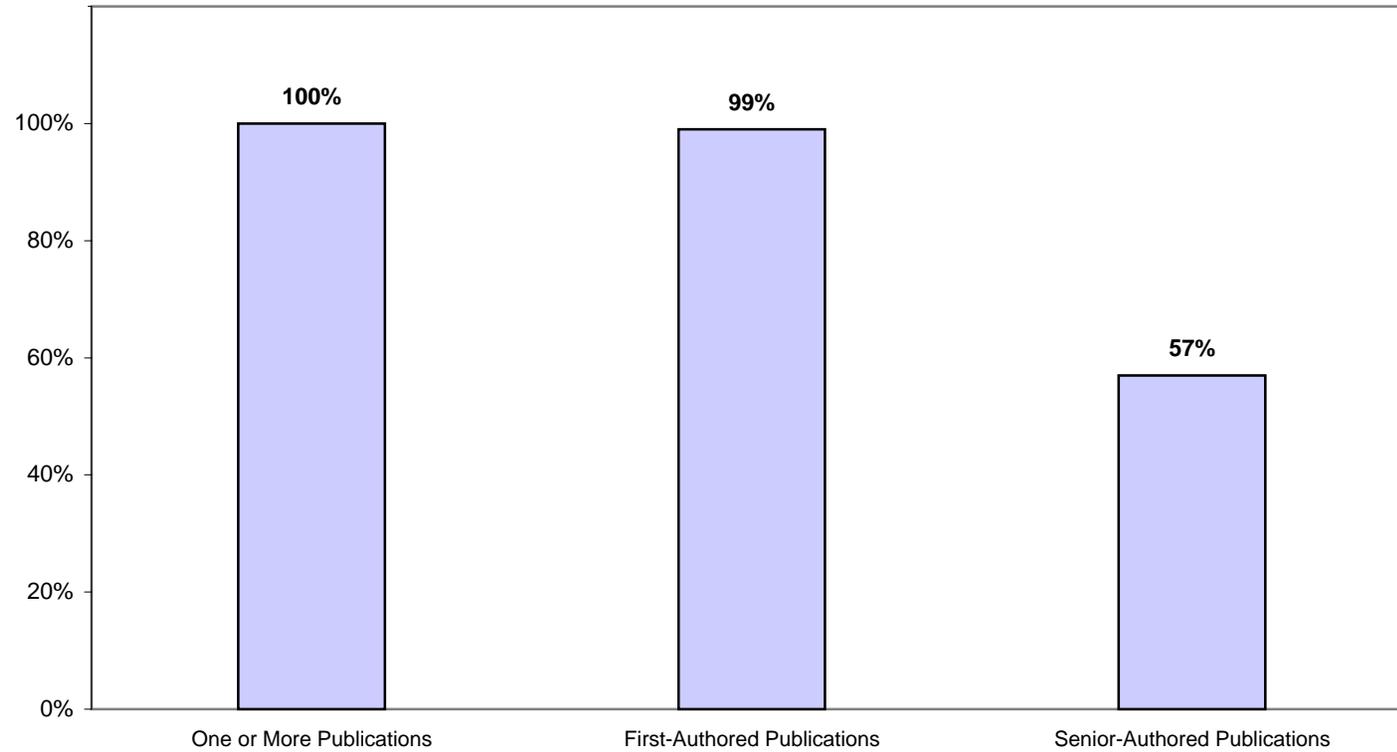


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Data source: IMPAC II.

Exhibit 15

Process Evaluation of the COBRE Program

**Percent of Junior Investigators with Previous Scientific Publications**

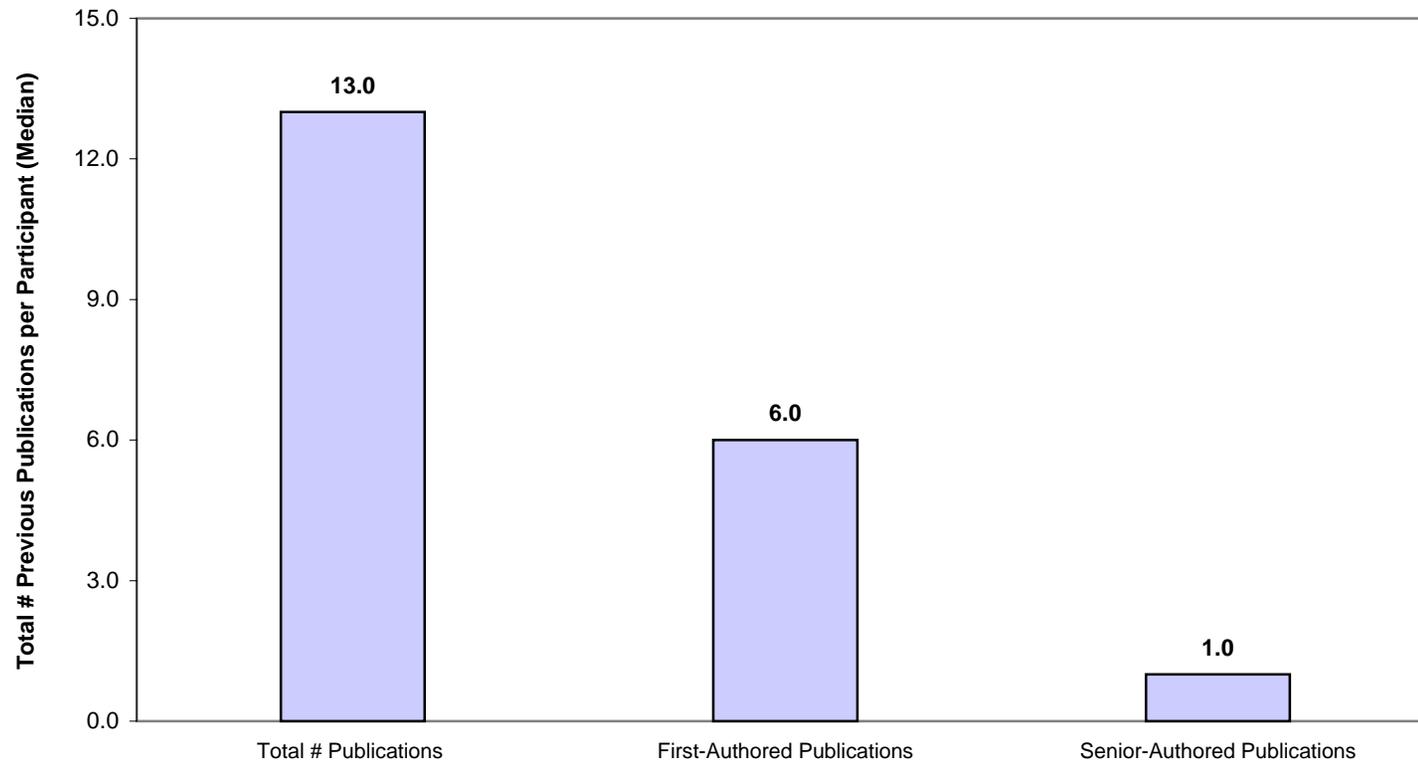


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 16

Process Evaluation of the COBRE Program

**Junior Investigators' Total Number of Previous Scientific Publications**

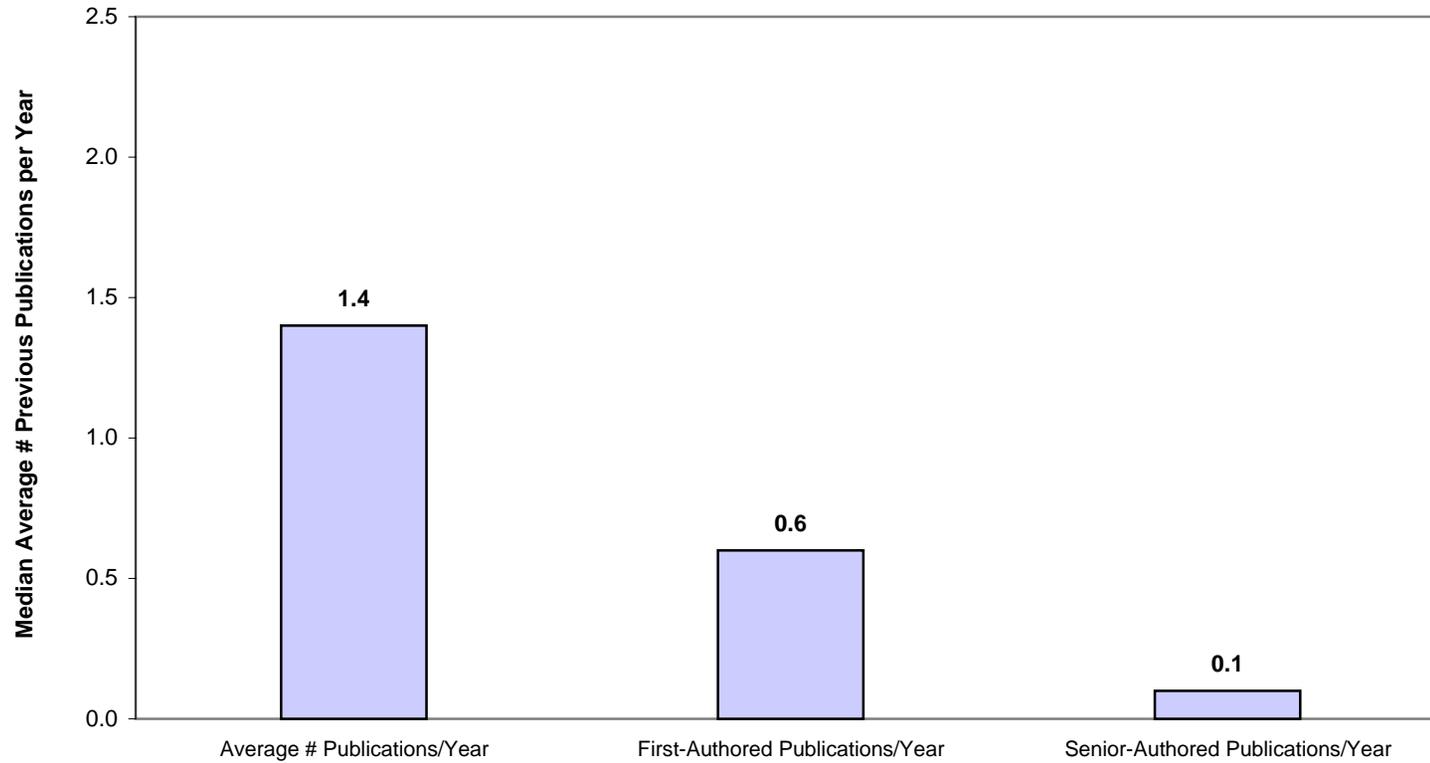


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 17

Process Evaluation of the COBRE Program

**Junior Investigators' Average Number of Previous Publications Per Year**

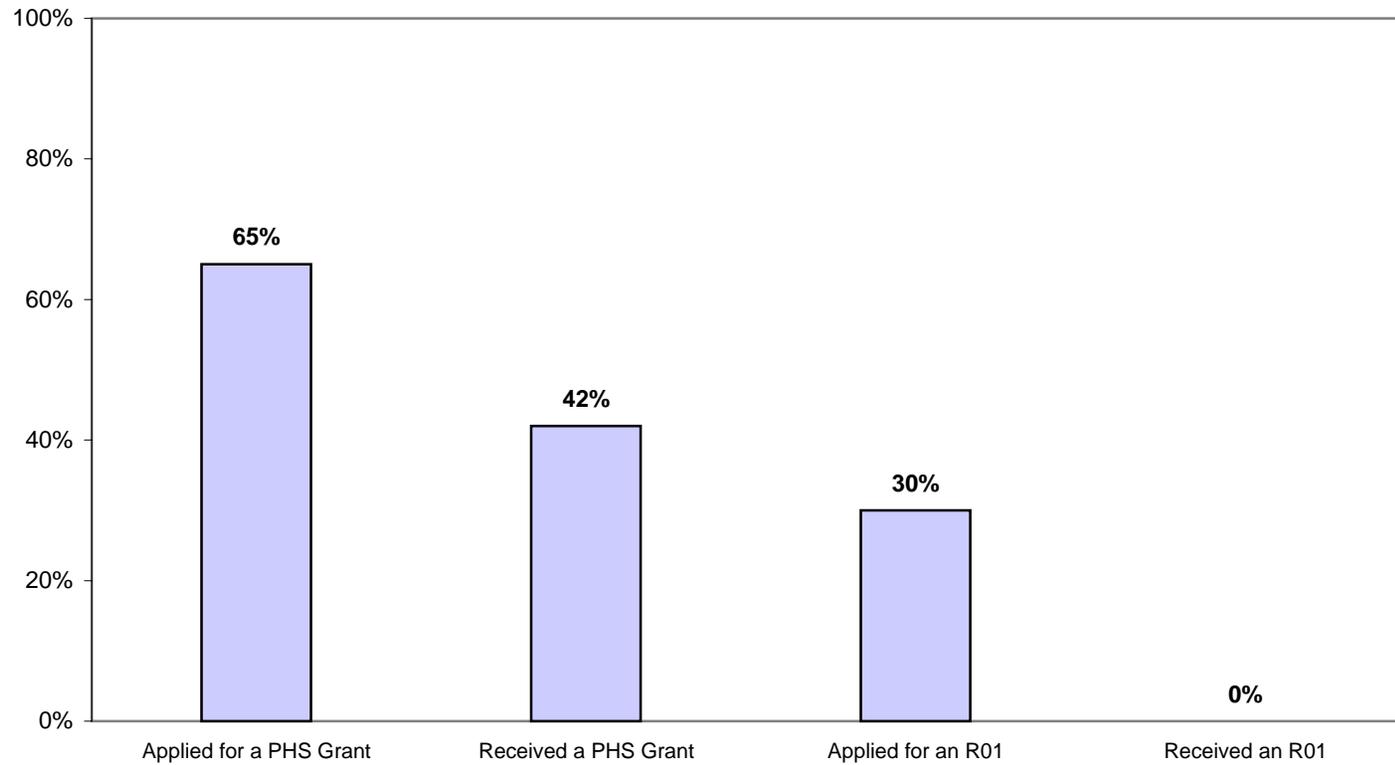


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 18

Process Evaluation of the COBRE Program

**Percent of Junior Investigators with Previous PHS Grant Applications and Awards**

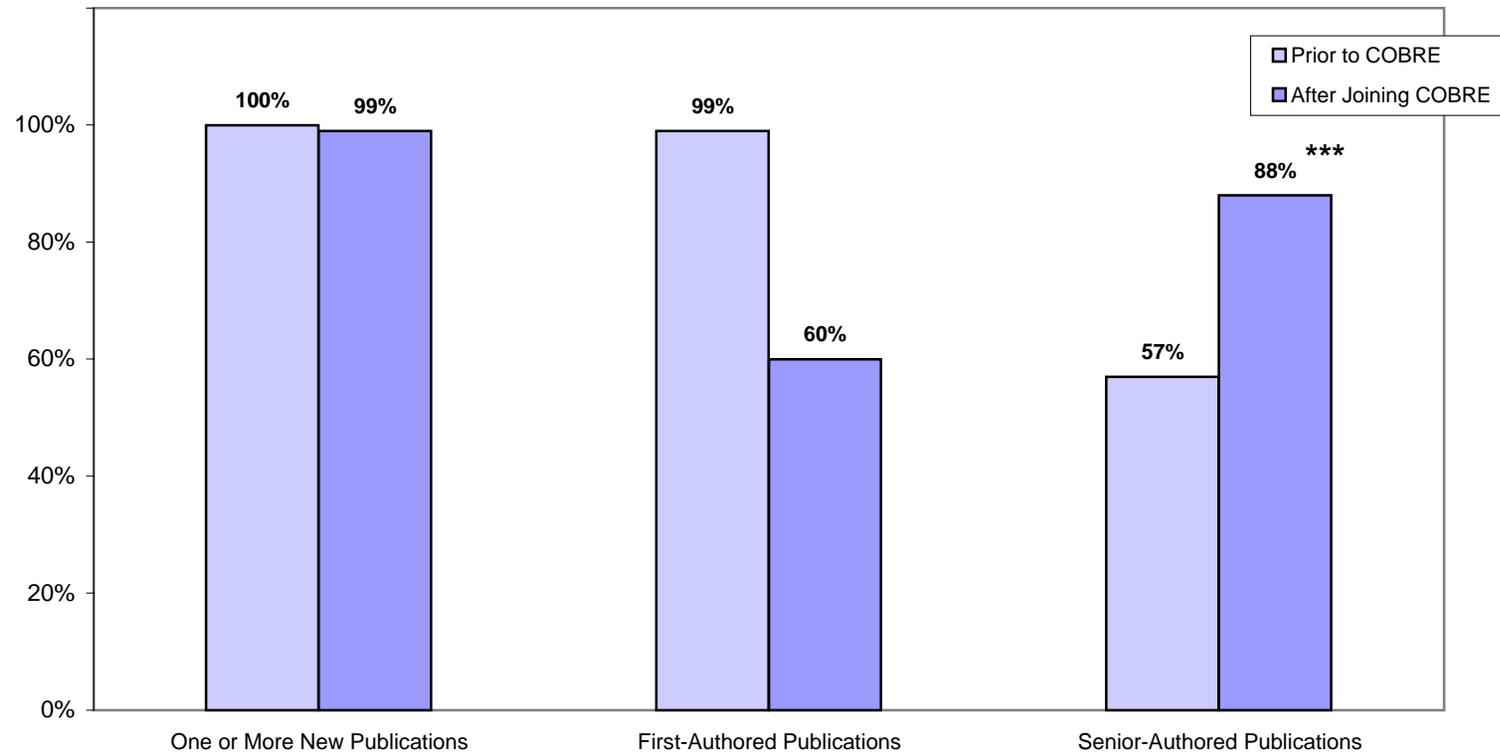


Based on an analysis of non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107). PHS subprojects were counted as grants. Data source: IMPAC II.

Exhibit 19

Process Evaluation of the COBRE Program

**Percent of Junior Investigators Who Published After Joining COBRE  
(Compared to Pre-COBRE Performance)**



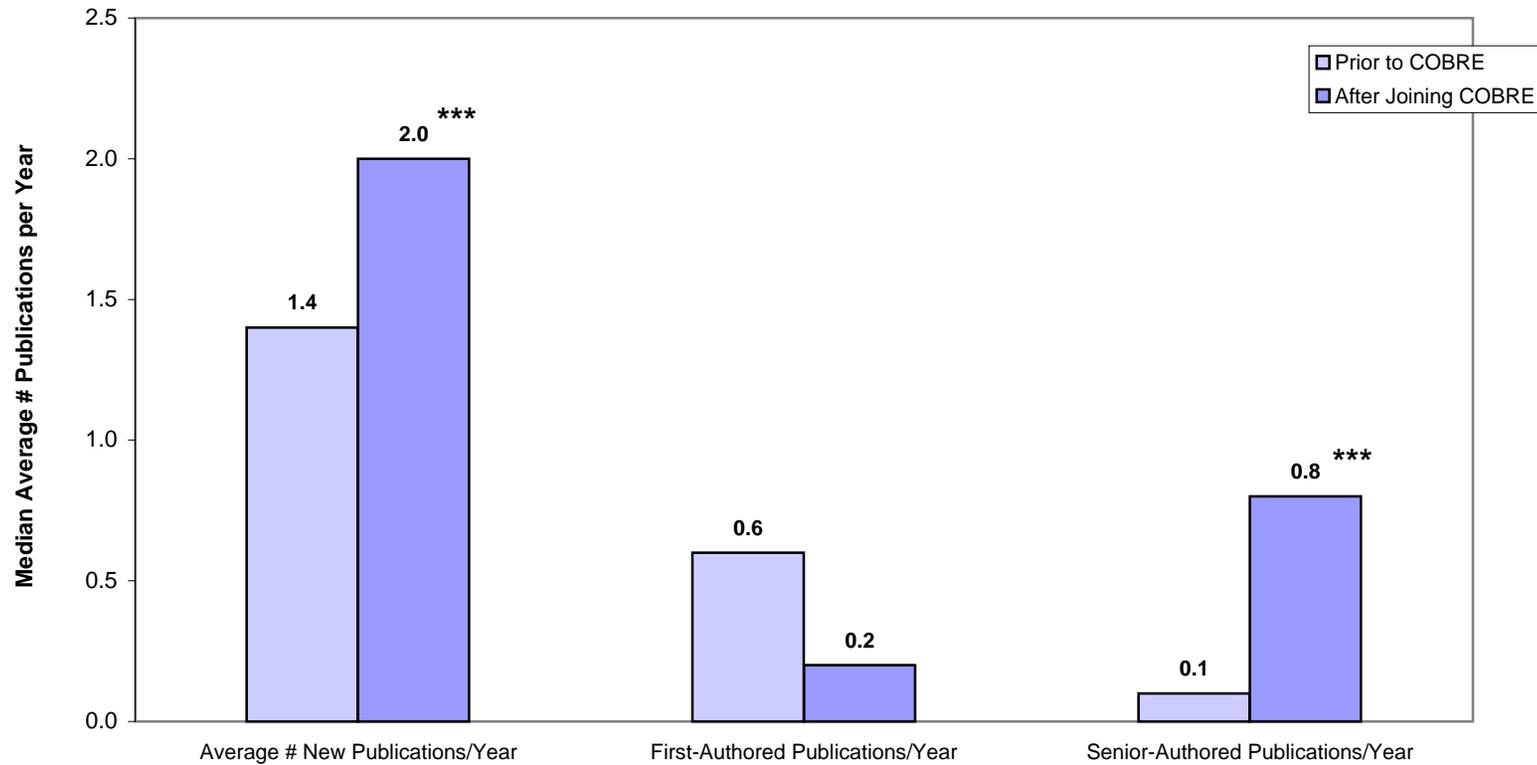
\*\*\* Significant improvement in performance ( $p < .001$ ).

Based on an analysis of the peer-reviewed scientific articles published by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 20

Process Evaluation of the COBRE Program

**Average Number of Publications Per Year  
(Compared to Pre-COBRE Performance)**



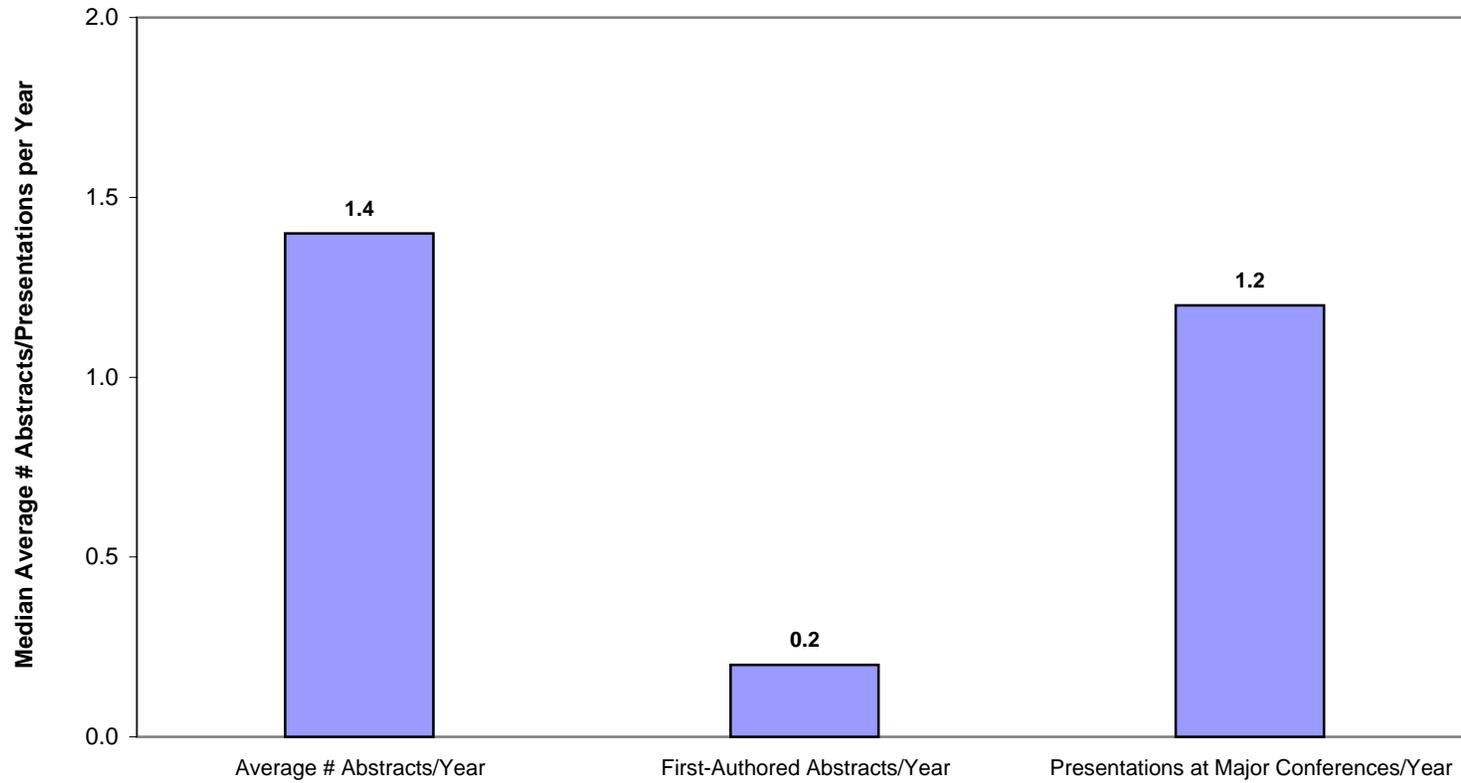
\*\*\* Significant improvement in performance ( $p < .001$ ).

Based on an analysis of peer-reviewed scientific articles published each year by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). Sole-authored articles were counted as first-authored but not senior-authored publications. Data source: PubMed.

Exhibit 21

Process Evaluation of the COBRE Program

**Average Number of Abstracts and Presentations Per Year After Joining COBRE**

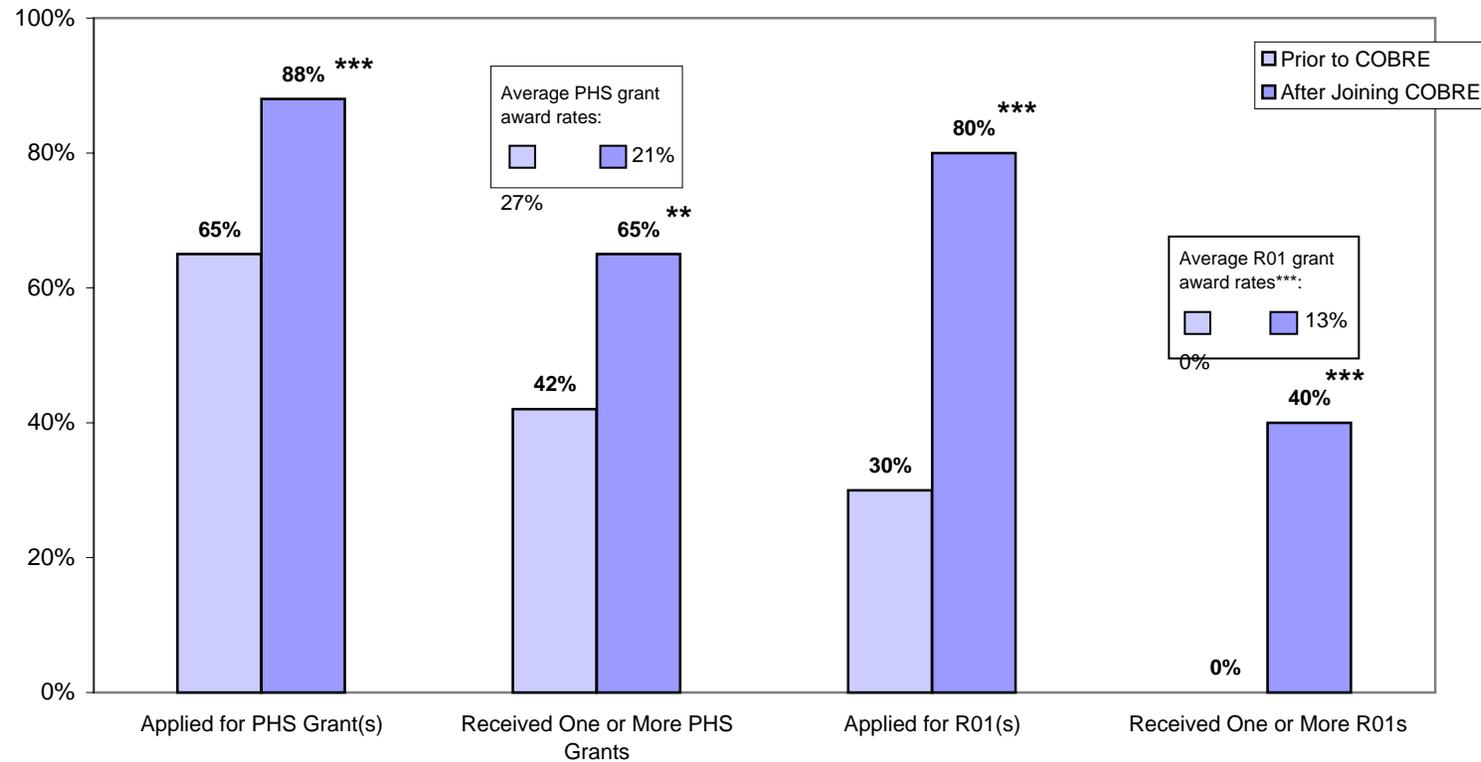


Based on an analysis of abstracts and presentations given at major research conferences per year by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), from the time they joined the program through Sept 2007. Data source: COBRE annual progress reports.

Exhibit 22

Process Evaluation of the COBRE Program

**Percent of Junior Investigators Who Applied For / Received a PHS Grant  
(Compared to Pre-COBRE Performance)**



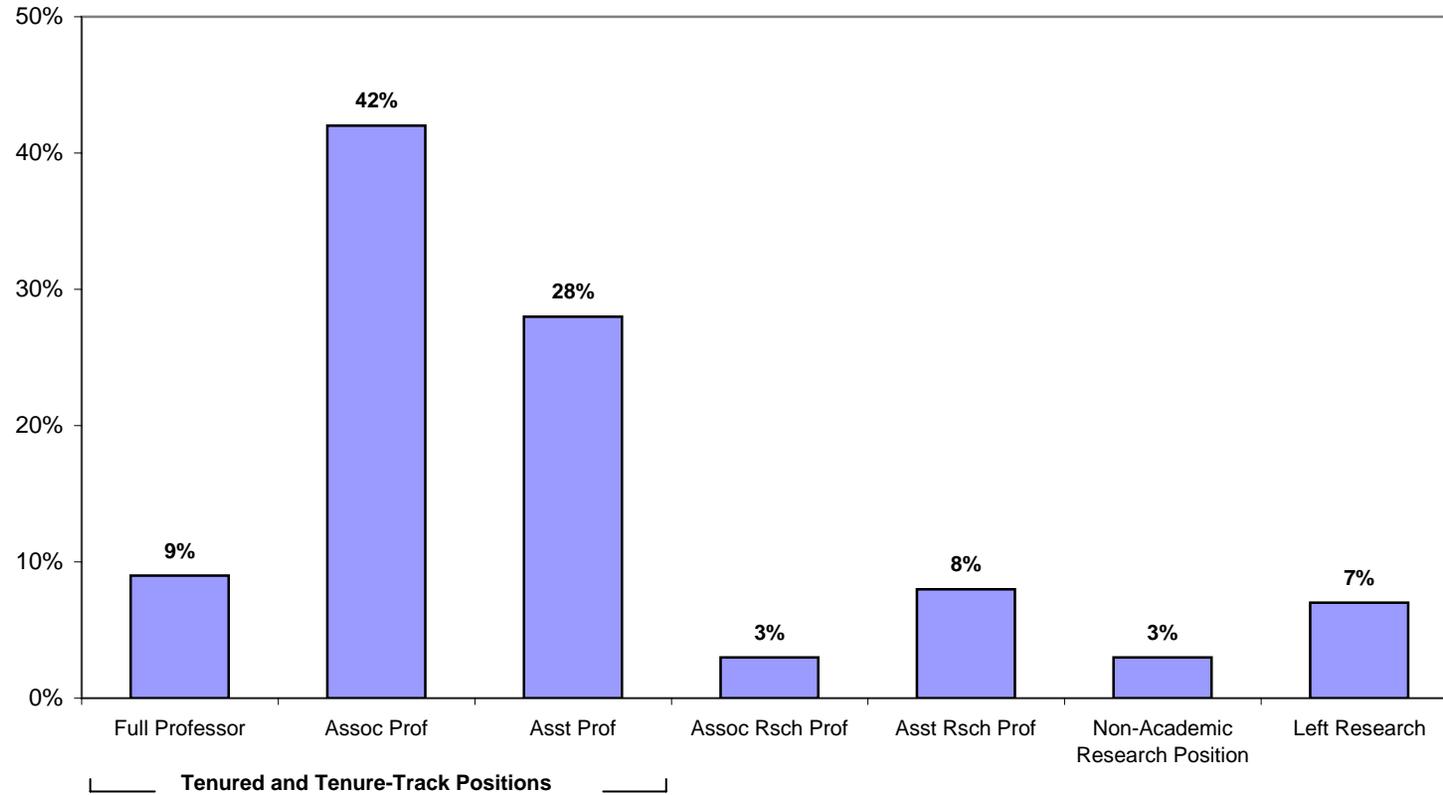
\*\*\* Significant improvement in performance ( $p < .001$ ). \*\* ( $p < .01$ )

Based on an analysis of competitive PHS grant applications submitted by and awarded to the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107), comparing their performance before and after they joined the program (through Sept 2007). PHS subprojects were counted as grants. **Average Grant Award Rate** was calculated by determining for each grant applicant the percent of his/her applications that were funded, and then averaging these percents for the group as a whole. Data source: IMPAC II.

Exhibit 23

Process Evaluation of the COBRE Program

**Types of Academic Positions Held by Junior Investigators**

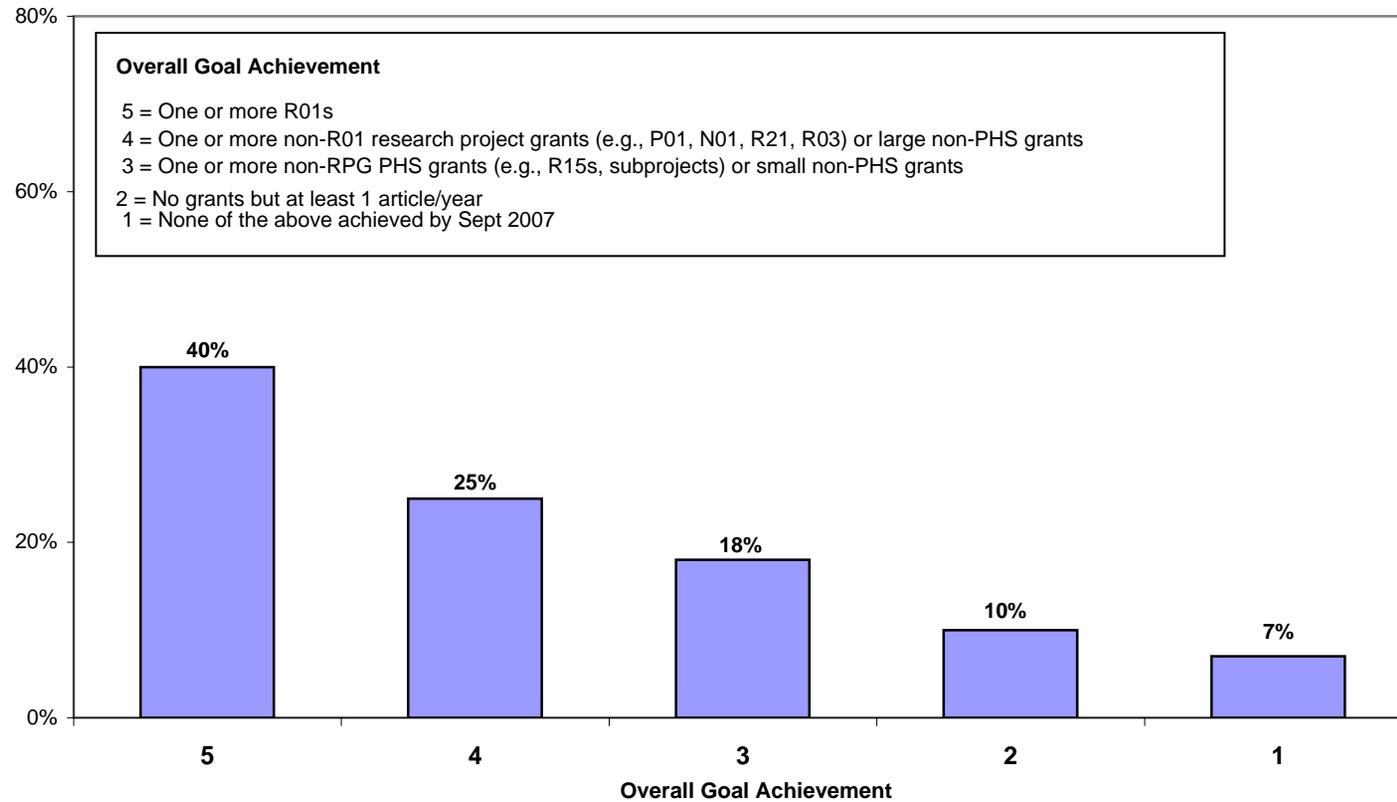


Based on an analysis of the positions held by the non-R01 junior investigators who received substantial COBRE support during Years 1-3 (N=107) as of Sept 2007. Data sources: IMPAC II, web searches.

Exhibit 24

Process Evaluation of the COBRE Program

**Overall Achievement of Program Goals by Junior Investigators**



Each non-R01 junior investigator who received substantial COBRE support during Years 1-3 (N=107) was given only one rating summarizing the extent to which the person achieved the major goals of the program by Sept 2007, based on the person's PHS grants and peer-reviewed publications after joining COBRE. Average Grant Award Rate was calculated by determining for each grant applicant the percent of his/her applications that were funded, and then averaging these percents for the group as a whole. Data sources: IMPAC II, PubMed, web searches.

# APPENDICES

## APPENDIX A

### OPERATIONAL DEFINITIONS AND DATA SOURCES

## APPENDIX A

### OPERATIONAL DEFINITIONS AND DATA SOURCES

## Appendix A

### PROCESS EVALUATION OF COBRE PROGRAM

## Operational Definitions and Data Sources for the Variables in the Conceptual Framework

<b>BASELINE CHARACTERISTICS OF COBRE CENTERS</b>	<b>Measures describing characteristics of each COBRE when it was first funded that are expected to be predictive of the center's subsequent success in achieving process goals</b>
Number of Participating Institutions and Departments	The number of different organizations (e.g., academic institutions, research institutes, health science centers) and academic and clinical departments during the center's first year. (Data sources: COBRE grant application, progress report for Year 1)
Affiliation with a Medical School and/or Health Sciences Center	The extent to which the participating institution(s) included (or had a formal affiliation with) a medical school, other health sciences school (osteopathy, veterinary medicine, dentistry, nursing, pharmacy, public health, allied health, biomedical engineering), research institute, and/or research hospital during the center's first year. (Data sources: COBRE grant application, summary statement, progress report for Year 1, Association of American Medical Colleges)
Type of Research to be Pursued by the Center (Basic, Clinical, Behavioral)	The primary type of research the center proposed for its first five years, categorized as (1) basic research (including animal studies); (2) clinical investigations and trials; and/or (3) behavioral, epidemiologic, or outcomes research. (Data sources: COBRE grant application, summary statement)
Existing Facilities and Resources Supporting This Type of Research	The number and types of research facilities and related services that were available to the junior investigators and other COBRE participants in Year 1, including facilities that were not directly funded by COBRE but were relevant to this type of research. (Data sources: COBRE grant application, summary statement, progress report for Year 1)
Research, Administrative, and Mentoring Experience of the Program Director	The extent to which the center's initial program director (PD) was experienced in conducting independent research, administering research programs, and mentoring, as measured by (1) the number of competing R01 or equivalent research project grants the PI had received from NIH and/or other organizations; (2) the type and scope of administrative positions the PI held prior to COBRE; and (3) the PI's previous experience in administering training grants and mentoring graduate students, postdoctoral fellows, and/or junior faculty. (Data sources: COBRE grant application, summary statement, IMPAC-II database)

Previous Research Experience of the Senior Investigators and Mentors	The extent to which the initial group of senior investigators listed as key personnel and those identified as being mentors for the junior investigators were experienced in conducting independent research, as measured by the number of competing R01 or equivalent research project grants each individual had received from NIH and/or other organizations prior to COBRE. (Data sources: COBRE grant application, summary statement, IMPAC-II database)
Number of Graduate and Postdoctoral Students in Scientific Fields	The number of graduate science students and science and health postdoctoral appointees at the participating institution(s) in 2000. (Data source: NSF-NIH Survey of Graduate Students and Postdoctorates in Science and Engineering)

**MAJOR PROGRAM ACTIVITIES**                      **Strategies employed by each COBRE during its first six years in implementing the major activities recommended by NCRR**

Providing Scientific and Administrative Leadership to Implement the Center’s Overall Research Plan	Strategies employed by the PD and other senior investigators to establish efficient and effective ways to promote high-quality science and manage the day-to-day needs of COBRE participants. Examples include strategies aimed at developing a center of excellence with a specific multidisciplinary research focus, stimulating research productivity, managing the center’s budget, improving communications among COBRE participants, reducing unnecessary paperwork, establishing and maintaining a center website, tracking the progress of research projects, and ensuring that communications involving the COBRE center (e.g., website content, progress reports) are clearly written. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Recruiting Additional Researchers and Support Staff	Strategies employed by the PD and other COBRE participants to identify and actively recruit high-quality junior and senior investigators, core facility directors/managers, and other research support staff for positions affiliated with the COBRE center. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Selecting and Supporting Promising Junior Investigators and Appropriate Mentors	Strategies employed by the PD, other senior investigators, and the EAC to select internal and external junior investigators who had adequate research experience, were interested in the center’s research focus, and had a strong potential to become independent researchers. Also, strategies to ensure that each junior investigator was assigned one or more mentors with expertise in the proposed research area, and that each junior investigator received adequate funding and staff support to conduct a high-quality research project. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)

Establishing and Enhancing Core Facilities and Resources to Support COBRE Research Projects	Strategies employed to establish, expand, and/or renovate shared core facilities needed by COBRE investigators to conduct their research projects. Also, strategies to provide training in the use of core facilities and scientific equipment, increase the use of core facilities, and provide junior investigators with other opportunities to present their findings and improve their research skills (e.g., workshops, research-in-progress seminars, retreats, scientific conferences, visiting scientists). (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Working with an External Advisory Committee (EAC) to Improve the Center's Effectiveness	Strategies employed by the PD and other senior investigators to ensure that EAC members met as a committee every year (in person or by conference call). Also, strategies employed by the EAC to assess the needs of COBRE investigators, encourage faculty development and mentoring, identify research resources, review/approve junior investigator candidates, evaluate the progress of junior investigators and the center as a whole, and provide recommendations and other assistance to improve the center's effectiveness. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Encouraging the Active Involvement of Senior Administrators	Strategies employed by the PD and other senior investigators to motivate senior administrators at the institution(s) to be actively involved in the COBRE. Examples include meeting with academic leaders on a regular basis either informally or formally to discuss the center's needs and progress, giving presentations to gain the support of community leaders and policymakers, holding retreats aimed at long-range planning, and working with others to leverage COBRE funding. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
<b>PROCESS GOALS FOR CENTERS</b>	<b>Measures of the extent to which each COBRE achieved specific process-related goals by the end of Year 6</b>
Successful Recruitment of New Research Faculty, Core Directors, and EAC Members	The extent to which the center was successful during Years 1-6 in encouraging both internal and external candidates to apply for positions affiliated with the COBRE center and recruiting high-quality candidates for these positions, as measured by the number of research faculty, core directors, and EAC members successfully recruited. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Expansion of Core Facilities and Other Resources to Meet the Needs of COBRE Investigators	The extent to which the center was successful during Years 1-6 in enhancing core facilities, research equipment, and related resources needed by COBRE investigators, as measured by the receipt of one or more C06 construction grants relevant to COBRE, the number of COBRE grant supplements to expand COBRE facilities, and the number of new core facilities available to COBRE investigators. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)

Successful Implementation of 3-5 Research Projects in Areas Relevant to the Center's Scientific Focus	The extent to which the center was successful during Years 1-6 in implementing relevant research projects involving junior investigators, as measured by the number of new full-scale research projects (subprojects) funded each year and pilot research projects funded each year that were related to the center's scientific focus. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Evidence that Junior Investigators are Receiving Adequate Mentoring, Research Support and Protected Time	The extent to which the junior investigators were provided with high-quality one-on-one mentoring, appropriate lab personnel, adequate release time, and feedback on their scientific progress during Years 1-6, as measured by the overall ratio of COBRE mentees to mentors, the average percent effort of junior investigators on full-scale COBRE research projects, the average number of postdoctorates and other lab personnel assigned to full-scale projects, the number of different opportunities given to junior investigators to present their findings and improve their research skills, and the amount of attention given to providing junior investigators with feedback on their scientific progress. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Evidence that the EAC is Offering Useful Advice, Encouraging Faculty Development, and Evaluating the Center's Progress	The extent to which the center's EAC was actively involved in assisting the center and assessing its progress during Years 1-6, as measured by (1) the total number of EAC meetings and the percent of committee members who participated in the meetings; (2) the production of minutes or summaries of EAC meetings; and (3) the amount of attention during the meetings on reviewing junior investigator candidates, hearing presentations from junior investigators and giving them feedback on their research progress, discussing challenges faced by the center and its investigators, and offering recommendations to improve the center's effectiveness. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)
Evidence that the Participating Institutions Are Committed to Enhancing the Center's Research Competitiveness	The extent to which senior administrators at the institution actively supported the COBRE center in becoming a center of excellence, as measured by the creation of new permanent research positions; expanded core facilities, laboratories, equipment, and technical staff; improved incentives for recruiting high-quality researchers (e.g., startup packages, release time); improved faculty appointment/promotion policies to encourage research productivity and the retention of research faculty; and successful leveraging of COBRE funds to enhance the center. (Data sources: COBRE progress reports, center website, renewal grant application and summary statement)

**OUTCOME GOALS  
FOR JUNIOR  
INVESTIGATORS**

**Measures of the extent to which each COBRE junior investigator and each center's group of junior investigators achieved specific outcome goals by the end of Year 6**

Publishing Research in Peer-Reviewed Journals

The extent to which each junior investigator and the center's group of junior investigators were successful in publishing manuscripts in refereed scientific journals, as measured by the total number and average number of articles published per year by junior investigators after joining COBRE, with separate counts for first- and senior-authored articles. (Data source: PubMed)

Giving Presentations at Scientific Meetings

The extent to which each junior investigator and the center's group of junior investigators were successful in being invited to give talks and having posters and abstracts accepted for presentation at scientific conferences and other meetings, as measured by number of presentations and abstracts accepted during the investigator's 1<sup>st</sup> through 6<sup>th</sup> year after joining COBRE. (Data source: COBRE progress reports)

Applying for Research Grants

The extent to which each junior investigator and the center's group of junior investigators were successful in preparing and submitting one or more grant applications to organizations outside the institution, as measured by the total number of initial and amended competitive PHS grant applications submitted per year by junior investigators after joining COBRE, with separate counts for R01s and other types of PHS applications. (Data source: IMPAC II database)

Receiving One or More Research Grants

The extent to which each junior investigator and the center's group of junior investigators were successful in serving as PI or co-PI on one or more grant awards from organizations outside the institution, as measured by the total number and average number of grants awarded per year to junior investigators after joining COBRE, with separate counts for PHS grants. (Data sources: IMPAC-II database, COBRE progress reports)

Achieving Overall Research Success as an Independent Investigator

The extent to which each junior investigator and the center's group of junior investigators were successful in publishing and obtaining different types of research grants, as measured by an algorithm approved by NCCR that produced a summary score ranging from 1 to 5, with 5 being the highest possible score (Data sources: PubMed, IMPAC-II, COBRE progress reports)

Continuing to Participate in COBRE Activities

The extent to which each junior investigator and the center's group of junior investigators continued to pursue research at the COBRE institution or an institution in another IDeA state and continued to participate in COBRE activities after they no longer received COBRE funding. (Data sources: COBRE progress reports, renewal grant application and summary statement)

**EXTERNAL FACTORS**    **The extent to which each COBRE center experienced unexpected events outside its control and strategies employed by the center in response to these events**

Unexpected Positive or Negative Events Over Which the Center Had No Control

The extent to which the center was faced with unexpected positive events (e.g., hiring of a university president or dean with a research background, state budget surplus) and/or unexpected negative events (e.g., fire, hurricane, flooding, departure or death of a senior investigator, state budget cut). Specific strategies employed by the center in response to each of these events. (Data sources: COBRE progress reports, renewal grant application and summary statement)

## APPENDIX B

### TECHNICAL NOTES ON DATA METHODS AND ANALYSES

## APPENDIX B

### TECHNICAL NOTES ON DATA METHODS AND ANALYSES

## Appendix B

### PROCESS EVALUATION OF COBRE PROGRAM

## Technical Notes on Data Methods and Analyses

### Counting Scientific Publications

To obtain an objective count of each individual's scientific publications (including those involving social/behavioral research), the PubMed database maintained by the National Library of Medicine was used as the primary data source. PubMed includes over 17 million citations from MEDLINE and other life science journals for biomedical articles.

The following procedures were used to identify research articles published by each junior investigator who received substantial COBRE support for at least one year during FY 2001-2003:

- Searches were limited to articles published in English between January 1975 and September 2007.
- Variations of a person's name were used to ensure that all publications were counted. This was especially important for individuals who were not consistent in using their middle initial and for individuals who changed their last name (primarily women).
- For individuals having common surnames, PubMed query functions were used to identify abstracts involving specific research areas, co-authors, and/or academic institutions.
- All abstracts of articles identified in PubMed searches were assessed to eliminate false matches.
- Case reports, comments, editorials, and other types of articles not directly related to a scientific research study were excluded.
- The total number of research articles was calculated for each individual, with separate counts of the number of articles for which the individual was (1) first author, and (2) senior (last) author. Sole-authored articles were counted as first-authored rather than senior-authored publications.
- Variations of a person's name were used to ensure that all publications were counted. This was especially important for individuals who were not consistent in using their middle initial and for individuals who changed their last name (primarily women).

## **Categorizing and Coding Academic Position**

IMPAC II and web searches were conducted to identify the current employment (as of Sept 2007) of each junior investigator who received substantial COBRE support for at least one year during FY 2001-2003. Nearly all of the individuals held academic-type positions, which in most cases could be categorized using the *Faculty Titles Dictionary* developed by the American Association of University Professors. The following categories and codes were used:

Tenured and tenure-track positions at academic institutions:

- Full professor, code = 3
- Assoc prof, code = 2
- Asst prof, code = 1

Tenured and tenure-track positions at research institutes and private laboratories:

- Assoc member of the staff, code =2
- Asst member of the staff, code =1

Non-tenure-track positions at academic institutions:

- Assoc research prof (also research assoc prof, research scientist, assoc prof in residence, adjunct assoc prof), code = 2R
- Asst research prof (also research asst prof, assoc research scientist, senior research associate, asst prof in residence, adjunct asst prof, code = 1R
- Instructor (also research assoc), code = 0R

Non-tenure-track positions at research institutes and private laboratories:

- Senior scientist, code = 2R
- Scientist (also asst research investigator, clinical investigator, investigator), code = 1R

## Identifying the Most Successful COBREs

To assess the extent to which the COBRE centers achieved the program's process goals (Study Question 3), six algorithms were developed – one for each of the process goals listed in the conceptual framework ([Exhibit 1](#)). Each algorithm (approved by NCCR) incorporated several data variables based on the operational definition of the particular goal. Quantitative data variables were used whenever possible (e.g., number of new COBRE hires, percent of junior investigators who left their COBRE institution during Years 1-6). However, in some cases qualitative data variables were needed to summarize collected from NCCR program documents (e.g., emphasis given to enhancing core facilities, EAC's enthusiasm for the center). For every center, each variable that was qualitative in nature was assigned a Likert-scale score ranging from 1 to 3 (e.g., 3 = strong emphasis, 2 = considerable emphasis, 1 = not much emphasis evidently given to this area). To enhance the reliability and validity of the scores assigned, the project director coded all of the qualitative variables based on the information obtained from program documents and the operational definition of the particular process goal, maintained written notes to justify the assigned score, and independently performed the same scoring process two months later after reviewing the program documents again. The resulting test-retest reliability coefficients for the qualitative variables were reasonably high (ranging from 77% to 100%) and cases in which the scores differed were given additional scrutiny to determine the final score.

After the data relevant to a particular process goal had been collected and reviewed for accuracy and completeness, the algorithm for that goal was then applied. The results were summarized in a table to show how each center fared with respect to the different variables assigned to that goal. To compare the centers' overall performance with respect to the goal, the findings for each variable were converted to standard  $z$ -scores and averaged for each center (shown in the right-most column of the table). A positive average  $z$ -score indicated an above-average rating and a negative average  $z$ -score indicated a below-average rating with respect to the particular process goal. The final results of the analyses (shown in [Exhibits 5-10](#)) identified the COBREs that were most successful in achieving each of the process goals. These centers were further analyzed to identify which strategies ("best practices") appeared to be most relevant to their success.

## APPENDIX C

### CENTER SNAPSHOTS FOR 18 COBRES



PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**AR1 Center for Protein Structure and Function, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Denise V Greathouse, PhD **	2.9 pubs/yr + 0 grants	UA / Chem & Biochem	Koepppe	2.2 pubs/yr + state grant
Ralph LeRoy Henry, PhD *	1.8 pubs/yr + 0 grants	UA / Biol Sci	Millett	2.2 pubs/yr + <b>P01 sub</b> , 2 DOE grants, 2 state grants
David Mack Ivey, PhD *	0.9 pubs/yr + R15	UA / Biol Sci	Koepppe, Davis, Durham	0.0 pubs/yr + 0 grants
Michael Lehmann, PhD (R) *	1.1 pubs/yr + 0 grants	UA / Biol Sci	Koepppe	1.0 pubs/yr + <b>R15</b> , NSF grant, 2 state grants
Grover Paul Miller, PhD (R) *	1.9 pubs/yr + F32	UAMS / Biochem & Molec Biol	Raney	1.3 pubs/yr + AHA grant, ACS grant
Joshua Sakon, PhD *	0.9 pubs/yr + 0 grants	UA / Chem & Biochem	Millett, Koepppe, Davis, Durham	1.6 pubs/yr + 2 DOE grants, USDA grant, state grant
Wesley E Stites, PhD **	1.6 pubs/yr + R15, F32	UA / Chem & Biochem	Wilkins, Yu, Pulay, Millett	1.8 pubs/yr + <b>R15</b> , state grant
Kenneth D Turnbull, PhD *	0.5 pubs/yr + 0 grants	UA / Chem & Biochem	Schafer, Gawley	0.2 pubs/yr + NSF grant
David A Vivic, PhD (R) *	2.6 pubs/yr + 0 grants	UAMS / Biochem & Molec Biol	Gawley	5.7 pubs/yr + ACS grant, 2 state grants
<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Kathryn D Curtin, PhD (R)	F32	UA / Biol Sci	Henry	0
Robyn L Goforth, PhD *	0	UA / Biol Sci	Henry	0
Thallampuranam K S Kumar, PhD (R) *	0	UA / Chem & Biochem	Yu	State grant
Travis L Spurling, PhD	0	UAMS / Biochem & Molec Biol	Raney	0
Alan J Tackett, PhD (R)	0	UAMS / Biochem & Molec Biol		0
<u>External Advisory Committee</u>	<u>Instit / Dept</u>			
Olaf S. Andersen, MD - Yr 1-6	Cornell U / Physiol, Biophys			
Jeffrey Aube, PhD - Yr 5-6	U Kansas / Medicinal Chem			
Rachel E Klevit, PhD - Yr 5-6	U Washington / Biochem			
Fusao Takusagawa, PhD - Yr 1-6	U Kansas / Molec Biosci			
Chang-An Yu, PhD - Yr 1-6	Oklahoma State U / Biochem			

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**DE1 Structural and Functional Genomics → Membrane Protein Production and Characterization**

[www.che.udel.edu/cobre/](http://www.che.udel.edu/cobre/)

**Grant Number** P20 RR015588  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Abraham M Lenhoff, PhD UD / Chem Engr

**Major Achievements in Yrs 1-6.** Awarded a full tuition waiver for all COBRE graduate students (\$35K each). Began planning for new multidisciplinary PhD program in Biomolec Sci & Engineering with several tracks. Helped fund a new super computer cluster (128-node server) administered by DBI.

**Center's Research Focus** Expression, purification and crystallization of membrane proteins to determine their structures and characterize their functions at the molecular level and in larger biological systems.

**Major Challenges.** Engaging senior administrators. Recruiting new faculty and retaining promising young faculty. Adding permanent faculty positions given state funding constraints. Transitioning to a more focused research agenda. Creating a good COBRE website.

**Participating Institutions**

University of Delaware (UD)

Delaware Biotechnology Institute (DBI)

**Location**

Newark, DE

Newark, DE

**Primary Departments Active in COBRE**

Chem Engr, Biol Sci, Chem & Biochem, Plant & Soil Sci, Comp & Info Sci

Biotechnology

**Strengths / Innovative Strategies.**

Atypical approach used: Initial COBRE subprojects involved topics somewhat peripheral to junior invs' main rsch focus. Both EAC and IAC reviewed and selected pilot projects. Awarded \$50-75K pilot projects to 12 junior investigators.

**COBRE-Funded Cores**

Administrative Core  
 Protein Production Core  
 Bioimaging Center  
 X-Ray Crystallography Core  
 Biotechnology Core  
 Bioinformatics Core

**Director / Coordinator**

Lenhoff  
 Wu  
 Czymmek  
 Bahnson  
 Lenhoff, A Robinson  
 O'Neal

**Instit / Dept**

UD / Chem Engr  
 DBI  
 DBI  
 UD / Chem & Biochem  
 UD / Chem Engr  
 DBI

**Core Notes**

Admin coord'r (8-40%)

**Experienced Investigators Active in COBRE**

Patricia A DeLeon, PhD - IAC member  
 Pamela J Green, PhD  
 Mahendra Kumar Jain, PhD - IAC member  
 Eric W Kaler, PhD - IAC member  
 John T Koh, PhD - IAC member  
 Abraham M Lenhoff, PhD - IAC member  
 Ulhas P Naik, PhD \*\*  
 Norman J Wagner, PhD (PP)

**Previous PHS Grants**

3 R01s, R03, 3 S07 subs  
 R03, F32  
 6 R01s, R03, S07, S15, 2 P41 subs  
 0  
 2 R01s  
 0  
 R01, R29  
 0

**Instit / Dept**

UD / Biol Sci  
 UD / Plant & Soil Sci  
 UD / Chem & Biochem  
 UD / Chem Engr  
 UD / Chem & Biochem  
 UD / Chem Engr  
 UD / Biol Sci  
 UD / Chem Engr

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**DE1 Structural and Functional Genomics → Membrane Protein Production and Characterization, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Brian J Bahnson, PhD * - IAC member	0.9 pubs/yr + F32	UD / Chem & Biochem	Jain, Lenhoff, Kaler	2.8 pubs/yr + <b>R01</b> , indus grant
Yong Duan, PhD *	1.8 pubs/yr + P41 sub	UD / Chem & Biochem	Lenhoff	5.6 pubs/yr + <b>3 R01s, 3 P41 subs</b>
Jeremy S Edwards, PhD *	4.0 pubs/yr + T32 predoc	UD / Chem Engr	Lenhoff, Wagner	5.6 pubs/yr + <b>R21</b>
Anne Skaja Robinson, PhD - IAC member **	2.0 pubs/yr + F32	UD / Chem Engr	Lenhoff, Kaler	6.3 pubs/yr + <b>3 R01s</b> , 2 NSF grants
Clifford R Robinson, PhD - IAC member **	1.8 pubs/yr + R43, F32, T32 predoc	UD / Chem & Biochem	Lenhoff, Kaler	1.5 pubs/yr + <b>P20 sub</b>

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Eric M Furst, PhD (PP)	0	UD / Chem Engr		<b>R01</b> , NSF grant
Javier Garcia-Frias, PhD (PP)	0	UD / Elec & Comp Engr		Indus grant
Chandra Kambhamettu, PhD (PP)	0	UD / Comp & Info Sci		NSF grant
Kristi L Kiick, PhD (PP)	0	UD / Matls Sci & Engr		<b>R13</b> , 2 fdn grants
Catherine Kim-Safran, PhD (PP)	0	UD / Biol Sci		0
Jung-Youn Lee, PhD (PP) *	0	UD / Plant & Soil Sci	Green	NSF grant
Li Liao, PhD (PP)	0	UD / Comp & Info Sci		0
Blake C Meyers, PhD (PP)	0	UD / Plant & Soil Sci		NSF grant
Darrin J Pochan, PhD (PP)	0	UD / Matls Sci & Engr		NSF grant, indus grant
Tatyana Polenova, PhD (PP)	0	UD / Chem & Biochem		2 NSF grants
Christopher J Roberts, PhD (PP)	0	UD / Chem Engr		Fdn grant
Joel P Schneider, PhD (PP) *	0	UD / Chem & Biochem		<b>R01</b> , fdn grant
Erica M Selva, PhD (PP)	F32	UD / Biol Sci		Fdn grant
Millicent M Sullivan, PhD	F32	UD / Chem Engr		0

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Michael J Betenbaugh, PhD - Yr 6	J Hopkins U / Chem, Biomolec Engr
Anastasia A M Christianson, PhD - Yr 3-6	AstraZeneca / Comput Chem, Biol
Lila M Gierasch, PhD - Yr 4-5	U Mass Amherst / Biochem & Mol Biol
Patrick J Loll, PhD - Yr 6	Drexel U Med / Biochem
Dagmar Ringe, PhD - Yr 3-6	Brandeis U / Biochem, Chem
Thomas P Sakmar, PhD - Yr 6	Rockefeller U / Molec Biol, Biochem
James S Schwaber, PhD - Yr 4-5	Th Jefferson U Med / Funct Genomics

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. (PP) Directed a COBRE pilot project. (R) Received a COBRE recruitment package. (ext) External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**ID1 Molecular and Cellular Basis for Host-Pathogen Interactions**

[www.ag.uidaho.edu/cobre/](http://www.ag.uidaho.edu/cobre/)

**Grant Number** P20 RR 015587  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Gregory A Bohach, PhD UI / MMBB

**Major Achievements in Yrs 1-6.** Created and filled 2 new tenure-track positions in MMBB dept + university created 4 more tenure-track positions for research faculty. Increased grad student recruitment with higher stipends, reduced tuition, and scholarships. Established microscopy core. Leveraged COBRE funding to obtain private funds for enhanced core facilities. Excellent website.

**Center's Research Focus** Molecular and cellular basis of host-pathogen interactions, with an emphasis on microbial pathogenesis in infection.

**Major Challenges.** Broadening mentor pool beyond PD (no IAC in Yr 1-5). Establishing an MD/PhD program at UI without strong institutional support.

**Participating Institutions**

University of Idaho (UI)  
  
Boise VA Medical Center (VA Med)

**Location**

Moscow, ID  
  
Boise, ID

**Primary Departments Active in COBRE**

Microbiol Molec Biol Chem (MMBB), Animal & Vet Sci, Biol Sci  
  
Infec Dis

**Strengths / Innovative Strategies.**

Strong institutional commitment (\$4M for lab space, equipmt) + 50% of indirect costs returned to COBRE (30% to invs). Strengthened affiliation with 5-state WWAMI Program to encourage med students to pursue research. Internal mentoring committee + several external mentors added in Yr 6.

**COBRE-Funded Cores**

Administrative Core  
Microscopy Core  
Flow Cytometry Core  
Molecular Biology Core  
Genomics Core

**Director / Coordinator**

Bohach  
Norton  
Ferens, Seo  
Daughdrill  
Fusco

**Instit / Dept**

UI / MMBB  
UI / MMBB  
UI / MMBB  
UI / MMBB  
UI / MMBB

**Core Notes**

Admin asst (0-100%)  
  
Yr 4 suppl funded cell separation equipment

**Experienced Investigators Active in COBRE**

Gregory A Bohach, PhD  
Elizabeth A Fortunato, PhD \*  
Alex Hristov, PhD  
Carl Hunt, PhD  
Michael B Laskowski, PhD  
Bruce L Miller, PhD \*  
Dennis Stevens, PhD  
Christopher J Williams, PhD

**Previous PHS Grants**

R01, R29, P51, S07, S15  
R01, R21  
0  
0  
4 R01s  
R01, P50, 2 P01s, T32, 9 M01 subs  
0  
R03

**Instit / Dept**

UI / MMBB  
UI / MMBB  
UI / Animal & Vet Sci  
UI / Animal & Vet Sci  
UI / Biol Sci  
UI / MMBB  
VA Med / Infec Dis  
UI / Statistics

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**ID1 Molecular and Cellular Basis for Host-Pathogen Interactions, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Kenneth W Bayles, PhD **	2.0 pubs/yr + R03, R29	UI / MMBB	Bohach	3.2 pubs/yr + <b>R01, 2 R13s</b> , DoD grant
Amy E Bryant, PhD *	7.3 pubs/yr + 0 grants	VA Med / Infec Dis	Bohach, Stevens	2.4 pubs/yr + 0 grants
Kurt E Gustin, PhD (PP)	1.2 pubs/yr + T32 predoc, postdoc	UI / MMBB	Bohach	1.3 pubs/yr + <b>R56</b> , ACS grant
Carolyn J Hovde (Bohach), PhD *	1.3 pubs/yr + R29, S15, F32	UI / MMBB	Bohach	4.8 pubs/yr + <b>U54 sub</b> , USDA, fdn grant, 2 indus grants
Jill L Johnson, PhD (PP)	1.1 pubs/yr + F32	UI / MMBB	Bohach	1.3 pubs/yr + 0 grants
Troy L Ott, PhD *	4.9 pubs/yr + 0 grants	UI / Animal & Vet Sci	Bohach	3.0 pubs/yr + 2 USDA grants

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Gustavo Arrizabalaga, PhD *	K22, F31, F32	UI / MMBB	Bohach, White (ext)	0
Scott D Kobayashi, PhD *	K22	UI / MMBB	Bohach, Quinn (ext)	0
Mark Adam McGuire, PhD *	0	UI / Animal & Vet Sci	Bohach, Lonnerdal (ext)	2 USDA grants, 2 indus grants

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Stephen Calderwood, MD - Yr 1-5	Harvard U / Infec Dis
Robert Coombs, MD, PhD - Yr 5-6	U Washington / Med, Virol
Olaf Schneewind, MD, PhD - Yr 1-6	UCLA & U Chicago / Molec Gen
Shousun C Szu, PhD - Yr 1-6	NICHD / Molec Immun
Ching Chung Wang, PhD - Yr 6	UCSF / Chem, Pharm Chem

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KS1 Center for Cancer Experimental Therapeutics**

<http://ccet.cobre.ku.edu/>

<b>Grant Number</b>	P20 RR 015563	
<b>Project Start Date</b>	Sept 2000	
<b>Program Director (PD) - Yr 1-6</b>	Gunda I Georg, PhD	KU / Med Chem
<b>Program Director (PD) - Yr 7</b>	Barbara N Timmermann, PhD	KU / Med Chem
<b>Co-Program Director (Co-PD) - Yr 3-6</b>	Richard H Himes, PhD	KU / Molec Biosci

**Major Achievements in Yrs 1-6:** Enlisted 23 junior invs to lead subprojects and pilot projects. Established one of the few academic HTS labs in U.S. Leveraged COBRE funding to support new \$6M Molec Library Screening Ctr, \$5M Structural Biol Ctr, \$10M Ctr for Methodol & Library Dev, consistent with KU's strategic plan for life sciences. KU provided 6,500 sq ft additional core lab space + >\$2M. A junior inv's research led to a major finding involving stem cells. Excellent website.

**Center's Research Focus**

Cancer-related research at the interface between chemistry and biology, with an emphasis on identifying novel bioactive compounds for use as basic biomedical research tools and new therapeutic agents.

**Major Challenges:** Coordinating consortium of 4 universities and many depts (e.g., getting dept chairs to phase in new faculty hires so research programs were complementary). Resolving billing and intellectual property issues for HTS core and director's salary.

**Participating Institutions**

University of Kansas - Lawrence (KU)

University of Kansas Medical Center (KUMC)

Kansas State University (KSU)

Emporia State University (ESU)

**Location**

Lawrence, KS

Kansas City, KS

Manhattan, KS

Emporia, KS

**Primary Departments Active in COBRE**

Med Chem, Molec Biosci, Chemistry, Pharm & Toxicol, Pharm Chem

Pharm, Toxicol & Therapeutics; Pathol & Lab Med; Anat & Cell Biology; Hemat & Oncology; Surgery; Urology

Biology, Chemistry, Biochem, Human Nutrition

Biology

**Strengths / Innovative Strategies:** Extensive mentoring and rsch support for junior invs. Very active EAC. Innovative pilot project program (\$100K First Awards) with external review process for selecting projects. Strong institutional support. Kansas Economic Growth Act (passed by state legislators in 2004) allocated \$500M over 10 years to recruit 60 bioscientists and fund research infrastructure.

**COBRE-Funded Cores**

Administrative & Mentoring Core  
High Throughput Screening (HTS) Laboratory  
Combinatorial & Medicinal Chemistry Core

**Director / Coordinator**

Georg, Himes  
Ye  
Georg, Mitscher, Hanson

**Instit / Dept**

KU / Med Chem  
KU / Med Chem  
KU / Med Chem

**Core Notes**

Pgm mgr (85-100%), award coordr

**Experienced Investigators Active in COBRE**

Jeffrey Aubé, PhD  
Sushanta K Banerjee, PhD  
Stephen Keith Chapes, PhD - IAC member  
Robert S Cohen, PhD \*  
Richard Consigli, PhD - IAC member  
Gunda I Georg, PhD - IAC member  
Paul Ronald Hanson, PhD  
Robert P Hanzlik, PhD - IAC member  
Charlie Hedgcoth, Jr, PhD - IAC member  
Richard H Himes, PhD - IAC member  
Joan S Hunt, PhD - IAC member

**Previous PHS Grants**

2 R01s, R29, F32  
0  
2 R01s, S15, P20 sub  
R01, F32  
6 R01s, 4 T32s, S15, K03  
8 R01s, N01 sub  
R01, F32  
10 R01s, R13, P41, T32  
2 R01s  
8 R01s, S10, F33  
6 R01s, R21, R29, R03, R13

**Instit / Dept**

KU / Med Chem  
KUMC / Hemat & Oncology  
KSU / Biology  
KU / Molec Biosci  
KSU / Biology  
KU / Med Chem  
KU / Chemistry  
KU / Med Chem  
KSU / Biochem  
KU / Molec Biosci  
KUMC / Anat & Cell Biol

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KS1 Center for Cancer Experimental Therapeutics, continued**

<u>Experienced Investigators Active in COBRE, cont'd</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>
Ryszard Jankowiak, PhD (PP)	P01 sub	KSU / Chemistry
Roy Andrew Jensen, PhD - IAC member	R01, R29, 2 P30 subs	KUMC / Pathol & Lab Med
Terry C Johnson, PhD - IAC member	3 R01s	KSU / Biology
Paul T Kelly, PhD	7 R01s, 2 K04s, F32, F22	KU / Molec Biosci
Curtis D Klaassen, PhD	12 R01s, 5 T32s, P50 sub	KUMC / Pharm, Toxicol & Ther
Denis M Medeiros, PhD	2 R01s, R23, R25	KSU / Human Nutrition
Mary Lou Michaelis, PhD - IAC member	R01, R23, 2 P30 subs	KU / Pharm & Toxicol
Lester A Mitscher, PhD	8 R01s, R09, 3 T32s	KU / Med Chem
Robert E Palazzo, PhD - IAC member	2 R01s, F32	KU / Molec Biosci
Jill C Pelling, PhD - IAC member	7 R01s, K04	KUMC / Pathol & Lab Med
Jean-Pierre H Perchellet, PhD - IAC member	3 R01s	KSU / Biology
William D Picking, PhD	R01, R29, P20 sub	KU / Molec Biosci
Teruna Siahaan, PhD	3 R01s	KU / Pharm Chem
Peter G Smith, PhD	3 R01s, S07 sub	KUMC / Molec & Integr Physiol
Brian S Spooner, PhD - IAC member	4 R01s	KSU / Biology
Kathy A Suprenant, PhD *	0	KU / Molec Biosci
Paul F Terranova, PhD - IAC member	6 R01s, P30, K04	KUMC / Ctr Reprod Sci
David G Vander Velde, PhD	S10	KU / Chemistry
Todd D Williams, PhD	S10	KU / Med Chem
Stephen K Williamson, PhD	0	KUMC / Hemat & Oncology
Qi-Zhuang Ye, PhD * (PP)	0	KU / Med Chem

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Kristi L Neufeld, PhD *	1.1 pubs/yr + T32 predoc	KU / Molec Biosci	Michaelis	0.3 pubs/yr + <b>R01</b>
Sandra L Quackenbush, PhD *	3.3 pubs/yr + F32, T32 postdoc	KU / Molec Biosci	Palazzo	2.0 pubs/yr + <b>R01</b>
Katherine F Roby, PhD *	2.7 pubs/yr + 2 R03s, F32	KUMC / Anat & Cell Biol	Terranova	3.4 pubs/yr + <b>R41</b> , state grant, indus grant
Lisa D Timmons, PhD * (PP)	1.8 pubs/yr + F32, T32 predoc	KU / Molec Biosci	Himes	2.0 pubs/yr + NSF grant
Scott C Todd, PhD *	2.0 pubs/yr + T32 postdoc	KSU / Biology	Georg, Himes, Perchellet	0.8 pubs/yr + <b>R13</b>
Sandra Catherine Vigil-Cruz, PhD * (PP)	0.3 pubs/yr + 0 grants	KU / Med Chem	Georg, Himes	0.3 pubs/yr + 0 grants

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Katsura Asano, PhD (PP)	0	KSU / Biology	Johnson, Spooner	<b>R01</b>
Snigdha Banerjee, PhD *	0	KUMC / Hemat & Oncology	SK Banerjee, Williamson	2 indus grants
Paul W Baures, PhD	F32	KSU / Chemistry	Georg	<b>P41</b>
Cory Berkland, PhD (PP)	0	KU / Chem & Petrol Engr	Siahaan	AHA grant, 4 fdn grants
Keith R Buszek, PhD	0	KSU / Chemistry	Georg	<b>R01, P50 sub</b>
Scott S Crupper, PhD	0	ESU / Biology	Georg, Himes, Mitscher	<b>R15</b> , USDA grant, state grant
Apurba Datta (or Dutta), PhD * (PP)	0	KU / Med Chem	Aube	Fdn grant
Sunil Abraham David, MD, PhD (PP)	0	KU / Molec Biosci	Hedgcoth, Aube	<b>R01, 2 R03s, 2 U01s</b>
Truman Christopher Gamblin, PhD (PP)	F32	KU / Molec Biosci	Hedgcoth	<b>R01, K02</b>
Leijun Grace Guo, PhD (PP)	0	KUMC / Pharm, Toxicol & Ther	Klaassen	Fdn grant
Edina Harsay, PhD *	R03, F32	KU / Molec Biosci	Picking	AHA grant
Benyi Li, PhD (PP)	0	KUMC / Surgery, Urology	Terranova	3 DoD grants, 3 fdn grants

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KS1 Center for Cancer Experimental Therapeutics, continued**

Other Non-R01 Junior Investigators, cont'd

Erik A Lundquist, PhD  
 Gerald H Lushington, PhD  
 Kathy E Mitchell, PhD (PP)  
 Minae Mure, PhD \*  
 A Lorena Passarelli, PhD (PP)  
 Diane L Persons, MD (PP)  
 Roland J Seifert, MD, PhD  
 Gregory B Vanden Heuvel, PhD (PP)  
 Weiqun (George) Wang, PhD (PP)  
 Robert Edwin Ward, PhD \*  
 Anna Zolkiewska, PhD (PP)

Previous PHS Grants

F32  
 0  
 P20 sub, F32  
 0  
 P20 sub  
 0  
 0  
 0  
 0  
 F32  
 R03, 3 Z01s

Instit / Dept

KU / Molec Biosci  
 KU / Molec Graphics & Modeling  
 KU / Pharm & Toxicol  
 KU / Chemistry  
 KSU / Biology  
 KUMC / Pathol & Lab Med  
 KU / Pharm & Toxicol  
 KUMC / Anat & Cell Biol  
 KSU / Human Nutrition  
 KU / Molec Biosci  
 KSU / Biochem

Mentors

Suprenant  
 Mitscher  
 Smith  
 Himes  
 Consigli, Spooner  
 Pelling, Terranova  
 Himes  
 Terranova  
 Medeiros  
 Cohen  
 Consigli, Kelly

PHS Grants After Joining COBRE

**2 R01s**  
 2 DoD grants, AHA grant  
 0  
 0  
 0  
 0  
 AHA grant, fdn grant  
**2 R01s, P50 sub**  
**R01**  
**R01**  
**R01, P20 sub**

External Advisory Committee

Joffre Baker, PhD - Yr 6  
 Dale L Boger, PhD - Yr 1-6  
 Edward Bresnick, PhD - Yr 1-3  
 Robert B Diasio, MD - Yr 1-6  
 William N Hait, MD, PhD - Yr 1-5  
 Susan Band Horwitz, PhD - Yr 1-5  
 Mary Ann Jordan, PhD - Yr 2-6  
 James William Lown, PhD - Yr 1-6  
 Garth Powis, DPhil - Yr 1-2  
 Leanne Marie Wiedemann, PhD - Yr 2-6

Instit / Dept

Genomic Health, Inc  
 Scripps Rsch Instit/ Chem  
 Dartmouth U Med / Biochem  
 Mayo Clinic / Pharmacol  
 Cancer Instit of NJ  
 Alb Einstein Med / Pharmacol  
 UCSB / Neurosci Rsch Instit  
 U Alberta/ Chem  
 U Ariz Med / Pharmacol  
 Stowers Instit Med Rsch

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KY1 Mechanisms of Plasticity and Repair After Spinal Cord Injury**

[www.louisville.edu/kscirc/](http://www.louisville.edu/kscirc/)

**Grant Number** P20 RR015576  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Scott R Whittemore, Ph.D. UL / Neurol Surgery

**Major Achievements in Yrs 1-6.** Created and filled 4 new permanent positions in Yrs 1-2. Renovated 10,600 sq ft lab space to bring COBRE labs closer together, leading to substantial research collaboration between COBRE subproject leaders and cores. Leveraged COBRE funding to create the Kentucky Spinal Cord Injury Research Center (KSCIRC), obtain additional state funds, and establish endowed chairs.

**Center's Research Focus** Molecular and cellular mechanisms of spinal cord injury and repair, with an emphasis on developing and characterizing clinically relevant animal models.

**Major Challenges.** Broadening mentor pool beyond PD. Recruiting new research faculty after Yr 2. Getting junior invs to publish more.

**Participating Institutions**

University of Louisville (UL)

Murray State University (MSU)

**Location**

Louisville, KY

Murray, KY

**Primary Departments Active in COBRE**

Neurol Surgery, Anat Sci & Neurobiol, Pediatrics

Biol Sciences

**Strengths / Innovative Strategies.**

Admin core included experts to help COBRE invs with research design and grants mgmt. IAC and EAC gave junior invs candid feedback at regular intervals.

**COBRE-Funded Cores**

Administration & Research Support Core  
 Cell Culture & Molecular Biology Core  
 Surgery & Animal Care Core  
 Electrophysiology & Behav'l Assessment Core  
 Microscopy Core

**Director / Coordinator**

Whittemore  
 Whittemore, Canning  
 Onifer, Magnuson  
 Magnuson  
 Roisen

**Instit / Dept**

UL / Neurol Surgery  
 UL / Neurol Surgery  
 UL / Neurol Surgery  
 UL / Neurol Surgery  
 UL / Anat Sci & Neurobiol

**Core Notes**

Admin assoc (100%), grants mgmt specialist, senior rsch analyst, rsch assts

**Experienced Investigators Active in COBRE**

Nicholas A Delamere, PhD - IAC member  
 Aly A Farag, PhD  
 Ronald G Gregg, PhD - IAC member  
 Theo Hagg, MD, PhD  
 Charles H Hubscher, PhD \*  
 Kathleen M Klueber, PhD  
 George D Mower, PhD - IAC member  
 Stephen M Onifer, PhD \*  
 MengSheng (Matthew) Qiu, PhD - IAC member  
 Fred J Roisen, PhD \*  
 Christopher B Shields, MD \*  
 Eugenia Wang, PhD - IAC member  
 Scott R Whittemore, PhD  
 Xiao-Ming Xu, MD - IAC member  
 Yi Ping Zhang, MD

**Previous PHS Grants**

5 R01s, S07 sub  
 R21  
 R01, 2 P01 subs, F32  
 0  
 R01  
 R29  
 3 R01s  
 R01  
 R01, F32  
 R01, S10, P50 sub, P10 sub  
 0  
 5 R01s, R37, 2 R13s, P01 sub  
 3 R01s, N01, R55, 2 F32s  
 F31  
 0

**Instit / Dept**

UL / Ophthalmol, Pharm/Tox  
 UL / Elec Engr  
 UL / Biochem & Molec Biol  
 UL / Neurol Surgery  
 UL / Anat Sci & Neurobiol  
 UL / Anat Sci & Neurobiol  
 UL / Anat Sci & Neurobiol  
 UL / Neurol Surgery  
 UL / Anat Sci & Neurobiol  
 UL / Anat Sci & Neurobiol  
 UL / Neurol Surgery  
 UL / Biochem & Molec Biol  
 UL / Neurol Surgery  
 UL / Anat Sci & Neurobiol  
 UL / Neurol Surgery

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KY1 Mechanisms of Plasticity and Repair After Spinal Cord Injury, continued**

**Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup>**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Evelyne Gozal, PhD **	5.6 pubs/yr + 0 grants	UL / Pediatrics	Xu, Whittemore, Hagg	4.4 pubs/yr + <b>R01</b>
Michal Hetman, MD PhD (R) **	3.5 pubs/yr + 0 grants	UL / Neurol Surgery	Hagg, Whittemore	1.8 pubs/yr + <b>R01</b> , state grant, 2 fdn grants
David S K Magnuson, PhD *	1.4 pubs/yr + T32 postdoc	UL / Neurol Surgery	Whittemore	2.6 pubs/yr + <b>R01</b> , state grant
Guang Jian Wang, PhD *	1.9 pubs/yr + T32 postdoc	UL / Pediatrics	Whittemore	0.5 pubs/yr + 0 grants

**Other Non-R01 Junior Investigators**

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
David R Canning, PhD *	R15	MSU / Biol Sci		State grant
Qi-Lin Cao, MD, PhD *	0	UL / Neurol Surgery		State grant
Welby Winstead, MD	0	UL / Med, Surg, Otolaryn		0

**External Advisory Committee**

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Jacqueline C Bresnahan, PhD - Yr 2-6	Ohio State / Neuroscience
Mary B Bunge, PhD - Yr 1-6	U Miami / Cell Biology & Anatomy
Gabriel Haddad, MD - Yr 1-3	Alb Einstein Med / Pediatrics
Larry M Jordan, PhD - Yr 1-6	U Manitoba / Physiology
David R Kaplan, PhD - Yr 6	Hosp for Sick Children / Physiology
Wolfram G Tetzlaff, MD, PhD - Yr 2-6	U British Columbia / Zoology

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KY2 Center of Biomedical Research Excellence in Women's Health (COBRE-WH)**

[www.mc.uky.edu/cobre/](http://www.mc.uky.edu/cobre/)

**Grant Number** P20 RR015592  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1** Phyllis M Wise, PhD UK / Physiology  
**Program Director (PD) - Yr 2-6** Thomas E Curry, Jr, PhD UK / ObGyn

**Major Achievements in Yrs 1-5.** Achieved more extensive collaborations between many depts. Developed an ovarian database. Created a formal mentoring program with many components. Leveraged COBRE funding to obtain funds from state, foundations, and donors to recruit new faculty. Excellent website.

**Center's Research Focus** Role of female reproductive hormones in manifestations of health and disease, with an emphasis on the impact of hormones and gender on heart disease, brain function, HIV, reproductive tract physiology, and behavior.

**Major Challenges.** Recruiting patients for a project involving hormone replacement therapy, which resulted in a modified study design. Departure of PD from university in Yr 2 (she joined EAC after leaving UK).

**Participating Institutions**

University of Kentucky (UK)

**Location**

Lexington, KY

**Primary Departments Active in COBRE**

ObGyn, Physiology, Anat & Neurobiol, Neurology, Statistics, Beh Sci, Clin Sci, Pediatrics, Cardiothor Surgery, Psychology, Pharmacology

**Strengths / Innovative Strategies.**

Atypical approach: Senior invs directed subprojects and mentored junior invs (each of whom directed a substudy and participated at  $\geq 25\%$  level of effort). Startup pkgs (\$100K) encouraged faculty to pursue research in women's health. Strong instit'l and state support for research.

**COBRE-Funded Cores**

Administrative Core  
 Animal Core  
 Imaging Facility  
 Biostatistical Core

**Director / Coordinator**

Curry  
 Smart, Rosewell  
 Kelly, Price  
 Kryscio

**Instit / Dept**

UK / ObGyn  
 UK / ObGyn  
 UK / Beh Sci, ObGyn  
 UK/Statistics

**Core Notes**

Admin'r (75-100%), rsch analyst

**Experienced Investigators Active in COBRE**

Joseph R Berger, MD \*  
 Rosemarie M Booze, PhD  
 Annadora J Bruce-Keller, PhD \*  
 Delwood C Collins, PhD - IAC member  
 Thomas E Curry, Jr, PhD - (PP) \*\*  
 Frederick C De Beer, MD - IAC member  
 Thomas F Garrity, PhD - IAC member  
 Don M Gash, PhD - IAC member  
 Lothar H Jennes, PhD \*  
 Thomas H Kelly, PhD \*  
 Richard J Kryscio, PhD  
 Catherine A Martin, MD  
 Kenneth N Muse, Jr, MD  
 Avindra Nath, MD \*  
 Craig R Rush, PhD  
 Eric James Smart, PhD \*  
 David S Watt, PhD - IAC member  
 Phyllis M Wise, PhD - PD

**Previous PHS Grants**

R01, P01, 2 R13s, M01 sub  
 4 R01s, S07, P50 sub, P01 sub  
 R01, R03  
 3 R01s, 2 T32s, N01 sub  
 2 R01s, R29  
 3 R01s  
 R01, 4 T32s  
 4 R01s, 3 P01s  
 4 R01s, P51 sub  
 2 R01s, R29, P50 sub, F32  
 R13, 2 P50 subs  
 K08, T01  
 0  
 3 R01s  
 2 R01s, M01 sub, F31  
 3 R01s, R29, F32  
 4 R01s, N01 sub, F02  
 6 R01s, P01, 2 T32s, R37, R13, K07

**Instit / Dept**

UK / Neurology  
 UK / Anat & Neurobiol  
 UK / Anat & Neurobiol  
 UK / ObGyn  
 UK / ObGyn  
 UK / Nutritional Sci  
 UK / Beh Sci  
 UK / Anat & Neurobiol  
 UK / Anat & Neurobiol  
 UK / Beh Sci  
 UK / Statistics  
 UK / Psychology  
 UK / ObGyn  
 UK / Neurology  
 UK / Beh Sci  
 UK / Physiol, Pediatrics  
 UK / Biochem  
 UK / Physiology

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**KY2 Center of Biomedical Research Excellence in Women's Health (COBRE-WH), continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Subramaniam (Subbu) Apparsundaram, PhD	2.0 pubs/yr + T32 postdoc	UK / Anat & Neurobiol	Jennes	3.7 pubs/yr + AHA grant, indus grant, 2 fdn grants
Scott E Diamond, PhD	0.9 pubs/yr + K01, T32 predoc	UK / Physiology	Jennes	1.0 pubs/yr + ACS grant, state grant
Misung Jo, PhD	1.7 pubs/yr + 0 grants	UK / ObGyn	Curry	1.3 pubs/yr + <b>R03</b>
Michael W Kilgore, PhD	1.9 pubs/yr + T32 predoc, postdoc	UK / Pharmacol	Curry	0.5 pubs/yr + <b>R01</b> , DoD grant, ACS grant
CheMyong (Jay) Ko, PhD (R)	1.4 pubs/yr + 0 grants	UK / Clin Sci	Curry	2.5 pubs/yr + <b>R01</b>
Carolyn M Komar, PhD	1.3 pubs/yr + T32 postdoc	UK / ObGyn	Curry	1.8 pubs/yr + <b>R03</b> , fdn grant
Melinda Elizabeth Wilson, PhD (R)	2.5 pubs/yr + F31, F32	UK / Physiology	Berger	3.8 pubs/yr + <b>R01</b> , <b>R03</b> , AHA grant

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Jane Elizabeth Joseph, PhD	F31, F32	UK / Anat & Neurobiol	Kelly	<b>R01</b> , NSF grant, fdn grant
Joshua Anthony Lile, PhD	F31	UK / Beh Sci	Kelly	<b>K01</b>
Valerie Ann Schroeder, MD	0	UK / Ped Cardiol	Smart	0
Jadwiga Turchan, PhD	0	UK / Anat & Neurobiol	Nath	0
Margaret Upchurch, PhD	0	Transylvania U / Psychol	Kelly	<b>R15</b>

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Barbara Jean Davis, DVM, PhD - Yr 2-6	Millenium Pharmaceuticals
Ariel Deutch, PhD - Yr 6	Vanderbilt U / Psychiatry
Harris A Gelbard, MD, PhD - Yr 2-5	U Rochester Med / Neurol, Peds
Kathleen A Grant, PhD - Yr 6	Oregon HSU / Beh Neurosci
Nobuyo Maeda, PhD - Yr 2-4	UNC Med / Pathology
Avindra Nath, MD - Yr 6	Johns Hopkins U / Neurol, Neurosci
Sergio Ojeda, DVM - Yr 2	Oregon Primate Rsch Ctr / Neurosci
Susan M Resnick, PhD - Yr 2-5	NIA / Personality & Cognition
William C Sessa, PhD - Yr 6	Yale U Med/ Pharmacol
Phyllis M Wise, PhD - Yr 2-6	U Washington / Provost & Exec VP

**NOTES**

<sup>1</sup> Junior investigators with no previous R01 grant who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**ME1 COBRE in Vascular Biology**

[www.mmcri.org/cmm/vascularCOBRE.html](http://www.mmcri.org/cmm/vascularCOBRE.html)

<b>Grant Number</b>	P20 RR 015555	
<b>Project Start Date</b>	Sept 2000	
<b>Program Director (PD) - Yr 1-4</b>	Thomas Maciag, PhD	MMCRI / Molec Med
<b>Co-Program Director (PD) - Yr 1-4</b>	Robert E Friesel, PhD	MMCRI / Molec Med
<b>Program Director (PD) - Yr 5-6</b>	Robert E Friesel, PhD	MMCRI / Molec Med
<b>Co-Program Director (PD) - Yr 5-6</b>	Don M Wojchowski, PhD	MMCRI / Molec Med

**Major Achievements in Yrs 1-6.** Created and filled 5 new permanent positions (3 jr, 2 sr). Collaborated with U Maine and Jackson Lab to create a new grad school in functional genomics and NSF-funded Institute for Molecular Biophysics. Moved into new 55,000 sq ft research building. Leveraged COBRE funding to obtain instit funds for startup packages, additional core facilities, and new Office of Research Development.

**Center's Research Focus** Cell and molecular mechanisms regulating development and homeostasis of the vascular system including vascular remodeling, angiogenesis, and disease mechanisms.

**Major Challenges.** Broadening local mentor pool beyond PD. Getting institutional commitment to hire a full-time MRI director and technical staff. PD's unexpected death in Yr 4 was a severe loss.

**Participating Institutions**

Maine Medical Center Research Institute (MMCRI)

**Location**

Scarborough, ME

**Primary Departments Active in COBRE**

Molec Med, Nephrology

**Strengths / Innovative Strategies.**

Developed extensive collaborations with other researchers in New England. Junior invs' R01 proposals reviewed by grant review committee 40 days before submission. EAC worked closely with junior invs at 2-day annual retreats. Strong instit'l support; new strategic plan completed in Yr 5 included a pledge of \$15M to increase MMCRI's research competitiveness.

**COBRE-Funded Cores**

Administrative Core  
Protein, Nucleic Acid Analysis & Cell Imaging Core  
Cell Culture & Viral Vector Core  
Mouse Transgenic & MRI Core

**Director / Coordinator**

Maciag, Friesel, Wojchowski  
Vary, Prudovsky, Spicer  
Mouta-Bellum, Yoon  
Liaw

**Instit / Dept**

MMCRI / Molec Med  
MMCRI / Molec Med  
MMCRI / Molec Med  
MMCRI / Molec Med

**Core Notes**

Admin asst (100%)

**Experienced Investigators Active in COBRE**

Kenneth A Ault, MD - IAC member  
Robert E Friesel, PhD  
Jonathan Himmelfarb, MD - IAC member  
Volkhard Lindner, MD, PhD \*\*  
Thomas Maciag, PhD \*  
Joseph M Verdi, PhD \*  
Don M Wojchowski, PhD \*

**Previous PHS Grants**

2 R01s, 2 P01s, S10, K04  
R01, R29, 2 P01 subs  
R01, U01, R29  
0  
13 R01s, P01, R13  
F32  
4 R01s, R29, S15, K04, F32

**Instit / Dept**

MMCRI / Director  
MMCRI / Molec Med  
MMCRI / Nephrology  
MMCRI / Molec Med  
MMCRI / Molec Med  
MMCRI / Molec Med  
MMCRI / Molec Med

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**ME1 COBRE in Vascular Biology, continued**

**Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup>**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Lucy Liaw, PhD *	3.4 pubs/yr + T32 predoc, postdoc	MMCRI / Molec Med	Friesel, Wojchowski	4.8 pubs/yr + <b>R01</b> , AHA grant, fdn grant
Carla Mouta-Bellum, PhD *	2.8 pubs/yr + 0 grants	MMCRI / Molec Med	Maciag, Seed (ext)	0.5 pubs/yr + <b>P20 sub</b>
Douglas Branch Spicer, PhD *	1.1 pubs/yr + F32, T32 predoc	MMCRI / Molec Med		0.4 pubs/yr + <b>R01</b> , AHA grant, 2 fdn grants
Calvin P H Vary, PhD **	1.0 pubs/yr + 0 grants	MMCRI / Molec Med		3.8 pubs/yr + <b>R01</b> , fdn grant
Jeong Kyo Yoon, PhD *	1.3 pubs/yr + 0 grants	MMCRI / Molec Med		0.8 pubs/yr + 0 grants

**Other Non-R01 Junior Investigators**

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Ilka Pinz, PhD *	0	MMCRI / Molec Med	Friesel	NSF grant
Igor A Prudovsky, PhD **	0	MMCRI / Molec Med		0

**External Advisory Committee**

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Dario Altieri, MD - Yr 4-6	U Mass Med / Cancer Ctr
Katherine Hajjar, MD - Yr 4-6	Cornell U / Cell & Dev Biology
Mark Israel, MD - Yr 4-6	Dartmouth Med / Cancer Ctr
Lester Lau, PhD - Yr 4-6	U Chicago Med / Biochem & Molec Genet
Sophia Merajver, MD, PhD - Yr 4-6	U Mich Med / Cancer Ctr
Dan Rifkin, PhD - Yr 1-6	NYU Med / Cell Biology
E Helene Sage, PhD - Yr 1-6	Benaroya Rsch Instit / Hope Heart Pgm

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

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	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**MT1 Center for Structural and Functional Neuroscience (CSFN)**

[www.umt.edu/csfn/](http://www.umt.edu/csfn/)

**Grant Number** P20 RR015583  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Richard J Bridges, PhD UM / Biomed & Pharm Sci  
**Co-Program Director (Co-PD) - Yr 3-6** Michael P Kavanaugh, PhD UM / Biomed & Pharm Sci

**Major Achievements in Yrs 1-6.** Hired 7 new faculty (5 jr, 2 sr) in Yr 1-2; tripled CSFN faculty in first 6 yrs. Acquired 24,000 sq ft of add'l rsch space for center. Recognized by UM Board of Regents as Center of Excellence. Established collaborations with UM, MSU, MRI, St Patrick's Hosp, and 2 biotech firms. Launched new PhD program in neuroscience (UM / MSU joint pgm). Leveraged COBRE funding to obtain instit'l, private sector, and \$1M state funds for startup packages, technology training, and enhanced core facilities. Excellent website.

**Center's Research Focus** Protein structure and function in the central nervous system, focusing on transport, membrane protein dynamics, and mechanisms of neurodegeneration.

**Major Challenges.** Recruiting postdocs and grad students for CSFN labs. Getting junior invs to publish more.

**Participating Institutions**

University of Montana (UM)

Montana State University (MSU)

McLaughlin Research Institute (MRI)

**Location**

Missoula, MT

Bozeman, MT

Great Falls, MT

**Primary Departments Active in COBRE**

Biomed & Pharm Sci, Biol Sci, Chemistry

Cell Biol & Neurosci

**Strengths / Innovative Strategies.**

Developed 3 formal workgroups (each led by a senior inv) to encourage CSFN collaborations and strategic recruiting. Designed annual statewide neuroscience retreats so EAC and other external scientists could critique junior invs' rsch and encourage collaborations. COBRE website helped to recruit grad students and technicians as well as faculty. Implemented videoconferencing. Strong instit'l and state support for research.

**COBRE-Funded Cores**

Administrative Core  
 Mass Spectrometry & Proteomics Core  
 Molecular Histology & Fluorescence Imaging Core  
 BioSpectroscopy Core  
 Molecular Computation Core  
 Quantitative PCR Core

**Director / Coordinator**

Bridges  
 Thompson  
 Lurie  
 Ross  
 Gerdes  
 Poulsen

**Instit / Dept**

UM / Biomed & Pharm Sci  
 UM / Biomed & Pharm Sci  
 UM / Biomed & Pharm Sci  
 UM / Chemistry  
 UM / Chemistry  
 UM / Biomed & Pharm Sci

**Core Notes**

Pgm coord'r (100%), coord'r asst (30%), systems admin'r

**Experienced Investigators Active in COBRE**

Stephen M Black, PhD  
 Richard J Bridges, PhD  
 Jesse C Hay, PhD  
 Darrell A Jackson, PhD  
 Michael P Kavanaugh, PhD  
 Frances Lefcort, PhD  
 Diana I Lurie, PhD  
 John A Mercer, PhD  
 J B Alexander (Sandy) Ross, PhD  
 Charles M Thompson, PhD

**Previous PHS Grants**

6 R01s  
 3 R01s, 2 P20s, R35 sub, F32  
 2 R01s  
 R01  
 3 R01s, R13, F32  
 R01, R03, R29, F32  
 R29, F32  
 3 R01s  
 2 P01 subs, 3 S07 subs, Z01  
 2 R01s, R29

**Instit / Dept**

UM / Biomed & Pharm Sci  
 UM / Biomed & Pharm Sci  
 UM / Biol Sci  
 UM / Biomed & Pharm Sci  
 UM / Biomed & Pharm Sci  
 MSU / Cell Biol & Neurosci  
 UM / Biomed & Pharm Sci  
 MRI  
 UM / Chemistry  
 UM / Biomed & Pharm Sci

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**MT1 Center for Structural and Functional Neuroscience (CSFN), continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Roger S Bradley, PhD *	0.7 pubs/yr + F32	MSU / Cell Biol & Neurosci		0.6 pubs/yr + 3 NSF grants
Christopher Sean Esslinger, PhD *	0.4 pubs/yr + F32	UM / Biomed & Pharm Sci	Bridges, Thompson, Kavanaugh	1.4 pubs/yr + <b>R01</b>
John M Gerdes, PhD (R) *	0.2 pubs/yr + 2 R15s, 2 S07 subs	UM / Biomed & Pharm Sci	Thompson	0.6 pubs/yr + NSF grant, state, fdn, indus grants
Mark L Grimes, PhD (R) **	0.9 pubs/yr + F32, T32 pre, post	UM / Biol Sci	Hay	0.8 pubs/yr + 0 grants
Thomas B Kuhn, PhD *	1.2 pubs/yr + R03, U54 sub	UM / Biomed & Pharm Sci		0.3 pubs/yr + 0 grants
Keith Krom Parker, PhD *	0.5 pubs/yr + 2 R15s	UM / Biomed & Pharm Sci	Ames (ext)	1.0 pubs/yr + 0 grants
David J Poulsen, PhD *	1.0 pubs/yr + 0 grants	UM / Biomed & Pharm Sci	Kavanaugh	1.2 pubs/yr + <b>2 R21s</b>
Pin-Xian Xu, PhD *	1.2 pubs/yr + F32	MRI		2.4 pubs/yr + <b>2 R01s</b> , NSF grant

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Lilian Calderon-Garciduenas, MD, PhD	K01	UM / Biomed & Pharm Sci		<b>R21</b> , 2 NSF grants
Fernando Cardozo-Pelaez, PhD *	0	UM / Biomed & Pharm Sci	Black	<b>R15</b> , NSF grant, state grant

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Matthew M Ames, PhD - Yr 3-6	Mayo Med / Molec Pharmacol
A Richard Chamberlin, PhD - Yr 1-6	UC Irvine / Chemistry
Carl W Cotman, PhD - Yr 3-6	UC Irvine / Neurobiol & Beh
Jeffrey S Diamond, PhD - Yr 2-6	NIH / NINDS
Thomas V Dunwiddie, PhD - Yr 1-2	U Colorado HSC / Pharmacol
Eric Gouaux, PhD - Yr 2	Columbia U / Biochem & Mol Biophys
Charles B Grissom, PhD - Yr 3-6	U Utah/ Chemistry
William C Mobley, MD, PhD - Yr 5-6	Stanford U / Neurol Sci
John L Portis, MD - Yr 6	Rocky Mtn Labs / Viral Dis
Edwin W Rubel, PhD - Yr 1-6	U Washington/ Physiol, Biophys
John T Williams, PhD - Yr 3-6	Oregon HSU / Physiol, Pharmac

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDEA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package. **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**NE1 Nebraska Center for Virology (NCV)**

[www.unl.edu/virologycenter/](http://www.unl.edu/virologycenter/)

<b>Grant Number</b>	P20 RR015635	
<b>Project Start Date</b>	Sept 2000	
<b>Program Director (PD) - Yr 1-6</b>	Charles Wood, PhD	UNL / Biol Sci
<b>Co-Program Director (Co-PD) - Yr 1-6</b>	Howard E Gendelman, MD	UNMC / CNND
<b>Co-Program Director (Co-PD) - Yr 1-6</b>	James L Van Etten, PhD	UNL / Chem
<b>Assoc Program Director (Assoc PD) - Yr 3-6</b>	Clinton Jones, PhD	UNL / Vet & Biomed Sci

**Major Achievements in Yrs 1-6.** Created a multidisciplinary research center involving virologists at all 3 rsch institutions in Nebraska. Recruited 6 virologist faculty from other institutions (5 at UNL, 1 at UNMC). Approved by Regents as Center of Research Excellence. Received a major NIH training grant. Leveraged COBRE funding to obtain state and instit funds for \$270-400K startup packages, enhanced core facilities, construction of 65,000 sq ft rsch bldg. Excellent website.

**Center's Research Focus** Fundamental mechanisms and regulation of the replicative cycle of human viruses and host responses in disease pathogenesis.

**Major Challenges.** Filling virology positions at CU. Stimulating cross-institutional interactions, collaborations, and core usage (except for microscopy core). Integrating the new center into the academic structure/culture. Addressing lack of adequate research space at UNL.

**Participating Institutions**

**Location**

**Primary Departments Active in COBRE**

**Strengths / Innovative Strategies.**

University of Nebraska at Lincoln (UNL)

Lincoln, NE

Biol Sci, Chemistry, Vet & Biomed Sci, Ctr for Biotech, Plant Pathol

Created an Assoc PD position to assist PD and co-PDs. Awarded small seed grants (pilot projects) to foster collaborations and help recruitment. Strengthened mentoring program, assigning internal and external mentors. Worked closely with UNL Vice Chancellor for Rsch. Implemented videoconferencing. Sent IAC reports to EAC members along with specific questions to get their advice. Very active EAC. Strong instit'l and state support for research.

University of Nebraska Medical Center (UNMC)

Omaha, NE

Ctr for Neuroviro & Neurodegen Disorders (CNND), Pathol & Microbiol, Biochem & Molec Biol, Oral Biol, Eppley Cancer Ctr, Pharmacol

Creighton University (CU)

Omaha, NE

Med Microbiol & Immunol, Biomed Sci, Phys Therapy

**COBRE-Funded Cores**

**Director / Coordinator**

**Instit / Dept**

**Core Notes**

Administrative Core  
Microscopy Core  
Proteomics/ Genomics Core  
Bioinformatics & Microarray Core  
Flow Cytometry Core

Wood  
Zhou  
Cerny, Hage  
Sherman  
Kuszynski

UNL / Biol Sci  
UNL / Ctr for Biotech  
UNL / Chem  
UNMC / Epply Cancer Ctr  
UNMC / Pathol & Microbiol

Admin'r (75-100%), sec'y (25-100%)

**Experienced Investigators Active in COBRE**

**Previous PHS Grants**

**Instit / Dept**

Keshore R Bidasee, PhD  
David A Crouse, PhD - IAC member  
Martin B Dickman, MD PhD (PP)  
Howard E Gendelman, MD - IAC member  
Tsuneya Ikezu, MD, PhD  
Clinton Jones, PhD - IAC member \*  
Thomas Jack Morris, PhD  
Fernando A Osorio, DVM PhD  
Kalipada Pahan, PhD (PP)  
Lawrence J Parkhurst, PhD  
Asit K Pattnaik, PhD (R)

R01  
3 R01s, R21, S10  
0  
4 R01s  
R01  
R29, S15  
0  
0  
R01, R03  
7 R01s  
R01, R29

UNMC / Pharmacol  
UNMC / Assoc Vice Chancellor  
UNL / Plant Pathol  
UNMC / Pharmacol, CNND  
UNMC / Pathol & Microbiol, CNND  
UNL / Vet & Biomed Sci  
UNL / Biol Sci  
UNL / Vet & Biomed Sci  
UNMC / Oral Biol  
UNL / Chem  
UNL / Vet & Biomed Sci

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**NE1 Nebraska Center for Virology (NCV), continued**

<u>Experienced Investigators Active in COBRE, cont'd</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>		
Prem S Paul, PhD - IAC member	R21, T35, S15	UNL / Vice Chancellor		
Thomas Petro, PhD (PP)	R15	UNMC / Oral Biol		
Simon A Sherman, PhD	R01, 2 P30 subs	UNMC / Eply Cancer Ctr		
David Lee Smith, PhD	3 R01s, 2 P30 subs, F06	UNL / Chem		
James L Van Etten, PhD - IAC member	7 R01s	UNL / Plant Pathol		
Charles Wood, PhD - IAC member	6 R01s, D43, P01 sub	UNL / Biol Sci		

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Peter Constantine Angeletti, PhD (R) *	0.9 pubs/yr + T32 predoc, postdoc	UNL / Biol Sci	Jones, Meyers (ext)	1.3 pubs/yr + <b>K01</b>
Richard A Bessen, PhD *	1.4 pubs/yr + R29	CU / Med Microbiol & Immun	Gendelman	2.0 pubs/yr + <b>R01</b>
Pawel S Ciborowski, PhD (R) *	1.0 pubs/yr + F33	UNMC / Biochem & Mol Biol, CNND		3.0 pubs/yr + <b>R21</b>
Yuri Persidsky, MD PhD *	2.8 pubs/yr + R29	UNMC / Pathol & Microbiol, CNND	Gendelman	5.0 pubs/yr + <b>4 R01s, R21, P01 sub</b>
Larisa Y Poluektova, MD PhD **	0.6 pubs/yr + 0 grants	UNMC / Pathol & Microbiol, CNND	Gendelman, Dewhurst (ext)	4.7 pubs/yr + <b>R21</b>
Robert A Weldon, Jr, PhD *	0.8 pubs/yr + F32	UNL / Biol Sci	Wood	0.4 pubs/yr + <b>R21</b>
John T West, PhD (PP) (R) *	1.8 pubs/yr + T32 predoc	UNL / Biol Sci	Wood	2.7 pubs/yr + 0 grants
Luwen Zhang, PhD (R)	1.6 pubs/yr + F32, T32 postdoc	UNL / Biol Sci		2.8 pubs/yr + <b>R01, R21, fdn grant</b>
Jialin C Zheng, MD **	2.7 pubs/yr + 0 grants	UNMC / Pathol & Microbiol, CNND	Gendelman, Miller (ext)	4.2 pubs/yr + <b>2 R01s, P01 sub</b>

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Jason C Bartz, PhD (PP) *	0	CU / Med Microbiol & Immun	Persidsky, Bessen (ext)	<b>R01</b> , DoD grant, state grant
Michael D Boska, PhD	S10	UNMC / Radiology, CNND		<b>R21</b>
Ruben O Donis, PhD (PP)	0	UNL / Vet & Biomed Sci		0
David D Dunigan, PhD (PP)	0	UNL / Plant Pathol		0
Melissa Inman, PhD (PP)	0	UNL / Vet & Biomed Sci		0
Anthony Edson Kincaid, PhD	0	CU / Biomed Sci, Phys Therapy		State grant
Mark P Thomas, PhD	R03	UNMC / Pharmacol		0
Huangui Xiong, MD PhD *	0	UNMC / Pathol & Microbiol, CNND	Gendelman	<b>2 R01s</b>

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Lynn Enquist, PhD - Yr 1-6	Princeton U / Molec Biol
Kamel Khalili, PhD - Yr 1-6	Temple U / Biol
Edward Mocarski, PhD - Yr 1-6	Emory U / Microbiol & Immun
Lee Ratner, MD PhD - Yr 1-6	Washington U / Molec Oncol

**NOTES**

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	Non-academic research position (e.g., pharm co.)
	Non-research position

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PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**NV1 Function and Role of Chloride Channels in the Cardiovascular System**

[www.unr.edu/med/dept/pharmacology/COBRE](http://www.unr.edu/med/dept/pharmacology/COBRE)

**Grant Number** P20 RR015581  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Joseph R Hume, PhD UNR / Pharmacology  
**Co-Program Director (Co-PD) - Yr 1-4** Burton Horowitz, PhD UNR / Physiol & Cell Biol

**Major Achievements in Yrs 1-6.** Established the Nevada Transgenic Center in Yr 4 (the only facility of its type in the state). State legislature became more supportive of research in Yr 6, augmenting UNR's operating budget and allocating indirect costs to fund new 100,000 sq ft biomedical rsch building (part of new Molec Biosci & Biotech Institute). Med school began developing the new field of functional genomics.

**Center's Research Focus** Role of chloride channels in normal cardiac function and disease.

**Major Challenges.** Obtaining permanent tenure-track positions for junior faculty. Getting instit to provide adequate lab space for junior invs and cores. Getting junior invs to publish more (few senior authors). Addressing interdept'l conflicts resulting from PD's decision in Yr 1 to leave Physiol Dept and chair Pharmacol Dept (taking 2 COBRE faculty and lab space with him). Creating a good COBRE website. Co-PD's unexpected death in Yr 4 was a severe loss.

**Participating Institutions**

University of Nevada Reno (UNR)

**Location**

Reno, NV

**Primary Departments Active in COBRE**

Pharmacol, Physiol & Cell Biol, Biochem

**Strengths / Innovative Strategies.** Atypical approach used:

PD encouraged junior invs to pursue R01s in areas independent of COBRE subprojects in order to promote faculty retention. PD worked closely with EAC to enhance instit commitment; EAC set annual goals for each core.

**COBRE-Funded Cores**

Administrative Core  
 Targeted & Transgenic Animal Core  
 Molecular/Genomics Core  
 Optical Imaging Core

**Director / Coordinator**

Hume  
 Bush, Horowitz, Burkin  
 Horowitz, Hume, Pari  
 Hatton

**Instit / Dept**

UNR / Pharmcol  
 UNR / Pharmcol  
 UNR / Biochem  
 UNR / Pharmcol

**Core Notes**

Admin asst (100%)

**Experienced Investigators Active in COBRE**

William Thomas Gerthoffer, PhD - IAC member  
 Burton Horowitz, PhD - IAC member \*  
 Joseph R Hume, PhD - IAC member \*  
 John A McDonald, MD PhD  
 Gregory S Pari, PhD  
 Terence K Smith, PhD  
 Maria L Valencik, PhD \*  
 Christopher Stephen Von Bartheld, MD  
 William Henry Welch, PhD

**Previous PHS Grants**

3 R01s, 3 P01 subs, F32  
 R01, 4 P01 subs  
 6 R01s, R37, P01 sub, F32  
 2 P01 subs  
 2 R01s  
 2 R01s, R29, P01 sub  
 R01  
 2 R01s, R29, F32  
 P50 sub

**Instit / Dept**

UNR / Pharmcol  
 UNR / Physiol & Cell Biol  
 UNR / Pharmcol  
 UNR / Dean SOM  
 UNR / Biochem  
 UNR / Physiol & Cell Biol  
 UNR / Biochem  
 UNR / Physiol & Cell Biol  
 UNR / Biochem

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**NV1 Function and Role of Chloride Channels in the Cardiovascular System, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Fiona C Britton, PhD *	1.0 pubs/yr + 0 grants	UNR / Physiol & Cell Biol	Horowitz, Pari, Smith	0.8 pubs/yr + fdn grant
Dayue Duan, MD PhD *	0.8 pubs/yr + 0 grants	UNR / Pharmacol	Horowitz, Hume	1.2 pubs/yr + <b>R01</b>
Normand R Leblanc, PhD (R) - IAC member	2.4 pubs/yr + 0 grants	UNR / Pharmacol	Hume	5.3 pubs/yr + <b>R01</b> , 2 fdn grants
Gexin Wang, PhD *	3.0 pubs/yr + 0 grants	UNR / Pharmacol	Leblanc	1.5 pubs/yr + 0 grants
Iliia A Yamboliev, PhD *	1.9 pubs/yr + 0 grants	UNR / Pharmacol	Gerthoffer	2.6 pubs/yr + 0 grants
<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Dean J Burkin, PhD	0	UNR / Pharmacol	Gerthoffer	0
Toby George Bush, PhD	0	UNR / Physiol & Cell Biol		<b>R03</b>
Iain Andrew Greenwood, PhD	0	UNR / Physiol & Cell Biol		0
William J Hatton, PhD	0	UNR / Pharmacol	Von Bartheld	Fdn grant
Diane McCloskey *	F32	UNR / Pharmacol		0
<u>External Advisory Committee</u>	<u>Instit / Dept</u>			
David C Dawson, PhD - Yr 1-6	Oregon HSC / Physiol & Pharmac			
Alfred George, MD - Yr 1-6	Vanderbilt U / Genetic Med			
Garrett J Gross, PhD - Yr 1-6	Med Coll Wisconsin / Pharmacol			
K C Kent Lloyd, DVM PhD - Yr 1-6	UC Davis / Ctr Comparative Med			

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**OK1 Functional Genomic/Proteomic Analysis of Pathogen-Host Interactions**

[No COBRE website]

<b>Grant Number</b>	P20 RR015564	
<b>Project Start Date</b>	Sept 2000	
<b>Program Director (PD) - Yr 1</b>	David W Dyer, PhD	OUHSC / Microbiol & Immunol
<b>Program Director (PD) - Yr 2-6</b>	John J Iandolo, PhD	OUHSC / Microbiol & Immunol
<b>Program Co-Director (Co-PD) - Yr 2-6</b>	David W Dyer, PhD	OUHSC / Microbiol & Immunol

**Major Achievements in Yrs 1-6.** Leveraged COBRE funding to obtain insttit funds for startup packages and more space for core facilities (4,000 sq ft) in new rsch building. Developed new procedures in Yr 4 to 'graduate' successful junior invs and appoint their successors (not easy since initial junior invs were expecting 5 years of support).

**Center's Research Focus** Genome-scale analysis of bacterial pathogenesis, with an emphasis on functional genomic and proteomic analysis of bacteria-host interactions.

**Major Challenges.** Recruiting new faculty and an IAC (no new hires and no IAC meetings in Yr 1-6). Retaining junior invs. Addressing admin changes (initial PD became co-PD in Yr 2 to allow more time for his own research). Consolidating core labs to reduce costs and enhance instrumentation at OUHSC (dropped satellite cores at OU and OSU in Yr 4). Developing a COBRE website.

**Participating Institutions**

University of Oklahoma Health Sciences Center (OUHSC) - Yr 1-6  
 University of Oklahoma (OU) - Yr 1-5  
 Oklahoma State University (OSU) - Yr 1-5

**Location**

Oklahoma City, OK  
 Norman, OK  
 Stillwater, OK

**Primary Departments Active in COBRE**

Microbiol & Immunol, Biochem & Molec Biol, Medicine, Pharm Sci  
 Botany & Microbiol  
 Biochem & Molec Biol, Vet Pathol, Animal Molec Biol

**Strengths / Innovative Strategies.** Developed synergistic research agenda focusing on core facilities. Adjusted COBRE budget to create development fund for pilot projects and travel awards. Used internal RFA to select junior invs from 3 campuses (successful applicants received \$75-125K/yr for 1-3 years + \$3K for mentors). Strong insttit'l support for research.

**COBRE-Funded Cores**

Administrative Core  
 Functional Genomics Core at OUHSC  
 Proteomics Core  
 Bioinformatics Core  
 DNA Microarray Core - Yr 1-4  
 Recombinant DNA / Protein Core - Yr 1-4

**Director / Coordinator**

Dyer, Iandolo  
 Lewis, Gillaspay  
 Matsumoto, Jackson  
 McLaughlin, Carson  
 Conway  
 Melcher

**Instit / Dept**

OUHSC / Microbiol & Immunol  
 OUHSC / Microbiol & Immunol  
 OUHSC / Biochem & Molec Biol  
 OUHSC / Microbiol & Immunol  
 OU / Botany & Microbiol  
 OSU / Biochem & Molec Biol

**Core Notes**

Sec'y (100%)  
 Now Funct Genomics Core at OU  
 Now Funct Genomics Core at OU

**Experienced Investigators Active in COBRE**

Gillian Air, PhD  
 Daniel J Carr, PhD  
 Cyril R Clarke, PhD  
 Kenneth Mark Coggeshall, PhD  
 Tyrrell D Conway, PhD \*  
 David W Dyer, PhD \*  
 Mark M Huycke, MD  
 John J Iandolo, PhD  
 Katherine M Kocan, PhD  
 Hiroyuki Matsumoto, PhD  
 Michael Sakalian, PhD  
 Nathan Shankar, PhD  
 Rodney Tweten, PhD

**Previous PHS Grants**

10 R01s, R21, R37, R13, T32  
 3 R01s, R21  
 0  
 2 R01s, R29, P20 sub  
 R01  
 3 R01s, R23, G08, 2 P50 subs, F32  
 0  
 4 R01s, R32, T32  
 0  
 4 R01s, 2 P30 subs  
 R01  
 R01, R29  
 7 R01s, F32

**Instit / Dept**

OSU / Biochem & Molec Biol  
 OUHSC / Microbiol & Immunol  
 OSU / Vet Pathology  
 OU / Botany & Microbiol  
 OU / Botany & Microbiol  
 OUHSC / Microbiol & Immunol  
 OUHSC / Medicine  
 OUHSC / Microbiol & Immunol  
 OSU / Vet Pathology  
 OUHSC / Biochem & Molec Biol  
 OUHSC / Microbiol & Immunol  
 OUHSC / Pharm Sci  
 OUHSC / Microbiol & Immunol

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**OK1 Functional Genomic/Proteomic Analysis of Pathogen-Host Interactions, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Darrin R Akins, PhD *	3.0 pubs/yr + 0 grants	OUHSC / Microbiol & Immunol		2.6 pubs/yr + <b>R01</b> , <b>R21</b>
Jimmy D Ballard, PhD *	1.3 pubs/yr + T32 predoc, postdoc	OU / Botany & Microbiol		3.2 pubs/yr + <b>R01</b> , <b>R21</b> , DOE grant
Alain C Stintzi, PhD *	2.6 pubs/yr + 0 grants	OSU / Vet Pathology	Clarke, Kocan	1.8 pubs/yr + <b>R01</b> , state grant
<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Ira J Blader, PhD *	K22, F32	OUHSC / Microbiol & Immunol	Carr	<b>R01</b> , AHA grant, fdn grant
Allison F Gillaspay, PhD *	0	OUHSC / Microbiol & Immunol	Iandolo, Dyer	4 NSF grants
Holly L Hoffman-Roberts, PharmD (PP)	0	OUHSC / Pharm Sci	Shankar	0
William M McShan, PhD (PP)	0	OUHSC / Pharm Sci	Tweten	<b>R15</b>
Karen A Wendel, MD *	0	OUHSC / Medicine	Huycke, Dyer	0
Marvin Whiteley, PhD *	0	OU / Botany & Microbiol	Ballard	State grant
Guolong (Glenn) Zhang, PhD *	0	OSU / Animal Molec Biol	Stintzi	USDA grant, state grant, 2 fdn grants
<u>External Advisory Committee</u>	<u>Instit / Dept</u>			
Michael Apicella, MD - Yr 1-6	U Iowa / Microbiology			
Sherwood Casjens, PhD - Yr 1-6	U Utah / Oncological Sciences			
Robert Munson, PhD - Yr 1-6	Ohio State U / Pediatrics			

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**OK2 Mentoring Immunology in Oklahoma**

[www.omrf.ouhsc.edu/omrf/research/cobre/aimscapra.asp](http://www.omrf.ouhsc.edu/omrf/research/cobre/aimscapra.asp)

**Grant Number** P20 RR015577  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** J Donald Capra, MD OMRF / Molec Immunogen  
**Program Director (PD) - Yr 6-7** Judith A James, MD PhD OMRF / Arthritis & Immunology

**Major Achievements in Yrs 1-6.** Recruited 8 junior and mid-level faculty (6 at OMRF, 1 at OUHSC, 1 at OSU). Maintained a high retention rate for COBRE investigators (only 2 of the initial 14 investigators left the state). Immunologists in Oklahoma began to share ideas and critique each others' research. Leveraged COBRE funding to obtain state funds. OMRF and OUHSC received a major NIH immunology training grant.

**Center's Research Focus** Molecular and cellular immunology in the context of human health and disease.

**Major Challenges.** Solving the bureaucratic complexity of recruiting on different campuses. Finding add'l resources to encourage newly recruited investigators to join the COBRE group (given the initial grant restrictions). Persuading mentees on different campuses to travel to OMRF for mentoring (75-120 miles).

**Participating Institutions**

Oklahoma Medical Research Foundation (OMRF)  
 University of Oklahoma Health Science Center (OUHSC)  
 Oklahoma State University (OSU)  
 University of Oklahoma (OU -Tulsa)

**Location**

Oklahoma City, OK  
 Oklahoma City, OK  
 Stillwater, OK  
 Tulsa, OK

**Primary Departments Active in COBRE**

Molec Immunogen; Arthritis & Immunol; Immunobiol & Cancer; Molec, Cell & Dev Biol; Cardiovasc Biol; Protein Studies  
 Microbiol & Immunol, Cell Biol, Biochem & Molec Biol, Pathology, Medicine  
 Vet Pathology  
 Surgery

**Strengths / Innovative Strategies.**

Cultivated a culture of mentoring since Yr 1, with focus on both science and career development (grantsmanship, team building, hiring/firing, budgeting); consultants were brought in to enhance mentors' skills. Funded one-year starter grants (pilot projects) as well as subprojects. Substantial COBRE funds allocated to recruiting new faculty (\$250K startup packages) + add'l funds (\$50K/yr) reserved for unforeseen events. Very active EAC. Strong institutional support (OMRF).

**COBRE-Funded Cores**

Administrative Core  
 Imaging Core  
 Transgenic Core  
 Signal Transduction Core  
 Microarray Core  
 Peptide Synthesis Core

**Director / Coordinator**

Capra  
 Dresser  
 Hochgeschwender  
 Coggeshall  
 Centola  
 James, Guthridge

**Instit / Dept**

OMRF / Molec Immunogen  
 OMRF / Molec, Cell & Dev Biol  
 OMRF / Molec, Cell & Dev Biol  
 OMRF/ Immunobiol & Cancer  
 OMRF/ Arthritis & Immunol  
 OMRF/ Arthritis & Immunol

**Core Notes**

Admin asst (20-80%), chief of staff (20-35%)

**Experienced Investigators Active in COBRE**

Jose (Pepe) Alberola-Ila, MD PhD (R)  
 Michael Bachmann, PhD (PP)  
 J Donald Capra, MD - IAC member  
 Kenneth Mark Coggeshall, PhD  
 Jose de la Fuente, PhD (PP)  
 Michael E Dresser, MD, PhD  
 Mark Barton Frank, PhD  
 Gary J Gorbsky, PhD  
 John B Harley, MD, PhD - IAC member  
 Ute Hochgeschwender, MD  
 Judith A James, MD PhD - IAC member  
 Paul W Kincade, PhD - IAC member

**Previous PHS Grants**

2 R01s  
 0  
 5 P01s, 14 R01s, R37, R03, C06  
 2 R01s, R29  
 0  
 R29  
 R01, P01 sub, F32  
 2 R01s, S10  
 2 R01s, P50 sub, 3 P01 subs  
 12 Z01s  
 R01, R03, R29, K08, 2 F31s  
 9 R01s, R37, 3 P01 subs, K04

**Instit / Dept**

OMRF/ Immunol & Cancer  
 OMRF / Arthritis & Immunol  
 OMRF / Molec Immunogen  
 OMRF / Immunobiol & Cancer  
 OSU / Vet Pathology  
 OMRF / Molec, Cell & Dev Biol  
 OMRF/ Arthritis & Immunol  
 OUHSC / Cell Biol  
 OUHSC / Medicine  
 OUHSC / Cell Biol  
 OMRF / Arthritis & Immunol  
 OUHSC / Molec Immunogen

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**OK2 Mentoring Immunology in Oklahoma, continued**

<u>Experienced Investigators Active in COBRE, cont'd</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>
Katherine M Kocan, PhD	0	OSU / Vet Pathology
Susan Kovats, PhD (PP)	R01, R21, M01 sub, F32	OMRF/ Arthritis & Immunol
Rodger P McEver, MD - IAC member	P50, 5 R01s, R37, 2 P01 subs	OMRF / Cardiovasc Biol
Morris Reichlin, MD	P20, 2 P01s, 8 R01s, T32, K03	OMRF/ Arthritis & Immunol
Xiao-Hong Sun, PhD *	2 R01s, R21	OMRF / Immunobiol & Cancer
Jordan J N Tang, PhD	16 R01s, R13, 3 S10s, P01 sub	OUHSC / Biochem & Mol Biol
Linda F Thompson, PhD - IAC member	P01, 6 R01s, R55, P01 sub	OMRF / Immunobiol & Cancer

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Michael B Centola, PhD **	2.3 pubs/yr + 0 grants	OMRF/ Arthritis & Immunol	McEver, Reichlin, James	8.0 pubs/yr + <b>P20 sub</b> , fdn grant
Dirk P Dittmer, PhD *	1.4 pubs/yr + 0 grants	OUHSC / Microbiol & Immunol	Harley	6.2 pubs/yr + <b>2 R01s, 3 R21s, R03</b> , 3 state/fdn grants
Amy Darise Farris, PhD (PP)	2.1 pubs/yr + T32 postdoc	OMRF/ Arthritis & Immunol	Thompson	1.8 pubs/yr + <b>2 R01s, K02, P50 sub</b>
William Allan Meier, DVM PhD (R)	0.6 pubs/yr + 0 grants	OSU / Vet Pathology		0.5 pubs/yr + 0 grants
Karla K Rodgers, PhD (PP)	0.6 pubs/yr + F32	OUHSC / Biochem & Mol Biol	Capra, Kincade	1.6 pubs/yr + <b>R01</b>
William Allen Rodgers, PhD (R) (PP) *	0.8 pubs/yr + F32, T32 postdoc	OMRF/ Molec Immunogen	Capra, Gorbsky	2.0 pubs/yr + <b>R01</b> , state grant
T Kent Teague, PhD *	2.1 pubs/yr + 0 grants	OU -Tulsa / Surgery	Thompson	1.4 pubs/yr + state grant
Patrick C Wilson, PhD (R)	1.8 pubs/yr + 0 grants	OMRF / Molec Immunogen	Capra	3.3 pubs/yr + <b>P20 sub</b>

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Wan-Pin (WanPin) Chang, PhD *	0	OMRF / Protein Studies	Capra, Reichlin, Tang, James	0
Joel M Guthridge, PhD	T32 postdoc	OMRF/ Arthritis & Immunol	Harley	<b>P20 sub, P30 sub</b>
Scott M Plafker, PhD (R)	F32, T32 predoc, postdoc	OUHSC / Cell Biol		State grant
Amr H Sawalha, MD *	0	OMRF/ Arthritis & Immunol	Harley, Farris	Fdn grant

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Richard Krause, MD (Yr 2-6)	NIH / NIAID
Henry Metzger, MD (Yr 2-6)	NIH / NIAMS
Andrew Pachner, MD (Yr 2-6)	UMDNJ / Neurosci
Charles Wood, PhD (Yr 2-6)	U Nebraska / Biol Sci
Maurizio Zanetti, MD (Yr 2-6)	UCSD / Medicine

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**PR1 Center for Molecular, Developmental and Behavioral Neuroscience**

<http://cobre-neuro.upr.edu/>

**Grant Number** P20 RR015565  
**Project Start Date** Sept 2000 (COBRE funding ended in June 2007)  
**Program Director (PD) - Yr 1-5** Conchita Zuazaga, PhD UPR-MSC / Physiology  
**Scientific Director - Proposed for Yr 6** Gregory J Quirk, PhD PSM / Physiology

**Major Achievements in Yrs 1-5.** Developed the only microarray facility of its kind in Puerto Rico. Leveraged COBRE funding to obtain institutional funds for startup packages. UPR's Board of Trustees agreed to create a new multidisciplinary Research Institute at UPR, with this center serving as its foundation. Annual PR Neuroscience Conference increased in size and popularity.

**Center's Research Focus** Cognitive neuroscience using rodent models, with an emphasis on molecular mechanisms underlying neuronal injury, emotional memory, cocaine-seeking behavior, and the expression of maternal behavior.

**Major Challenges.** Recruiting research faculty (no new hires in Yr 1-6). Mentoring junior investigators in manuscript writing and grantsmanship. Completing lab renovations.

**Participating Institutions**

U Puerto Rico - Med Sciences Campus (UPR-MSC)

U Puerto Rico - Rio Piedras Campus (UPR-RPC)

**Location**

San Juan, PR

San Juan, PR

**Primary Departments Active in COBRE**

Physiology, Anatomy

Biology, Chemistry

**Strengths / Innovative Strategies.** Recruited external senior invs (collaborators) to help mentor junior invs. EAC served key role in discussing problems with UPR's senior administrators. Good institutional support (40% of indirect costs returned to COBRE).

**COBRE-Funded Cores**

Administrative Core  
 Instrumentation Core / Microarray Facility

**Director / Coordinator**

Zuazaga  
 Gonzalez, Pena de Ortiz

**Instit / Dept**

**Core Notes**

Admin coord (100%), admin asst (100%)  
 Microarray facility established in Yr 1. Yr 4 supplement expanded core to include functional genomics and analysis of complex behaviors.

**Experienced Investigators Active in COBRE**

Gladys Escalona de Motta, PhD - IAC member  
 Emma D Fernandez-Repollet, PhD - IAC member  
 Nidza Lugo-Garcia, PhD  
 Brad R Weiner, PhD - IAC member  
 Conchita Zuazaga, PhD - IAC member

**Previous PHS Grants**

4 S06 subs  
 R23, 2 S06 subs  
 3 R24s, F34  
 S06 sub  
 3 S06 subs, 3 F34s

**Instit / Dept**

UPR-RPC / Biology  
 UPR-MSC / Pharmacol  
 UPR-MSC / Anatomy  
 UPR-RPC / Chemistry  
 UPR-MSC / Physiology

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**PR1 Center for Molecular, Developmental and Behavioral Neuroscience, continued**

**Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup>**

Fernando A González, PhD \*  
 Juan Carlos Jorge-Rivera, PhD \*  
 Carmen S Maldonado-Vlaar, PhD \*  
 Sandra Pena de Ortiz, PhD \*

**Previous Pubs + PHS Grants**

2.7 pubs/yr + 3 S06 subs, F31  
 1.4 pubs/yr + T32 predoc  
 1.3 pubs/yr + R29, S06 sub, T32  
 0.8 pubs/yr + U54 & S06 sub, T32

**Instit / Dept**

UPR-RPC / Chemistry  
 UPR- MSC / Anatomy  
 UPR-RPC / Biology  
 UPR-RPC / Biology

**Mentors**

Weisman (ext), Sun (ext)

**Pubs + Grants After Joining COBRE**

5.4 pubs/yr + **2 P20s, P20 sub, S06 sub**, VA grant  
 1.6 pubs/yr + **P20 sub**  
 1.6 pubs/yr + 0 grants  
 2.6 pubs/yr + **S06 sub**

**Other Non-R01 Junior Investigators**

None

**Previous PHS Grants**

**Instit / Dept**

**Mentors**

**Grants After Joining COBRE**

**External Advisory Committee**

Edward Kravitz, PhD (Chair) - Yr 1-5  
 Eve Marder, PhD - Yr 1-5  
 Darcy B. Kelley, PhD - Yr 1-5  
 John G. Hildebrand, PhD - Yr 1-5

**Instit / Dept**

Harvard Med / Neurobiology  
 Brandeis U / Neuroscience  
 Columbia U / Neurobiol & Behavior  
 U of Arizona / Neurobiology

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**RI1 Center for Genomics and Proteomics (CGP) → Center for Cancer Signaling Networks**

[www.brown.edu/Research/CGP/](http://www.brown.edu/Research/CGP/)

<b>Grant Number</b>	P20 RR015578	
<b>Project Start Date</b>	Sept 2000	
<b>Program Director (PD) - Yr 1-6</b>	John Sedivy, PhD	Brown / MCB
<b>Program Director (PD) - End of Yr 6</b>	Walter J Atwood, PhD	Brown / MCB

**Major Achievements in Yrs 1-6.** 3 core facilities were developed, staffed, and operational by Yr 3. Univ created 2 new centers (CGP and CCMB), purchased/renovated 105,000 sq ft research building to house the 2 centers and allocated 6 new CGP tenure-track positions in Yr 1-6. Strong institutional support due in part to the COBRE's emphasis on genomics, which was consistent with the university's 1996 strategic plan.

**Center's Research Focus** Multidisciplinary approach to molecular genetics research redirected to focus on molecular mechanisms by which cancer signaling networks are regulated.

**Major Challenges.** Strengthening bioinformatics area (initially underbudgeted, understaffed). Transitioning to a more focused research agenda. Addressing admin problems caused by large number of active junior invs and diversity of research projects. Getting EAC members to meet in person. Developing a website for the Center for Cancer Signaling Networks COBRE.

**Participating Institutions**

Brown University

**Location**

Providence, RI

**Primary Departments Active in COBRE**

Molec Biol, Cell Biol & Biochem (MCB); Molec Pharmacol, Physiol & Biotech (MPPB); Molec Microbiol & Immunol (MMI); Pathol & Lab Med (PLM); Medicine; Neurosci; Clin Neurosci; Applied Math

Rhode Island Hospital / Lifespan

Providence, RI

**Strengths / Innovative Strategies.** Atypical approach used in Yrs 1-5: Senior invs directed subprojects and mentored junior invs leading pilot projects (most of whom participated at 10-15% level of effort); graduation rule for junior invs was "2 R01s and you're out." New cores were major factor in recruiting high-quality faculty in many depts. Mini-grant competition held to encourage use of new cores.

**COBRE-Funded Cores**

Administrative Core  
Transgenic Core  
Genomics Core  
Bioinformatics Core  
Microscopy & Bioimaging Core

**Director / Coordinator**

Sedivy  
Sedivy, Singer, Klysik  
Sedivy  
Thompson  
Wessel, Creton

**Instit / Dept**

Brown / MCB  
Brown / MCB  
Brown / MCB  
Brown / Applied Math  
Brown / MCB

**Core Notes**

Executive asst (100%)

**Experienced Investigators Active in COBRE**

Christine A Biron, PhD - IAC member \*  
Leslie A C Blair, PhD (PP)  
Kim Boekelheide, MD PhD - IAC member  
Suzanne M de la Monte, MD (PP)  
Justin R Fallon, PhD - IAC member \*  
Edward Hawrot, PhD - IAC member \*  
Agnes B Kane, MD PhD - IAC member  
Charles E Lawrence, PhD - IAC member  
Diane Lipscombe, PhD  
Zixu Mao, MD PhD (PP)  
John Marshall, PhD (PP)  
Dale F Mierke, PhD - IAC member (PP)  
Stephen P Salloway, MD (PP)  
John M Sedivy, PhD (PP) \*  
Jack R Wands, MD - IAC member \*  
Anatoly Zhitkovich, PhD \*

**Previous PHS Grants**

5 R01s  
2 R01s, F32  
4 R01s, K04  
R01, K11  
4 R01s, T32, P01, P01 sub  
7 R01s, P01 sub, S10  
8 R01s, 2 T32s, R23, R55, K04  
2 R01s, R21  
R01, R29, T32, K02  
R01  
R29  
R03, R29  
K08  
6 R01s  
18 R01s, 2 R37s, K02, K05, K08  
2 R01s

**Instit / Dept**

Brown / MMI  
Brown / MPPB  
Brown / PLM  
Brown / Medicine  
Brown / Neurosci  
Brown / MPPB  
Brown / PLM  
Brown / Applied Math  
Brown / Neurosci  
Brown / Medicine  
Brown / MPPB  
Brown / MPPB  
Brown / Clin Neurosci  
Brown / MCB  
Brown / Medicine  
Brown / PLM

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**RI1 Center for Genomics and Proteomics (CGP) → Center for Cancer Signaling Networks, continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Walter J Atwood, PhD - IAC member (PP)	1.6 pubs/yr + R29	Brown / MMI, MCB	Biron	4.6 pubs/yr + <b>2 R01s, R13</b>
Laurent Brossay, PhD (PP)	3.3 pubs/yr + R21	Brown / MMI	Biron	2.6 pubs/yr + <b>2 R01s, S10</b>
Andrew G Campbell, PhD (PP)	0.5 pubs/yr + 0 grants	Brown / MMI	Biron	0.2 pubs/yr + NSF grant, fdn grant
Alison DeLong, PhD (PP)	0.8 pubs/yr + 0 grants	Brown / MCB	Sedivy	1.6 pubs/yr + 2 NSF grants
Elizabeth Petrovitch Garcia, PhD (PP)	0.8 pubs/yr + F32	Brown / MPPB	Hawrot, Lipscombe, Marshall	1.0 pubs/yr + 0 grants
Ji-Su Li, MD PhD (PP)	1.6 pubs/yr + 0 grants	Brown / Medicine	Wands	2.2 pubs/yr + <b>R01, 2 R21s</b> , fdn grant
ShuPing Tong, MD PhD (PP)	1.4 pubs/yr + 0 grants	Brown / Medicine	Wands	2.2 pubs/yr + <b>R21, R03</b>
George S Yap, PhD (PP)	3.9 pubs/yr + 0 grants	Brown / MMI	Biron	2.2 pubs/yr + <b>R01</b> , fdn grant
Kam C Yeung, PhD (PP)	1.0 pubs/yr + 0 grants	Brown / MCB	Sedivy	1.0 pubs/yr + <b>R01</b>

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Richard N Freiman, PhD *	0	Brown / MCB	Boekelheide	Fdn grant
Miran Kim, PhD *	0	Brown / Medicine	Wands	0
Jan E Klysik, PhD (PP)	P01 sub	Brown / MCB	Sedivy	0
Arthur Salomon, PhD *	0	Brown / MCB	Mierke	Fdn grant
Carl P Simkevich, PhD	0	Brown / MCB	Sedivy	0
Jeffrey Dean Singer, PhD (PP) *	0	Brown / MCB	Hawrot, Atwood	3 fdn grants
William A Thompson, PhD (PP)	0	Brown / Applied Math	Lawrence	0

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Brian T Chait, DPhil - Yr 6	Rockefeller U / Molec Biophys
Ethan Dmitrovsky, MD - Yr 6	Dartmouth U / Pharm & Toxicol
Marshall S Horwitz, PhD - Yr 3-5	Albert Einstein Med / Microbiol
Henry A Lester, PhD - Yr 1-5	Cal Tech / Biology
Linda Z Penn, PhD - Yr 6	Ontario Cancer Inst / Molec Biol
Michael J Weber, PhD - Yr 1-5	U Virginia Med / Oncology
Trevor Williams - Yr 1-5	U Colo HSC / Molec Biol
Michael Q Zhang, PhD - Yr 6	Cold Spring Harbor / Comp Biol

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**SD1 Neural Mechanisms of Adaptive Behavior**

[www.usd.edu/neurogroup/COBRE.cfm](http://www.usd.edu/neurogroup/COBRE.cfm)

**Grant Number** P20 RR015567  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Joyce N Keifer, PhD USD / Basic Biomed Sci

**Major Achievements in Yrs 1-6** Recruited 8 new junior faculty in Yr 1-6 (4 new tenure-track positions). Established MD/PhD program to expand research in basic biomedical sciences and attract grad students. Created psychiatry residency program with neuroscience research track. Planned for new Brain Research Center (Sioux Falls) to conduct basic and translational research in neuroscience and address regional mental health needs.

**Center's Research Focus** Structural reorganization in neural pathways resulting in adaptive behavioral responses to novel sensorimotor experiences, with an emphasis on physiological, pharmacological, anatomical, molecular, and behavioral experimental approaches.

**Major Challenges.** Recruiting neuroscience faculty given a very competitive job market. University's lack of support for a neuroscience PhD program. Encouraging psychiatry residents to apply for pilot projects with basic science mentors. Broadening mentoring pool.

**Participating Institutions**

University of South Dakota School of Medicine (USD)

**Location**

Vermillion, SD

**Primary Departments Active in COBRE**

Basic Biomed Sci, Biology, Psychiatry, Communic Disorders

Black Hills State University (BHSU)

Spearfish, SD

Biology

**Strengths / Innovative Strategies.** Atypical approach used: Pilot projects (\$8-12K each) funded since Yr 1 prepared junior invs for subprojects and encouraged collaborations. One pilot project awarded to faculty member at undergrad institution (BHSU) to help attract grad students to USD.

**COBRE-Funded Cores**

Administrative Core  
 Biological Imaging Core  
 Behavioral Core - Yr 6

**Director / Coordinator**

Keifer  
 Day  
 Forster, Watt

**Instit / Dept**

USD / Basic Biomed Sci  
 USD / Basic Biomed Sci  
 USD / Basic Biomed Sci

**Core Notes**

Program asst (100%)

**Experienced Investigators Active in COBRE**

William A Cafruny, PhD (PP)  
 Joyce N Keifer, PhD - IAC member \*  
 Curtis K Kost, PhD (PP)  
 Charles Lamb, PhD (PP)  
 Ronald Lindahl, PhD - IAC member  
 Douglas S Martin, PhD (PP)  
 Robin Miskimins, PhD  
 Evelyn H Schlenker, PhD \*  
 Cliff H Summers, PhD - IAC member  
 John Swallow, PhD (PP)

**Previous PHS Grants**

R15  
 R01, R29  
 0  
 0  
 5 R01s, C06, S15  
 R01, R29, R15, G20, F32  
 2 R01s  
 R15  
 R13  
 F32

**Instit / Dept**

USD / Basic Biomed Sci  
 USD / Basic Biomed Sci  
 USD / Basic Biomed Sci  
 BHSU / Biology  
 USD / Dean, Basic Biomed Sci  
 USD / Biology  
 USD / Biology

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**SD1 Neural Mechanisms of Adaptive Behavior, continued**

**Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup>**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Timothy G Clark, PhD (PP) *	1.1 pubs/yr + 0 grants	USD / Basic Biomed Sci	Summers	1.0 pubs/yr + <b>P20 sub</b> , AHA grant
Robert J Morecraft, PhD (PP) *	1.5 pubs/yr + R29, R15	USD / Basic Biomed Sci		2.2 pubs/yr + <b>R01</b> , state grant
Kenneth J Renner, PhD (PP) *	1.9 pubs/yr + R03, F32	USD / Biology		3.8 pubs/yr + 0 grants

**Other Non-R01 Junior Investigators**

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Teri James Bellis, PhD (PP)	0	USD / Communic Disorders		0
Brian D Burrell, PhD (R) *	2 F32s	USD / Basic Biomed Sci		NSF grant, state grant
Gina L Forster, PhD (R) (PP) *	0	USD / Basic Biomed Sci		<b>R01, R03</b>
Josette S Lindahl, PhD (R) (PP) *	0	USD / Basic Biomed Sci	Keifer	<b>K08</b> , fdn grant
Christine A Livingston, MD (R) (PP)	R29	USD / Basic Biomed Sci		0
Pasquale Manzerra, PhD (R) *	0	USD / Basic Biomed Sci		State grant
Oyvind Overli, PhD (PP)	0	USD / Biology		0
Alicia F Paulson, PhD (R) (PP) *	0	USD / Biology		0
Patrick J Ronan, PhD (PP) *	0	USD / Psychiatry	Summers	Fdn grant
Manish Sheth, MD, PhD (PP)	0	USD / Psychiatry		0
Michael James Watt, PhD (PP)	0	USD / Biology	Summers	<b>R03</b>
Da-Qing Yang, PhD (PP)	0	USD / Basic Biomed Sci		<b>P20 sub</b> , fdn grant

**External Advisory Committee**

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
Paul D Cheney, PhD - Yr 2-4	KUMC / Physiology
L Craig Evinger, PhD - Yr 5-6	SUNY Stony Bk / Neurobiol
Ann E Kelley, PhD - Yr 5-6	U Wisconsin / Psychiatry
Daniel Johnston, PhD - Yr 2-4	Baylor Med / Neuroscience
Gordon S Mitchell, PhD - Yr 2-4	U Wisconsin / Comp Biosci
Frank L Moore, PhD - Yr 2-4	Oregon State U / Zoology
Donata Oertel, PhD - Yr 1-6	U Wisconsin / Physiology

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**VT1 Translational Research in Lung Biology (Vermont Lung Center)**

[www.vermontlung.org](http://www.vermontlung.org)

**Grant Number** P20 RR015557  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** Charles G Irvin, PhD UVM / Med-Pulm, MPB  
**Program Co-Director (Co-PD) - Yr 6** Jason H T Bates, PhD, DSc UVM / Med-Pulm, MPB

**Major Achievements in Yrs 1-6.** Successful in creating critical mass of MD and PhD scientists involved in basic and clinical translational rsch (1 senior, 3 junior invs recruited from other instits). Added 6,200 sq ft rsch space. Leveraged COBRE funding to obtain instit funds for startup packages, visiting scientists, and lab equipment. VLC became an 'offered program' and was named one of med school's 4 centers of excellence. PD received T32 grant for new MD/PhD pre- and postdoc training program.

**Center's Research Focus** Translation of basic laboratory research into clinical applications to fight lung disease, with an emphasis on understanding the mechanisms of lung biology and disease (including asthma and cystic fibrosis).

**Major Challenges.** Dealing with bureaucracy in UVM's accounting dept - excessive paperwork, miscommunications, and problems involving new accounting software (PD had to hire a full-time accounts person). Minimal state support for research.

**Participating Institutions**  
 University of Vermont College of Medicine (UVM)

**Location**  
 Burlington, VT

**Primary Departments Active in COBRE**  
 Medicine (Pulm, Immunobiol, Endocrin, Cardiol), Molec Physiol & Biophys (MPB), Pathology, Biochem, Mech Engr, H Molec Genet, Pulm Dis & Crit Care Med (PDCCM) located at Fletcher Allen Health Care

**Strengths / Innovative Strategies.** Strong emphasis on career development of junior invs (mentors assigned since Yr 1). Developed workshops for grantwriting, scientific writing, ethics, academic survival skills, and specific research topics (several approved as grad school courses for credit). Strong instit support for research.

**COBRE-Funded Cores**  
 Administrative Core  
 Biomedical Engineering Core  
 Transgenic Animal Core

**Director / Coordinator**  
 Irvin  
 Bates, Chesler  
 Rincón

**Instit / Dept**  
 UVM / Medicine  
 UVM / Medicine  
 UVM / Med-Immunobiol

**Core Notes**  
 Admin asst (50%), budget manager, biostatistician, sys programmer

**Experienced Investigators Active in COBRE**  
 Jason H T Bates, PhD, DSc - IAC member  
 Ralph C Budd, PhD - IAC member  
 Dieter C Gruenert, PhD  
 Yvonne M W Janssen-Heininger, PhD \*  
 David R Hemenway, PhD - IAC member  
 Charles G Irvin, PhD - IAC member  
 Robert B Low, PhD - IAC member  
 Polly E Parsons, MD - IAC member  
 Richard E Pratley, MD \*  
 Mercedes R Rincón, PhD  
 Burton E Sobel, MD  
 David M Warshaw, PhD - IAC member

**Previous PHS Grants**  
 0  
 5 R01s, R29, P01, U09, F06  
 4 R01s, R13, P30 sub, P01 sub  
 R01, R03  
 R03, 4 P50 subs  
 R01, R23, 2 P01 subs, F32  
 R01 2 P50s, S07, 3 S15s, F06  
 4 P50 subs, K08  
 Z01, 2 M01 subs, K08  
 R29, P01 sub  
 2 R01s, 4 P50s, U01, 4 T32s  
 4 R01s, P01, P01 sub, F32

**Instit / Dept**  
 UVM / Med-Pulm, MPB  
 UVM / Med-Immunobiol  
 UVM / Dir H Molec Genet  
 UVM / Pathology  
 UVM / Civil & Envir Engr  
 UVM / Med-Pulm, MPB  
 UVM / MPB, former Provost  
 UVM / Dir PDCCM, DOM Chair  
 UVM / Med-Endocrin  
 UVM / Med-Immunobiol  
 UVM / Biochem, Med-Card  
 UVM / Chair MPB

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**VT1 Translational Research in Lung Biology (Vermont Lung Center), continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Naomi C Chesler, PhD *	0.5 pubs/yr + 0 grants	UVM / Mech Engr	Sobel, Gruenert	2.2 pubs/yr + <b>R01</b> , fdn grant
David Alan Kaminsky, MD *	0.8 pubs/yr + K08, T32 postdoc	UVM / Med-Pulm	Bates	1.4 pubs/yr + <b>R03</b> , 3 fdn grants, indus grant
Matthew E Poynter, PhD **	2.3 pubs/yr + F32, T32 predoc, postdoc	UVM / Med-Pulm	Janssen-Heininger	3.3 pubs/yr + <b>R01</b> , <b>K22</b> , fdn grant
Scott S Wagers, MD **	0.3 pubs/yr + 0 grants	UVM / Med-Pulm	Irvin, Sobel	1.2 pubs/yr + <b>M01 sub</b> , indus grant
<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Benjamin T Suratt, MD	K08	UVM / Med-Pulm		<b>R01</b>
Daniel J Weiss, MD, PhD *	P51 sub, K08, F32	UVM / Med-Pulm	Bates, Kolls (ext)	<b>2 R21s</b>
Laurie A Whittaker, MD **	0	UVM / Med-Pulm	Budd, Rincon	3 fdn grants
<u>External Advisory Committee</u>	<u>Instit / Dept</u>			
Jeffrey Fredberg, PhD - Yr 1-6	Harvard / Physiology			
Jay Kolls, MD - Yr 6	Ch Hosp Pittsb / Ped Pulm			
James Martin, MD - Yr 1-6	McGill U / Meakins-Christie Labs			
David Riches, PhD - Yr 2-6	Natl Jewish MRC / Peds			

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

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	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**WV1 Sensory Neuroscience Research Center (SNRC)**

[www.hsc.wvu.edu/wvucn/research\\_areas.php](http://www.hsc.wvu.edu/wvucn/research_areas.php)

**Grant Number** P20 RR015574  
**Project Start Date** Sept 2000  
**Program Director (PD) - Yr 1-6** George A Spirou, PhD Otolaryn, Physiol & Pharmacol

**Major Achievements in Yrs 1-6.** Created 6 tenure-track positions, hired 7 new junior invs, tripled SNRC faculty, increased # of postdocs, grad students, and technicians. All junior invs funded in Yr 1-3 rcvd R01 grants. Created Interdisciplinary Center for Neuroscience in Yr 4 (directed by COBRE PD), bringing in researchers from different depts and expanding range of sensory systems studied and diversity of technical approaches. Increased faculty startup packages and postdoc pay. Established common first-year grad school curriculum. Leveraged COBRE funding to obtain state and instit'l funds for startup packages, enhanced core facilities, and construction of new Biomedical Research Building.

**Center's Research Focus** Function and development of sensory systems, with an emphasis on the genetic basis and loss of function resulting from congenital sensory disorders and the development of treatments for human neurological diseases.

**Major Challenges.** Recruiting high-quality postdocs and grad students. Finding adequate space for SNRC scientists. Forging collaborative ties between WVU and Marshall U (200 miles apart); Marshall was phased out of SNRC in Yr 3 when its junior inv left.

**Participating Institutions**

West Virginia University (WVU)

**Location**

Morgantown, WV

**Primary Departments Active in COBRE**

Otolaryn, Neurobiol & Anat, Biochem, Physiology & Pharmacol, Ophthalmol, Radiology, Biology

Marshall University School of Medicine (MU)

Huntington, WV

Microbiol, Immunol, & Molec Genetics

**Strengths / Innovative Strategies.**

Worked closely with WVU's new Assoc VP for Rsch & Grad Studies to improve policies for promoting rsch and fostering collaborations. Held bi-weekly meetings critiquing manuscripts and grant proposals of colleagues studying other sensory systems. 3 EAC members mentored junior invs. Strong instit'l and state support for research.

**COBRE-Funded Cores**

Administrative Core  
 Transgenic Rodent Facility  
 Center for Advanced Imaging  
 Electron Microscopy Core  
 Confocal Microscope Core

**Director / Coordinator**

Spirou  
 Mathers  
 Puce, Raylman  
 Spirou  
 Dey, Cyr

**Instit / Dept**

WVU / Otolaryn  
 WVU / Otolaryn  
 WVU / Radiology  
 WVU / Otolaryn  
 WVU / Otolaryn

**Core Notes**

Admin asst (100%), rsch/grants coord'r

**Experienced Investigators Active in COBRE**

Elizabeth C Bryda, PhD \*  
 J Vernon Odom, PhD  
 Aina Puce, PhD  
 Bernard G Schreurs, PhD  
 Terry L Schwartz, MD  
 George A Spirou, PhD \*  
 Stephen J Wetmore, MD - IAC member

**Previous PHS Grants**

R01, R03  
 R01  
 R01  
 2 R01s, 4 Z01s  
 0  
 R21, R29, F31  
 R03

**Instit / Dept**

MU / Microbiol, Immun, & Molec Gen  
 WVU / Ophthalmol, Physiol  
 WVU / Radiology  
 WVU / Physiol & Pharmacol  
 WVU / Ophthalmol  
 WVU / Otolaryn, Physiol  
 WVU / Dept Chair Otolaryn

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**WV1 Sensory Neuroscience Research Center (SNRC), continued**

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Albert S Berrebi, PhD *	1.6 pubs/yr + R29, 2 F32s	WVU / Otolaryn, Neurobiol & Anat		2.0 pubs/yr + <b>R01</b>
Janet L Cyr, PhD (R)	0.5 pubs/yr + R21, T32 predoc	WVU / Otolaryn, Biochem		0.4 pubs/yr + <b>R01</b> , fdn grant
Peter H Mathers, PhD *	0.8 pubs/yr + R29, T32 predoc	WVU / Otolaryn, Biochem	Spirou, Berrebi, O'Leary (ext)	1.6 pubs/yr + <b>R01</b>
Janine D Mendola, PhD *	1.5 pubs/yr + T32 predoc	WVU / Radiology, Neurobiol & Anat	Schwartz, Odom, Wandell (ext)	1.8 pubs/yr + <b>R01</b>

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Ariel Agmon, PhD *	R29, F32	WVU / Neurobiol & Anat	Augustine (ext)	<b>R01, R21</b>
Kevin C Daly, PhD *	R03	WVU / Biology	Schreurs	0
James W Lewis, PhD (PP) *	R03, F32	WVU / Physiol & Pharmacol	Puce	0
Visvanathan Ramamurthy, PhD	0	WVU / Ophthalmol, Biochem		<b>R01</b>
Benjamin M Ramsden, PhD (PP) *	0	WVU / Neurobiol & Anat	Berrebi, Wandell (ext)	0
Maxim V Sokolov, PhD *	0	WVU / Ophthalmol, Biochem	Mathers	0
Sepideh Zarepars, PhD	F32	WVU / Ophthalmol		0

<u>External Advisory Committee</u>	<u>Instit / Dept</u>
George A Augustine, PhD - Yr 1-6	Duke U / Neurobiol
Margit Burmeister, PhD - Yr 1-3	U Michigan / Human Genetics
Dennis D M O'Leary, PhD - Yr 1-6	Salk Institute / Molec Neurobiol
Brian A Wandell, PhD - Yr 1-6	Stanford U / Psychol & Neurosci
Eric D Young, PhD - Yr 3-6	JHU / Biomed Eng, Neurosci

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDEA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**WY1** Biology of Spatiotemporal Nitric Oxide Gradients → Neuroscience Center for Biomedical Research Excellence

**WY2** Cellular Responses to Stressors of Cardiovascular Health → Neuroscience Center for Biomedical Research Excellence

<http://uwacadweb.uwyo.edu/microscopy/cobres.htm>

**Grant Numbers** P20 RR 015553 and 015640  
**Project Start Date** Sept 2000  
**Program Directors (PDs)** David S Bohle, PhD (Yr 1-2) UW / Chemistry  
 James D Rose, PhD (Yr 3-5) UW / Zool & Physiol  
 Francis W Flynn, PhD (Yr 1-6) UW / Zool & Physiol

**Major Achievements in Yrs 1-6.** Established 2 major facilities (microscopy and macromolecular cores) with excellent directors, websites, user fees, and broad range of users from many depts and outside agencies. 3 new tenure-track positions created in Yr 1-5. Successful transition from initial research themes of the 2 COBREs to a broader research program in sensory neuroscience, consistent with UW's academic plan.

**Center's Research Focus** Nitrous oxide and cardiovascular research redirected to focus on cellular mechanisms underlying activity-dependent changes in central nervous system circuitry and functioning.

**Major Challenges.** Having to restructure the 2 COBREs after only 2 of 5 initial WY2 subprojects were approved and after WY1's first PD left university in Yr 2. Getting support from senior administrators in response to some depts' decisions on hiring faculty and increasing release time for junior invs. Retaining junior invs. Developing a website for the Neuroscience COBRE.

**Participating Institutions**  
 University of Wyoming (UW)

**Location**  
 Laramie, WY

**Primary Departments Active in COBRE**  
 Zool & Physiol, Molec Biol, Pharmacol, Chemistry, Elec & Comp Engr, Kinesiol & Hlth

**Strengths / Innovative Strategies.** Expanding mentoring program to focus on career as well as research skills; encouraging EAC members to serve as mentors. Collaborating with UCHSC to enhance DNA microarray capability. Junior invs' affiliation with neuroscience PhD program helped recruit grad students to COBRE labs.

**COBRE-Funded Cores**

Administrative Core  
 Microscopy Core  
 Macromolecular Core  
 DNA Microarray Core

**Director / Coordinator**

Flynn  
 Zhang  
 Jones  
 Gomelsky

**Instit / Dept**

UW / Zool & Physiol  
 UW / Zool & Physiol  
 UW / Molec Biol  
 UW / Molec Biol

**Core Notes**

Bookkeeper (100%), office asst (50%)

**Experienced Investigators Active in COBRE**

Robert W Atherton, PhD  
 Donald S Bohle, PhD  
 Francis W (Bill) Flynn, PhD \*  
 Zoltan M (Nick) Fuzessery, PhD - IAC member  
 Donald L Jarvis, PhD  
 Randolph V Lewis, PhD - IAC member  
 Richard J McCormick, PhD (PP)  
 Jun Ren, MD PhD \*  
 James D Rose, PhD - IAC member  
 D Paul Thomas, PhD (PP)  
 Charles Jeffery Woodbury, PhD \*

**Previous PHS Grants**

R01  
 R01, S10, F32  
 3 R01s, R55, R23  
 R01, R29, F32  
 2 R01s  
 2 R01s, R23, P41, 2 S10s, K04  
 R15  
 R03, R15  
 5 R01s  
 0  
 R01

**Instit / Dept**

UW / Zool & Physiol  
 UW / Chemistry  
 UW / Zool & Physiol  
 UW / Zool & Physiol  
 UW / Molec Biol  
 UW / Dir, EPSCoR Pgm  
 UW / Animal Sci  
 UW / Pharmacol  
 UW / Zool & Physiol  
 UW / Kinesiol & Hlth  
 UW / Zool & Physiol

PROCESS EVALUATION OF THE COBRE PROGRAM

**CENTER SNAPSHOT -- YEARS 1-6**

**WY1** Biology of Spatiotemporal Nitric Oxide Gradients → Neuroscience Center for Biomedical Research Excellenc

**WY2** Cellular Responses to Stressors of Cardiovascular Health → Neuroscience Center for Biomedical Research Excellence, continued

<u>Non-R01 Junior Investigators Funded in Yrs 1-3<sup>1</sup></u>	<u>Previous Pubs + PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Pubs + Grants After Joining COBRE</u>
Steven F Barrett, PhD **	2.9 pubs/yr + 0 grants	UW / Elec Engr	Rose, Fuzessery	5.7 pubs/yr + NSF grant
Scott A Boitano, PhD *	1.3 pubs/yr + R15	UW / Zool & Physiol		1.8 pubs/yr + <b>R01</b>
Mark Gomelsky, PhD *	1.2 pubs/yr + 0 grants	UW / Molec Biol	Flynn	3.2 pubs/yr + NSF grant
Robert A Heinzen, PhD *	2.3 pubs/yr + R29	UW / Molec Biol		4.4 pubs/yr + <b>2 Z01s</b>
Shelly J Robertson, PhD *	1.6 pubs/yr + 0 grants	UW / Molec Biol		1.4 pubs/yr + 0 grants
Donal C Skinner, PhD **	3.5 pubs/yr + 0 grants	UW / Zool & Physiol	Rose, Flynn, Sladek (ext)	6.0 pubs/yr + USDA grant
Nair Sreejayan, PhD *	0.9 pubs/yr + 0 grants	UW / Pharmacol	Ren	4.0 pubs/yr + fdn grant
Paul R Wade, PhD *	1.0 pubs/yr + 0 grants	UW / Zool & Physiol		1.2 pubs/yr + 0 grants

<u>Other Non-R01 Junior Investigators</u>	<u>Previous PHS Grants</u>	<u>Instit / Dept</u>	<u>Mentors</u>	<u>Grants After Joining COBRE</u>
Kirstin E Beach, PhD (PP) *	0	UW / Communic Disord		0
Merav Ben-David, PhD (PP)	0	UW / Zool & Physiol		0
Mark M Stayton, PhD (PP)	0	UW / Molec Biol		0
Qian-Quan Sun, PhD *	0	UW / Zool & Physiol	Rose, Fuzessery	<b>R01</b>
Cameron H G Wright, PhD	0	UW / Elec & Comp Engr		0
Zhaojie Zhang, PhD (PP)	0	UW / Zool & Physiol		0

**External Advisory Committees**

**WY 1**

	<u>Instit / Dept</u>
Steven L Bealer, PhD - Yr 3-5	U Utah / Pharmacol & Toxicol
F Edward Dudek, PhD - Yr 3-5	Colo State U / Anat & Neurobiol
Brian R Duling, PhD - Yr 1-2	U Virginia HSC / Physiology
Thomas E Finger, PhD - Yr 3-5	U Colo HSC / Cell & Struct Biol
Michael A Marletta, PhD - Yr 1-2	U Michigan / Medicinal Chem
Frank L Moore, PhD - Yr 3-5	Oregon State U / Zoology
Kenton Sanders, PhD - Yr 1-2	U Nevada / Physiol & Cell Biol
James Tidball, PhD - Yr 1-2	UCLA / Physiol Sci

**WY 2**

Alan Kim Johnson, PhD - Yr 1-6	U Iowa / Psychol, Pharmacol
Robert E Lanford, PhD - Yr 1-2	SW Fndtn / Virol & Immunol
Russell L Moore, PhD - Yr 1-6	U Colo / Integrative Physiol
Robert O Poyton, PhD - Yr 4-5	U Colo / Molec, Cell, & Dev Biol
Celia D Sladek - Yr 2-6	U Colo HSC / Physiol & Biophys

**NOTES**

<sup>1</sup> Junior investigators who received substantial support during Yr 1-3 (junior faculty who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).

Current position of junior investigators who are no longer at the COBRE institution:

	Academic position in an IDeA state
	Academic position in a non-IDeA state
	Non-academic research position (e.g., pharm co.)
	Non-research position

\* Directed a COBRE subproject. \*\* Directed 2 different COBRE subprojects. **(PP)** Directed a COBRE pilot project. **(R)** Received a COBRE recruitment package **(ext)** External mentor.

## APPENDIX D

### JUNIOR INVESTIGATOR SNAPSHOT (SAMPLE)

## PROCESS EVALUATION OF THE COBRE PROGRAM

## JUNIOR INVESTIGATOR SNAPSHOT (SAMPLE)

<b>AR1 COBRE: Center for Protein Structure and Function</b>		
1	Name of 'junior investigator' and degrees (see definition in footnote)	<b>John A Doe, PhD</b>
2	Investigator's first COBRE year as a 'junior investigator'	FY 2001 (Year 1)
3	Academic position when joining COBRE + position at end of Year 6	Asst Prof / Assoc Prof
4	COBRE institution / department	U Arkansas / Biol Sci
5	Doctoral institutions (year of doctorate degree)	Louisiana State (1993)
6	Postdoctoral institutions (year postdoctoral work was completed)	U Alabama Birmingham (1998)
7	Competitive PHS research grant applications (as PI) prior to joining COBRE	F32 application
8	Competitive PHS research grant awards (as PI) prior to joining COBRE	F32
9	# previous PubMed articles (through first year in COBRE)	15 previous pubs (6 first author, 3 senior author)
10	Average annual rate of previous articles (since year of doctorate)	1.4 previous pubs /year (0.5 /year first author, 0.3 /year senior author)
11	Primary COBRE activities	Directed a subproject, worked on another subproject
12	COBRE mentor(s)	Smith
13	Investigator's % effort on COBRE grant during Years 1-3	25-32%
14	Type of lab personnel provided to investigator during Years 1-3	1 postdoc (100%), 1 lab tech, 2 collaborators
15	# PubMed articles since joining COBRE (not counting first year in COBRE)	10 new pubs (0 first author, 8 senior author)
16	Average annual rate of PubMed articles since joining COBRE	2.0 new pubs /year (0.0 /year first author, 1.6 /year senior author)
17	# abstracts during Years 1-6	3 abstracts (1 first author)
18	# presentations during Years 1-6	10 presentations
19	Competitive PHS research grant applications (as PI) after joining COBRE	4 R01, R21 applications
20	Competitive research grant awards (as PI) after joining COBRE	R01
21	Still at institution? (If no, list new institution and year transferred)	Yes

NOTE: For purposes of the evaluation, 'junior investigators' are defined as COBRE participants at the assistant/associate professor level who did not have an R01 or other major grants prior to joining COBRE and who received substantial support during Years 1-3 (those who directed a COBRE subproject, were recruited with a COBRE startup package, and/or received substantial mentoring on a COBRE subproject on which they committed at least 15% level of effort).