

DEPT of BIOCHEMISTRY REVIEW of DEGREE GRANTING PROGRAMS

January 3, 2009

REVIEW COMMITTEE

John I. Clark, Professor, Biological Structure, UW (Committee Chair)

Merrill B. Hille, Professor, Biology, UW

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Katherine L. Wilson, Professor, Dept of Cell Biology, Johns Hopkins University

INTRODUCTION:

The Biochemistry Department is a prominent program that has maintained a distinguished tradition of excellence in research and education since its founding in the early 1950s. The current Chair and the first outside appointment to the Chair (in 2000) is devoted to continuing the tradition of academic excellence.

FUNDING: The Department of Biochemistry has a strong record of funding (approximately \$20 million in the most recent reporting year), which can be expected to continue even under the current economic conditions. Funding sources include NIH, NSF, The Howard Hughes Medical Institute, The Ellison Foundation, The Gates Foundation, the Muscular Dystrophy Fund, American Cancer Society, March of Dimes, and the M.J. Murdock Charitable Trust.

OUTSTANDING FACULTY: The faculty are scientifically diverse and interdisciplinary with interests that include molecular structure, biophysics, cell and molecular biology, aging, development, stem cells, transcription, translation, infectious diseases, genetics, computational biology, gene therapy, drug design and vaccine development. Faculty members are unified and passionate in their commitment to excellence in research and education. Faculty have received awards too numerous to list here, including the Nobel Prize.

Successful recruitment of three outstanding new faculty have strengthened the scientific and academic efforts of the Department of Biochemistry. All three stated that they receive strong support from other faculty and have considerable and direct access to the Chair.

EXCELLENT FACILITIES: Recent renovations improved nearly every laboratory in the Department. The Department houses an impressive new CryoElectron Microscopy

facility, a comprehensive Yeast Resource Center, a DNA Sequencing Facility and Biochemistry Stores. Other new technologies have been incorporated through collaborations or joint programs.

REVIEW PROCESS:

A preliminary “Charge” meeting of the Review Committee was held on September 30, 2008 and was attended by Merrill Hille, Leo Pallanck, Alan Weiner, James Antony, John Slattery, John Sahr, Chris Mathews (by phone), and David Canfield-Budde.

The Review was held in the Department of Biochemistry on 22 – 24 October, 2008. The Exit Interview was held from 2:30 to 5:30 on 24 October and included the Review Committee plus Program Representatives: Thomas Gething, (Associate Dean of the Graduate School), Douglas J Wadden, (Executive Vice Provost), John Slattery, (Vice Dean for Research and Graduate Education, UWSOM), John Sahr, (Associate Dean, Undergraduate Academic Affairs), David Canfield-Budde, (Academic Program Specialist of the Graduate School) and Alan Weiner (Chair of Biochemistry).

The Review Committee received an extensive Self Study Document, which summarized the strengths and weaknesses of the Department and its educational programs. The Self Study Document was the basis for many of the discussions and interviews conducted during the two days of the Review. (see schedule below). The major findings of the Review Committee are listed below as STRENGTHS, WEAKNESSES and RECOMMENDATIONS.

REVIEW

STRENGTH in graduate research training: The graduate program in the Department of Biochemistry is strong with impressive students and faculty mentors. Over 63 Ph.D. and 5 M.S. degrees in Biochemistry were awarded during the past ten year period. The predoctoral students have won prestigious academic awards. The Department is the home for two major training grants. There is a high level of collegiality between the students and a responsive and caring faculty who take great pride in education of the graduate students. The students feel well prepared for attending national and international scientific meetings, publication of their research and seeking desirable postdoctoral opportunities. Students give high marks to Literature Review Courses and their “student-only” research forums. Every research laboratory is open to students for interactions that range from scientific discussion to research collaborations, and the students take advantage of these opportunities. Students have excellent access to the Chair, who is approachable and responsive to their needs. The graduate program emphasizes scientific diversity and critical thinking skills to identify and solve biological problems.

STRENGTH in teaching and communication skills: The opportunities for predoctoral and undergraduate students to develop teaching skills as Teaching Assistants (TAs) are numerous and rewarding for the students. The value of the TA experience in teaching Biochemistry to undergraduates was clearly stated by the TAs interviewed by the

Committee who emphasized that “teaching is where maximum learning occurs.” TAs are essential to the effective teaching of Biochemistry to undergraduates. Last year, to fill a gap in the number of graduate TAs and to maintain 15 high-quality sections for small group learning, the Biochemistry Department selected senior undergraduate students as TAs. This innovation proved effective and rewarding, and raised a question: should biochemistry graduate students continue to be required to TA undergraduate courses?

RECOMMENDATION: The faculty and graduate students recommend a strong TA requirement for all graduate students because it strengthens their ‘core’ expertise in biochemistry, and improves teaching and communication skills essential for all careers, not just academic research. Strong faculty guidance in the development of teaching skills needs to continue. The TA requirement for predoctoral students should continue, with any unfilled TA positions offered to talented undergraduates. A mix of graduate and undergraduate TAs worked well this year and should continue. More resources from the UWSOM and the University are needed to continue the high level of commitment to excellent education in Biochemistry, including funds to retain and expand the number of TAs.

STRENGTH in teaching undergraduates: Although this report focuses upon graduate programs, the Department has significant responsibilities in undergraduate education that require a substantial effort by the faculty. The undergraduate program is extremely successful and is experiencing steady increases in enrollment. More than 180 undergraduate students are awarded a B.S. in Biochemistry each year and the demands on the faculty can be expected to increase with the increase in biochemistry and science majors. There is a large and expanding requirement for the Department to teach biochemistry both to majors and nonmajor students whose programs require BIOC 440, 441, and 442, the three-quarter, 4-credit-hour series which currently has about 295 students, with 3 lectures/week given by six instructors over the year. Each quarter there are fifteen 20-student sections (one for honors students) per week that reinforce course material with problem solving. Biochemistry majors take a 4-credit laboratory course (BIOC 426) consisting of three lab sections (56 students each) that each meet twice a week. The lab course is given twice a year by a WOT faculty member and three TAs. These are excellent courses, rated highly by the undergraduate and course TAs. To maintain these courses at a very high level, the three credit series, BIOC 405, 406, is offered to most pre-med majors and other science majors and enrolls more than 600 students per year.

STRENGTH in postdoctoral training: The postdoctoral program is very effective. Current fellows are satisfied with the program and their research, specifically stating they had numerous valuable opportunities to collaborate with other laboratories. They appreciate the opportunity to meet with seminar speakers over Wine and Cheese, and feel the post-doctoral office in the graduate school is an excellent resource. They are competitive in the current job market.

WEAKNESS in resources and “systems” support for undergraduate education: The Department is being strained by the demand for Biochemistry education and expanding

undergraduate enrollment. Resources required to support the large and expanding commitment are inadequate. Undergraduate tutoring services need improvement. Classrooms to accommodate the increasing numbers of students are becoming more and more difficult to schedule. The problems with classroom scheduling are not limited to the Department of Biochemistry.

- RECOMMENDATION: (a) Classroom scheduling for large lectures and small group sessions (undergraduate and graduate level) has become increasingly complex, time consuming, inconsistent and unreliable over the past three years. This problem is outside the department's control, and needs Dean-level attention to be fixed now.
- (b) Tutoring services for undergraduates can be improved by adding a Biochemistry table in Mary Gates Hall or Bagley Hall (or both).
- (c) A broader set of electives for undergraduate majors, including access to graduate level courses, is recommended.
- (d) More resources are needed to support TAs (graduate and undergraduate), hire hourly proctors for exams, and cover other hourly administrative needs.

WEAKNESS in the graduate curriculum: While many Biochemistry Departments have a basic core curriculum over the first year, the Biochemistry Department at the UW does not. The flagship course, BIOC 530, emphasizes learning to define and identify solutions to research problems in modern biochemistry, not simply learning the basic facts of biochemistry. That said, BIOC 530 was identified as needing improvement and better coordination. The multidisciplinary science in the Department that includes molecular structure, developmental biology, physical biochemistry, molecular biology, computational biochemistry, in addition to the traditional strengths in protein biochemistry, is viewed as a strength for the research and educational programs. The current program gives students access to a flexible choice of a large number and of Conjoint Courses, taught by faculty inside and outside the Department, which cover many or most of the topics in contemporary biochemistry. This allows flexibility in program design, and, with suitable oversight, assures coverage of the field. Still, an argument can be made that there are core concepts that need to be understood by all who aspire to be called biochemists. An active discussion between the faculty and the Review Committee considered many issues regarding the absence of a core sequence of coursework. This is an issue upon which reasonable educators can disagree, and some faculty commented that a core curriculum was abandoned in the past because broader educational opportunities were both expected by the students and required for success in modern interdisciplinary science. During the discussion of the graduate program, it became clear that the faculty and the Chairman need to work together on the issues surrounding the graduate program.

RECOMMENDATION: Faculty discussion of the advantages and disadvantages of a core sequence course is needed to define a "biochemistry curriculum" and clarify what students need to understand to be classified as "biochemists". With respect to BIOC 530, discussions are needed between the course organizers, students, and faculty responsible for the curriculum to identify improvements. The students have thoughtful and

constructive ideas on improvements for BIOC 530 that need consideration. These are areas that can be addressed jointly by the faculty and the Chairman working together. WEAKNESS in opportunities for research presentations with faculty feedback: While predoctoral students consider their first-year rotation talks a good experience, there are few opportunities to give research talks in front of faculty. Students welcome faculty feedback. Faculty attendance at student talks needs to be strong.

RECOMMENDATION: Faculty and students need to discuss opportunities for graduate student presentations on a regular (e.g., yearly) basis, with constructive feedback from faculty. The graduate students have ideas about presentations that need to be considered.

WEAKNESS in the number of and support for graduate students: The size of the graduate program seems small for the size of the Department and the number of cutting-edge research laboratories available for graduate research education. Continued Departmental support for graduate students was a problem that was of concern specifically during the second year or when a laboratory lost funding. Discussions between the faculty and the Chairman have not been held on this issue which is central to the future of the graduate program.

RECOMMENDATION: The Department needs a faculty-wide discussion of the objectives for the graduate program, and consideration of recent trends in the numbers of applicants, and the number of available research laboratories. If a larger pool of beginning students is essential to recruit new faculty, then we strongly recommend that State and/or Departmental funds be directed toward two goals: increasing the number of students admitted to as many as 8 to 10 students per year, and to provide emergency support for students whose labs experience a lapse in research funds. The Department plan should define the future of the graduate program with respect to numbers of students, a critical mass for each entering class, support for students during their second year, and a core curriculum. Graduate students are eager and valuable allies in recruiting both new students and new faculty; their participation and input may need to be increased. This is an area where faculty and Chairman can work together to make decisions on the graduate program.

WEAKNESS in the effort to increase graduate student diversity: Improving the recruitment of underrepresented minorities to graduate biochemistry research programs is a challenge that is being met successfully by other institutions. This success can be attributed to two factors: participation in programs that can identify a local and national pool of research-oriented undergraduates, and having the staff and resources in place to actively recruit students for funded experiences in basic biomedical research (e.g., summer research programs). Funding for at least two existing graduate training grants directed by Biochemistry Department faculty is now at risk, due to the absence of successful plans to recruit and admit underrepresented minorities. Also putting current programs at risk, is the inability of program directors to easily access a central UW database for detailed information about every graduate school applicant, now required as supporting documentation for the competitive renewal of these training grants.

RECOMMENDATIONS: (a) At the departmental level, the faculty need to work together with the chair on long-term strategies for improving minority student recruitment including a systematic approach to identify and recruit potential research-oriented biochemistry undergraduates for summer lab research projects each year. Some Biochemistry faculty are active in such programs, and their success needs to be considered. Resources need to be committed to support trips for faculty and/or students to recruit underrepresented minorities.

(b) At the level of the Dean's office, resources are needed to promote and enable recruitment visits by department chairs, faculty, and importantly, current graduate students and minority undergraduates who have experienced lab research, to minority colleges and to attend national meetings of SACNAS (Society for Advancement of Chicanos and Native Americans in Sciences). The mission of SACNAS is to encourage Chicano/Latino and Native American students to pursue graduate education and obtain advanced degrees needed for science research, leadership, and teaching careers at all levels.

(c) The Dean is urged to engage the University of Washington as a supporting member of the Leadership Alliance, a highly successful national program that recruits applications from academically outstanding, research-interested students from a variety of backgrounds including minorities, first generation college, low-income or attending colleges with no access to research experience, and helps "match" them with participating research institutions. The Leadership Alliance funds a small number of summer internships per institution, but this number is pitifully low compared to the number of outstandingly qualified, enthusiastic applicants. Thus direct institutional (UW) support for additional student stipends, in all participating graduate departments, will be vital. Long-term participation in summer research programs has proven to have tangible benefits in increasing and sustaining the matriculation of minority students in PhD research programs.

(d) Summer research programs can be administered by Janice M DeCosmo, Associate Dean of Undergraduate Academic Affairs and Director, Undergraduate Research Program, Experiential Learning. The challenge of identifying and recruiting underrepresented minorities is not limited to the Department of Biochemistry, and requires an institutional commitment to implementing successful programs at the Departmental level. This is a serious problem that puts federal funding for training grants at risk. It needs to be addressed now.

WEAKNESS in administering and tracking predoctoral student progress: Records and documentation of student progress, and student advising need improvement. Currently, a single faculty member is responsible for all aspects of graduate student admissions and administration, with help from one graduate program coordinator. This is a significant level of responsibility for only two individuals, and inadequate for the needs of the program. During discussion, one student asked whether predoctoral students are allowed to rotate with adjunct faculty.

RECOMMENDATIONS: The Graduate Program Committee should include more than one faculty member. The faculty need to work together with the Chairman to define clearly the responsibilities of the Graduate Program Committee. The committee needs

better organization for admissions, progress reports, coursework, examinations, thesis committee meeting summaries, and comments by the GSR. The committee needs better coordination of the individual predoctoral records, to enable timely reviews of student progress. The committee should schedule regular (quarterly?) meetings to discuss and review students, or more frequently when specific students have problems. Progress of individual graduate students should also be reviewed and discussed in a faculty meeting each year.

RECOMMENDATION for improvements for applicants: The Department website needs updating for recruiting new students, providing information on course requirements and scheduling.

WEAKNESS in the distribution of teaching responsibilities: The demographics of the Department suggest that retirements will limit the faculty available for major teaching efforts. While the faculty and the Chairman are aware of the problem, there has been little discussion of options to solve the problem between the faculty and the Chairman.

RECOMMENDATION: Faculty need to work together with the Chairman to discuss teaching assignments and collectively develop a plan that addresses both immediate and long term needs. Additional FTEs are needed to address the expanding teaching load.

WEAKNESS: Some WOT and Research Faculty feel a lack of recognition for their teaching.

RECOMMENDATION: A specific policy describing the teaching responsibilities and expectations for WOT and Research Faculty may need to be generated by the faculty working together with the Chairman. Such written documentation will help faculty to understand the contributions of WOT and Research Faculty to the educational programs of the Department.

WEAKNESS in efforts to recruit new faculty: Three excellent young faculty members were successfully recruited. However the Committee was told that during another recruitment, faculty members were told by the Chairman not to contact the recruit after the offer letter was sent. If accurate, this wastes a valuable recruiting resource, namely the existing faculty in the Department.

RECOMMENDATION: Women faculty must be included on all search committees: Women and minority faculty candidates need to be recruited more actively. Current faculty need to work with the Chairman so that they are empowered and encouraged, rather than discouraged, from involvement in all stages of the search and recruitment process.

WEAKNESS in support for directors of graduate training grants: The administrative load required to maintain and renew two strong training grants centered in the Department of Biochemistry is a growing burden to the faculty who direct these grants.

RECOMMENDATION: Administrative support and tangible incentives for the Directors are needed. Currently, it is a major effort to collect and document student and faculty records for competitive renewals for all training grants, including detailed information on faculty sponsors, graduates, and applicants, minority applicants and acceptances. The Dean is urged to centralize information that is common to all applications in a manner that enables easy electronic access to data required for grant applications and renewals.

WEAKNESS in evaluating and tracking junior faculty: Annual reviews and written evaluations of Assistant and Associate Professors are not being conducted by faculty or by the Chairman. The Committee was asked during one interview, “What is required for promotion?”

RECOMMENDATION: Clear promotion requirements need to be defined for each Assistant or Associate Professor. This is an area where communication between the faculty and the Chairman needs improvement. The annual review and written summaries of progress for new faculty need to be conducted in compliance with section 24-54 and/or 24-57 of the faculty code. Mentors for new faculty are another way to involve faculty in Departmental activities and can be helpful for new appointments.

WEAKNESS in Departmental spirit: While a strong commitment to excellence is obvious at every level of the Department, there was concern about the overall vision and direction of the Department. Currently, there is a sense of frustration, apathy, and/or discouragement, which was mentioned first in the Self Study Document, written by the Chairman, and confirmed during the interviews with the faculty. While there is agreement on the problems that need to be addressed, the faculty and Chairman do not appear to be sharing the responsibility and working together to restore a positive and constructive environment in the Department. These are management issues which, if not addressed, have negative impact on collegiality, and interdepartmental relationships.

RECOMMENDATIONS: “The swiftest boat has many oars pulling together”. We recommend that faculty and Chair work constructively together to develop a strategic plan and collective vision for the Department, to identify and creatively solve problems facing the Department. Shared responsibility is an important factor in improved Department spirit.

Specific actions include:

- (1) Conducting a strategic planning retreat run by a professional facilitator (e.g. Louise Carnachan WEB Site: carnachan.com).
- (2) Increasing the level of faculty involvement, input and responsibility in several areas noted above including graduate admissions, graduate advising, and faculty tenure and promotion.
- (3) Organize regular faculty meetings to discuss specific problems facing the Department and recommend actions.

OVERALL SUMMARY

Improved resources are needed to support the current and expanding educational effort for the Department of Biochemistry. The necessary resources include additional new FTEs, funding for TAs and support staff, and improved classroom availability and scheduling for both large lectures and small group sessions. These are essential.

University-wide commitments to, and funding for, summer research opportunities and other pathways leading to recruitment of underrepresented minority students in Biochemistry and related departments are essential.

Within the Department, there is a need for better communication between the Chairman and the faculty, which will lead to greater participation, enthusiasm and commitment by the faculty to the mission of the Department. The existing strains in the Department are having a negative impact on the scientific collegiality and multidisciplinary relationships between investigators, which should be strengths of the Department. Specific points for working together are described above and include support for the graduate program, recruitment of new faculty and faculty involvement in the action plan for future academic advances.

It needs to be emphasized that the Department of Biochemistry is an outstanding department with a strong faculty led by a dedicated and capable Chairman. Substantial advances were made under the current Chairman in infrastructure, recruitment of new faculty, and education. The will to create a stronger Department even under the current economic strain was obvious in nearly all discussions. The weaknesses, real and perceived, are primarily management problems that can be addressed relatively easily through improved communication between the faculty and the Chairman. There is a shared but unspoken vision that embraces a common commitment to academic excellence in research and education. The educational environment in the Department will benefit from a shared effort by the Chairman and the faculty in defining responsibilities for specific departmental actions that respond collectively to the academic challenges facing the Department of Biochemistry. In the specific case of the resources needed for the increasing demands of the teaching effort, external funds from the School of Medicine and the Undergraduate administration are needed. The Review Committee urges the University and the School to provide resources to support new efforts in education in the Department of Biochemistry specifically by providing additional FTEs, and TA salaries, and administrative support for classroom assignments, expanded efforts to improve student diversity, general support functions and training grant administration.

The advances of the past several years are a credit to the strength of the faculty and the leadership of the Chairman. The goal of this Review Committee was to recommend improvements in the degree granting programs that build on these advances and will support continued progress in academic research and education for the Department of Biochemistry.

Biochemistry Program Review, October 23 and 24, 2008

Thursday, October 23

Health Sciences J-412

8:00 – 9:30 am Alan Weiner, Chair, Biochemistry

9:30 – 10:00 **Advisors for the Undergraduate Major** (out of sequence, only time available)

Lani Stone and Mary Harty

10:00 – 11:15 **Senior Teaching Faculty**

David Baker

Sue Brockerhoff

Dominic Chung

[Earl Davie, China]

[Trisha Davis, sabbatical]

John Glomset

Steve Hauschka

Wim Hol

Jim Hurley

Brian Kennedy

David Kimelman

Rachel Klevit [11:30 class]

Dave Morris

Richard Palmiter

Bill Parson

Hannele Ruohola-Baker

Ted Young

11:45 – 12:00 **BREAK**

12:00 – 12:45 **Early Lunch with Biochemistry Graduate Students**

Cortney Angers (Merz)

Mihai Azoitei (Schief)

Andrei Chertov (Hurley)

Lina Dahlberg (Kimelman)

Richard Frock (Hauschka/Kennedy)

Lars Holzhausen (Brockerhoff)

Jones Parker (Palmiter)

Kristan Steffen (Kennedy)

Dawn Wenzel (Klevit)

Megan Wargacki (Davis)

12:45 – 1:00 **BREAK**

1:00 – 1:45 **Late Lunch with Biochemistry Postdocs**

Juergen Bosch (Hol)
David Brackett (Morris)
Benjamin Martin (Kimelman)
Daniela Roethlisberger (Baker)
Monique Stanfel (Kennedy)
George Wisedchaisri (Gonen)
Alex Zelter (Davis)

1:45 – 2:00 **BREAK**

2:00 – 2:30 **Junior Teaching Faculty**

Alex Merz
Tamir Gonen

2:30 – 3:00 **Research and other WOT Faculty**

Peter Brzovic
Erkang Fan
Vivian MacKay
Ethan Merritt
[Eric Muller, sabbatical]
Bill Schief
Christophe Verlinde

3:00 – 3:30 **Joint Faculty**

Larry Loeb (with Pathology)
Nancy Maizels (with Immunology)
Jack Saari (with Ophthalmology)
Gabriele Varani (with Chemistry)

3:30 – 4:15 **Undergraduate Biochemistry Majors**

Katja Dove (Klevit)
Nicole Fernandez (Ruohola-Baker)
Carmen Lau (Kennedy)
Alexandra Mackenzie (Hauschka)
Mylinh Trinh Nguyen (Davis)
Paul Ryan (Kennedy)
Wai-Shan Sinn (Kimelman)
Meilany Wijaya (Brockhoff)
Lite Wu (Hol)
Sarah Kleinstein (Ruohola-Baker)

4:15 – 5:00 **Tour of Research Facilities** with Alan Weiner
Tour of Cryo EM Facility with Tamir Gonen

Friday, October 24

Health Sciences J-412

9:00 – 9:30 am **Biochemistry Administrator**, Paul Pearson

9:30 – 10:00 **Faculty Graduate Program Advisor**, Jim Hurley

Graduate Program Coordinator, Kelley Pankow
10:00 – 10:30 **Graduate Student President**, Chris Burtner
Graduate Student TA Assignment Coordinator 2004–2007, Kristan Steffen

10:30 – 11:00 **NIH Training Grants administered by Biochemistry**
David Kimelman, PI, Cell and Molecular Biology Training Grant
Rachel Klevit, PI, Molecular Biophysics Training Grant

11:00 – 2:00 **Review Committee Executive Session and Lunch**

2:00 – 2:30 **BREAK**

2:30 – 3:30 **Exit Interview with Review Committee and Program Representatives**
Thomas Gething, Associate Dean, The Graduate School
Douglas J. Wadden, Executive Vice Provost, Office of the Provost
John Slattery, Vice Dean for Research and Graduate Education, School of Medicine
John Sahr, Associate Dean, Undergraduate Academic Affairs
David Canfield-Budde, Academic Program Specialist, The Graduate School
Alan Weiner, Chair, Biochemistry

3:30 – 4:30 **Exit Interview as above without Program Representatives**

4:30 – 5:00 **Review Committee Debriefing (Review Committee only)**