Report of the Review Committee for the Department of Pathology Molecular Basis of Disease Ph.D. Program at the University of Washington

Submitted: April 29, 2013

Review Committee

The 2013 review committee included two University of Washington faculty members, Neil Nathanson, Professor, Department of Pharmacology, and Lynne Robins (review committee chair), Professor, Department of Biomedical Informatics and Medical Education, and two external faculty members, William Coleman, Professor, Department of Pathology and Laboratory Medicine, University of North Carolina School of Medicine (Chapel Hill, NC), and Paul DiCorleto, Professor and Director, The Lerner Research Institute, Chair, Department of Molecular Medicine, Cleveland Clinic Lerner College of Medicine, Case Western Reserve University (Cleveland, OH).

Background and Site Visit

On November 26, 2012, the 2013 review committee was charged to assess the quality of the Pathology Department's PhD degree, in accordance with the state legislative mandate and under the auspices of the Graduate School, Office of Research and Graduate Education in the School of Medicine, and the Office of the Provost. The last review of the Pathology Department's degree programs was completed in November 2002, at which time the Graduate School Council recommended continuation of the M.S. and Ph.D. programs with a review to occur in the 2012-2013 academic year. The Provost and Executive Vice Provost concurred with the recommendation.

This document is based on the current committee's review of the 2013 academic self-study document, the Graduate and Professional Student Senate Survey of graduate students in Pathology, and information gathered during site visit interviews that took place March 28th and 29th, 2013. Committee members met with the Pathology department chair, the Molecular Basis of Disease (MBD) Program Committee (including the current program director and co-directors), the incoming program director, faculty (including joint and adjunct faculty), graduate students, postdoctoral fellows, and administrative staff. The committee's comments, including those that appear critical, are intended to assist the program in identifying and addressing opportunities for enhancement.

Current State

From all accounts, this is an exciting time to be part of the Department of Pathology's Molecular Basis of Disease PhD program, which has been undergoing rapid change since Dr. Tom Montine, MD, PhD, became Interim Chair of Pathology in

2011 and Chair in June, 2012.1 Interviewees expressed enthusiastic support for Dr. Montine's vision for and demonstrated commitment to expanding the scope of the Pathology MBD program with the goal of creating a School of Medicine-wide program emphasizing basic biomedical research in the context of the practice of medicine. Faculty members noted:

- The "…time is right to have the program focused on human disease…" because "…translational medicine is the growth area of the future...."
- There is "…increasing interest in regenerative and personalized medicine…" which is "…synergistic with the program's future aims..."
- With "…humans now the preferred organism of study…" the program has "…gone from irrelevance to relevant..."

Key Findings

The review committee's overall assessment is that the Molecular Basis of Disease graduate program is healthy and progressing toward its goal of becoming a School of Medicine-wide program emphasizing translation-oriented research.

- The committee recommends that the Molecular Basis of Disease graduate program be granted continuing status with a subsequent formal review in ten years.
- Additionally, in consideration of the many changes that have been made and that are anticipated for the immediate future, the committee suggests that the Department of Pathology hold an informal internal review of the Molecular Basis of Disease program in three years. This will provide opportunities to assess progress toward meeting the recommendations of the current review and to determine how well the changes implemented meet the needs of both faculty and graduate students.

Program Strengths

Chair's commitment to graduate education and faculty mentoring

Dr. Tom Montine is widely acknowledged to be the driving force behind current efforts to expand and redefine the Pathology department's Molecular Basis of Disease graduate program. He is credited with leadership in:

- Actively recruiting highly successful faculty with strong track records in translational research from other UW School of Medicine departments without PhD programs to teach and mentor students in the MBD program.
- Securing new sources of funding to support first-year graduate students, enabling expansion of the student body.

[1] The self-study document referred to the previous 1-2 years under Dr. Montine as the "current" state of the program focused on the Molecular Basis of Disease, distinguishing it from the "traditional" state in which the Pathology program was small and limited to a single Department.

- Setting up a formal mentoring system to support and advance the professional development of junior faculty.

Dedicated program director and appointment of highly able and enthusiastic program co-directors

- Dr. Dan Bowen-Pope has a long history of student advocacy and excellent interactions with the graduate students in the Molecular Basis of Disease PhD Program.
- Dr. Bill Mahoney and Dr. Jean Campbell, who recently became co-directors of the MBD program, received accolades for their achievements in mentoring, advising and teaching. Dr. Mahoney was recognized for his role in faculty recruitment from other University of Washington departments. Dr. Campbell was recognized for her contributions to improving the annual review process.
- In spring, 2013 Dr. Nick Crispe will become MBD program director, taking over the duties of Dr. Bowen-Pope, who is retiring. Dr. Crispe was previously involved in training immunology graduate students and was endorsed by the Pathology Department's Teaching and Training Committee due to his experience and enthusiasm for training graduate students.

Outstanding, committed faculty

- All faculty members associated with the MBD program are actively engaged in research and well-funded. Among departments of pathology in the country, UW Medicine Pathology is annually among the top recipients of NIH funding for research grants.
- An overwhelming majority of the program's graduate students (88%) rated the quality of the research faculty as excellent.
- Students characterized the learning climate as collegial and were pleased that faculty discussed and shared their research.

The number and quality of applicants to the program is increasing

- Both faculty and the current graduate students acknowledged the increasing quality and number of program applicants and matriculating graduate students. Some attributed these trends to changes in program leadership, resources, and recruitment strategies, others to the program's new focus on translational research.
- The research faculty observed that "…the yield…" of graduate student applicants is improving over time as the program becomes more desirable, and believe it will be important to continue recruiting high quality faculty to attract more and better students.
- Recruitment of underrepresented minorities (URM) is extremely strong. Outreach is done in a variety of national recruitment conferences and URM students work closely with program directors and Graduate Program Administrator Steve Berard to recruit new URMs.

Outstanding administrative support

The Graduate Program Administrator (GPA), Steve Berard, is considered indispensable among the leadership of the MBD program, the research faculty, the postdoctoral fellows, and the graduate students. A senior faculty member described him as "…stellar…" while a junior graduate student described him as "…awesome..." Several interviewees indicated that the quality of the graduate program improved when Mr. Berard was hired. He was described as doing the work of three people while remaining available, patient, and understanding. He is credited with:

- Effectively and efficiently handling routine matters related to graduate training (course registration, paperwork, etc.).
- Organizing retreats and formalizing student presentation opportunities.
- Handling complaints, "…fixing things…" and solving problems.
- Setting up reliable systems and improving internal trainee record keeping.
- Listening when graduate students and/or postdoctoral fellows are having difficulty with their PIs.
- Increasing communication and transparency within the program.

Opportunities for Improvement:

<u>The educational program</u>

Learning objectives, course and program evaluation, and course scheduling

- The development and publication of learning objectives describing the knowledge, skill, behaviors, and/or attitudes that students are expected to achieve in each course is recommended. Learning objectives provide faculty members a roadmap for designing course materials and educational activities and for assessing student learning. They provide students information about instructor expectations for mastery of course content and aid them in making course selections.
- Courses should be evaluated annually to determine whether they continue to meet stated objectives and fit into the educational program as a whole. Discussions should include whether curricular and/or course topics need to be added, revised or deleted. Student feedback on teaching effectiveness should be reviewed and interventions should be made where deemed appropriate.
- To the extent possible, required courses should be offered as listed in the course catalogue so that students can complete their degree program requirements in a timely fashion (~5 years).
- To the extent possible, courses should be scheduled at the beginning or end of the day rather than during mid-day (as is now very often the case). Graduate students from multiple off-campus sites often lose significant blocks of time traveling to classes. Additionally, mid-day classes take

students out of the laboratory when technical support people from the laboratory are available.

Writing and Presentation Skills

Among the skills faculty and graduate students consider essential for a successful career in science are writing and public speaking. Faculty reported students do "…some writing…" during their introduction to pathology research in the laboratory setting and Dr. Jean Campbell was recognized for her efforts in teaching students to write up science data.

- The committee endorses faculty suggestions to develop a programmatic approach to teaching writing and to require publication of a scientific manuscript in a peer-reviewed journal prior to graduation.

GPA Steve Berard was recognized for his role in formalizing oral presentation opportunities. The self-study document reports that students make research presentations frequently and that all have the opportunity to present their research eight times in a formal lecture hall setting. However, in our meetings with the current graduate students, they reported that they do not get the opportunity to present seminar-length presentations (45 minutes in duration) and were concerned about preparation for giving talks in conjunction with job interviews. Former students (now postdoctoral fellows) reported that their first seminar-length presentation was delivered at the time of their final dissertation defense.

- The committee recommends formalizing a structure to support graduate student presentation of seminar-length talks, with feedback from faculty and peers.

Student Teaching Opportunities

Results of the GPSS survey indicated students wanted opportunities to gain experience teaching, but appreciated that TA-ing was not a graduate program requirement. This sentiment was echoed in meetings with the current graduate students. However, graduate students desiring to enter academic careers may be disadvantaged if they cannot demonstrate teaching competence and teaching experience. One challenge to finding opportunities for teaching is there is no undergraduate population of pathology students at UW.

- The committee encourages Dr. Montine to continue exploring some of the creative methods he described to provide graduate students with teaching experience, including offering credit for teaching in the context of a revised Path 544 course.

Graduate Student Career Counseling

Respondents to the GPSS survey identified career counseling as an area requiring "…some improvement…" Graduate students want more guidance in how

to prepare resumes or CVs and search for research scientist positions. They perceived departmental career counseling to be heavily oriented toward academic careers and most felt their PIs did not have the experience to help them plan for non-academic careers. Some students expressed reticence to state an interest in industry, biotech, or other non-academic career paths fearing it might trigger negative reaction among senior faculty members. Junior faculty members were perceived to be more open to careers in industry and/or other non-academic careers.

- Based on student interest in industry-related careers and the growth in employment opportunities outside of academia, the committee recommends organizing department-sponsored events where students can interact with industry representatives and potential employers.
- Additionally, it would be relatively easy to provide web links to resources relevant to the job search, including sample resumes, CVs, cover letters, and other important documents and "tips".

Assessment of student progress

- Students should be required to prepare an annual progress report for review by their dissertation committee. The report should contain updates on progress toward mutually agreed upon milestones and a set of new 6 month and 12-month milestones for the upcoming year. The report should also contain student and mentor comments regarding the student's progress toward his/her degree. The co-signed report should be distributed to the dissertation committee, the leadership of the graduate program, and the program office.
- The program should consider requiring dissertation committees to meet every six months rather than annually.
- A faculty committee, chaired by the program director, should conduct an annual evaluation of every student in the program. If a student's progress toward degree attainment is not on track, an action plan should be developed. An emphasis on time-to-degree is of critical importance due to the high priority this metric is given during the review of T32 grants. The Molecular Basis of Disease program has a high dependence for financial viability on multiple T32 awards that go to students in various programmatic areas.

Trainers

Appointment of Training Research Faculty

Currently, all research faculty that train Molecular Basis of Disease graduate students are required to hold an appointment in the Department of Pathology (primary appointment or adjunct appoint for faculty in other departments). This requirement has hampered the addition of new faculty due to the time required to work through the process of making adjunct appointments.

- The review committee recommends that the Department of Pathology evaluate the current requirements for trainers with respect to the requirement for a departmental appointment. The requirement that all training research faculty hold an adjunct appointment in Pathology may detract from the desired interdisciplinary nature of the program faculty.

Currently, faculty members that want to train graduate students are required to have "…substantial funding…" prior to recruitment of graduate students to their laboratories. It is well recognized that graduate students often prefer young, dynamic faculty members. In the current funding climate, even very successful young faculty members may require 3-5 years to obtain their first R01-like funding. Having graduate students during that period of time might assist young faculty to obtain the research results required to secure extramural funding.

- The review committee recommends that this restriction on junior faculty be examined and the policy clarified. A stringent restriction of this sort may dissuade prospective external faculty recruits. The Department and graduate program should accept the use of start-up funding for support of graduate students, and/or should evaluate the feasibility of faculty members partnering to support students in the early years (where a more senior faculty member provides the funding backstop).

Faculty Development

Enhancing mentoring for graduate students

Molecular Basis of Disease graduate students receive most of their instruction and mentoring in their research advisors' laboratories, learning through direct interaction with the faculty advisor and other members of the laboratory (and/or research group) how to design, perform, and interpret the experiments that test their dissertation hypotheses. Scientific mentoring requires a set of skills, including the ability to share knowledge, provide encouragement, set expectations, give timely and specific feedback on performance, provide information about opportunities and help to obtain them, and role model professionalism. In the past, the program may have been small enough to monitor student satisfaction with mentoring through direct personal contact and by reports from other students and faculty. However, the Molecular Basis of Disease program is currently transitioning from a small, department-centered program to one that incorporates faculty from clinical departments who may not have had experience training or mentoring PhD students. Additionally, recruiting women and underrepresented minorities to the program is a priority. Helping faculty mentors to address the challenges and needs of these groups may require targeted training to increase awareness and skills.

- To ensure continued success in training an increasingly diverse graduate student body, in increasingly diverse laboratory/research settings, the review committee recommends creating a more defined structure for

mentoring mentors and instruction in how to integrate graduate students into various laboratory settings.

- Several faculty members described resources and approaches that can be easily incorporated into a mentor training program, including assessment tools and mentoring materials available from the Howard Hughes Medical Institute website and pairing successful mentors with less experienced mentors to do co-mentoring. Clinical faculty members new to working with graduate students endorsed the value of co-mentoring, noting how helpful it was to learn how the PhD training process works, what the expectations for graduate students are, and what general exams consist of from an experienced mentor.
- A plan for collecting student feedback on mentoring quality is recommended to facilitate coaching/intervention where necessary.

Program Administration

Transition to New Graduate Program Director

Dr. Nick Crispe will face a steep learning curve during the early stages of his tenure as MBD program director. He will need help initially in decision-making about courses and curriculum, funding, and interactions with other training programs.

- Dr. Crispe has been shadowing Dr. Bowen-Pope to meetings and will have the benefit of Dr. Bowen-Pope's guidance during his transition. The review committee recommends the development of a structured plan to support Dr. Crispe as he transitions into his new role.

Establishing a Committee Structure

As the MBD graduate program expands, it is imperative that a viable committee structure is put into place, one that involves and engages faculty within the Department of Pathology as well as faculty recruited to this program from clinical departments.

- The review committee recommends the creation of separate committees to oversee decision-making related to (1) curriculum content and integration, (2) recruitment and admissions, and (3) student progress. An oversight committee comprised of students and faculty drawn from the Department of Pathology and other participating departments is also recommended.
- Term limits for membership on each committee should be considered to maximize faculty engagement.

Engaging Faculty from Clinical Departments

The research faculty of the Molecular Basis of Disease graduate program is highly concentrated in the department of Pathology, but is now in a period of expansion to include research faculty from a number of other Departments (many of

which are clinical). Expansion of the training faculty provides numerous advantages, including the ability to train greater numbers of graduate students, provide expanded research opportunities for graduate students, and broaden the scope of the graduate program to include more translational research. However, it is critical that the newly added research faculty (from other departments) are engaged and have opportunities to interact with the trainers that have primary appointments in the Department of Pathology. These other faculty members are unlikely to attend faculty meetings in the Department of Pathology.

- The review committee recommends that there be regular meetings of the faculty of the Molecular Basis of Disease graduate program, and that issues related to the program be discussed in that setting. This will enable the entire faculty associated with the graduate program to provide input and participate in discussions related to programmatic activities, curricula, and structure.

Students

Funding for first year graduate students

The Department has done an excellent job in securing new funding enabling expansion of the entering class of graduate students, with 2 positions supported by Departmental funds, 2 supported by the Children's Hospital Research Institute, and 2 provided by short-term (2 year) funding from the School of Medicine. As the Department plans for its entering class to be 6-8 per year in future years (with addition of new faculty mentors), it will be important to identify new and stable sources of support to both replace the seed money from the School of Medicine and to provide additional funding for the desired additional expansion. The Department hopes that as students begin to join faculty members whose primary appointments are outside of Pathology (mainly clinical Departments), their home departments will see the value in contributing to the support of first year students. While this is a solution that is both reasonable and equitable, there are additional and/or alternative approaches that could be considered as well.

- Some University departments have faculty members with primary appointments in other departments pay the stipend for a rotation student during their rotation quarter. This might be useful for departments with relatively few faculty members who are in the Pathology/MBD program which can not or do not wish to commit general departmental funds.
- There may also be mechanisms for generating additional support from members of the Pathology department. For example, faculty members that have graduate students join their labs for their dissertation research could contribute some fraction of a first year graduate stipend using a small increase in salary recapture.

Building a sense of community

Graduate students who began their graduate training during the past two years have developed a strong sense of community with their classmates. However, several students commented that the sense of department-wide community is less than they would like. This is a common occurrence in many departments where graduate students are located at multiple sites on and off-campus, and as the more senior students become heavily immersed in their dissertation labs. Students had mixed opinions about whether department-wide social events could help alleviate this.

- Most students thought that having a monthly social hour in late afternoon, for example, after a Pathology Presents seminar, would be valuable. Some students indicated a lack of interest in this sort of activity, while others indicated an interest, particularly if scheduled proximal to an event they would be attending already.
- Some departments have biweekly or monthly student-organized research presentations that combine both science and socializing that aid in developing a sense of cohesiveness; this could alternate between the UW campus and SLU to encourage participation and mixing by students at both locations. Such a series could also include postdoctoral fellows to increase their participation in department-wide activities and provide them with additional opportunities to present their work.

The Molecular Basis of Disease graduate program currently utilizes their website as the repository of information related to programmatic structure, curricula, requirements, and activities. This information is available to program applicants as well as current students.

- The review committee recommends creation of a handbook that provides complete information about the MBD program as well as other essential things a student may need to know. (For example, most of the current graduate students were not aware that the Department provides travel support to attend a meeting once during training. The handbook would contain this information.) The handbook would be central to the orientation of new graduate students and could be deposited on the website as a pdf (with annual revisions as required).

Clarifying requirements for MSTP students and students entering with a M.D. degree

There appears to be some uncertainty regarding how the Molecular Basis of Disease graduate program modifies its course requirements for graduate students who are in the Medical Scientist Training Program (and have had two years of medical school coursework) or who enter the graduate program after receiving an M.D. degree. While the MSTP director thought that MSTP students take all of the courses required of other graduate courses, Dr. Bowen-Pope stated that some

required courses whose material was covered in the Human Biology course sequence were indeed waived (or could be waived upon request).

- It would be a simple matter to clarify this and indicate on the Graduate Program website and in the student handbook how the curriculum is modified for MSTP students and for those who already have the M.D. degree.
- This same issue should be addressed for graduate students that enter with other advanced degrees (for instance D.V.M. or D.D.S.).