

**SELF-REVIEW OF THE CELLULAR AND MOLECULAR
PATHOLOGY GRADUATE PROGRAM**

June 1, 2008

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I. INTRODUCTION

This document provides a self-review of the Cellular and Molecular Pathology (CMP) Graduate Program that is based in the Department of Pathology and Laboratory Medicine at UCLA. The Program awards the Ph.D. degree to students who work under the guidance of faculty members who have primary or secondary appointments in the Department.

Preparation of this document was coordinated by Dr. Kenneth Dorshkind, the Vice-Chair for Research, Dr. Rita Effros, the CMP Graduate Advisor, and Christina Yoon, the CMP Student Affairs Officer, based on input from CMP program faculty and students. Documents from which information was obtained include the CMP Graduate Program Manual, the UCLA General Catalog, the UCLA ACCESS guide, institutional and program summaries prepared by the UCLA Graduate Division, and the Department of Pathology and Laboratory Medicine and School of Medicine web sites.

The initial draft of this report was reviewed by Dr. Jonathan Braun, chair of the Department of Pathology and Laboratory Medicine. Following the incorporation of his comments, a revised document was made available to all CMP faculty and students for comments. The final version that was submitted to the Graduate Council was then prepared.

All CMP faculty members and students were notified by e-mail on January 28, 2008 that this review was underway, and they were invited to provide input and to forward suggestions for names of external reviewers.

The remaining sections of this report will address the following topics:

The Department of Pathology and Laboratory Medicine: The Cellular and Molecular Pathology Graduate Program is the Ph.D. training unit of the Department of Pathology and Laboratory Medicine.

Research in the Department of Pathology and Laboratory Medicine: This section will describe the extensive research opportunities available to faculty and students.

The Cellular and Molecular Pathology Graduate Program: This section will describe the graduate training program, including its policies on governance, degree requirements, admissions, student support, and advising.

Response to the Previous Review: This section will address issues raised in the prior review.

II. THE DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE

The missions of the Department of Pathology and Laboratory Medicine are patient care, residency instruction, medical and dental school education, research, and graduate education. The Department has no undergraduate educational programs.

A. History

The Department of Pathology and Laboratory Medicine at UCLA was formed in the summer of 1951 and was led by Dr. Sydney Madden for its first twenty years. Subsequently, Drs. Julien Van Lancker and Pasquale Cancilla served as chair for about ten years each. During these periods, an Experimental Pathology Ph.D. program, later renamed Cellular and Molecular Pathology as described below, was established, and the clinical activities expanded dramatically. Dr. Jonathan Braun was appointed as departmental chair in 1995 and is now in his third, five-year term. Dr. Braun was the chair at the time of the last graduate program review and Dr. Dorshkind, the current vice-chair for research, was the graduate advisor.

The Department has undergone enormous growth and development since Dr. Braun assumed the chair 13 years ago, and four events in particular are of direct relevance to the CMP graduate program.

- The departmental research base has been strengthened as a result of a significant faculty recruitment campaign. Drs. Dorshkind, Mischel, Rao, Reed, Said, Teitell, and Tontonoz joined the department during this period. A search is currently underway to fill 3 additional tenure-track faculty positions.
- The research base, and number of training opportunities for CMP students, has been increased by jointly appointing faculty from other departments in the Department of Pathology and Laboratory Medicine. Clinical departments such as Medicine, Pediatrics, and Surgery do not have Ph.D. training programs yet many faculty members in these units conduct significant research that is often highly translational. Through this joint appointment mechanism in the Department of Pathology and Laboratory Medicine, individuals such as Drs. Dubinett, Ganz, Kupiec-Weglinkski, and Sakamoto benefit by having access to CMP graduate students and the program benefits by having an expanded research base.
- Significant departmental funding has been allocated for equipment purchase and maintenance. While a precise record of expenditures has not been kept, the amount is at least \$500,000 over the past decade. Examples of major pieces of instrumentation that have been purchased include fluorescence microscopes, an Aperio Scanscope, an Amaxa Nucleofector, a confocal microscope, and two real-time PCR machines.
- Members of the Department have moved into leadership positions in key campus and school of medicine initiatives focused on cancer, molecular medicine, imaging,

and stem cell biology. This in turn has increased the breadth of training opportunities available to our students.

B. Organization

The Department of Pathology and Laboratory Medicine is organized into five main divisions focused on i) Medical/Dental Education, ii) Clinical Services, iii) Resident and Fellow Education, iv) Research Services, and v) Basic Research. As shown in **Figure 1**, a Vice-Chair is responsible for each of these areas, and together they constitute the Departmental Executive Committee, chaired by Dr. Braun, that serves as a forum for decision making and communication to faculty and staff.

The mission of each of these divisions includes:

Medical/Dental Education: As its name implies, the division focuses on curriculum development and instruction in the schools of medicine and dentistry and operates largely independent of the CMP graduate program.

Resident and Fellow Education: The Department offers an outstanding program of clinical education in Anatomic and Clinical Pathology. Residents experience both areas of pathology early in their training and obtain hands-on experience that is augmented by conferences, problem-solving sessions, and didactic presentations. The Department also offers fellowship training in Neuropathology, Dermatopathology, GI/Liver Pathology, Transfusion Medicine, Hematopathology, Cytopathology, Clinical Microbiology, and Surgical Pathology.

Training of residents and fellows in general does not overlap with the graduate program. However, fellows have the opportunity to pursue the Ph.D. degree in Cellular and Molecular Pathology through the UCLA STAR program, described in detail in Section III.

Clinical Services: The Department of Pathology and Laboratory Medicine provides morphologic and analytical diagnostic services to the UCLA Medical Enterprise and the wider medical community. Although its mission is primarily clinical, the members of this division are a valuable resource for research based diagnostic and interpretive consultation. Several faculty members in this division, including Jonathan Said and Wayne Grody, are members of the CMP graduate program and train graduate students in addition to directing critical clinical laboratories.

Department of Pathology & Laboratory Medicine
Program Organizational Chart

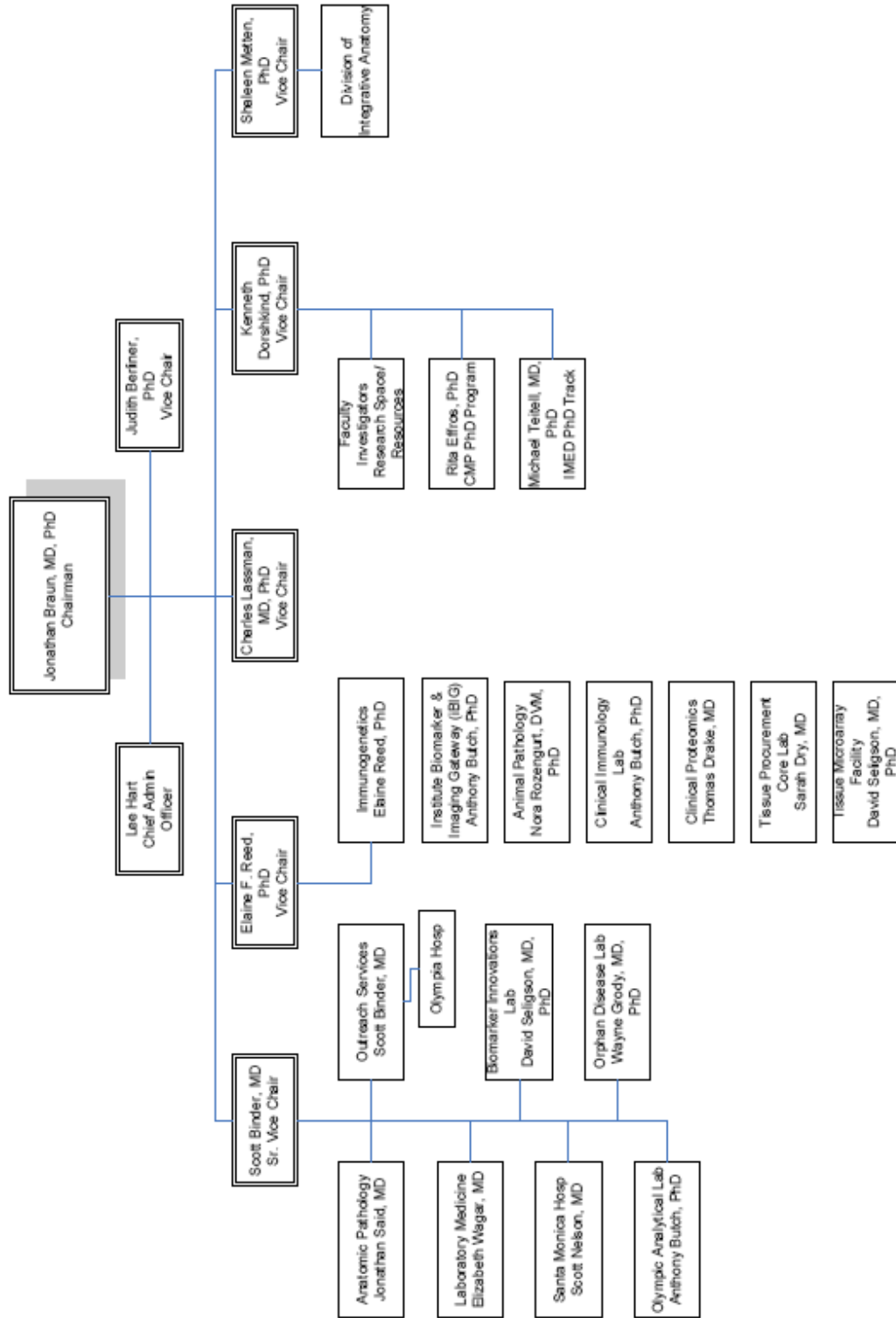


Figure 1. Organization of the Department of Pathology and Laboratory Medicine.

Research Services: The Immunogenetics laboratory, which provides clinical histocompatibility testing, is a cornerstone of this division. The faculty members in this division, which include its director Dr. Elaine Reed, also operate basic/translational research laboratories and are actively involved in graduate education. In addition, several key core laboratories provide a foundation that supports basic and translational research studies. For example, the Translational Pathology Core Laboratory provides an important mechanism for efficient procurement and banking of human tissues and tumors for use by researchers. An animal pathology service headed by a veterinary pathologist, Dr. Nora Rozengurt, is of particular value to investigators needing analysis of experimental animals.

Research: The responsibilities of the research division include administration of space, disbursement of equipment funds, and review of requests for bridge funding. The CMP graduate program is a component within the research division.

The Vice-Chair for Research heads a Research Committee that makes decisions regarding major equipment purchases and reviews requests for space and bridge funding. The CMP graduate advisor is a member of the Research Committee, thus ensuring that the interests of the CMP graduate program are integrated into the division's decision making process. Also, as noted above, the Vice-Chair for Research is a member of the Department Executive Committee and represents graduate program issues at that level.

The integration of the CMP graduate program in the Department and Research Division is discussed in more detail in Section IV.

C. Infrastructure

Faculty research laboratories are located in the Center for Health Sciences (CHS) complex, the Brain Research Institute/Neuropsychiatric Institute, the Rehabilitation Center, the Factor Building, and the Macdonald Research Building. A campus map showing the location of these buildings is shown in **Figure 2**.

When Dr. Braun became chair in 1995, the Department fully remodeled 6000 ASF of research space in the 1-3 area of CHS and obtained space in the MacDonal Research Laboratory (MRL). In addition, 8000 ASF of additional academic research space in areas of the 1-2/1-P complex were upgraded.

Nevertheless, accommodating space for expanding research programs is always a major issue at a dynamic research institution such as UCLA. Some alleviation of this problem will occur as various departments complete their relocation to the newly completed Biomedical Sciences Research Building (BSRB) and the vacation of space in various parts of the CHS. Negotiations between Dr. Braun and the Dean's Office in the School of Medicine are underway to have some of this space assigned to the Department of Pathology and Laboratory Medicine. Nevertheless, it must be

emphasized that space issues have not impeded the success of any particular faculty member or graduate student.

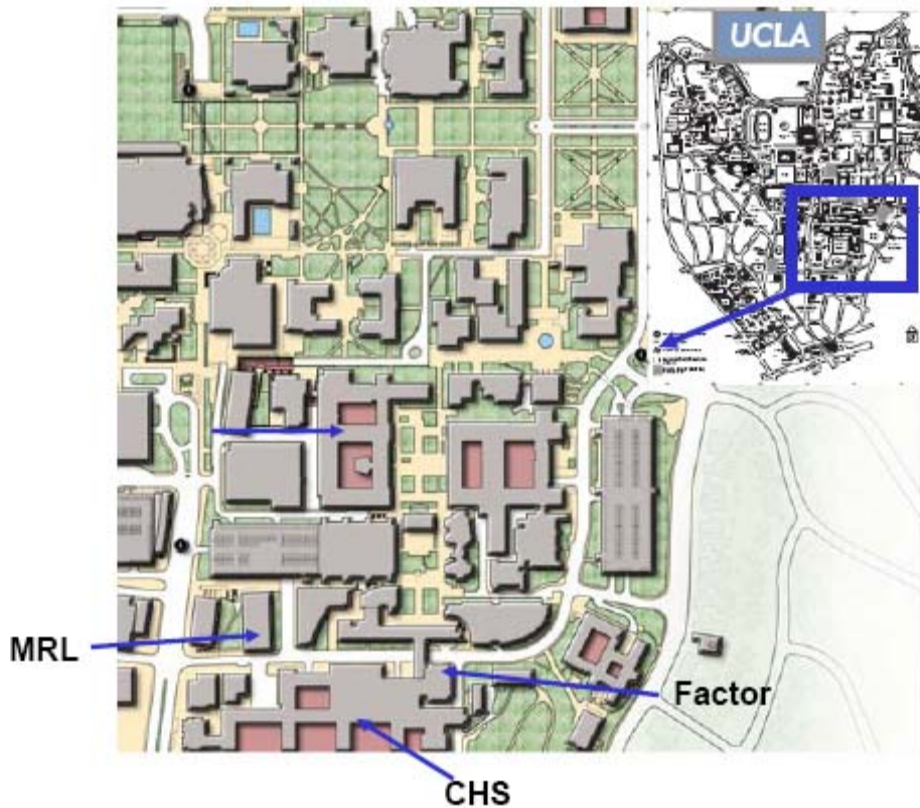
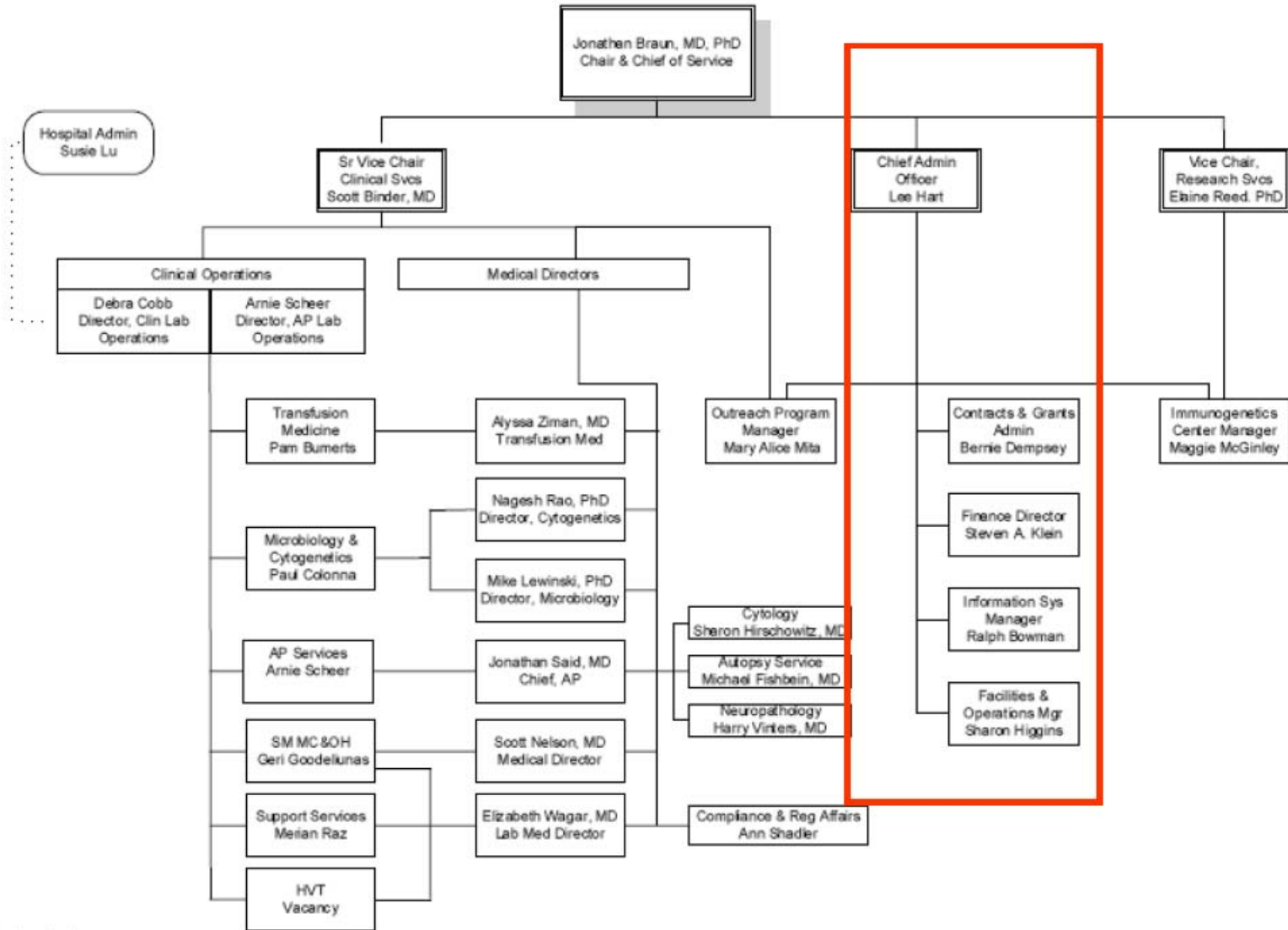


Figure 2. The UCLA campus and the location of Pathology and Laboratory Medicine faculty laboratories in the MacDonal Research Laboratory (MRL), Center for Health Sciences (CHS), and the Factor Building.

D. Administrative Support

In view of the multiple and complex missions of the Department, an extensive administrative support structure has evolved to meet the needs of the clinical and research elements (**Figure 3**). Departmental administration is coordinated by a Chief Administrative Officer (CAO) who reports directly to Dr. Braun. The CAO oversees units devoted to contracts and grants, finance, information systems, and facilities management, which are highlighted in the red box in Figure 3. The interface of the graduate program within the Departmental administrative structure is discussed in detail in section IV.A.

Department of Pathology & Laboratory Medicine – Clinical Services



Pathology Services
Rev 8/2007

Figure 3. Administrative Organization of the Department of Pathology and Laboratory Medicine. Red box = units of direct relevance to the CMP Graduate Program.

The following administrative units provide support for the CMP graduate program:

Contracts and Grants Administration: This unit includes four fund managers, each of whom manages the grants and contracts portfolios of individual research faculty members. All faculty members have personalized electronic files that they access through an intranet site that lists their grant and contract information.

The fund managers in this office interact with departmental personnel officers and the CMP student affairs officer to facilitate the appointment of CMP graduate students to research and training grants and to deal with any issues that arise. In fact, the job description of the CMP student affairs officer was revised in 2007 to specifically ensure frequent communication and interaction with the Contracts and Grant administrators.

The Vice-Chair for Research and the Contracts and Grants Administrator meet monthly to review contracts and grant administration issues that arise. This interaction also ensures that matters related to the graduate program are brought to the attention of the administrative officer who can address them.

Information Services: This unit is responsible for supporting the Departmental network infrastructure, the Departmental WEB site, and the clinical laboratory computer system. All faculty and graduate student researchers in the Department have full 24-hour access to the world wide web, MEDLINE, and the UCLA library catalog.

Facilities Management: This unit is responsible for coordinating space planning, laboratory moves, construction, renovation, and equipment maintenance. The value of this Department-based unit can not be overemphasized, because research investigators no longer have to take valuable time to find out who to call to solve a physical plant or equipment maintenance problem.

III. DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE RESEARCH

When Dr. Braun became permanent chair in 1995, a major goal was for the Department to become nationally and internationally recognized as a leader in the investigation of disease pathogenesis and to become a center of scientific and clinical innovation. Particular emphasis was placed on building and integrating basic, translational, and clinical research programs.

As a result of these efforts, the department has developed considerable strength in Immunology/Inflammation, Cancer, and Molecular Neuropathology. A significant emphasis of the research in these areas is oriented towards unraveling the cellular and molecular basis for disease as indicated by the following examples:

- The development of anti-HLA antibodies following transplantation is associated with transplant atherosclerosis, a manifestation of chronic allograft rejection. Studies in the laboratory of Dr. Elaine Reed are focused on elucidating the class I signal transduction pathway in order to develop new therapeutic modalities for

the treatment and prevention of transplant atherosclerosis and extending the functional life of transplanted organs.

- Research in the laboratory of Dr. Michael Teitell is focused on defining how failure to properly execute developmental gene expression programs can lead to the development of lymphoma. This work involves both pre-clinical animal models and the analysis of primary human tumor tissue.
- The research in Dr. Effros' laboratory is addressing telomerase-based pharmacological approaches to enhance anti-viral immunity in aging and HIV disease.
- Work in Dr. Braun's laboratory is studying the cellular and molecular basis of bacterial-immune homeostasis in the gut and how these insights can explain the pathogenesis and guide the treatment of inflammatory bowel disease.
- Dr. Stephen Dubinett, the chief of pulmonary medicine, has identified inflammation-dependent genes and proteins mediating angiogenesis, apoptosis resistance, invasion and immune suppression in human non-small cell lung cancer (NSCLC).
- Dr. Paul Mischel's laboratory has moved beyond traditional pathologic examination of glioblastoma and used molecular profiling to identify clinically relevant molecular subsets that can be used to inform treatment decisions.

Many additional examples of the disease orientation of departmental research could be highlighted. However, the important point to make is that our students receive state of the art cell and molecular training as well as an awareness of the translational aspects of the research being conducted

As noted in previous sections, an extensive faculty recruitment program was initiated during Dr. Braun's first term as chair, and in succeeding years several faculty from clinical departments were jointly appointed in the department and joined the CMP program. The core CMP faculty members are listed in **Table 1**, and the curriculum vitae (2 copies) for each of these individuals has been distributed to the review committee.

Numerous additional faculty with clinical appointments are also members of the Department of Pathology and Laboratory Medicine. While these individuals do not directly supervise graduate students, they often play an ancillary role in research projects. Because their primary focus is on patient care and diagnostic services, they are not listed in Table 1.

CMP faculty members publish frequently and in high impact journals. Furthermore, as shown in **Figure 4**, the record of federal research funding has been consistent over the past five years, despite the fact that it is becoming increasingly difficult to obtain. This same trend applies to private funding as well. The number of faculty members has remained stable during this five year reporting period.

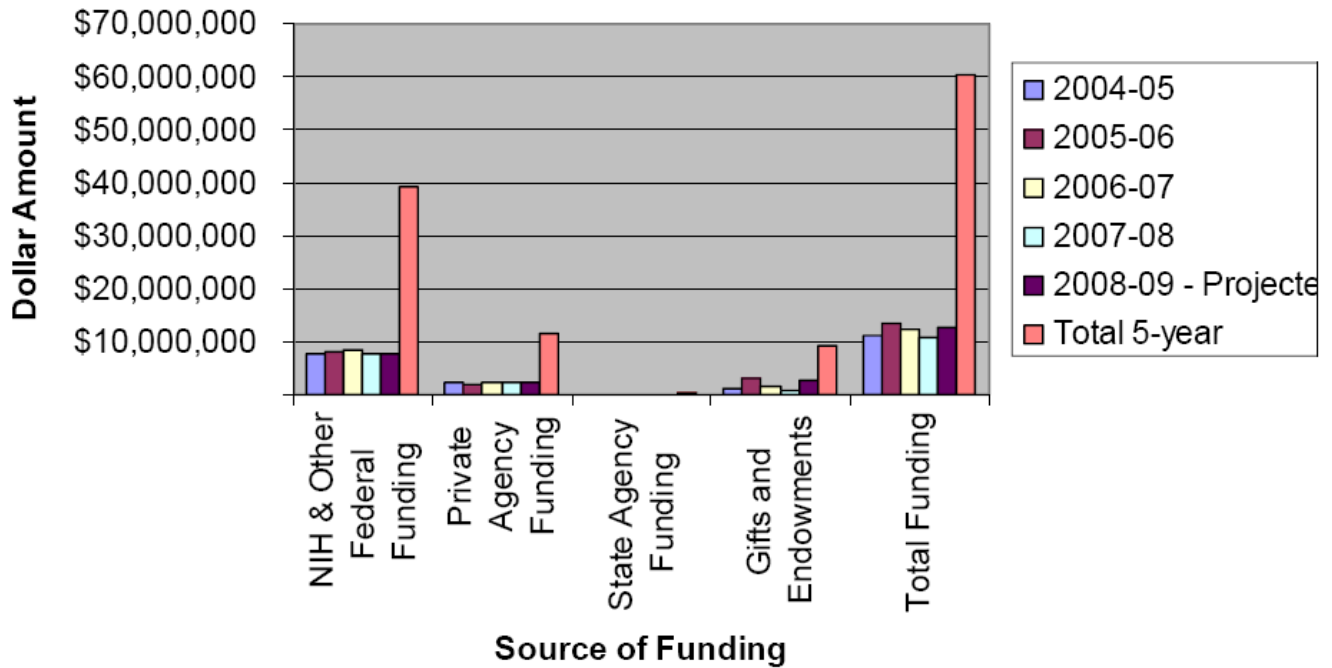


Figure 4. Department of Pathology and Laboratory Medicine contracts, gifts, and endowments from 2004-2009 (projected).

Table 1. Cellular and Molecular Pathology Graduate Program Faculty Members

Linda Baum, M.D., Ph.D. - <i>Glycans in cell-cell interactions and immune function</i>
Judith Berliner, Ph.D. - <i>Lipid regulation of monocyte endothelial Interactions - implications for atherosclerosis</i>
Jonathan Braun, M.D., Ph.D. - <i>Mucosal immunology, immunologic imaging, and Inflammatory bowel disease</i>
David Dawson, M.D., Ph.D. - <i>Pancreatic carcinogenesis – epigenetics and cell signaling</i>
Ken Dorshkind, Ph.D. - <i>Lymphocyte development from embryogenesis through senescence</i>
Steven Dubinett, M.D.– <i>Inflammation in lung cancer progression and response to therapy</i>
Rita Effros, Ph.D. - <i>Immunodeficiency of HIV & Aging; Osteoimmunology: the link between T cells and bone</i>
Michael Fishbein, M.D. - <i>Formation and progression of lung cancer</i>
Samuel French, M.D., Ph.D. - <i>Hepatitis C virus and hepatocellular carcinoma</i>
Tom Ganz, M.D., Ph.D. - <i>Innate immunity in host defense and iron metabolism</i>
Richard Gatti, M.D. - <i>Diagnosis and pathogenesis of Ataxias and radiosensitivity</i>
Ben Glasgow, M.D. - <i>Pathogenesis of Ocular Disease</i>
Wayne Grody, M.D., Ph.D. - <i>Molecular genetics of metabolic and neoplastic disorders</i>
Oliver Hankinson, Ph.D. - <i>Chemical carcinogenesis, role of hypoxia in tumor growth</i>
Kathleen Kelly, Ph.D. - <i>Reproductive mucosal immune trafficking, inflammation and pathogenesis of STDs</i>
Jerzy Kupiec-Weglinski, M.D. - <i>Liver and Pancreas Transplantation</i>
Benhur Lee, M.D. - <i>Dendritic cell biology, microbial immune interactions and biodefense</i>
Xin Liu, M.D., Ph.D. - <i>Molecular biology of cognition</i>
Paul Mischel, M.D. - <i>Brain cancer molecular signaling and therapy</i>
Michael Phelps, Ph.D. - <i>Biological Imaging and Neurosciences</i>
Jian Yu Rao, M.D. - <i>Cancer molecular signatures, biomarker and prevention</i>

Elaine F. Reed, Ph.D. - <i>Immunogenetics and transplant immunology</i>
Jonathan Said, M.D. - <i>Lymphoma and urologic cancer biology and therapy</i>
Kathleen Sakamoto, M.D. - <i>Leukemia, Stem Cells, and Therapeutics</i>
Robert Schiestl, Ph.D. - <i>Gene-Environment-Nutrition interactions in predisposition to cancer</i>
Ram Raj Singh, M.D. - <i>Autoimmune diseases: T, NKT and dendritic cells; Immune tolerance; Biomarkers</i>
Michael Teitell, M.D., Ph.D. - <i>Cancer mechanisms and nanosystems</i>
James Tidball, Ph.D. - <i>Cell Biology of Muscle Growth, Adaptation and Disease</i>
Peter Tontonoz, M.D., Ph.D. - <i>Nuclear hormone receptor family in metabolism and inflammation</i>
Harry Vinters, M.D., Ph.D. - <i>Pathogenesis of degenerative, vascular and malformative diseases of the nervous system</i>

Another important feature of the research environment is that it is interdisciplinary. While the David Geffen School of Medicine at UCLA is organized along traditional departmental lines for administrative purposes, research within the school and across campus is distinctly inter-departmental by design. Thus, institutes such as the UCLA AIDS Institute, the Jonsson Comprehensive Cancer Center, the Broad Stem Cell Institute, and the Institute for Molecular Medicine include faculty from multiple departments that include Pathology and Laboratory Medicine. In fact, CMP graduate program faculty members have assumed major leadership positions in many of these campus institutes that provide numerous resources for our graduate students. Three campus institutes are particularly noteworthy in this regard.

- Jonsson Comprehensive Cancer Center (JCCC): The mission of the JCCC is to support basic research and translate discoveries to the treatment of cancer. In order to facilitate this mission, the JCCC is organized into various program areas that are co-directed by a basic researcher and clinician scientist. It is particularly noteworthy that 6 of the 10 basic and clinical program areas are directed or co-directed by CMP faculty members.

The appointment of CMP faculty members to these positions is based on their scientific and/or clinical achievements, leadership skills, and translational orientation. These perspectives are in turn brought back to the CMP graduate program and are reinforced in the training of CMP graduate students. It is also important point to emphasize is that the JCCC operates multiple core laboratories, and since most CMP faculty members are also JCCC members, they have access to them at member rates. In particular, the flow cytometry,

gene expression, small animal imaging, vector, transgenic mouse, and molecular screening cores have played a valuable role in the research of CMP graduate students.

- Eli and Edyth Broad Center of Regenerative Medicine and Stem Cell Research: The stem cell institute was launched in 2005 and since that time has developed rapidly. For example, 6 new assistant professors have been hired, a \$20 million gift has been received from the Broad Foundation, major new stem cell core laboratories have or will be established in the Factor Building, Biological Sciences Replacement Building (BSRB), and the Life Sciences Replacement Building.

Three stem cell institute endeavors are of direct benefit to CMP graduate students. First, the capacity for flow cytometry has been greatly expanded as a result of a new stem cell institute core facility. Rather than competing with the existing, highly utilized core in the JCCC, the new flow laboratory complements it by providing additional resources to faculty and students. Second, the stem cell institute will soon complete newly remodeled 'time-share' laboratories in the Factor Building that will allow researchers the space and facilities to conduct work with both federally approved and non-approved human embryonic stem cells. Finally, the Institute has been awarded a \$3.7 million training grant, co-directed by Dr. Dorshkind, from the California Institute for Regenerative Medicine to support the training of 5 pre-doctoral, 5 post-doctoral, and 6 clinical fellows. Two CMP graduate students have received support from this training grant.

- The Institute for Molecular Medicine (IMED): IMED is a trans-institutional program bringing together top scientists at UCLA, Caltech, and the Institute for Systems Biology (ISB) in Seattle. Although only two years old, IMED has already become a recognized leader in the systems approach to disease. IMED will be located in a new, single floor of the Geffen School of Medicine at UCLA, where a select group of selected clinical and basic scientists will be gathered in a total immersion environment to create science and technology that none of them can do individually. IMED will serve as an organizing principle to realize the transformation towards personalized medicine at the UCLA by (a) incorporating scientists with expertise in areas normally outside the realm of traditional medicine (eg., engineering, mathematics, chemistry); and (b) by fostering interaction between basic and clinical researchers, together with community "translationalists" to address real-world medical problems. Dr. Braun is the co-director of IMED.

IV. THE CELLULAR AND MOLECULAR PATHOLOGY GRADUATE PROGRAM

The goal of the Cellular and Molecular Pathology Graduate Program is to provide students with state-of-the-art research training in cell and molecular biology that will allow them to unravel disease mechanisms at the organ, tissue, cellular, and sub-cellular levels. This aim is achieved through a combination of didactic coursework, small-group seminar courses that focus on specific research topics, attendance at various seminars, and a rigorous period of laboratory training.

A. Administration

As described above and in **Figure 5**, the head of the Graduate Program is the Graduate Advisor, who reports to the Vice-Chair for Research. The CMP Student Affairs Officer (SAO) provides administrative support to the Graduate Advisor. The Graduate Advisor and the SAO are the primary contacts for students enrolled in the program, and both are available to provide advice and assistance. The Graduate Advisor is also the program's representative on the UCLA ACCESS Steering Committee that oversees the first year admissions and curriculum. UCLA ACCESS is described in more detail in the following section.

The majority of student issues involve routine clarification or interpretation of graduate division or CMP program requirements. However, policy issues often arise that do not fall within these confines. In this case, the graduate advisor first consults with members of the Graduate Program Executive Committee, formed by the Graduate Advisor, the Vice-Chair for Research, and one to two additional CMP faculty members. However, for matters that involve reformulation of program policy or course requirements, the entire CMP program faculty meets to discuss the matter. It is also important to emphasize that student input is solicited whenever changes are made to the program. In this regard, the CMP graduate students elect two representatives each year, and these individuals routinely meet with the graduate advisor and attend CMP graduate faculty meetings.

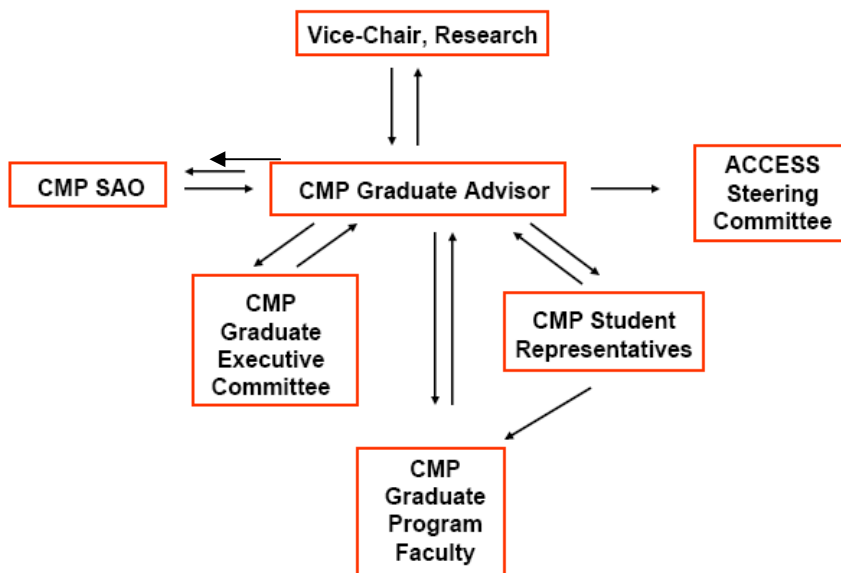


Figure 5. Organization of the Cellular and Molecular Pathology Graduate Program.

The process involved in the change in the name of the Ph.D. program from 'Experimental Pathology' to 'Cellular and Molecular Pathology' provides an example of how the program functions. At the time of the last program area review, the name of the graduate program in the Department of Pathology of Laboratory Medicine was Experimental Pathology. The view of the graduate students, and the external reviewers, was that this moniker did not convey the modern cell and molecular orientation of the program. Thus, the two student representatives approached the Graduate Advisor to ask that the name be changed to Cellular and Molecular Pathology. The Graduate Advisor at that time, Dr. Dorshkind, consulted with the CMP Executive Committee that initially approved the concept. Subsequently, the idea was presented to the full graduate program faculty in a meeting attended by the student representatives. This extensive consultation between students and faculty resulted in a unanimous vote at the program level to change the program's name, and this clear departmental/program consensus was a major factor in the ultimate approval of the name change by the School of Medicine and the Graduate Division. A similar consultative approach was followed when changes to the guidelines for the written and oral qualifying examination and a requirement for annual meetings with the thesis committee were instituted.

B. Student Admissions

The CMP graduate program only rarely admits students directly into the program. Instead, admission occurs through UCLA ACCESS, which coordinates admission to graduate school as well as the first year of study. The ACCESS program, established in 1995, is formed by 12 programs that include Cellular and Molecular Pathology. As described in the following section, graduate students also enter the CMP program through the medical scientist training program (MSTP) and UCLA STAR.

UCLA ACCESS: In 1995, the Departments of Biochemistry, Microbiology and Molecular Genetics, Molecular Biology, Molecular Cell, and Developmental Biology (MCDB), and Physiological Sciences in the College of Letters and Science and the Departments of Anatomy and Cell Biology (now Neurobiology), Biological Chemistry, Cellular and Molecular Pathology, Microbiology and Immunology, Pharmacology, and Physiology in the School of Medicine formed the ACCESS program. The Department of Oral Biology within the UCLA Dental School subsequently joined ACCESS. Graduate student recruitment, admission, and the first year curriculum are coordinated through this joint program. The head of the program is Dr. Greg Payne, Professor of Biological Chemistry in the David Geffen School of Medicine. Dr. Payne chairs the ACCESS Steering Committee, composed of one representative from each of the above departments, which sets program policies and reviews all student matters that arise. The Cellular and Molecular Pathology Graduate Advisor is a member of this committee (Figure 5).

Individuals interested in graduate study at UCLA in one of the above programs apply via the ACCESS program. Those students ultimately accepted must have completed an undergraduate major in a life or physical science discipline with superior scholastic achievement. Preparation in physics, biology and chemistry, as well as specialized courses within such majors as cell biology, neurobiology, immunology, structural or

computational biology, developmental biology, biochemistry, or molecular biology are considered to be particularly important. In certain cases, background deficiencies may be remedied concurrently with graduate studies, if recommended by the ACCESS Steering Committee. In addition to the UCLA Application for Graduate Admission, students submit their scores on the Graduate Record Examination (GRE) General Test and three letters of recommendation. Students are accepted for entrance during Fall quarter only.

Those potentially acceptable applicants are invited to visit UCLA during one of three recruitment weekends held in January and February. During this two-day, all-expenses-paid visit, they are interviewed by several faculty members in their area of interest and given a tour of Los Angeles and the UCLA campus. Decisions regarding admission are made after completion of these visits. ACCESS admissions statistics are presented in **Table 2**.

Table 2. ACCESS Admissions Statistics: 2002-2006

Program Entering Year	Number of Formal Applicants	Number Offered Admission	Number Entering Training	Number who Completed or are in Training	Number who Left the Program before Completion of Training
2006	574	92	42	41	1
2005	458	109	40	40	0
2004	446	149	67	64	3
2003	365	115	72	70	2
2002	358	117	58	52	6

Approximately half of the students offered admission ultimately enroll. On average the entering ACCESS class consists of approximately 50 students each Fall.

The Medical Scientist Training Program (MSTP): The Medical Scientist Training Program (MSTP) at UCLA in conjunction with the California Institute of Technology (Caltech) is designed for the education and training of exceptionally qualified individuals for careers in biomedical science. The MSTP requires an average of seven years of study, leading to both the M.D. and Ph.D. degrees. The program seeks to provide an optimal environment for education and research, utilizing the individual talents of participating faculty and students, and leading to a greater understanding of basic biology and of the causes and treatment of human disease. The program encourages independent thinking, creativity, self-motivated lifelong-learning, personal responsibility and service. There are well over a hundred core faculty at UCLA and Caltech participating in the program. MSTP faculty members tend to be leading researchers who are expert in postgraduate training or exciting young faculty. The MSTP faculty have strong research funding support from a wide variety of sources including the National Institutes of Health, the National Science Foundation, the Howard Hughes Medical

Institute and many private organizations and foundations. Faculty of the Cellular and Molecular Pathology Graduate Program are available to serve as mentors. Four MSTP students are currently enrolled in the Program.

UCLA STAR: The UCLA Department of Medicine offers Ph.D. training combined with clinical fellowship training in the Specialty Training and Advanced Research (STAR) Program. Awardees of this program complete clinical training toward certification in a sub-specialty as well as research training to complete a Ph.D. Awardees select their mentors from faculty in the School of Medicine, the College of Letters and Science, the School of Public Health, the RAND Graduate School, and Caltech. In general, the STAR Program begins with approximately 12 to 24 months of clinical fellowship training. This is followed by research training in a Ph.D. granting department. The remainder of specialty clinical training is integrated into these research years. The research portion is usually 3 to 4 years. Those physicians committed to careers combining basic science with subspecialty medicine undertake their laboratory training in one of UCLA's Ph.D. granting programs such as Cellular and Molecular Pathology. At present, two STAR trainees are enrolled in the CMP graduate program. .

Admission of increased numbers of MSTP and STAR students is considered to be particularly important for the Program to maximize its impact on pathology as an academic discipline.

C. Minority Recruitment

UCLA is located in a multi-ethnic cultural environment, and the campus is emerging as one of the most diverse institutions of higher education in the world. The campus is committed to producing well-educated professionals who can serve diverse populations and succeed in a multi-cultural environment. To ensure that this goal is attained, the campus is engaged in numerous activities at the high school, undergraduate, and graduate levels aimed at increasing the number of under-represented graduate students.

High School: It is clear that universities need to go far beyond recruiting from the available pool of applicants for graduate studies in the sciences. Instead, the importance of early outreach to potential students is critical. Thus, UCLA is actively engaged in the "Early Academic Outreach Program (EAOP)" which is aimed at interesting economically disadvantaged students in science during formative periods in their education. This program was established in 1976 is funded by the UC office of the president. The goals of the UCLA EAOP are to increase the academic competitiveness of students so they are college ready and admissible. By successfully completing the UC requirements, college entrance exams and participating in extracurricular activities, EAOP participants prepare to be admissible to the most selective colleges like UCLA upon high school graduation. The UCLA EAP is currently operating in partnership with 61 high schools in Los Angeles County.

Undergraduate Initiatives: UCLA is also forming partnerships with local community colleges in order to ensure that talented students at those institutions are encouraged to continue their education at research universities like UCLA. For example, students who attend several local community colleges are guaranteed admission to UCLA if they complete a series of required courses. Since community colleges in California often serve students from disadvantaged backgrounds, the importance of this partnership can not be overemphasized.

The UCLA Summer Research Scholars (SRS) program: The SRS is funded by a National Science Foundation AGEP grant, sponsors underrepresented undergraduates and master's students to participate in hands-on research with leading UCLA faculty in science, technology, engineering and mathematics (STEM) fields. AGEP SRS is a joint program in which interested students participate in various research programs. In addition to this program's activities, they also participate in weekly AGEP SRS lunches with UCLA faculty and graduate students. The program includes a minimum \$3000 stipend, travel reimbursement, on-campus housing allowance (all program participants are required to reside in assigned University housing), meal allowance, GRE test preparation, workshops, seminars and poster presentations.

Students are eligible for this program if they are committed to pursuing a science, technology, engineering or mathematics (STEM) doctoral degree. In addition, they must be from backgrounds that are underrepresented in STEM doctoral fields and in accordance with the NSF (African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians or other Pacific Islanders). Priority is given to applicants who are attending Historically Black Colleges and Universities (HBCU), Hispanic Serving Institutions (HSI), Minority Serving Institutions (MSI), Tribal Colleges and Universities Programs (TCUP) or California State Universities (CSU). The program is 8-10 weeks in duration.

Center for Research, Education, Training, and Strategic Communication on Minority Health Disparities Summer Program: This NIH-funded program is designed to encourage and aid traditionally underrepresented undergraduate students interested in pursuing research-based careers designed to reduce or eliminate health disparities in racial and ethnic minorities. Central to the program is the pairing of each student with a faculty mentor who will guide him or her through the summer research project. Students have the opportunity to work with faculty from a wide variety of UCLA departments, including the life sciences departments (Ecology and Evolutionary Biology; Microbiology, Immunology and Molecular Genetics; Molecular, Cell and Developmental Biology; Physiological Science; and Psychology), Epidemiology, Public Health, Psychiatry, Urban Planning, Chicano Studies, Social Welfare and Medicine. Students are required to pursue research problems that focus on, or can apply to, health disparities in racial/ethnic minorities. In addition to conducting research, students are given valuable assistance in the graduate school application process, including preparation for the Graduate Record Examination and workshops on drafting a personal statement. The goal of the summer is to give students a glimpse of their future careers as researchers, while equipping them with the tools to successfully pursue advanced

degrees in health. Eligible students must have a 3.0 GPA and plan to attend medical or graduate school in a science/health-related discipline. Program participants receive a \$2,400 stipend, as well as room and/or a meal allowance.

Recruitment Programs: The ACCESS program director is actively involved in activities designed to increase recruitment of underrepresented minorities. For example, the director routinely has attended meetings of the Association of Minority Health Professional Schools, Symposium on Career Opportunities in Biomedical and Public Health Sciences, the Minority Basic Research Symposium, and the Society for Advancement of Chicanos and Native Americans in Science.

Graduate Level: The Graduate Division is committed to providing fellowship support to students from educationally and socio-economically disadvantaged backgrounds. Such financial support includes funds from the Eugene V. Cota Robles Program that provides multiyear support to doctoral students. The UCLA Vice-Chancellor for Graduate Studies organizes periodic workshops, which all Graduate Advisors attend, aimed at enhancing the recruitment and retention of under-represented minority students. For example, the most recent workshop in February 2008 focused on developing additional strategies for evaluating minority applications and for providing appropriate experiences during campus visits by minority applicants. The CMP Graduate Advisor participated in this workshop and was able to transmit specific suggestions to the Graduate Executive Committee to further increase our minority representation.

Documentation of recent success in recruiting minority candidates to UCLA is evident as shown in **Table 3**. As indicated in the table, on average, ~17% of the ACCESS class is composed of minority students.

Table 3. Access Minority Statistics: 2001-2007

	2001	2002	2003	2004	2005	2006	2007	Minority Average
Domestic Apps	187	194	277	293	336	342	298	17.7
Minority Apps	27	35	49	62	64	62	48	
Dom Interviews	119	122	167	120	139	102	101	15.7
Min Interviews	17	24	32	19	15	11	23	
Dom Offers	98	107	136	109	117	87	91	15.8
Min Offers	11	20	26	18	12	10	22	
Dom Enrolled	47	66	63	43	48	34	46	16.5
Min Enrolled	5	16	11	7	7	3	11	
Class Size*	58	76	70	44	54	43	42	57
% Minorities	11	24	17	16	15	9	26	16.8

D. Cellular and Molecular Pathology Student Profile

Twenty-eight doctoral students are enrolled in the Cellular and Molecular Pathology Graduate Program during 2007-2008 (**Table 4**). Twenty of these students (71%) entered via ACCESS, and 1 (3%) was admitted directly to the Program (prior to the change in policy to not allow direct admits). In addition, 2 STAR and 5 MSTP students are enrolled.

Table 4. Cellular and Molecular Pathology Graduate Students

Student	Mentor	Program of Entry	Year Entered CMP
Mary Atz	Elaine Reed	ACCESS	2006
Cynthia Baltoni	Michael Teitell	ACCESS	2004
Simon Beven	Peter Tontonoz	STAR	2005
Sarah Brewer	Jonathan Braun	ACCESS	2005
Margaret Chang	Benhur Lee	MSTP	2007
Hsiao-Wen Chen	Michael Teitell	ACCESS	2003
Lesley Earl	Linda Baum	ACCESS	2005
Steven Fauce	Rita Effros	ACCESS	2003
Matthew Frank	Michael Teitell	MSTP	2005
Jennifer Fulcher	Benhur Lee	MSTP	2004
Julia Goodnough	Tomas Ganz	MSTP	2005
Lucia Graham	Rita Effros	ACCESS	2003
Lucia Hamilton	Wayne Grody	ACCESS	2005
Eileen Heinrich	Steven Dubinett	ACCESS	2006
Jenny Hernandez	Kathleen Sakamoto	ACCESS	2006
Peter Jindra	Elaine Reed	ACCESS	2003
Raymond Moniz	Kathleen Kelly	ACCESS	2002
Shawn Morales	Jonathan Braun	ACCESS	2003
Shannon Mumenthaler	Wayne Grody	ACCESS	2004
Dayo Oluwadara	Paul Mischel	ACCESS	2005
Stan Parish	Rita Effros	ACCESS	2005
Gloria Preza	Tomas Ganz	ACCESS	2005
Nicole Rodriguez	Steven Dubinett	ACCESS	2006
Matthew Schrage	Jonathan Said	Direct Admit	2001
Caroline Sham	Jonathan Braun	MSTP	2007
Robert Signer	Kenneth Dorshkind	ACCESS	2004
Andrew Vardanian	Jerzy Kupiec-Weglinski	STAR	2006
Jin Zhang	Michael Teitell	ACCESS	2007

Several CMP Graduate Program faculty are members of other inter-departmental programs and institutes (e.g., the Molecular Biology Institute, the Molecular Toxicology Program) that have their own graduate training programs and train students from these programs as well. 19 such students from these programs are currently working in the Pathology department laboratories.

Table 5 provides the profile of the currently enrolled CMP graduate students. Approximately 57% are White/Caucasian, 14% are Asian, and 21% are Hispanic. Over half of the CMP graduate students are women.

**Table 5. Cellular and Molecular Pathology Graduate Program
2007-2008 Student Profile**

Group	Number	%
Caucasian	16	57.1
Asian	4	14.3
Black	1	3.6
Hispanic	6	21.4
Pacific Islander	1	3.6
East Indian	0	0
Male	12	42.9
Female	16	57.1

E. Cellular and Molecular Pathology Program Coursework Requirements

During year one of graduate training, all students complete a uniform first year ACCESS curriculum. At the end of year 1, students enter a laboratory for thesis training and then complete the additional requirements of the graduate program to which their mentor belongs. As described below, the CMP graduate program requires the completion of a course in Cellular and Molecular Pathology as well as three reading/discussion courses.

Year 1 ACCESS Curriculum:

Fall Quarter

M253. Macromolecular Structure. (4): Chemical and physical properties of proteins and nucleic acids. Structure, cloning, and analysis of DNA; biosynthesis and processing of RNA; biosynthesis, purification, structure, and analysis of proteins; correlation of structure and biological properties. Concurrently scheduled with course CM153G.

M248. Molecular Genetics. (4): Basic concepts in modern genetics, with examples from both eukaryotic and prokaryotic systems. Emphasis on use of genetic techniques for addressing fundamental questions in cellular biochemistry. Topics include mutagenesis, repair, recombination, transposition, genetic regulation, developmental genetics, neurogenetics, and immunogenetics. Letter grading.

Winter Quarter

M267A. Cell Structure, Signaling, and Development. (4) and *M267B. Seminar in Cell Structure, Signaling, and Development.* (4). These courses cover cell cycle regulation; chromosomes and DNA repair; protein trafficking and endocytosis; extracellular matrix, cell to cell communication and signal transduction; cell transformation and apoptosis; molecular aspects of development, differentiation, and cancer.

Spring Quarter

Two 200 level, 4 unit elective courses and M234: Ethic and Accountability in Biomedical Sciences.

Multiple elective survey courses covering various disciplines and topics are offered. As a Spring Quarter requirement, ACCESS students select two of these courses based on their emerging research interests.

In addition, they enroll in M234, which provides training in ethics. This two-unit, interdepartmental course introduces standard and ethical practices in the life sciences, with emphasis on responsibilities in research activities such as record keeping, authorship, peer review, mentoring, and utilization of human or animal subjects in experimentation. Conflicts of interest, ownership of data and other intellectual property, and potential problems stemming from use of data from human genetic experiments are topics for discussion. The course consists of five, 2-hour lecture/discussion sessions in which all trainees meet first with the instructor to obtain a brief grounding in the subjects under discussion. This brief introduction may include presentation of background information and case studies presented as video enactments. Following this introduction, trainees break into smaller groups for discussion of assigned case studies. In the discussion sessions, small groups of up to 12 students explore possible responses to ethical problems presented in the case studies. Each discussion group includes a faculty mentor who monitors discussion and contributes comments in areas where experience may be helpful in making judgments. The student composition of each group remains constant throughout the course, but a different faculty member monitors each period so that students are exposed to different faculty points of view. Conclusions reached by individual groups are shared at the end of each session. Special attention is given to cases for which there is no consensus or an appropriate path to solution. A typical course outline includes sessions on mentoring, scientific record keeping, authorship and peer review, animals in biomedical research, human in biomedical experimentation, ownership of data and intellectual property, and bioethics.

Year 1 Laboratory Rotations:

During the first year of study, students have not committed to a department and are classified as ACCESS students. During this initial year, under the guidance of a faculty advisor and through organized activities, students rotate through three research laboratories and complete a standard series of courses. These rotation assignments are based entirely on student preference and are selected from the list of over 250 participating faculty. Faculty presentations in a variety of formats are made prior to the beginning of Fall quarter and throughout the year, to make possible an informed and appropriate selection of rotation mentor. A Faculty Research Guide that contains pictures, a brief research description, and citations of recent publications is distributed to each student and is available online at www.uclaaccess.ucla.edu. Students then approach the head of the laboratory in which they are interested. Formal acceptance into a rotation in that laboratory is by mutual agreement of the professor and student.

Of the more than 230 laboratories that are part of ACCESS, some 150 open their doors to rotating students each year. In most cases students are able to match with a lab after three rotations. In those rare instances where this is not the case, students may rotate a 4th time during the Summer following the ACCESS year. In the ten year history of the ACCESS Program, no one has ever failed to match with a laboratory following 4 rotations.

First Year ACCESS Events:

Students admitted to ACCESS enter UCLA in the Fall quarter. The first week of the ACCESS Program includes a variety of activities that help the students become more familiar with the program and the research opportunities. On the first day, a comprehensive introduction to UCLA and to the Program is given in a series of presentations by the Program director and many staff and faculty members at UCLA. The subsequent three days, comprised of 6 half-day poster sessions, is known as the *Affinity Fair*. In this venue each laboratory that is interested in recruiting students for rotations presents a poster on its research. The six sessions are based on major research areas represented by affinity groups within the ACCESS Program.

Near the beginning of the academic year (typically in November), all of the new ACCESS students attend a weekend-long retreat at the UCLA Conference Center located on the shores of Lake Arrowhead, a private lake in the San Bernardino Mountains. At the retreat, students become more familiar with research opportunities at UCLA, with a number of faculty members with rotation opportunities in their laboratories and with each other. The Conference Center provides superb opportunities for outdoor activities in a rustic setting and there is a good balance between planned activities and free time.

Finally, in order to become more familiar with research opportunities, ACCESS students meet with three faculty members each week during the Fall quarter over lunch. Faculty members make presentations focusing on rotation projects in their laboratories, and

students are able to gain better insights into cutting edge research in at least 30 different laboratories.

Year 2 CMP Course Requirements

If at the end of the first year students enter the laboratory of a CMP faculty member, they complete additional coursework specific to the program. The coursework requirement includes:

Pathology 237. Cellular and Molecular Basis of Disease (4 units) and one of the following coursework options:

- a. Three *298 seminar courses*; at least one of the seminar courses must focus on mechanism(s) of disease
- b. *Pathology 294. Molecular Basis of Cancer* (4 units) and one *298 seminar course*
- c. *Pathology 260. Immunopathology* (4 units) and one *298 seminar course*
- d. *Pathology 240. Transplantation Immunobiology* (4 units) and two *298 seminar courses*

Additional advanced courses offered by the CMP or other graduate programs may be substituted for two of the 298 seminar courses, if approved in advance by the Cellular and Molecular Pathology Graduate Advisor. Students must receive approval for these course substitutions a priori. A description of above courses, as well as additional course offerings by the CMP program is provided in **Table 6**.

Table 6. Courses Offered by the Cellular and Molecular Pathology Program

<p>M229. (Spring Quarter) MOLECULAR MECHANISMS OF HOST/PATHOGEN INTERACTION (4 units) INSTRUCTOR: Dr. Kathleen Kelly</p> <p>(Same as Microbiology M229.) Lecture, two hours; discussion, two hours. Requisite: Biological Chemistry CM253. Molecular mechanisms of microbial interactions with eukaryotic host cells that result in disease or pathogen survival. Topics include pathogenesis of common viruses, bacteria, fungi, and parasites, basis of toxin-mediated cellular damage, and immune suppression of microbial tissue damage. Letter grading.</p>
<p>M237. (Spring Quarter) CELLULAR AND MOLECULAR BASIS OF DISEASE. (4 units) INSTRUCTORS: P. Tontonoz & J. Said</p> <p>Four hours weekly - Lecture, 1 hour on molecular basis of a disease pertaining to a particular organ or disease; 1 hour student presentations directly following lecture - 2 students will present papers related to lecture; 2 hours lab pertaining to lecture topic - Students sit down at multi-head microscopes and visualize diagnostic parameters of disease. Letter grading.</p>
<p>240. (Spring Quarter) TRANSPLANTATION IMMUNOLOGY FROM BENCHSIDE TO BEDSIDE. (4 units) The course is open to graduate students, medical students, residents and fellows. INSTRUCTORS: Drs. E. Reed, Jerzy Kupiec-Weglinski</p> <p>Lecture, three hours; laboratory, one hour. Preparation: knowledge of basic immunology. New developments in organ transplantation, updates on basic science of immune mechanisms, integration of basic science principles with clinical practice. Letter grading.</p>
<p>M255. (Spring Quarter) MAPPING AND MINING THE HUMAN GENOME (3 units) INSTRUCTORS: DRs. R.A. Gatti, W. Grody, and P. Nagesh Rao</p> <p>(Same as Human Genetics M255.) Lecture, three hours. Basic molecular genetic and cytogenetic techniques of gene mapping. Selected regions of human genomic map scrutinized in detail, particularly gene families and clusters of genes that have remained linked from mouse to human. Discussion of localizations of disease genes. S/U or letter grading.</p>
<p>260. (Fall Quarter) IMMUNOPATHOLOGY (4 units) INSTRUCTORS: Drs. K. Dorshkind, L. Baum, M. Teitell and J. Berliner</p> <p>Lecture, two hours; discussion, one hour; laboratory, one hour. Requisite: Microbiology M261. Advanced information for graduate and advanced undergraduate students regarding immune system anatomy, lymphocytic development, acute and chronic inflammation, hypersensitivity, and autoimmunity. Letter grading.</p>

270. (Winter Quarter) BASIC AND CLINICAL ASPECTS OF DEVELOPMENTAL HEMATOLOGY (4 units)

INSTRUCTOR: Dr. Kathleen Sakamoto

Lecture, two hours. Graduate- and postgraduate-level course that covers broad range of topics in both basic and clinical aspects of developmental hematology. Pediatric hematologic disorders provide important paradigm to study other developmental systems. Subjects include hematopoiesis, basic stem cell biology, angiogenesis, alternative models to study developmental hematology (zebrafish and "Drosophila"), basic physiology of normal and abnormal red cells, platelets, and white cells, leukemogenesis and novel therapeutics to treat leukemia, basic and clinical stem cell transplantation, state-of-the-art methods in developmental hematology (genomics, proteomics, and gene therapy, design of clinical trials, and biomathematical modeling and statistics in developmental hematology. Letter grading.

M272. (Spring Quarter) STEM CELL BIOLOGY AND REGENERATIVE MEDICINE (4 units)

INSTRUCTOR: Dr. Ken Dorshkind

(Same as Molecular, Cell, and Developmental Biology M272.) Lecture, two hours; discussion, two hours. Designed for graduate students. Presentation of current knowledge of embryonic and adult stem cells and factors that regulate their growth and development. Major emphasis on how advances in cell and molecular biology and tissue engineering can be applied to use of stem cells in regenerative medicine. Bioethical and legal issues related to stem cell research. S/U or letter grading.

294. (Spring Quarter) BASIC CONCEPTS IN ONCOLOGY (4 units)

INSTRUCTORS: Drs. O. Hankinson and K. Sakamoto

Lecture, three hours. Requisites: Biol Ch. 253, 248, CM267A & B (current first two terms of ACCESS curriculum), *or* Instructor's Approval. Fundamental biological, genetic, and molecular process involved in genesis and growth of cancer cells and diagnosis, characterization, and treatment of cancer. Letter grading.

296. Research Topics in Pathology (1 to 2 units)

Research group meeting, one to two hours. Limited to departmental graduate students. Advanced study and analysis of current topics in pathology. Discussion of current research and literature in research specialty of faculty member teaching course. May be repeated for credit. S/U grading.

298A. (Quarter TBA) CURRENT RESEARCH IN DISEASE MECHANISMS (2 units)

Lecture, 90 minutes. Preparation: one course each in molecular biology, cell biology, and biological chemistry. Designed for graduate experimental pathology students. Current research in disease mechanisms, with strong emphasis on experimental approach in pathology. Topics include genetic and metabolic disorders, thyroid disease, immunology, atherosclerosis, infectious diseases, and Alzheimer's disease. S/U or letter grading.

596. DIRECTED INDIVIDUAL STUDY OR RESEARCH (4 to 12 units)

Tutorial, to be arranged. Individual research with members of the staff or of other departments, the latter for purpose of supplementing programs available in department. S/U grading.

599. PREPARATION OF PH.D. DISSERTATION (2 to 12 units)

Tutorial, to be arranged. Preparation: completion of qualifying examinations and majority of Ph.D. research. Writing and completion of dissertation. S/U grading.

Teaching: A requirement of the ACCESS program is that students complete two successful quarters of teaching. This requirement is typically completed during the second and third years of study. Teaching Assistant (TA) assignments are influenced by student preference and may be at the undergraduate or graduate level. The teaching requirement is considered to be an educational and professional experience and course credit is given. A course on approaches and methods for successful teaching is administered by ACCESS to assist each student in the completion of this requirement.

F. The Thesis Committee and Advancement to Candidacy

By the end of the second year of graduate study, which marks the end of the student's first year as a CMP Graduate Student, a thesis committee consisting of at least 4 faculty members is selected. Students are required to meet with the full committee no later than December 1 to discuss the potential dissertation project and to set a timeline for the Oral Qualifying Examination.

The thesis committee conducts the University Oral Qualifying Examination and guides the student in the preparation and defense of the dissertation. The committee is made up of at least four graduate faculty; the thesis advisor, who serves as Chair of the Committee, two additional Pathology Department members, and one member from outside the Department but holding a graduate faculty appointment on the UCLA campus (a University requirement). Alternatively, according to the regulations of the UCLA Graduate Division, a student may petition to have a faculty member from another UC campus serve as an "outside" member. At least two of the four committee members must be tenured (that is, at the rank of Professor or Associate Professor). At least one member of the four-member doctoral committee should be an expert in the proposed orals topic.

Advancement to Candidacy: All students are required to take the University Oral Qualifying Examination by June 30 of their third year of graduate study. Advancement to candidacy in the CMP graduate program is based on the quality of a research proposal that is presented orally to the thesis committee. The research proposal must be written according to the NIH grant application format, with a maximum length of 10 pages, excluding references. The examination is graded pass/fail by the committee. Students who do not pass the examination are permitted one re-examination, to be held no later than six months after the initial exam. This examination is to be completed by the beginning of Fall quarter of year three of study. Upon successful completion of the written and oral examination, students are advanced to candidacy.

Annual Committee Meetings: Students are required to meet with their thesis committee on an annual basis. One week prior to the meeting, the student submits a one to two page proposa/progress report to the committee. The aim of these meetings is to provide the student with constructive comments that will facilitate their work and avoid subsequent time-consuming problems. It is expected that the first meeting will take place soon after the committee has been formed, no later than December 1 of the second year, well before the Oral Qualifying Exam is scheduled.

At the conclusion of the meeting, each committee member completes an evaluation form, which, along with a copy of the potential Ph.D. project report, is maintained in the student's file in the Graduate Program Student Affairs Office.

G. Final Oral Examination (Defense of the Dissertation)

A final oral presentation and defense of the student's Ph.D. dissertation to members of the doctoral committee is required for completion of the degree. The Ph.D. dissertation should be an original body of work performed by the Candidate.

H. Academic Advising

During year one, when the course of study is administered by the ACCESS program, students are assigned a member of the ACCESS Steering Committee as their faculty advisor. The advisor ensures that the student is enrolling in the proper courses and is available to discuss any difficulties that might arise.

From year two until the completion of graduate study, the thesis advisor takes on the principal advisory role. It is hoped that a relationship between the student and thesis advisor develops to the point that each is comfortable discussing both scientific and career matters that arise.

The CMP Graduate Advisor is another source of advising. The Graduate Advisor is contacted frequently by most students for clarification of routine academic matters. However, on occasion, more serious issues arise that can be of a sensitive nature. The Graduate Advisor is available to discuss these and any other matters that arise. It has been the policy that discussions between students in the Program and the Graduate Advisor are confidential. Thus, no feedback is provided to the thesis advisor unless the student wishes that the Graduate Advisor act as an intermediary.

Should students still encounter problems of a personal nature, they can be referred to the UCLA Student Psychological Services for counseling. In this regard, Student Psychological Services staff members frequently conduct workshops for graduate students at different stages of training.

I. Assessment of Student Progress

Students are expected to make timely progress in their studies and adhere to the "Time to Degree Policy" for the CMP Ph.D. program. Failure to comply with these guidelines can result in either dismissal from the program or delay in obtaining the Ph.D. degree. The following guidelines have been adopted:

1. At the end of year one of graduate work, the ACCESS core curriculum must have been completed by all students, regardless of their route of admission into the program. Entry into the program by ACCESS students is dependent upon their acceptance of the student into the laboratory of a Pathology and Laboratory Medicine faculty member.

2. Toward the end of the second year, the student must have selected a doctoral committee and completed the required form that is obtained from the CMP graduate office.
3. It is recommended that student's complete all of the CMP course requirements by the end of Spring quarter of year two of graduate study. However, when necessary, some of the core requirements may be completed in subsequent years.
4. The written proposal and an oral defense (ie., the Oral Qualifying Exam) must be completed by the beginning of the student's third year. Upon successful completion of this exam, the student will be advanced to candidacy. If the student does not pass the exam, it may be retaken six months later. A student can not advance to candidacy and thus can not receive his/her Ph.D. degree without first passing the Oral Qualifying Exam.
5. Students must convene an annual meeting of their thesis committee to discuss the progress of their thesis research.
6. Once advanced to candidacy, the student should have completed his/her research and defense of the dissertation by the end of an additional three years in the mentor's laboratory. A final oral exam must be presented to the public at the end of this period.
7. The expected time for completion of the Ph.D. program in Cellular and Molecular Pathology is five (5) years. The purpose of the dissertation is to demonstrate ability for independent investigation and proficiency in the field. As evidence of this, it is expected that, by the time of graduation, the student will have made significant intellectual contributions that have been or will be published in peer-reviewed biomedical journals.

Mentors and students are responsible for seeing that these requirements are fulfilled. Each stage of the student's progress is entered onto a spreadsheet and kept on record in the student's file. Failure to complete the "Qualifying Exam" and "Progress Report/Preliminary Studies" in a timely fashion or failure to demonstrate sufficient yearly progress can result in the Graduate Executive Committee convening a special meeting of the student and the thesis committee to determine the reason for lack of progress.

J. Financial Support

Students in the Cellular and Molecular Pathology Graduate Program are guaranteed full financial support for 5 years of training. In fact, students who require a longer period to complete their dissertation research have been fully supported as well. All students are paid at a rate determined by the ACCESS program, and in the 2008-2009 academic year the stipend will be \$27,000 per year. In addition, all educational and registration fees are covered, and students receive health insurance. These additional fees are summarized in **Table 7**.

Table 7. UCLA Graduate Student Fees

UCLA GRADUATE DIVISION

2007-2008 Graduate Student Fee Rates

IN-STATE FEES		ESTIMATED BREAKDOWN OF UCLA GRADUATE STUDENT FEES	
RESIDENT		University Registration Fee	786.00
Fall 2007	2,988.50	Educational Fee (Residents)	6,654.00
Winter 2008	2,989.50	Educational Fee (Non-Residents)	6,948.00
Spring 2008	2,989.50	Graduate Student's Association Fee	39.00
TOTAL	\$8,967.50	Graduate Writing Center Fee	12.00
NONRESIDENT		Ackerman Student Union Fee	31.50
Fall 2007	3,086.50	Seismic Fee for Ackerman/Kerckhoff	113.00
Winter 2008	3,087.50	Wooden Center Fee	45.00
Spring 2008	3,087.50	Student Programs, Activities, and Resources Center Fee	93.00
TOTAL	\$9,261.50	MIP (Mandatory Medical Insurance)	1,194.00
NONRESIDENT TUITION		Non-Resident Tuition	\$14,694.00
Fall 2007	4,898.00	TOTAL: Resident Students	\$8,967.50
Winter 2008	4,898.00	TOTAL: Non-Resident Students	\$23,955.50
Spring 2008	4,898.00		
TOTAL	\$14,694.00		

Please note:

- UCLA Graduate Student Fees are *subject to change at any time*.
- Nonresident students in a Ph.D. program qualify for a 100% reduction in the cost of NRT the quarter after they advance to doctoral candidacy for a maximum of three calendar years.

The funding to support graduate training is derived from multiple sources. During their first year in the program, all stipends, registration, and educational fees are fully covered by the ACCESS program. The ACCESS funds to do so are derived from a variety of sources that include the School of Medicine, the College of Letters and Science, the Graduate Division, Department of Education Funds, and the ACCESS Bank. The latter account is funded by a payback mechanism from the Departments in which ACCESS students ultimately enroll. The payback amount is revised each year and varies according to the amount of funds received by the ACCESS program from the administration.

For example, in the Fall of 2006, six ACCESS students entered the Cellular and Molecular Pathology doctoral program. In order to reimburse the ACCESS program for the first year of supporting these students, the Department of Pathology and Laboratory Medicine, through the departmental Research Committee budget, paid the ACCESS Bank \$97,750 (~\$17,000 per student) for the six admitted students. The Department

received \$30,515 in unrestricted funds from the Graduate Division to help defray this cost. Thus, in the **2007-2008** academic year, the Department paid the ACCESS bank an additional \$67,235 in fees that were derived from Departmental reserves. **As is evident from these calculations, the Department is making a very significant financial commitment to graduate education.**

Upon entering a Cellular and Molecular Pathology Laboratory, student fees are paid primarily from the mentor's research grants. The exception occurs (a) when students serve as teaching assistants, in which case they are paid from the budget of the course; (b) when they qualify for NIH Underrepresented Minority Graduate Training Fellowships; and (c) when they are appointed to one of several training grants.

Several training grant opportunities are available to CMP students. Of particular note is that from 2002-2007, 4 CMP students per year were supported by the Immunopathology Training Grant. This was an NIH T32 training grant that provided a stipend and supply funds to students. A renewal of this grant was not re-submitted. Instead, Drs. Braun and Dorshkind are working on the submission of an NIH training grant that will support pre- and post-doctoral fellows from multiple campus programs in which immunology-related work is being conducted.

There are instances when mentors have had problems with grant renewals, thus causing a shortage of funds in their programs. In order to ensure that this does not affect students, these laboratories have received supplements from the Research Committee budget that has covered the student stipend. The bottom line is that students who have entered our program during the past five years have been fully supported.

Finally, the Research Committee provides up to \$500 per year for each student to attend a meeting at which they are presenting a talk or poster.

K. Graduation Rates

Given that students graduating today can expect to undertake at least four years of post-doctoral training before obtaining a permanent position, it seems critical that completion of the degree in 5 years remain a goal of the program. The increasing length of doctoral training was one rationale for the requiring that students meet at least annually with their thesis committee. It is hoped that such frequent meetings will identify problems early on, thus allowing the student to avoid time consuming dead-ends.

Between 2000 and 2007, 32 doctoral degrees were awarded.

L. Placement of Students

Graduates of the CMP Program are qualified to compete for faculty positions in basic science departments of universities and medical schools. In addition, given their translational training, they are also well positioned to compete for positions in research oriented clinical departments. In this regard, the Department of Pathology and Laboratory Medicine is currently recruiting for 3 translational researchers. These individuals need not have an M.D. degree.

The traditional assumption is that following completion of Ph.D. training, students will spend several additional years as postdoctoral fellows and then assume a faculty position. This view is probably no longer viable for several reasons. First, over the last two decades multiple new opportunities have developed in the Pharmaceutical and Biotechnology sectors, and many students follow that route. However, it is not clear that enough positions exist in academia or the biotechnology/pharmaceutical industry to place all Life Sciences graduates in the United States. In view of this changing climate there has been considerable focus in recent years on promoting alternative careers for individuals with doctoral degrees in the Life Sciences including in teaching, science journalism, science/biomedical policy, business, and law.

A thorough tracking of students who have graduated from the program from its inception has not been performed. However, **Table 8** provides information, collected in March 2008, for graduates from 2000 through the Spring quarter of 2007.

Table 8. Placement of graduates of the CMP Graduate Program

Year of Graduation	Name	Mentor	Position	Location
2002				
Fall	Michael Leaway Lin	Sakamoto	Postdoc	
Spring	Sean Barry Joseph	Tontonoz	Postdoc	UCLA
Summer	Helen Hyunkyung Chun	Gatti	Assistant Professor of Biology	CSU Dominguez Hills
2003				
Fall	Katrina Kaye Hoyer	Teitell	Postdoc	UCSF
Winter	Shane G. Smith	Mischel	Law Student	UC Berkeley
Spring	Mirabell D. Dagarag	Effros	Employee	Biotech Company
Spring	Sven Devos	Said	Assistant Professor of Medicine (Heme-Onc)	UCLA
Spring	Song Wang	Hankinson	Researcher	SALK Institute
Summer	Kimberly A. Walton	Berliner	Research Assistant Professor	University of Washington
2004				
Fall	Jason John Christiansen	Rajasekaran	Quality Control Scientist	Bayer HealthCare QC Validation; Berkeley, CA
Spring	Ming-Yen M. Yeh	Berliner	Cardiologist	Hospital in Alhambra, CA
Summer	Chih-Hung Lai	Gatti/McBride	Clinical Lab Director	Ceders Sinai Medical Center
Summer	Hyeyoung Min	Dorshkind	Graduate Student in Statistics	Stanford University
2005				
Fall	Ilene Dale Auerbach	Vinters	Special Medical Writer	ACCESS Medical Group; Chicago
Winter	Jay Hyuk Chang	Berliner/Twiss	Pharmacologist	Food & Drug Administration Silver Springs, MD
Winter	Cromwell Eneria Espineda	Rajasekaran	Senior Technical Service Scientist	QIAGEN Inc., Technical Service; Valencia, CA
Winter	Heather Kolupailo Maxion	Kelly/Strieter	Research Fellow	Boston Children's Hospital
Spring	Joseph Demetrius Hernandez	Baum	Resident	UCSF; Pediatrics
Spring	Kan Viah Lu	Mischel/Grody	Postdoc	UCLA
Spring	Brianna Nicole Stillman	Baum	Teacher	Zhejiang University; China
Spring	Peter Velázquez	Braun/Strieter	Postdoc	Skirball Research Institute of Biomolecular Medicine, NYU-SOM
2006				
Fall	Jared Evan Goldstine	Vinters	Postdoc	UCLA; Radiology
Winter	Luciana Kohatsu	Baum	Postdoc	UCLA
Spring	Nima Mousaviol Gharavi	Berliner	Resident	UCLA
Spring	Liming Pei	Tontonoz	Postdoc	UCLA
Spring	Seth Rivera	Ganz	Clinical Instructor of Medicine	UCLA
Spring	Rhine Ruying Shen	Teitell	Postdoc	William Hahn Medical School; Dana Farber Cancer Institute; Boston
Spring	Diana Y. Yoon	Hankinson	Surgery Fellow	Albert Einstein Medical Center

2007				
Winter	Wei Liu	Kelly	Postdoc	3D Biotek, New Jersey
Spring	Joshua Lacroix Deignan	Grody	Postdoc	UCLA; Intercampus Medical Genetics Training Program
Spring	Landon J. Inge	Rajasekaran	Postdoc	University of Arizona
Spring	Lan Lin	Ganz	Postdoc	University of Iowa; Internal Medicine

V. Response to the Previous Review

The previous review in 2001 concluded that “this is a truly outstanding department which should be provided with an environment that nurtures its continued success”.

The CMP faculty were extremely gratified by this review, because we had worked very hard to address clear deficiencies that were noted when the program was previously reviewed in 1989. The rejuvenation of the graduate program was due in no small part to the efforts of Dr. Braun, who recruited new faculty to the department and committed significant funding to the support of graduate education and purchase of new equipment.

The following issues were raised in the Summary Report of the previous review:

1. *Many faculty are in only 800 square feet of space....there should be some ability to grow to meet programmatic changes. One of the reviewers also noted the need for increased space by the department.*

This comment was forwarded to the School of Medicine Dean’s office. A need for additional space will always be an issue for any dynamic research program, and the Department is currently using all of its research space to a maximum. As parts of the CHS are vacated due to relocation of various departments to newly completed buildings, it is hoped that additional space will be assigned to the department by the Dean’s office. Dr. Braun has requested additional space, and we are awaiting a reply. .

2. *Many students would prefer to teach only one quarter. Perhaps the second quarter of teaching could be made optional.*

The concern regarding the 2 quarter teaching requirement is appreciated, and this issue has been discussed at numerous occasions by the ACCESS Steering Committee, which has the ultimate authority to make any changes. In contrast to members of the CMP faculty, the majority of steering committee members still support a two quarter teaching requirement. Thus, as a participating ACCESS department, we must abide by their rules and continue to enforce the two quarter requirement.

3. Reorganize the course (M237) to include systemic tissue and organ biology.

As a result of the suggestions made in the last review, M237, the core CMP course required for all students, has been extensively reorganized. In addition to teaching important concepts regarding disease pathogenesis, the course now includes histopathology laboratory sessions. These laboratories are taught by pathologists in the department, parallel the lectures, and teach students to recognize both normal and pathologic features of tissues at the microscopic level. Students are tested by asking them questions based on projected tissue sections.

In addition, a course in Immunopathology was developed and taught by Drs. Baum, Berliner, Dorshkind, and Teitell. During the first 4 weeks of the course, students review the normal appearance of tissue as well as damage caused by immune system mediated diseases.

4. Extend the student evaluation process so that students fill in the same evaluation form that is used by their advisors as a self-review process.

We have not adopted this recommendation because there was no enthusiasm on the part of the faculty or the students to do so. However, an evaluation form is filled out by each committee member and immediately distributed to the student at the end of each committee meeting. The thesis advisor and the student discuss the comments at that time.

5. Student representatives should be members of the Graduate Committee and attend faculty meetings.

As noted, the graduate students elect two representatives. These individuals meet frequently with the graduate advisor and attend all CMP faculty meetings to provide student input.

6. The qualifying examination should be more closely aligned with the proposed dissertation topic and should be taken before the second quarter of the third year to shorten time to degree.

This point was raised at a CMP faculty meeting. While several members agreed with it, the general faculty consensus was that the qualifying examination could not be the same as the dissertation topic. On the other hand, the written proposal may be related to the general interest of the training laboratory.

7. Students should organize and seek funding for a one day retreat

The department held a 1.5 day retreat in Ventura, CA in 2003 attended by faculty, postdoctoral fellows, and CMP graduate students. In addition to talks by various laboratory groups, sufficient time was reserved for social interactions between the attendees.

8. *Student reps should poll students regarding issues raised in faculty meetings.*

The CMP graduate students elect two student representatives who represent student interests with the CMP graduate advisor and at CMP faculty meetings. As described in the current review, the program has been highly responsive to the requests and issues raised by the students.

The following issues were raised by the External Reviewers:

1. *The name 'Experimental Pathology' lacks consumer appeal.*

As described in Section IV.A., the program name has been changed to Cellular and Molecular Pathology to reflect the research in the department.

2. *It would be worthwhile for the program to organize community building events that will increase cohesiveness of the student body.*

In addition to the retreat described above, the graduate students hold a monthly seminar meeting in which 2 students present their research to other students in the program, who in turn provide comments, suggestions, and intellectual input. The department provides funds for lunch at these meetings.

It is also important to note that the department holds an orientation reception each fall for new and continuing students. At this catered event, program area requirements are reviewed by the Graduate Advisor and all students are encouraged to ask questions.

3. *A small pot of money should be made available for student-initiated social events.*

The CMP graduate students have recently decided to hold monthly social hours at the end of the week. The department provides funds to purchase snacks and refreshments.

4. *Courses offered by this department duplicated not only one another but ... in ACCESS. The courses fail to coalesce into a unique, coherent curriculum in disease biology.*

As noted above, the main response to this criticism was to redesign M237 to include tissue and organ system biology. Also, new courses such as Immunopathology and Stem Cell Biology and Regenerative Medicine do not duplicate any existing course on campus.

5. The program could consider waiving all or most coursework requirements for MSTPs and instead offer them wide discretion in choosing one or two elective classes.

This has been done. For example, MSTP students do not have to serve as TAs and only complete the CMP, and not the ACCESS, course requirements. They are also given considerable freedom to choose their elective classes.

6. The time required for a student to complete the program is long...qualifying exams should focus on their thesis project and progress reviews [should] supplement regular thesis committee meetings.

The increasing length of time to degree was the main impetus for implementing the requirement for annual committee meetings. Thesis committee chairs and students are encouraged at these meetings to formulate clear, and realistic, goals that will allow graduation within the 5 year period.

7. Replace the dissertation advisor as the thesis committee chair.

There are pros and cons to doing so. However, this is a UCLA requirement and cannot be changed at the program level.