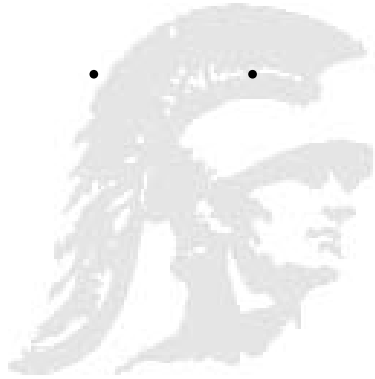


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M.D./Ph.D. Program

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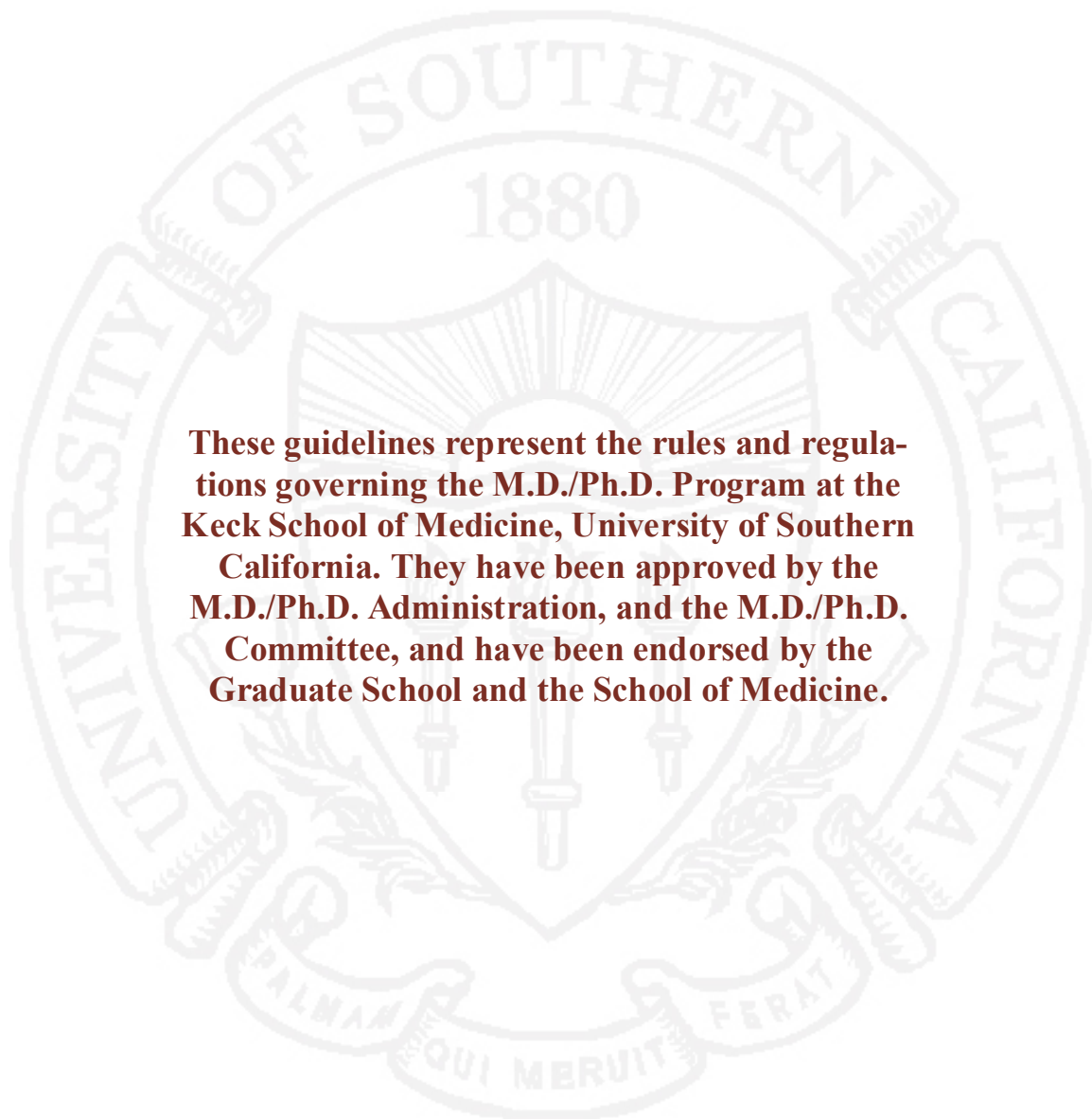
Guidebook



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Keck School of Medicine
University of Southern California

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These guidelines represent the rules and regulations governing the M.D./Ph.D. Program at the Keck School of Medicine, University of Southern California. They have been approved by the M.D./Ph.D. Administration, and the M.D./Ph.D. Committee, and have been endorsed by the Graduate School and the School of Medicine.

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The M.D./Ph.D. Program

A program that provide students with a strong clinical and research training to confront and manage the challenges posed by the rapid pace of medical discovery.

The combined M.D./Ph.D. degree is awarded for demonstrated competence in two related areas: clinical performance under the auspices of the Keck School of Medicine at the University of Southern California, and innovative research within the specific guidelines of a doctoral degree granting program within the Graduate School at the University of Southern California for the USC M.D./Ph.D degree program, or at the California Institute of Technology for the Keck-Caltech M.D./Ph.D. degree program. The Ph.D. degree must be in a field that is related to the Health Sciences.

Competency in clinical medicine is judged first by satisfactory completion of all Year I and II basic science coursework, as well as the Introduction to Clinical Medicine program offered during both years. Additional requirements include completion of all clinical rotations in Years III and IV. M.D./Ph.D students are required to pass the National Boards Parts I and II.

Since the Ph.D. degree is awarded for innovative research, students are encouraged to explore research ideas from the beginning of their enrollment in the program. Competency in a particular basic science research area is evaluated based upon grades in coursework, as well as successful completion of an individual Basic Science department's specific requirements for the award of their Ph.D. Degree. This may involve such requirements as the following: completion of laboratory rotations, participation in departmental seminars, acquisition of research and library skills, performance on screening procedures and the qualifying examination, success in teaching assignments, publication and presentation at national meetings, and satisfactory progress on the dissertation research.

Program Administration

USC M.D./PH.D. PROGRAM

Overall responsibility of the M.D./Ph.D. Program at the Keck School of Medicine at USC is shared by the Deans of the Graduate and Medical Schools. The program is administered by an M.D./Ph.D Program Director, two Associate Directors and a Program Administrator (see list of the current administrators and administrative responsibilities, below).

JOINT USC-CALTECH M.D./PH.D. PROGRAM

Responsibility for the joint USC-Caltech M.D. Ph.D. Program is shared between the Deans of the Graduate Schools of the two Universities and the Dean of the Keck School of Medicine at USC. The medical part of the program is administered by the USC M.D/Ph.D. Program Director, the two Associate Directors and the Program Administrator. Students within the joint program receive their M.D. Degree from the Keck School of Medicine at USC and their Ph.D. from the California Institute of Technology. The administration of the joint program is by two Co-Directors, one at Caltech and one at the Keck School of Medicine, two associate directors at each institution, a joint policy and admissions committee comprised of faculty at each institution, and a program administrator at each campus.

CURRENT ADMINISTRATORS - 2002-2003

Dean of the USC Graduate School

Jonathan Kotler, J.D.

Dean of the Keck Medical School

Stephen J. Ryan, M.D.

Director of the USC M.D./Ph.D. Program

Brian Henderson, M.D.

Directors of the Keck-Caltech Program

Brian Henderson, M.D.

Paul Patterson, Ph.D.

Associate Directors of the Keck M.D./ Ph.D. Program

Judy Garner, Ph.D.
Juergen Reichardt, Ph.D.

Associate Directors of the Keck-Caltech M.D./ Ph.D Program

Judy Garner, Ph.D.
Linda Hsieh Wilson, Ph.D.
Juergen Reichardt, Ph.D.
Jack Richards, Ph.D.

Keck Program Administrator

Sandra Mosteller

Keck/ Caltech Program Administrators

Liz Ayala
Sandra Mosteller

Staff:

Program Assistant

Roland Rapanot

Graduate Student Affairs

Oralia Gonzales

Medical Student Affairs

Robert McCann

ADMINISTRATOR RESPONSIBILITIES

1. DIRECTORS

The Director of the USC M.D./Ph.D. Program and the Co-Directors of the Keck-Caltech M.D./ Ph.D. Program have overall responsibility for the Policy of the programs. They oversee the administrative functions performed by staff. They appoint the members of the other committees, and guarantee that they meet on a regular basis. They oversee the agenda of the other committees, and bring special problems to the other committees when appropriate. They are members of the Executive and Policy/Admissions committees and attend all meetings, if possible. They hold fiduciary responsibility for the program. Besides representing the programs to the higher administration

of both institutions, they would deal with administrative problems between the institutions, should they arise.

2. EXECUTIVE COMMITTEE

The Executive Committee is comprised of the Director, the Associate Directors and the Program Administrators. The members of the Executive Committee, working with the Directors bear responsibility for running the training and research activities of the students on a day-to-day basis. This group may meet in order to a) expedite solution of administrative problems, b) set the format for weekly student meetings, c) organize retreats for exchange of scientific information (in consultation with students), or d) meet with the student group as a whole to respond to student concerns. They help define the teaching program, and organize and/or coordinate the research opportunities courses. They coordinate research rotations, and help the Policy/Admissions committee vet laboratories and mentors for students. They are responsible for individual counseling of students, and the assignment of faculty advisors during the first 2 years, prior to entering a formal laboratory. The Committee also coordinates the “re-entry” course from the Ph.D. portion of the program back into the clinics in years 6-7. They provide information regarding the academic performance of all the students to the Policy/Admissions committee. They pre-review applications for the M.D./Ph.D. They coordinate opportunities for travel and research presentation to local and national meetings, and run the M.D./Ph.D. seminar program.

3. KECK PROGRAM POLICY/ADMISSIONS COMMITTEE (PAC)

The PAC decides admissions policy, selects students based upon their evaluation and interview, makes decisions about individual offers of financial aid, and interacts with the Medical School Admissions Committee. A member of the PAC is usually one of the interviewers of each M.D./Ph.D. candidate, and presents that student's qualifications to the committee.

The PAC considers policy decisions concerning the operation of the program as a whole, and oversees progress and development of currently enrolled students. The PAC also considers the rules and requirements of the program, informs students of policy issues or changes that will affect them, and reviews student

petitions. This committee also tracks students' progress once they have left the program. The PAC meets approximately once a month during the academic year, or as needed. Students are encouraged to consult with the PAC about any matters that affect their graduate studies and future professional careers; the confidential nature of such discussions is recognized and honored by the Committee.

Members of the PAC are nominated by departments, and are appointed by the Executive Committee. In addition to the members of the Executive Committee, the PAC includes at least one member from each Medical School Basic Science Department, one or more representatives of some Clinical Departments, and an M.D./Ph.D student representative. The composition of the committee may also include members of other degree granting programs that enroll our students that are not medical school basic science departments. Efforts are made to enlist members of the committee who have M.D./Ph.D. degrees. All regular members of the committee are voting members.

4. KECK-CALTECH POLICY/ADMISSIONS COMMITTEE (KCPAC)

This group is comprised of the Executive Committees from both Keck School of Medicine and Caltech plus seven additional members appointed from the faculties of departments participating in the joint Keck-Caltech Program. This group of 11 bears responsibility for the overall quality of the joint M.D./Ph.D. Program. They establish criteria for recruiting, screening, acceptance and support. The actual acceptance/funding decisions for the joint program are made by this committee, with one vote for each member (including the Co-Directors). The committee evaluates the progress of each student on a yearly basis, and more often if required. The committee adjudicates special problems or situations that cannot be easily handled by the Co-Directors and Executive committee. These problems might have to do with inappropriate mentoring, nonproductive or absent mentors, academic difficulties, off-site research experiences, and/or personal difficulties requiring leave-of-absence. This committee is responsible for the overall M.D./Ph.D. learning experience at both campuses to guarantee that standards are met and training is appropriate. The Policy/Admissions Committee includes a certain number of faculty with MD degrees, and it is also their

responsibility to guarantee the quality of the clinical experience of the M.D./Ph.D. fellows, and to aid them in securing the best possible residencies/fellowships.

5. PROGRAM ADMINISTRATOR

Day to day operation of both programs is provided by the Keck Program Administrator (plus additional staff members) for the Keck M.D./Ph.D. Program, and the Keck and Caltech Program Administrators for the Joint program. The Program Administrators report directly to the Program Director(s). In addition, the Keck Program Administrator reports to the Senior Associate Dean for Educational Affairs. The Program Administrators screen applicants based on criteria decided upon by the PAC Committee, arrange student interviews and agendas for visiting students, notify students of their acceptance status, and are the contact for the students interested in the program. The Program Administrator administers the Program budget including scholarships, stipends, tuition remission, and other monies provided to the students during their tenure. The Program Administrator aids the students during enrollment in courses. They maintain the files and historical records on the students, and work with the Senior Associate Deans of each campus to alert the Committees to academic or other problems if they arise. The Program Administrators assist the committees in recruitment, admission, and policy making.

M.D./Ph.D. Student Representative

The student representative to the PAC is elected annually by a plurality of a secret ballot taken of all M.D./Ph.D. students at the beginning of each academic year. Candidates must have been in the program for at least one year. The student representative participates in discussions and decisions about policies, admissions, and curriculum, and is a highly valuable resource for the committee. The student representative may be excused from discussion and decisions regarding the specific evaluation of individual students or other personal matters that may come before the Committee.

M.D./Ph.D. Student Council

The entire group of M.D./Ph.D. students, on an annual basis, will elect at least four members to comprise the M.D./Ph.D. Student Council. This group will meet on a regular basis and will identify problems encountered by the M.D./Ph.D. students, suggest possible solutions, and bring those problems to the attention of the Program Administrator and Executive Committee. Members of the Student Council may be called upon to participate in recruitment, or be consulted for feedback on the program, and are a valuable resource to the administrators of the program. It is recommended that the membership of this council be representative of the constituency; that is, there should be members who are first or second year students, Ph.D. students, and clinical rotation students.

The Medical School

The medical degree is offered through the Keck School of Medicine of the University of Southern California. The Medical School is responsible for the central administration and general policy of the medical training and education of medical students at USC and is administered by the Dean of the Medical School. The medical school meets or exceeds all state curricular and training requirements, and is routinely accredited by the Liaison Committee of Medical Education (LCME). The Medical School Student Affairs offices are in Keith Administration Building, and telephone numbers and email addresses of various deans and administrative departments can be obtained through the Campus Directory or on the University web server (www.usc.edu).

The Graduate School

Graduate programs in each of the USC Basic Science Departments are under the administration of the Graduate School. The Graduate School is responsible for central administration and general policy of all graduate programs at

USC and is administered by the Dean of the Graduate School. Departmental graduate programs conform to or exceed the practices and standards set by the Graduate School. The Graduate Student Affairs Office on the Health Sciences Campus is located in KAM 110 and the Cashier's Office is located in the Seaver Residence Hall lobby. The administrative offices of the Graduate School and other associated offices are located at University Park Campus. The telephone numbers and addresses can be obtained from the USC campus directory or on the University web server (www.usc.edu). If additional information is required, the Program Administrator can help answer questions. Many administrative matters including registration and fee payments are handled on the Health Sciences Campus for full time students by the Office of Student Affairs. Students should contact the Office of Graduate Student Affairs in the School of Medicine (442-1607) for any additional information regarding specific graduate student policies and programs.

The USC-Caltech Program

Students admitted to the USC-California Institute of Technology (USC-Caltech) M.D./Ph.D. program are subject to somewhat different rules than those admitted to the USC M.D./Ph.D. Program. Candidates are interviewed separately for these positions and must be accepted to both the Caltech program as well as the USC School of Medicine. Students in this program may perform their research at either Caltech or USC under the guidance of one of their faculty advisors. All medical school training is performed at USC, and all required Keck School of Medicine criteria for an M.D. degree must be satisfactorily met. While the M.D. Degree is awarded from the Keck School of Medicine at USC, the Ph.D. Degree is awarded by the institution in which the student performed their research.

Students applying to this program are interviewed by faculty on both campuses, and are reviewed and granted acceptance by the KPAC committee, comprised of faculty from both campuses as described above.

Students in the USC M.D./Ph.D. Program who are interested in training at Caltech, but who have not been accepted by the joint admissions committee, may do so only under the following

constraint. First, the faculty mentor at Caltech must have an adjunct appointment in a degree granting department at USC, and the student must be accepted into that USC degree granting graduate program under the joint thesis advisor ship of a faculty member within that department. The awarded Ph.D. degree will come from USC, as will the M.D. degree.

Students interested in obtaining a Ph.D. degree from Caltech but who have not been admitted to the USC-Caltech M.D./Ph.D. program, may apply for admission to the USC-Caltech M.D./Ph.D. program. If accepted to that program, the student would then have all the rights and privileges accorded a student in that program. If, however, they are not admitted to that program, the student may always withdraw from the USC M.D./Ph.D. program and take a leave of absence from medical school in order to obtain the Ph.D. degree at Caltech. Once they have withdrawn from the USC M.D./ Ph.D program in this case, however, they lose the rights and privileges accorded that group.

Sources of Information

M.D./Ph.D. WEBSITE

http://xdev.sf.pentagram.com/schools/medicine/education/degrees_programs/mdp/mdphd.html

The M.D./Ph.D. Website contains detailed information on the dual program and talks about the administrative, academic, social, and financial aspects of the program.

M.D./Ph.D. BROCHURE

The M.D./Ph.D. Brochure contains general information about the program, the new curriculum, and the application procedures.

M.D./Ph.D. GUIDEBOOK

This Guidebook provides both incoming and current students with information about the M.D./Ph.D. Program at the Keck

M.D./PH.D. GUIDEBOOK

School of Medicine and offer guidelines. The guidebook also addresses common questions regarding academic, social, and financial issues.

UNIVERSITY CATALOGUE

The University Catalogue describes the general policies and degree requirements for the Graduate School, the School of Medicine, and each degree granting department eligible to train M.D./Ph.D. students.

STUDENT HANDBOOKS

The M.D./Ph.D. Student Handbook (In preparation).

This handbook, which is being written specifically for the students in the M.D./Ph.D. Program, emphasizes rules, regulations, and requirements that specifically and uniquely apply to students within the dual degree program. The handbooks described below will provide additional information about either the medical or graduate aspects of the program.

The Medical Student Handbook.

This handbook, published by the Medical School and provided to each student on enrollment in the medical school, describes the rules, regulations and requirements that specifically relate to participation in the Medical School curriculum.

The Graduate Student Handbook.

This handbook, published by the Graduate School, guides students through the rules, regulations, and administrative details of obtaining a degree at USC. The handbook is particularly valuable because it includes a step-by-step checklist that students can use to monitor their progress toward their graduate degree.

GRADUATE SCHOOL WEBSITE

<http://www.usc.edu/dept/GRADSCHL/>

This site has detailed information regarding rules, regulations and administrative details of obtaining a graduate level degree at USC.

Student Advisement: Faculty Advisors

Each entering student has a faculty advisor appointed who serves on the PAC. The faculty advisor, in consultation with the PAC, assists the student in the following areas: (a) helping to arrange student rotations in research laboratories in their areas of interest, (b) monitoring the academic progress of the student in the first year, and identifying areas of potential difficulty, (c) helping to identify potential departments and thesis advisors. It is understood that the appointed faculty advisor should have some expertise in a research area that is as closely related as possible to the interests of the students, so as to be in the best position to offer advice. Once the student has identified an individual with whom he or she wishes to work, they should make that individual their faculty advisor after obtaining permission from the PAC. It is then the PAC's responsibility to ensure that this faculty advisor is aware of the rules and requirements of the M.D./Ph.D. Program. The faculty advisor serves as the student's advocate in the specific discussions and deliberations of the PAC that relate to that student.

Student Progress: First Two Years

RECEIVING GRADUATE CREDIT FOR MEDICAL SCHOOL COURSES

During the first two years of medical school, students are enrolled as medical students in the medical curriculum (which is graded Pass/Fail). *Students must perform at an acceptable level in their coursework in order to receive full credit for these medical school courses. Students who repeatedly fall below acceptable performance in these courses may be subject to dismissal from the*

program as described later under “Grounds for Dismissal from the Program”. Such students will receive notice that they are on probation prior to their dismissal.

In the past, many of the same courses given to the medical students were also numbered graduate courses given for graduate credit. M.D./Ph.D. students had been able to transfer credits from these satisfactorily completed courses to their graduate record at the end of year II, if applicable. With the advent of the new, integrated curriculum, many of the graduate courses are no longer offered because of time and scheduling changes. A new series of graduate courses (INTD 536, 537, 538, and 539) are now being developed for incoming M.D./Ph.D. students, so that they may receive credit for basic science study performed during those years. One course will be offered each semester of the first two years of medical school and will consist of a 12 units in General Basic Medical Sciences. Each course will include training in biochemistry, microanatomy, gross anatomy, neurosciences, physiology, pathology, microbiology, and pharmacology as related to the organ system(s) studied during that semester. At the end of year II, all appropriate and satisfactorily completed graduate credits will be transferred to each M.D./Ph.D. student’s transcript.

Student Progress: Ph.D. Years

In general, the satisfactory progress of a student in the Ph.D. years of the program will be determined by the departmental program in which they are participating. The minimum credit requirement for any Ph.D. program in the USC Graduate School is 60 units (including research units), at least 24 of which must have been obtained at USC. At least 2/3 of those units must be taken in courses at the 500 level or higher. In addition, each program may have very specific additional course requirements. It is the student’s responsibility to determine the course requirements in their program, and to assure that they have met those requirements in a timely manner. For more details, the student should consult the University Catalogue, or SCampus.

For the Joint Keck-Caltech program, the satisfactory progress of a student in the Ph.D. years will be determined by the

departmental program in which they are participating. Graduate coursework is usually tailored to an individual student's needs.

During the Ph.D. years in both programs, students must complete coursework in scientific ethics as required by either school.

Identifying Research Advisor and Ph.D. Program

During the first two years of the program, each student should actively seek out potential candidates to serve as a research advisor. During orientation, they will be exposed to the various degree-granting programs on the Health Sciences Campus in a variety of formats. Most of these formats provide some print information concerning the current research interests of individual research faculty in doctoral degree granting programs. In addition, students are directed to individual websites of faculty (which can be viewed through the University of Southern California web server at www.usc.edu), and the M.D./Ph.D. Program Office for lists of faculty and research interests. During the first year, students should consult with their assigned M.D./Ph.D. advisor, the Director or an Associate Director of the program, to determine the identity of potential faculty advisors. Students should contact advisors in whose work they are interested, and make arrangements with that potential advisor to discuss research projects. If possible, it would help if the student could meet with potential advisors a number of times before the first summer to more clearly delineate areas in which they might perform a small preliminary project.

Students should be aware that only faculty who have appointments (either secondary or primary) in departments with Ph.D. degree-granting programs are eligible to serve as faculty advisors for the graduate degree. Some clinical faculty may thus not be strictly eligible. Students who are interested in studying with someone who is not currently a faculty member in a Ph.D.-granting department may still work with that individual if they can identify a member of a degree granting department who will serve as a co-advisor. Alternatively, they should urge the

potential faculty mentor to seek a secondary appointment in an appropriate department.

Students are urged to carefully evaluate the nature of the laboratories in which they are interested to determine if that particular laboratory would operate in a manner that would most facilitate their own method of learning. Factors in any decision would include first and foremost whether the research area is one that the student finds stimulating and intriguing. Other factors would be the number of people in the laboratory, who actually does the training in the laboratory (the laboratory director, or technicians and postdoctoral fellows), the funding level of the laboratory (the laboratory is required to provide graduate support for the student by some mechanism), and the past training history of the laboratory. Students should consult with their more senior student colleagues, but should keep in mind that each student has his or her individual requirements and needs, and the criteria used by certain students for their ultimate choice may not be appropriate for others.

When a student has identified a faculty member with whom they wish to work, they must contact the Program Administrator with this information. ***Formal approval of the advisor by the PAC is required before the student may enter the laboratory.*** The PAC considers the appropriateness of the research area for Ph.D. training, the previous scholarly activity of the laboratory, funding source, and previous training success.

Students admitted to the joint USC-Caltech program follow a similar process in selecting an advisor. Their advisors are usually Caltech faculty, however, this is not a requirement---and they may seek out a USC advisor as well. In addition, these students are required to attend twice in a weekly evening seminar program as well during their first year.

Application and Enrollment in a Ph.D. Program

During the second year of the program, the M.D./ Ph.D. student must decide which Ph.D. granting graduate departmental program they choose to enter. The requirements for the

graduate program selected are: a) that it must be a Ph.D. granting program within the University of Southern California, or, under certain circumstances, the California Institute of Technology, and b) that the project proposed to be performed by the student has a strong relationship to the Health Sciences. The student must then formally apply for admission to that program, under the rules of that particular graduate program. After the student has been formally admitted to a particular program, **they must report the identity of the program they have entered to the M.D./Ph.D. Program Administrator, as well as the identity of their advisor(s).**

Once the student has entered a particular graduate program, the rules and requirements governing the completion of their degree are solely determined by the faculty administering that program. They will be judged as having completed all requirements when they have completed the Ph.D. degree.

Grade Point Average

The graduate course grades are used to determine each student's grade point average in graduate courses. At USC, a student must maintain a 3.0 (B) GPA to be in good academic standing in graduate school. Dropping below a 3.0 places the student on academic probation; the student has one year to bring the GPA up to 3.0 (See below in Section VI). Financial aid may be adversely affected in the event that the grade point average drops below 3.0.

Summer Research Rotations

In general, each M.D./Ph.D. student will perform a summer research rotation between Years I and II in the laboratory of the individual they are most likely to choose as an advisor. Obviously, if the student has an opportunity to work in someone's laboratory in the summer before they start Year I, this is an advantage as well and highly encouraged.

Grounds for Dismissal from the Program

GPA

If a student does not maintain a 3.0 USC Grade Point Average (GPA) for Graduate School, that student is given one year to bring their average up to 3.0. If the student fails to bring his or her average up to 3.0 that may be grounds for dismissal from the program. Students who fail a major medical student course, or are judged to have deficiencies so severe that they require remediation in a major sub discipline (e.g., Biochemistry, Gross Anatomy, Neurosciences) will be considered to be under academic probation until that coursework has been successfully remediated. Failure in more than one course or repeated failures may be considered grounds for dismissal from the program. In general, students must meet the standards set forth by the Medical School for promotion and advancement throughout the entire four years of the medical curriculum to maintain eligibility for the combined degree program.

ETHICAL OR INTEGRITY CONSIDERATION

Students are held to the highest standards of professionalism and integrity in their performance of their studies. The USC publication entitled Academic Integrity: a Guide for Graduate Students developed by the Office for Student Conduct (<http://www.usc.edu/dept/student-affairs/student-conduct/>) should be used as a guide for behavior, and specifically outlines the standards for academic honesty at USC. Breach of these standards, specifically plagiarism, unauthorized collaboration, violation of examinations, or fabrication of data or dishonesty in presentation, are grounds for dismissal from the program.

All medical students, including M.D./Ph.D. students, are also subject to an additional set of ethical and integrity guidelines. This includes the medical student Honor Code and a number of specific guidelines that have to do with ethical medical care of patients and patient confidentiality. These guidelines are given to all medical students when they enter medical school, during their Introduction to Clinical Medicine classes, and during their

clinical years. Violations of these guidelines are usually brought before a student Honor Council, which makes recommendations for action to the Dean of the School of Medicine. Established violations of these guidelines may also be considered grounds for dismissal from the M.D./Ph.D. Program office.

TIME LIMITATIONS

If a student takes longer than 6 years to finish the Ph.D. degree, they must petition for an extension. The USC Graduate School limit is 8 years to finish the Ph.D. degree.

Student Information Updates

The students are requested to update the information in their files on an annual basis. Information to be provided includes: changes in advisor, coursework taken in Ph.D. years with grades, publications, speaking engagements, or other events in which the student participated. This will facilitate the writing of future letters in support of the students.

Intro to Clinical Medicine During the Ph.D. Years

The Director of the Introduction to Clinical Medicine (ICM) Program administers a 1-hour course entitled Continuing ICM for MD/PhD Students each semester (INTD 535). This is a credit/no credit course that entails approximately 8 afternoon meetings per semester and is specifically geared towards M.D./Ph.D. students during their Ph.D. Years. The purpose of this course is to allow students to remain current in their clinical skills during their research years, and to ease their transition into the clinical setting after their thesis is complete. Other aspects of clinical medicine, above and beyond what the students learned in Years I and II ICM may also be addressed. Students are required to take at least one semester of this course during the spring semester of the year preceding their expected entrance into clinical rotations and it is particularly recommended that they take the course more than once. If they

wish, students may take this course every semester they are in their Ph.D. years, however, the M.D./Ph.D. program will only pay tuition for this course for 1 semester. In the event that there are fewer than 4 students taking the course in any one year, the course may not be offered, and the M.D./Ph.D. Associate Directors and Program Administrator will work with the students to help them obtain alternative clinical experiences. Students must make specific arrangements with the Student Affairs office to ensure that their malpractice insurance is current. Prior to entering Year III students must also take a required CPR class.

Post Ph.D. Clinical Rotations

Each student must complete the requirements for the Ph.D. degree (including their thesis defense) before they will be allowed to re-enter the clinical Years III and IV. Students, who expect to complete the Ph.D. and enter Year III in June of the respective year of completion, must contact the Office of Medical Student Affairs in the early spring to notify this office of their intent and to develop a rotation schedule. In addition, the students should notify the M.D./Ph.D. Program Office. During this period, the students will be assigned an M.D./Ph.D. Clinical Advisor to discuss career goals and possibilities in terms of academic medicine and will meet with that individual as needed to obtain information and counseling about clinical career paths.

Program Copy of the Dissertation

Each graduating student should provide the Program Office with a copy of the approved dissertation, which is placed in the program archive. Abstracts and reference information of published manuscripts should also be provided to the Program Office.

Participating Basic Science Departments

BIOCHEMISTRY AND MOLECULAR BIOLOGY

http://www.usc.edu/schools/medicine/academic_departments/biochem_molbiol/

The Department of Biochemistry & Molecular Biology offers graduate training for careers in the biomolecular sciences. The program consists of course work and research leading to the doctoral degree and is intended to provide students with a broad conceptual background in addition to focused research training. Research in the department encompasses all areas of modern biochemistry, ranging from fundamental chemical to biomedical topics. Specific research areas of the faculty include molecular biology, molecular and genetic epidemiology, mechanisms of enzyme action, nucleic acid biochemistry, molecular genetics and gene therapy, cellular biochemistry, lipid and lipoprotein biochemistry and membrane biology, and molecular aspects of eukaryotic development and gene expression. The faculty publish their research prolifically in many prestigious journals including Science, Cell, Genes & Development, and the Proceedings of the National Academy of Sciences, and have accrued numerous honors and awards. Many serve as advisors to national and international scientific organizations, and on the editorial boards of international scientific journals.

CELL AND NEUROBIOLOGY

http://www.usc.edu/schools/medicine/academic_departments/cnb/index.html

The Department of Cell and Neurobiology provides multidisciplinary and interdisciplinary training in molecular, cell and systems biology. The faculty members of Cell and Neurobiology are responsible for a broad range of the basic science medical teaching program, including anatomy, histology, cell biology, neuroscience, pharmacology and nutrition. Ongoing funded research programs in molecular, developmental and behavioral neuroscience, endocrinology/reproduction, and

neuropharmacology provide research experiences and training in molecular, genetic and biochemical techniques. Disease oriented research focuses in areas of vision, circadian rhythms, neural development, neural degeneration and chemosensory pathways and provide a challenge for developing clinical intervention technology. The goal of these interdisciplinary programs is to provide a bridge between basic science discoveries and advances in technology which support clinical innovation.

MOLECULAR MICROBIOLOGY AND IMMUNOLOGY

http://www.usc.edu/schools/medicine/academic_departments/microbiology

The objective of this department is to train scientists who will make original, significant contributions to biomedical science. The department offers a training program which emphasizes knowledge in immunology, virology and cellular and molecular biology. Areas of specialization include: animal virology, molecular and cellular immunology, regulation and mechanisms of transcription and translation, signal transduction, and chemical carcinogenesis.

PATHOLOGY

http://www.usc.edu/schools/medicine/academic_departments/pathology/

The Department of Pathology offers a program leading to a Ph.D. in Pathobiology. Emphasis is placed in interdisciplinary approaches to the study of human disease. Areas currently under investigation include molecular genetics and pathogenetic mechanisms in cancer, animal models for cancer, viral oncogenesis, tumor biology and immunotherapy, molecular endocrinology, developmental biology, alcohol-induced liver and pancreatic diseases, immunogenetics and immunobiology, diseases of the nervous system, environmental pathology and toxicology, and genetic diseases and gene therapy.

PHYSIOLOGY AND BIOPHYSICS

http://www.usc.edu/schools/medicine/academic_departments/physiology_biophysics/

To become an effective member of the biomedical research community today requires an integrated knowledge of physiological systems at several levels of organization: molecular, cellular, and system. Reflecting this fact, students in Physiology and Biophysics are guided in the development of an educational program that considers problems from multiple perspectives. Areas of active research in the Department include: endocrinology and metabolism, especially the causes of diabetes and obesity; signal transduction and molecular biological studies of insulin resistance; molecular mechanisms of fluid and electrolyte balance and disruption, especially hypertension and potassium balance; structure and function of membrane transport proteins; mechanical and biophysical behavior of human blood cells in normal, chemically modified, aged, and pathologic states; hormonal regulation of exocrine function and the cellular and molecular bases of autoimmune exocrine disease; and the molecular control of regulated secretion in health and disease.

PREVENTIVE MEDICINE

http://www.usc.edu/schools/medicine/academic_departments/preventive_med/

Three divisions within the Department of Preventive Medicine offer Ph.D. programs: biostatistics, epidemiology and health behavior research.

The biostatistics program is concerned with the development and application of statistical principles and methods to problems in medical, biological and health sciences. Students are trained in techniques for collection, analysis and interpretation of data, primarily by computer. Coursework includes biostatistics, statistical epidemiology, statistical computing, clinical trials, multivariate analysis and survival analysis.

The epidemiology program trains students to formulate original hypotheses about disease etiology and to design and conduct epidemiologic research to test these hypotheses. Coursework orients the student to epidemiologic research methods, biostatistics and current epidemiologic issues within cancer

epidemiology and molecular epidemiology. Excellent opportunities exist for conducting independent research, particularly in the area of cancer epidemiology and molecular epidemiology.

The health behavior research program trains behavioral scientists and physicians for research careers that focus on studies of alternative strategies for population-based disease prevention and health promotion. Students receive multidisciplinary training that encompasses models and methods from the social and behavioral sciences, epidemiology, preventive medicine and statistics.

Social Issues

HOUSING

Campus housing is chosen by lottery. Lottery numbers for MD/PhD students are chosen with their medical school classmates. Students that choose to remain on campus housing have a priority over the entering class. For other housing options, such as off campus housing, visit the USC Housing web site at: <http://housing.usc.edu/>

ANNUAL M.D./Ph.D. PARTIES

Every year the M.D./Ph.D. Program hosts three parties. A Welcome Party at the beginning of the year to welcome the entering class and give an opportunity for the current students to catch up with one another. Then there's a Holiday Party in December to celebrate the festivity. And at the end of the Spring term there's a End Of The Year Party.

The parties are held at one of the Director's/Associate Director's homes or at a restaurant/club.

STUDENT RESEARCH SEMINARS

Throughout the enrollment in the M.D./Ph.D. program, students are expected to attend the weekly student research seminars. This seminar series is organized by the Associate Directors of the

Program in consultation with the students. During the first two years, this is a particularly valuable time for the students to acquaint themselves with their more senior colleagues, to obtain information concerning the types of research available to them, and to become more educated concerning the breadth and depth of basic science and clinical science research that is current. The seminars include student research seminars, invited faculty presentations, and presentations by individuals who have information concerning the students' future career goals and responsibilities.

STUDENT RESEARCH RETREATS

M.D./Ph.D. students interested in organizing a research retreat for the program are encouraged to do so, and may enlist the help of the Program Office in planning such a retreat if funds are available for such a program.

Financial Issues

FUNDING

Financial support, tuition waivers, and scholarships are awarded upon availability. Specific awards are determined at the time of admission. Partial or complete support during the Ph.D. portion of the program will be provided for each student by the specific department and/or research preceptor.

STIPEND

Fully funded M.D./Ph.D. students currently receive an annual stipend of \$18,000 which is awarded in monthly installments of \$1,500.

The stipend is available for direct deposit as long as the student's bank of choice supports it. Students must print and fill out the request form in the Disbursement Control web site: http://www.usc.edu/dept/finserv/disbursement_control/index.htm. The name of the form is "Direct Deposit/Electronic Funds Transfer". After completion of the form send to the

Disbursement Control Office by regular mail, campus mail, or by fax. The address and fax number is at the bottom of the form.

POLICY FOR MEETING PRESENTATIONS

Efforts will be made to provide money for student travel to the National M.D./Ph.D. Conference in Aspen as well as the Western Medical Student Research Forum (WMSRF) in Carmel on an annual basis for students presenting an oral or poster research presentation. Students desiring to attend a scientific meeting in their own subject area should rely upon funds from their advisors, departments, and/or professional associations.

In the past, students have been reimbursed for up to \$500 for the symposium in Carmel and up to \$1,000 for the conference in Aspen.

KECK SCHOOL OF MEDICINE, UNIVERSITY OF SOUTHERN CALIFORNIA

M.D./Ph.D. Guidebook

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