

Endocrinology

The main goal of our program is to engage students in the interdisciplinary aspects of the field of endocrinology through seminars, courses, and our diverse faculty research perspectives that range from structural, molecular, and cellular endocrinology through organismal and comparative endocrinology to chemical ecology. Graduates from our endocrinology program have transitioned into careers in a variety of fields including education, research in both academic and industry settings, government regulation, and private business.

The faculty associated with the Graduate Group in Endocrinology leading to the MA and the Ph.D. degrees have diverse interests representing endocrinology in the broadest sense: chemical mediators in the living world directed by autocrine, paracrine, endocrine, and ectohormonal factors. Our program faculty encompasses hormone-oriented research programs such as cancer biology, signal transduction, drug design, membrane biology, virology, metabolism, differentiation, morphogenesis, toxicology, and gene transcription. Graduates from our endocrinology program have transitioned into careers in a variety of fields including education, research in both academic and industry settings, government regulation, and private business.

Students who plan to work for higher degrees in endocrinology at Berkeley will be guided by a graduate adviser and by the professor who directs their research (mentor). The graduate advisor and mentor will ascertain whether students have met the minimum requirements, will recommend to prospective candidates what additional courses to take, will decide with them the fields to be covered in the qualifying examinations, and will act generally in an advisory capacity. The candidates are expected to have completed an undergraduate major in some area of animal biology leading to the BA or BS degree.

To advance to candidacy for the Ph.D., students must complete all requirements, including passage of an oral qualifying examination.

Admission to the University

We are a "direct admit" program, there are no lab rotations — students enter our program already paired with a faculty mentor and immediately begin research in that lab. Because of this, it is imperative that interested individuals make a connection with the Endocrinology faculty (<http://endo.berkeley.edu/faculty/>) member they are interested in working with *before* applying.

Minimum Requirements for Admission

The following minimum requirements apply to all graduate programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A grade point average of B or better (3.0);
3. If the applicant has completed a basic degree from a country or political entity (e.g., Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 90 on the iBT test, 570 on the paper-and-pencil test, or an IELTS Band score of at least 7 on a 9-point scale (note that individual programs may set higher levels for any of these); and
4. Sufficient undergraduate training to do graduate work in the given field.

Applicants Who Already Hold a Graduate Degree

The Graduate Council views academic degrees not as vocational training certificates, but as evidence of broad training in research methods, independent study, and articulation of learning. Therefore, applicants who already have academic graduate degrees should be able to pursue new subject matter at an advanced level without the need to enroll in a related or similar graduate program.

Programs may consider students for an additional academic master's or professional master's degree only if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.
2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may apply only to one single degree program or one concurrent degree program per admission cycle.

Required Documents for Applications

1. **Transcripts:** Applicants may upload *unofficial* transcripts with your application for the departmental initial review. Unofficial transcripts must contain specific information including the name of the applicant, name of the school, all courses, grades, units, & degree conferral (if applicable).
2. **Letters of recommendation:** Applicants may request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, by the recommender, not the Graduate Admissions.
3. **Evidence of English language proficiency:** All applicants who have completed a basic degree from a country or political entity in which the official language is not English are required to submit official evidence of English language proficiency. This applies to institutions from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, most European countries, and Quebec (Canada). However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a US university may submit an official transcript from the US university to fulfill this requirement. The following courses will not fulfill this requirement:
 - courses in English as a Second Language,
 - courses conducted in a language other than English,

- courses that will be completed after the application is submitted, and
- courses of a non-academic nature.

Applicants who have previously applied to Berkeley must also submit new test scores that meet the current minimum requirement from one of the standardized tests. Official TOEFL score reports must be sent directly from Educational Test Services (ETS). The institution code for Berkeley is 4833 for Graduate Organizations. Official IELTS score reports must be sent electronically from the testing center to University of California, Berkeley, Graduate Division, Sproul Hall, Rm 318 MC 5900, Berkeley, CA 94720. TOEFL and IELTS score reports are only valid for two years prior to beginning the graduate program at UC Berkeley. Note: score reports can not expire before the month of June.

Where to Apply

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

Admission to the Program

The online Graduate Application for Admission, Fellowship, and Financial Aid will be available in early September on the Graduate Division's website (http://www.grad.berkeley.edu/admissions/grad_app.shtml/) and will include the current deadline to apply to the program. Be sure to allow sufficient time for your letters of recommendation and test scores to arrive by the deadline.

Checklist of Required Documentation and Information

- 1. Completion of the online Graduate Application for Admission, Fellowship, and Financial Aid.** Read the instructions carefully and complete all pages relevant to you. Be sure to include:
 - A current email address. This is the primary means of communication.
 - List faculty members you have contacted or whose research you are interested in. We strongly recommend that you initiate correspondence with faculty members whose research is of interest to you. Please refer to the endocrinology faculty list for descriptions of faculty research interests.
 - Grade Point Average (GPA) after the first two years (international applicants do not need to calculate GPA).
 - Statement of purpose and personal history statement. Take particular care in writing your statement of purpose. It is used to evaluate your preparation and aptitude for graduate study in our department.
- 2. Three letters of recommendation.** At least two letters must be from faculty familiar with your academic performance. Your recommenders will be able to submit online letters of recommendations. See the Graduate Division (<http://www.grad.berkeley.edu/prospective/index.shtml/>) website for detailed instructions and information. We will also accept letters directly from a letter service.
- 3. Transcripts from each college and graduate institution you have attended.** You can upload unofficial transcripts for review purposes. Official transcripts will be required if admitted.
- 4. Test of English as a Foreign Language (TOEFL)** for applicants from a country in which the official language is not English. TOEFL exams must be recent (see info about this on the Grad Div website

(<https://grad.berkeley.edu/admissions/requirements/>). Older exams will not be accepted even if your score was reported to Berkeley.

The GRE is not required, but for students that would like to include scores in their application, our Institution Code: 4833; Department Code: 0299.

If you have further questions, please the graduate student services advisor at endo@berkeley.edu.

Unit requirements to complete the program:

96 units (equivalent of at least 8 semesters, full-time).

All required courses:

- IB 248: Comparative Physiology and Endocrinology Seminar (<http://guide.berkeley.edu/courses/integbi/>) (1 unit) - Reviews and reports of current research in vertebrate endocrinology and physiology. Must be taking in the Spring of each year enrolled.
- IB 137: Human Endocrinology (<http://guide.berkeley.edu/courses/integbi/>) (4 units) - Course will address the role of hormones in physiology with a focus on humans. Regulation of hormone secretion and mechanisms of hormone action will be discussed. Physiological processes to be addressed include reproduction, metabolism, water balance, growth, fetal development. Experimental and clinical aspects will be addressed.
- MCB 135A: Topics in Cell and Developmental Biology: Molecular Endocrinology (<http://guide.berkeley.edu/courses/mcellbi/>) (3 units) - Molecular mechanisms by which hormones elicit specific responses and regulate gene expression; hormone-receptor interaction; synthesis, transport and targeting of hormones, growth factors and receptors.

All elective requirements:

- There are no elective requirements for this PhD. As it is a direct admit, research-focused program, students will enroll most semesters in research lab units with their faculty mentors.
- Further course work can be taken, in consultation with the major professor and graduate advisor to allow emphasis in the area(s) of the student's research interest, such as biochemistry, cell biology, immunology, molecular biology, morphology, physiology, psychobiology, tumor biology, etc. -- but it is not required for the degree.

Normative Time Requirements

Total normative time is 5 years, but some international students may choose to finish in 4 years.

Curriculum

The following courses are recommended for the Ph.D. degree in the field of endocrinology.

- Completion of the requirements listed above for the MA candidates.
- Further coursework selected in consultation with the major professor and graduate advisor to allow emphasis in the area(s) of the student's research interest, such as biochemistry, cell biology, immunology, molecular biology, morphology, physiology, psychobiology, or tumor biology.
- Two additional graduate-level seminars, including advanced topics in endocrinology and one other seminar in endocrinology.

- The seminar will be selected after consultation with the research adviser.
- It is recommended that students enroll in the teaching colloquium INTEGBI 375.
- Serve as a graduate student instructor in one or more appropriate courses. Enforcement of this requirement will depend on the availability of funding.
- Dissertation.
- Students are encouraged to give oral presentations on their research at least twice during their tenure at Berkeley in INTEGBI 248 or in other appropriate courses.

In addition, the student must pass an oral qualifying examination for Ph.D. degree candidacy. This exam should be taken by the end of the fourth semester in residence. For the exam, students will be held responsible for subjects the graduate adviser and mentor designate from the list of approved topics.

The purpose of the oral exam is to test the student's understanding of general principles in broad areas, rather than detailed knowledge of narrow fields. However, the examining committee may choose to evaluate the student's abilities to understand and solve problems or questions related to their chosen area of research. This decision will depend to some degree on the student's training and experience. When the oral exam does cover a research topic, not more than 45 minutes of the three-hour exam period should be devoted to that area.

All students are required to defend the following two areas on the oral exam:

- Organismal endocrinology (either mammalian or comparative).
- Molecular and cellular endocrinology.

Two of the following list of 12 subject areas of plant and or animal biology must also be defended:

1. Anatomy
2. Biochemistry
3. Cell Biology
4. Developmental Biology
5. Ethology
6. Evolutionary Biology
7. Genetics
8. Immunology
9. Molecular Biology
10. Neurobiology
11. Physiology
12. Tumor Biology

Some other topics may also be acceptable, but approval by a majority of the guidance committee is required in such cases.

Narrow fields, such as pituitary anatomy and physiology, osmoregulation, membrane biology or regulation of gene expression are not acceptable.

Although there is no specific foreign language required of candidates, students are encouraged to be familiar and conversant with the foreign language literature in the field or fields relevant to their research interest. The mentor may require the student to take an appropriate reading examination in their foreign language literature or to examine the student in this literature as part of the Ph.D. oral examination.

Please see our admissions information (p. 1). Endocrinology directly admits students into research labs. We recommend applicants connect with an Endocrinology faculty (<http://endo.berkeley.edu/faculty/>) member to see if they are considering master's degree applicants *before* applying.

Unit requirements to complete the program:

48 units (equivalent of at least 4 semesters, full-time).

All required courses:

- IB 248: Comparative Physiology and Endocrinology Seminar (<http://guide.berkeley.edu/courses/integbi/>) (1 unit) - Reviews and reports of current research in vertebrate endocrinology and physiology. Must be taking in the Spring of each year enrolled.
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Further course work can be taken, in consultation with the major professor and graduate advisor to allow emphasis in the area(s) of the student's research interest, such as biochemistry, cell biology, immunology, molecular biology, morphology, physiology, psychobiology, tumor biology, etc. -- but it is not required for the degree.

Master's Degree

Students who are applying to the Endocrinology MA program should have the following courses completed at their undergraduate institutions before beginning the master's program in endocrinology:

- Chemistry, to include introductory inorganic, quantitative analysis, introductory organic, and introductory biochemistry.
- General physics and math through calculus.
- General biology.
- A survey course in organismal physiology.
- A survey course in cellular and molecular biology.

A course in statistics is recommended.