COMPARATIVE BIOSCIENCES

http://vetmed.illinois.edu/cb/

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Head of the Department: Uwe Rudolph
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Major: Veterinary Medical Science – Comparative Biosciences

Degrees Offered: M.S., Ph.D.

Joint Degree Program: Veterinary Medical Scholars Program

Degrees Offered: D.V.M and M.S., D.V.M. and Ph.D.

Graduate Degree Programs

The Department of Comparative Biosciences offers graduate work leading to the degree of Master of Science. Areas of specialization include physiology, pharmacology, and toxicology. Each area has a core of required courses supplemented by others within the Department of Comparative Biosciences and from other departments of the Graduate College. Adequate laboratory and animal holding space to conduct the research of the faculty and graduate students is provided in the Basic Sciences Building, Veterinary Teaching Hospitals, and the Veterinary Research Farm.

Admission

Applicants for graduate study in comparative biosciences must have a minimum grade point average of 3.0 (A = 4.0). Grade point averages will be calculated on the last 60 hours of undergraduate studies for those without the D.V.M. degree and on the entire professional curriculum for those with the D.V.M., or equivalent, degree. Applicants with a graduate degree or with some graduate coursework will be evaluated on the basis of their graduate work as well as their undergraduate or professional records. Qualifications of students must be approved by the department’s Graduate Studies Committee.

The Graduate Record Examination (GRE) is required and must have been taken within the last five years prior to application. Candidates must score an average in the 80th percentile or higher on each of the three portions of the GRE to be eligible for consideration.

International applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL). A score of at least 600 on the paper-based test, or 250 on the computer-based test, is required. Those applicants who gain admission on the basis of their academic credentials, but score below 600 on the TOEFL, will be admitted on limited status and required to take the English Placement Test (EPT) upon their arrival. Students are exempt from the TOEFL requirement if they have completed at least two academic years of full-time study at an institution where the language of instruction is English during the five-year period prior to the proposed date of enrollment. Students also need to take the Test of Spoken English (TSE) oral exam and score at least 50. We are not accepting applications for the M.S./D.V.M. program at this time.

Joint Degree Programs

Students accepted into the Veterinary Medical Scholars Program (https://vetmed.illinois.edu/education/doctor-veterinary-medicine-degree/research-opportunities-dvm-students/veterinary-medical-scholars-program) can complete a D.V.M. and Ph.D. simultaneously.

Graduate Teaching Experience

Experience in teaching is considered a vital part of the graduate program and is required as part of the academic work of all M.S. and Ph.D. candidates in this program.

Faculty Research Interests

Experimental models range from stem cells to rodent models to domestic animals, wildlife, and human patients. Exciting research is being conducted by CB faculty in the areas of:

- endocrine/reproductive biology and toxicology
- environmental and ecological toxicology
- uterine and placental biology
- aortic mesangial stem cells
- stem cells for assessment of small molecule and nanoparticle pharmacology and toxicology
- nanodisks as platforms for the study of membrane proteins
- mouse and frog models of development
- the impact of environmental and dietary compounds on neurodevelopment and on addictive potential of substances of abuse
- circadian rhythms in animal models of shift work and jet lag
- immunopharmacology and drug allergy
- obesity and diabetes mellitus
- cancer chemotherapy
- the interplay between infectious agents and contaminants with wildlife populations
- comparative drug disposition and pharmacokinetics

Research techniques range from micro-RNA to animal and human patient epidemiology to ecological assessments.

Training Programs, Centers and Institutes

Our faculty provide graduate instruction in stem cell research, molecular genetics, pharmacology and toxicology. They also participate in interdisciplinary training programs including the NIEHS-funded Environmental Toxicology Training Program (http://vetmed.illinois.edu/cb/nhtox), the Interdisciplinary Environmental Toxicology Training Program (https://vetmed.illinois.edu/ihtp), the Reproductive Biology Program (https://vetmed.illinois.edu/peer), the Neuroscience Program (http://neuroscience.illinois.edu), the Nutritional Sciences Division (http://www.nutrsci.illinois.edu), Beckman Institute (http://www.beckman.uiuc.edu), and the Institute for Genomic Biology (http://www.igb.illinois.edu). CB faculty also lead the Veterinary Clinical Pharmacology Residency Program (https://vetmed.illinois.edu/college-organization/comparative-biosciences/graduate-study-training-programs), which prepares graduate veterinarians for the certifying examination of the American College of Veterinary Clinical Pharmacology (ACVCP). In addition, together with the Animal Poison Control Center in Urbana, we jointly offer a Veterinary Clinical Toxicology residency (https://vetmed.illinois.edu/college-organization/comparative-biosciences/graduate-study-training-programs) to prepare veterinarians...
for board certification by the American Board of Veterinary Toxicology (ABVT) and the American Board of Toxicology (ABT).

**Financial Aid**

A limited number of research and teaching assistantships or associate positions are available.

### VMS Comparative Biosciences, M.S.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Student must select from one of the following courses with the advice of his/her dissertation committee:</td>
<td></td>
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<tr>
<td>MCB 450</td>
<td>Introductory Biochemistry</td>
<td>3-4</td>
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<tr>
<td>MCB 354</td>
<td>Biochem &amp; Phys Basis of Life (credits cannot be used towards degree)</td>
<td></td>
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<tr>
<td>MCB 401</td>
<td>Cell &amp; Membrane Physiology</td>
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<tr>
<td>MCB 402</td>
<td>Sys &amp; Integrative Physiology</td>
<td></td>
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<tr>
<td>MCB 410</td>
<td>Developmental Biology, Stem Cells and Regenerative Medicine</td>
<td></td>
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<tr>
<td>MCB 480</td>
<td>Eukaryotic Cell Signaling</td>
<td></td>
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<tr>
<td>MCB 501</td>
<td>Advanced Biochemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>PATH 524</td>
<td>Biostatistics</td>
<td></td>
</tr>
<tr>
<td>VCM 572</td>
<td>Clinical Epidemiology</td>
<td></td>
</tr>
<tr>
<td>CPSC 440</td>
<td>Applied Statistical Methods I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or approved equivalent</td>
<td></td>
</tr>
<tr>
<td>CB 590</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CB 591</td>
<td>Biosciences Seminar Series (may be repeated for up to 2 hours of credit)</td>
<td>1</td>
</tr>
<tr>
<td>CB 592</td>
<td>Special Problems (4 max applied toward degree)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>5-11</td>
</tr>
<tr>
<td>CB 599</td>
<td>Thesis Research (min/max applied toward degree)</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>32</td>
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</tbody>
</table>

**Other Requirements**

Other requirements may overlap. Students may be required to take additional courses as recommended by Advisory Committee or Department Divisions.

| Minimum Hours Required Within the Unit: | 8 (500 level) |
| Minimum 500-level Hours Required Overall: | 12 |
| Final Exam/Thesis Defense | Required |
| Thesis Deposit Required | |
| Minimum GPA: | 3.00 |

1 For additional details and requirements refer to the department’s graduate degree requirements (https://vetmed.illinois.edu/college-organization/comparative-biosciences/graduate-study-training-programs) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook).

### VMS Comparative Biosciences, Ph.D.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB 590</td>
<td>Seminar (Thesis Defense seminar 1 hour and Prospectus Exam 1 hour.)</td>
<td>2</td>
</tr>
<tr>
<td>CB 591</td>
<td>Biosciences Seminar Series (May be repeated for up to 4 hours of credit)</td>
<td>2</td>
</tr>
<tr>
<td>CB 592</td>
<td>Special Problems (min/max applied toward degree. Limit of 12 credit hours total. This limit includes credits accrued during the MS degree.)</td>
<td>12</td>
</tr>
<tr>
<td>CB 599</td>
<td>Thesis Research (min/max applied toward degree)</td>
<td>0</td>
</tr>
</tbody>
</table>

Students must select one of the following courses with the advice of his/her dissertation committee:

- MCB 354 | Biochem & Phys Basis of Life
- MCB 401 | Cell & Membrane Physiology
- MCB 402 | Sys & Integrative Physiology
- MCB 410 | Developmental Biology, Stem Cells and Regenerative Medicine
- MCB 480 | Eukaryotic Cell Signaling
- MCB 501 | Advanced Biochemistry

Select one of the following: 4

- PATH 524 | Biostatistics
- VCM 572 | Clinical Epidemiology
- CPSC 440 | Applied Statistical Methods I

or approved equivalent

**Total Hours**: 64

1 Or approved equivalent course.

**Other requirements**

Other requirements may overlap.

Students may be required to take additional courses as recommended by Advisory Committee or Department Divisions.

64 hours (including thesis research) earned in courses meeting on the Urbana-Champaign campus, on the Chicago campus, or in other locations approved by the Graduate College for graduate credit.

Teaching experience is required.

Masters degree required for admission to Ph.D.? No, but Masters-level requirements must be met (32 hours min.)

Qualifying exam required: Yes

Final exam/Dissertation defense required:

Dissertation deposit required: Yes

Minimum GPA: 3.00

1 Information listed in this catalog is current as of 01/2019
For additional details and requirements refer to the department’s graduate degree requirements (https://vetmed.illinois.edu/college-organization/comparative-biosciences/graduate-study-training-programs) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook).

**M.B.A. Joint Degree Program**

Students in this unit may choose to earn their major degree and simultaneously complete an M.B.A., with 12 fewer required hours than when pursuing both degrees independently. Students must be enrolled in the M.B.A. program for three terms and complete all the requirements of their primary degree. Interested students should see the joint program requirements (http://catalog.illinois.edu/graduate/graduate-majors/bus-admin-mba/joint-mba) and contact the M.B.A. program and their major department office for more information.

**D.V.M. and Ph.D. in Veterinary Medical Science – Comparative Biosciences**

Students accepted into the Veterinary Medical Scholars Program (https://vetmed.illinois.edu/education/doctor-veterinary-medicine-degree/research-opportunities-dvm-students/veterinary-medical-scholars-program) can complete a D.V.M. and Ph.D. simultaneously.