COMPARATIVE BIOMEDICAL SCIENCES, MS

The Comparative Biomedical Sciences (CBMS) graduate program emphasizes an integrated approach to contemporary biology that combines molecular and cellular techniques with the analysis of complex whole animal systems. Faculty provide exceptional graduate and undergraduate interdisciplinary research training opportunities in core areas of animal and human health including immunology, molecular and cellular biology, physiology, neuroscience, genomics, oncology, virology, medical technology, infectious diseases and toxicology and pharmacology. They also contribute extensive public services, both nationally and internationally, within related faculty disciplines.

The graduate program serves as a focal point for graduate research training in the School of Veterinary Medicine (SVM) and is administered by the Department of Pathobiological Sciences. Trainers in CBMS have their tenure homes in all four departments of the School of Veterinary Medicine as well as in the College of Agricultural and Life Sciences (CALS), the School of Medicine and Public Health (SMPH), the College of Engineering, and the College of Letters & Science. Faculty in the CBMS program also serve in other campus training programs including bacteriology, biocore, cellular and molecular biology, endocrinology and reproductive physiology, medical microbiology and immunology, molecular and environmental toxicology, and the Primate Center.

Currently, there are over 100 faculty trainers in the Comparative Biomedical Sciences program. Affiliate faculty outside the School of Veterinary Medicine have their tenure homes in the Departments of Anatomy, Animal Sciences, Biochemistry, Dermatology, Entomology, Human Oncology, Medical Microbiology and Immunology, Medicine, Neurosurgery, Ophthalmology and Visual Sciences, Pathology and Laboratory Medicine, Population Health Sciences, Radiology, and Surgery. The program is currently comprised of approximately 55 graduate students, most of whom are pursuing the PhD degree. The program is recognized as a premier research and graduate training program for students with or without a degree in veterinary medicine.

ADMISSIONS

ADMISSIONS

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website.

Graduate admissions is a two-step process between academic programs and the Graduate School. Applicants must meet the minimum requirements (https://grad.wisc.edu/apply/requirements/) of the Graduate School as well as the program(s). Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/apply/).

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 1</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>June 1</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>December 1</td>
</tr>
<tr>
<td>GRE (Graduate Record Examinations)</td>
<td>Not required but may be considered if available.</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>Every applicant whose native language is not English, or whose undergraduate instruction was not exclusively in English, must provide an English proficiency test score earned within two years of the anticipated term of enrollment. Refer to the Graduate School: Minimum Requirements for Admission policy: <a href="https://policy.wisc.edu/library/UW-1241">https://policy.wisc.edu/library/UW-1241</a> (<a href="https://policy.wisc.edu/library/UW-1241/">https://policy.wisc.edu/library/UW-1241/</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
<tr>
<td>Letters of Recommendation Required</td>
<td>3</td>
</tr>
</tbody>
</table>

Admission is competitive. Applicants must hold a BS, DVM, MS, MA or MD from an accredited institution and have a strong background in biology and chemistry. Applications are judged on the basis of previous academic record, letters of recommendation, and the personal statement. Before admission, most applicants must be accepted by an eligible program faculty member who agrees to serve as the major professor. A limited number of applicants may be offered rotations.

Historically, most admitted applicants start in the fall semester.

FUNDING

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding/) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

Most graduate students receive financial support through fellowships, research assistantships through their major professor, and/or National Research Service Awards. Faculty in the program are PIs for Training Grants (Parasitology and Vector Biology Training Program, Comparative Biomedical Sciences Research Training for Veterinarians, and Research Training for Veterinary Medical Students) for which students with the appropriate background and credentials may compete.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/
#policiesandrequirementstext), in addition to the program requirements listed below.

## MAJOR REQUIREMENTS

### MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
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### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW-Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

#### Requirement Detail

<table>
<thead>
<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>Minimum Credit</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Residence</td>
<td>16 credits</td>
</tr>
<tr>
<td>Minimum Graduate</td>
<td>15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework Requirement policy: <a href="https://policy.wisc.edu/library/UW-1244/">https://policy.wisc.edu/library/UW-1244/</a>).</td>
</tr>
<tr>
<td>Overall GPA</td>
<td>3.00 GPA required. Refer to the Graduate School: Grade Point Average GPA Requirement policy: <a href="https://policy.wisc.edu/library/UW-1203/">https://policy.wisc.edu/library/UW-1203/</a>).</td>
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<tr>
<td>Other Grade</td>
<td>Students must earn a B or above in all coursework.</td>
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#### Assessments and Examinations

After the committee is chosen, the student must submit certification paperwork that details the intended coursework plan, the committee members’ names and signatures, a short explanation of why they were chosen and an appended research plan. Certification plans will be reviewed and approved by the program academic committee.

Students are expected to meet with their committee at least once per year until degree completion.

Candidates are required to author a thesis based on original work, or, at the option of the major professor and with the approval of the thesis committee, the equivalent in the form of a substantial paper suitable for publication. The thesis or paper must be must be submitted to the student’s committee two weeks before the final exam. A final public presentation, followed by an oral exam in front of their committee are required. Official deposit of the thesis with the Graduate School is not required.

### REQUIRED COURSES

- 9 didactic credits.
- Master’s students must register for two semesters of PATH–BIO 930 Advanced Seminar and present once during their second semester. MS students will take the course as P/S/U (Progress/Satisfactory/Unsatisfactory) if not presenting.
- 19 (minimum) research 990 credits

### Approved and Recommended Courses

The following is a list of core courses taken by many students and recommended courses that are appropriate to specific research areas. These courses are suggestions only. The student and their committee ultimately decide the best coursework plan for each student’s specific program, with final approval from the program’s academic committee. Students are responsible for determining that the coursework chosen meets the Graduate School’s criteria for graduate work.

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<td>Research Ethics and Career Development</td>
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<td>Eukaryotic Molecular Biology</td>
<td>3</td>
</tr>
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<td>ZOOLOGY 570</td>
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### Core Courses

These courses are chosen by many students to fulfill their major coursework plan

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### Language Requirements

No language requirements.

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### REQUIRED COURSES

- 9 didactic credits.
- Master’s students must register for two semesters of PATH–BIO 930 Advanced Seminar and present once during their second semester. MS students will take the course as P/S/U (Progress/Satisfactory/Unsatisfactory) if not presenting.
- 19 (minimum) research 990 credits

### Approved and Recommended Courses

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### Courses from which Students Build Disciplinary Strength

#### Epidemiology
- PATH-BIO 512: Introduction to Veterinary Epidemiology 2
- POP HLTH/SOC 797: Introduction to Epidemiology 3

#### Physiology
- AN SCI/DY SCI 434: Reproductive Physiology 3
- COMP BIO 551: Veterinary Physiology A (fall) 4
- COMP BIO 506: Veterinary Physiology B (spring) 4
- ZOOLOGY 611: Comparative and Evolutionary Physiology 3
- ZOOLOGY/AN SCI/OBS&GYN 954: Seminar in Endocrinology-Reproductive Physiology 1

#### Infectious Disease and Immunology
- PATH-BIO 510: Veterinary Immunology 3
- PATH-BIO 514: Veterinary Parasitology 3
- PATH-BIO 517: Veterinary Bacteriology and Mycology 4
- PATH-BIO 513: Veterinary Virology 2
- PATH-BIO/M M & I 528: Immunology 3
- PATH-BIO/M M & I 750: Host-Parasite Relationships in Vertebrate Viral Disease 3
- M M & I/PATH-BIO 720: Advanced Immunology: Critical Thinking 3

#### Neuroscience
- COMP BIO 505: Veterinary Neuroanatomy and Neurophysiology 3
- ZOOLOGY/PSYCH 523: Neurobiology 3
- NTP/NEURODPT 610: Cellular and Molecular Neuroscience 4
- NTP/NEURODPT/PSYCH 611: Systems Neuroscience 4

#### Toxicology and Pharmacology
- COMP BIO 555: Veterinary Toxicology 2

#### Oncology
- ONCOLOGY 675: Advanced or Special Topics in Cancer Research 1-3
- ONCOLOGY 703: Carcinogenesis and Tumor Cell Biology 3

#### Virology
- PATH-BIO 513: Veterinary Virology 2
- BIOCHEM/MM&I 575: Biology of Viruses 2
- ONCOLOGY/M M & I/PL PATH 640: Host-Parasite Relationships in Vertebrate Viral Disease 3

### Major-Specific Policies

#### Prior Coursework

**Graduate Credits Earned at Other Institutions**
With program approval, students may transfer up to 6 credits of advanced graduate coursework from other institutions. These courses may not be used toward the Graduate School’s minimum residence credit requirement. Coursework earned ten or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

**Undergraduate Credits Earned at Other Institutions or UW-Madison**
With program approval, students may transfer up to 6 credits of advanced undergraduate coursework from UW–Madison. These courses must meet the Graduate School’s criteria as graduate-level coursework and may not be used toward the 50% graduate coursework requirement unless numbered 700 or above. Credits earned at other institutions do not transfer. Coursework earned ten or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

**Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)**
Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**Credits Earned as a University Special Student at UW-Madison**
With program approval, students may transfer up to 6 credits of coursework numbered 400 or above taken as a University Special student. These credits are not allowed to count toward the 50% graduate coursework minimum unless numbered 700 or above or are taken to meet the requirements of a capstone certificate and has the “Grad 50%” attribute. Coursework earned ten or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

(Students may transfer up to 6 credits of prior coursework between these categories.)

### Probation

Refer to the Graduate School: Probation (https://policy.wisc.edu/library/UW-1217/) policy.
ADVISOR / COMMITTEE
All students must have an advisor prior to final admission. A thesis committee consisting of three members, the advisor plus one program trainer and one outside member, must be chosen by the end of the first semester. The third member may be a scientist, industry expert, or a member of the faculty from UW-Madison or from another institution.

CREDITS PER TERM ALLOWED
15 credits

TIME LIMITS
Certification should be completed by the end of the first semester of enrollment.

Refer to the Graduate School: Time Limits (https://policy.wisc.edu/library/UW-1221/) policy.

GRIEVANCES AND APPEALS
These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (https://doso.students.wisc.edu/bias-or-hate-reporting/)
- Graduate Assistantship Policies and Procedures (https://hr.wisc.edu/policies/gapp/#grievance-procedure)
- Hostile and Intimidating Behavior Policies and Procedures (https://hr.wisc.edu/hib/)
  - Office of the Provost for Faculty and Staff Affairs (https://facstaff.provost.wisc.edu/)
  - Employee Assistance (http://www.eao.wisc.edu/) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)  
  - Employee Disability Resource Office (https://employeedisabilities.wisc.edu/) (for qualified employees or applicants with disabilities to have equal employment opportunities)  
  - Graduate School (https://grad.wisc.edu/) (for informal advice at any level of review and for official appeals of program/departamental or school/college grievance decisions)
  - Office of Compliance (https://compliance.wisc.edu/) (for class harassment and discrimination, including sexual harassment and sexual violence)
  - Office Student Assistance and Support (OSAS) (https://osas.wisc.edu/) (for all students to seek grievance assistance and support)
  - Office of Student Conduct and Compliance Standards (https://conduct.students.wisc.edu/) (for conflicts involving students)
  - Ombuds Office for Faculty and Staff (http://www.ombuds.wisc.edu/) (for employed graduate students and post-docs, as well as faculty and staff)
  - Title IX (https://compliance.wisc.edu/titleix/) (for concerns about discrimination)

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance. Students’ concerns about unfair treatment are best handled directly with the person responsible for the objectionable action. If the student is uncomfortable making direct contact with the individual(s) involved, they should contact the advisor or the person in charge of the unit where the action occurred (program or department chair, section chair, lab manager, etc.). For more information see the Graduate School Academic Policies & Procedures: Grievances & Appeals: https://grad.wisc.edu/acadpolicy/#grievancesandappeals

Procedures for proper accounting of student grievances:

1. The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level.
2. Should a satisfactory resolution not be achieved, the student should contact the program’s Grievance Advisor or Director of Graduate Study to discuss the grievance. The Grievance Advisor or Director of Graduate Study will facilitate problem resolution through informal channels and facilitate any complaints or issues of students. The first attempt is to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment, discrimination, disability accommodations, and other related concerns can be found on the UW Office of Compliance website (https://compliance.wisc.edu/).
3. If the issue is not resolved to the student’s satisfaction, the student can submit the grievance to the Grievance Advisor in writing, within 60 calendar days of the alleged unfair treatment.
4. On receipt of a written complaint, a faculty committee will be convened by the Grievance Advisor to manage the grievance. The program faculty committee will obtain a written response from the person toward whom the complaint is directed. This response will be shared with the person filing the grievance.
5. The faculty committee will determine a decision regarding the grievance. The Grievance Advisor will report on the action taken by the committee in writing to both the student and the party toward whom the complaint was directed within 15 working days from the date the complaint was received.
6. At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has 10 working days to file a written appeal to the School/College.
7. Documentation of the grievance will be stored for at least 7 years. Significant grievances that set a precedent will be stored indefinitely.

OTHER
All students must be accepted by a major professor in the Comparative Biomedical Sciences Graduate Program before they can be fully admitted to the program.

PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd/) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

1. Articulates, critiques, or elaborates the theories, research methods, and approaches to inquiry and/or schools of practice in the field of study.
2. Articulates sources and assembles evidence pertaining to questions or challenges in the field of study.
3. Assesses and/or applies methodologies and practices in the field of study.
4. Articulates challenges involved in practicing the field of study, elucidates its leading edges, and delineates its current limits with respect to theory, knowledge, and/or practice.
5. Appreciates the implication of the primary field of study in terms of challenges, trends, and developments in a broader scientific context.
6. Demonstrates abilities to apply knowledge through critical thinking, inquiry, and analysis to solve problems, engage in scholarly work, and/or produce creative products.
7. Evaluates, assesses or refines information resources or an information base within the field.
8. Communicates clearly in styles appropriate to the field of study.
9. Recognizes and applies ethical conduct and professional guidelines.

PEOPLE

Faculty: See Comparative Biomedical Sciences (https://www.vetmed.wisc.edu/education/ms-phd/trainers/) faculty list.