Twin Cities Campus
Comparative and Molecular Biosciences M.S.
College of Veterinary Medicine - Adm
College of Veterinary Medicine

Link to a list of faculty for this program.

Contact Information:
College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)
Email: cvmmsphd@umn.edu
Website: http://www.cvm.umn.edu/cmb

- Program Type: Master's
- Requirements for this program are current for Fall 2014
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The mission of the Comparative and Molecular Biosciences (CMB) program is to train outstanding scientists in the basic mechanisms of animal and human health and disease.

The CMB program is transdisciplinary, bringing together basic, applied, and clinical scientists from a number of departments to provide students with individualized, cutting-edge biomedical research training. Areas of emphasis include genetic and infectious diseases, and comparative aspects of biology and pathology across animal species and humans. Students receive scientific training that prepares them for careers as independent investigators and educators in academia, industry, and government. The CMB program focuses on health that spans a wide range of species, from laboratory animal, companion animal, and livestock species to humans, and is unique within the University of Minnesota.

Note: The primary emphasis of the CMB program is the training of doctoral students; however, a small number of individuals complete a master's degree. The purpose of the master's degree is to provide technical training and scientific competence in the basic mechanisms of animal and human health and disease.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.25.

A bachelor's degree in a biological or basic science is required. Previous laboratory experience is strongly preferred.

Other requirements to be completed before admission:
Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

Special Application Requirements:
Submission of all application materials by December 15 is required to ensure consideration for fall semester admission.

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS

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Information current as of September 19, 2014
- Total Score: 6.5
  • MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The M.S. requires a core curriculum of fundamental coursework and laboratory experiences. Students complete a minimum of 20 course credits and 10 thesis credits; the thesis is based on original laboratory research.

Required Courses

CMB 8134 - Ethical Conduct of Animal Research (3.0 cr)
CMB 8202 - Mechanisms of Animal Health and Disease II (3.0 cr)
CMB 8303 - Comparative Models of Disease (2.0 cr)
CMB 8550 - Comparative and Molecular Biosciences Seminar (1.0 cr)
CMB 8560 - Research and Literature Reports (1.0 cr)

Statistics

CMB 5200 - Statistical Genetics and Genomics (4.0 cr)
or PUBH 6450 - Biostatistics I (4.0 cr)
or STAT 5021 - Statistical Analysis (4.0 cr)
or STAT 5031 - Statistical Methods for Quality Improvement (4.0 cr)
or STAT 5302 - Applied Regression Analysis (4.0 cr)
or STAT 5303 - Designing Experiments (4.0 cr)
or STAT 5421 - Analysis of Categorical Data (3.0 cr)
**Twin Cities Campus**

**Comparative and Molecular Biosciences Ph.D.**

*College of Veterinary Medicine - Adm*

**College of Veterinary Medicine**

Link to a list of faculty for this program.

**Contact Information:**
College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)
Email: cvmmsphd@umn.edu
Website: [http://www.cvm.umn.edu/cmb](http://www.cvm.umn.edu/cmb)

- Program Type: Doctorate
- Requirements for this program are current for Fall 2014
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The mission of the Comparative and Molecular Biosciences (CMB) program is to train outstanding scientists in the basic mechanisms of animal and human health and disease.

The CMB program is transdisciplinary, bringing together basic, applied, and clinical scientists from a number of departments to provide students with individualized, cutting-edge biomedical research training. Areas of emphasis include genetic and infectious diseases, and comparative aspects of biology and pathology across animal species and humans. Students receive scientific training that prepares them for careers as independent investigators and educators in academia, industry, and government. The CMB program focuses on health that spans a wide range of species, from laboratory animal, companion animal, and livestock species to humans, and is unique within the University of Minnesota.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**
The preferred undergraduate GPA for admittance to the program is 3.25.

A bachelor’s degree in a biological or basic science is required. Previous laboratory experience is strongly preferred.

Other requirements to be completed before admission:
Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

**Special Application Requirements:**
Submission of all application materials by December 15 is required to ensure consideration for fellowships and research assistantships awarded for the next academic year.

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
The preferred English language test is Test of English as Foreign Language (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**

24 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The Ph.D. requires a core curriculum of fundamental coursework and laboratory experiences. Considerable flexibility is available for students in selecting their courses to construct a program around their own interests and research. In addition, all students are required to complete a teaching experience.

**CMB program courses**

- **CMB 8100** - Research Rotation in Comparative and Molecular Biosciences (1.0 cr)
- **CMB 8202** - Mechanisms of Animal Health and Disease II (3.0 cr)
- **CMB 8303** - Comparative Models of Disease (2.0 cr)
- **CMB 8550** - Comparative and Molecular Biosciences Seminar (1.0 cr)
- **CMB 8560** - Research and Literature Reports (1.0 cr)

**Ethics**

- **CMB 8134** - Ethical Conduct of Animal Research (3.0 cr)

**Statistics**

- **CMB 5200** - Statistical Genetics and Genomics (4.0 cr)
- **or PUBH 6450** - Biostatistics I (4.0 cr)
- **or PUBH 6451** - Biostatistics II (4.0 cr)
- **or STAT 5031** - Statistical Methods for Quality Improvement (4.0 cr)
- **or STAT 5302** - Applied Regression Analysis (4.0 cr)
- **or STAT 5303** - Designing Experiments (4.0 cr)
- **or STAT 5421** - Analysis of Categorical Data (3.0 cr)
Twin Cities Campus
Veterinary Medicine M.S.
College of Veterinary Medicine - Adm
College of Veterinary Medicine

Link to a list of faculty for this program.

Contact Information:
College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)
Email: cvmmsphd@umn.edu
Website: http://www.cvm.umn.edu/vmed

- Program Type: Master's
- Requirements for this program are current for Fall 2014
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The mission of the Veterinary Medicine graduate program is to promote science-based research and provide high-quality education to develop scientists working to improve the health and well-being of animals and humans.

Program Goals:
- Prepare independent basic and applied scientists for successful careers in academia, industry, government, or veterinary practice
- Foster development of specific skills including leadership, communication, independent and critical thinking, teaching, interdisciplinary research in collaborative environments, scientific and grant writing, experimental and analytical methods
- Contribute to the body of knowledge in basic, translational, and applied sciences in animal health and well-being, and emerging and zoonotic threats

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.25.

D.V.M. or equivalent; students with a B.A. or B.S. in biological sciences may be considered. Previous laboratory experience is preferred.

Other requirements to be completed before admission:
Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

Special Application Requirements:
Submission of all application materials by December 15 is required to ensure consideration for fellowships and research assistantships awarded for the next academic year.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language.
Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Formal coursework for the M.S. degree varies according to the field of study, interests, and career goals of the individual student. Courses may be taken in disciplines other than veterinary medicine.

**Ethics**
VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)

**Seminar**
VMED 8550 - Veterinary Medicine Seminar (1.0 cr)

**Statistics**
At least one course, but two are recommended.

PUBH 6450 - Biostatistics I (4.0 cr)

or PUBH 6451 - Biostatistics II (4.0 cr)

or STAT 5021 - Statistical Analysis (4.0 cr)

or STAT 5031 - Statistical Methods for Quality Improvement (4.0 cr)

or STAT 5302 - Applied Regression Analysis (4.0 cr)

or STAT 5303 - Designing Experiments (4.0 cr)

or STAT 5421 - Analysis of Categorical Data (3.0 cr)

**8000 level courses**
At least one additional 8000 level course for the major field

Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.
Twin Cities Campus
Veterinary Medicine Minor
College of Veterinary Medicine - Adm
College of Veterinary Medicine

Link to a list of faculty for this program.

Contact Information:
College of Veterinary Medicine, 1365 Gortner Avenue, Room 443  VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)
Email: cvmmsphd@umn.edu
Website: http://www.cvm.umn.edu/vmed

• Program Type: Graduate minor related to major
• Requirements for this program are current for Fall 2014
• Length of program in credits (Masters): 6
• Length of program in credits (Doctorate): 12
• This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The mission of the Veterinary Medicine graduate program is to promote science-based research and provide high-quality education to develop scientists working to improve the health and well-being of animals and people.

Program Goals:
- Prepare independent basic and applied scientists for successful careers in academia, industry, government, or veterinary practice
- Foster development of specific skills including leadership, communication, independent and critical thinking, teaching, interdisciplinary research in collaborative environments, scientific and grant writing, experimental and analytical methods
- Contribute to the body of knowledge in basic, translational, and applied sciences in animal health and well-being, and emerging and zoonotic threats.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.
Twin Cities Campus
Veterinary Medicine Ph.D.
College of Veterinary Medicine - Adm
College of Veterinary Medicine

Link to a list of faculty for this program.

Contact Information:
College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)
Email: cvmmsphd@umn.edu
Website: http://www.cvm.umn.edu/vmed

- Program Type: Doctorate
- Requirements for this program are current for Fall 2014
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The mission of the Veterinary Medicine (VMED) graduate program is to promote science-based research and provide high quality education to develop scientists working to improve the health and well being of animals and humans.

Program Goals:
- Prepare independent basic and applied scientists for successful careers in academia, industry, government, or veterinary practice
- Foster development of specific skills including leadership, communication, independent and critical thinking, teaching, interdisciplinary research in collaborative environments, scientific and grant writing, experimental and analytical methods
- Contribute to the body of knowledge in basic, translational, and applied sciences in animal health and well-being, and emerging and zoonotic threats

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.25.

D.V.M. or equivalent; students with a B.A. or B.S. in biological sciences may be considered. Previous laboratory experience is preferred.

Other requirements to be completed before admission:
Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

Special Application Requirements:
Submission of all application materials by December 15 is required to ensure consideration for fellowships and research assistantships awarded for the next academic year.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
• IELTS
  - Total Score: 6.5
• MELAB
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
24 credits are required in the major.
0 credits are required outside the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Formal coursework for the Ph.D. degree varies according to the field of study, interests, and career goals of the individual student. Courses for the Ph.D. degree may be taken in areas other than VMED

Ethics
VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)

Seminar
VMED 8550 - Veterinary Medicine Seminar (1.0 cr)

Statistics
At least one course, but two courses are recommended.

PUBH 6450 - Biostatistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or STAT 5021 - Statistical Analysis (4.0 cr)
or STAT 5031 - Statistical Methods for Quality Improvement (4.0 cr)
or STAT 5302 - Applied Regression Analysis (4.0 cr)
or STAT 5303 - Designing Experiments (4.0 cr)
or STAT 5421 - Analysis of Categorical Data (3.0 cr)

8000 level courses
At least three additional 8000 level courses for the major field