

C u r r i c u l u m

This is the Curriculum and Administration and Faculty sections of the 1996-1999 University of Minnesota, Duluth School of Medicine Catalog

Overview

The UMD School of Medicine curriculum was originally developed by the faculty in consultation with members of the University of Minnesota's Medical School in Minneapolis, practicing physicians in the community, and curricular consultants from many other medical schools. Over the past years, the curriculum has evolved into a strong academic and clinical program with continued input from practicing physicians and faculty.

During the two years of study, students are exposed to the various basic, behavioral, and clinical sciences to prepare them for continuing their studies in Minneapolis. Transfer to the Medical School in Minneapolis is guaranteed upon successful completion of the program in Duluth.

The current first-year curriculum introduces the concept of problem-based learning and, in addition to presentations in the clinical and behavioral sciences, includes instruction in the following integrated courses: cell and molecular biology; renal, respiratory, and acid-base regulation; metabolism: mechanisms and regulation; cardiovascular science; neuroscience; reproduction: structure and function; and human immunology. This coursework is correlated with the appropriate clinical examples and incorporates the latest features of computerized and laserdisk instruction.

During the second year, clinical material is again correlated with the basic science presentations in behavioral sciences, immunology, microbiology, pathology, and pharmacology. During this year, the student spends more time in clinical settings and receives more intensive didactic instruction in clinical medicine.

During both years of study, students participate in the Family Practice Preceptorship Program. In the first year, each student is assigned to a family practitioner within the immediate geographic area and is introduced to medicine as practiced in its actual setting. The preceptorship during the second year involves the student with physicians who practice in nonurban areas of northern Minnesota and Wisconsin.

The combination of classroom and clinical experiences throughout the two years enables the student to acquire the necessary knowledge of the scientific basis for medical practice while, at the same time, reinforcing this knowledge by active participation in patient care. The student is assured of adequate preparation for continuing his or her studies.

Grades and Progress

Examinations and other forms of evaluation of student performance are administered by the various departments and, in some cases, by interdepartmental teaching teams. Grades are reported as O (outstanding), E (excellent), S (satisfactory), I (incomplete), or N (no credit), and appear as such on the official University transcript.

The Scholastic Standing Committee of the School Assembly is charged with the responsibility of monitoring each student's performance while enrolled. Academic probation is one mechanism used by the faculty to signal that a student's standing in the School of Medicine is in jeopardy. In circumstances where the development of clinical skills, the acquisition of knowledge, or personal conduct in a clinical setting is inconsistent with a student's potential capability as a physician, the Scholastic Standing Committee may recommend dismissal of the student to the School Assembly.

Courses and Symbols

Courses listed are required for first- and second-year medical students. Most required and elective medical courses are open to upper division undergraduate and graduate students through special arrangement if space is available and approval of the appropriate adviser(s) and course instructor(s) is obtained.

The following standard symbols are used throughout the course descriptions in lieu of footnotes.

- § Credit will not be granted if credit has been received for the course listed after this symbol.
- # Approval of the instructor is required for registration.
- Δ Approval of the department offering the course is required for registration.

Anatomy and Cell Biology (Anat)

Professor

Arlen R. Severson, Ph.D., *head*
Conrad E. Firling, Ph.D., *adjunct*

Associate Professor

Stephen W. Downing, Ph.D.
Donna J. Forbes, Ph.D.
Lillian A. Repesh, Ph.D.

Assistant Professor

Jon M. Holy, Ph.D.

Senior Research Associate

Richard L. Leino, Ph.D.

Clinical Assistant Professor

Edward D. Halls, D.V.M.

The required courses in anatomy and cell biology correlate human structure and function, spanning macrostructure to ultrastructure. Human gross anatomy and embryology courses are taught concurrently. The cell and tissue biology course presents the basic body tissues. The microscopic structure of organ systems is presented throughout the first year as part of several interdisciplinary courses (Med 5120, Med 5220, Med 5221, Med 5222, Med 5223, Med 5224, Med 5454). Neuroanatomy is presented as a portion of the neuroscience course, Med 5223. Considerable emphasis is placed on basic-clinical science correlations throughout the study of the anatomical sciences. Anatomy and cell biology courses introduce the first-year student to much of the basic language and anatomical concepts used in medical practice.

Required Courses—First Year

Anat 5504. Human Gross Anatomy. (10 cr; prereq regis med) Repesh, Severson
Adult gross structure taught using the regional approach with strong emphasis on functional and clinical applications. Basic-clinical science correlation conferences are held frequently to emphasize the applied anatomy of a region.

Anat 5512. Human Embryology. (3 cr; prereq regis med) Forbes, Severson
Development of body regions and organs taught concurrently with study of those regions in 5504. Normal adult structure and origin of congenital malformations.

Anat 5119. Cell and Tissue Biology. (7 cr; prereq regis med) Downing, Holy, Leino
Embryological origins, development, structure, and functions of basic tissues and cells of the human body.

Behavioral Sciences (BhSc)

Professor

Ronald D. Franks, M.D.
Frederic W. Hafferty, Ph.D.

Associate Professor

James G. Boulger, Ph.D.
Gary L. Davis, Ph.D., *head*
Barbara A. Elliott, Ph.D.
Richard G. Hoffman, Ph.D.

Clinical Assistant Professor

Steven J. Bauer, M.D.
Fred T. Friedman, J.D.
Peter Miller, M.D.
Robert S. Nesheim, M.D.
Joseph J. Sivak, M.D.
David X. Swenson, Ph.D.

Clinical Instructor

Brian A. Erickson, M.D.
Benjamin Wolfe, M.A.

The offerings in this discipline attempt to provide a social scientific analysis of those facets of human behavior that bear most heavily on the practice of medicine. The courses encompass both the social science of medicine (i.e., analysis of the medical profession, the hospital as a social system, examination of the doctor-patient relationship) and social science in medicine (i.e., the impact of social attitudes on illness behavior, interviewing techniques, and the developmental process). In addition, the student is given a solid grounding in the areas of abnormal behavior and psychiatry.

Required Courses—First Year

BhSc 5211. Medical Sociology. (2 cr; prereq regis med) Hafferty, staff
Advanced aspects of sociology and their application to medical science. Emphasis on the doctor-patient relationship, the role of medicine in society, and the institutionalization of medical care through hospitals, medical schools, and the medical profession. Analysis of contemporary society in terms of the effect social class, family structure, and religious and other social attitudes have on illness behavior.

BhSc 5220-5221-5222. Medical Social Psychology. (1 cr each; prereq regis med) Davis, staff
Series of electives on various topics in medical behavioral science. Each medical student is required to select 3 credits of coursework from those offered.

BhSc 5230. Medical Psychology: Interviewing. (2 cr; prereq regis med) Boulger, Hoffman
Psychological aspects of interviewing in health care settings; interpersonal communicative skills and problems; techniques of rapport building and history taking.

BhSc 5231. Medical Psychology: Developmental. (2 cr; prereq regis med) Boulger
Human psychological development from infancy to old age; cognition, learning, social development, and personality formation as related to the practice of medicine.

BhSc 5301. Biostatistics and Epidemiology. (2 cr [cr cannot be applied to a Graduate School program]; prereq regis med) Hafferty, staff
Basic elements of biostatistics, including descriptive and inferential statistics, study design, probability statistics, and ordering and interpreting diagnostic tests; topics in clinical epidemiology and epidemiologic methods.

BhSc 5701. Medical Ethics. (2 cr [cr cannot be applied to a Graduate School program]; prereq regis med) Elliott, staff
Basic concepts and skills of medical ethics, including core values, clinical issues, and case analysis.

Required Courses—Second Year

BhSc 5260. Psycho-Social-Spiritual Aspects of Life-Threatening Illness. (2 cr; prereq regis med) Wolfe
Experiences of patients, families, and health care professionals coping with life-threatening illnesses. Psychological, social, and spiritual factors involved in coping. Emphasis on effective intervention strategies for health care professionals. Postdeath responses of families and health care personnel.

BhSc 5401. Human Problems in Family Medicine: Childhood and Adolescence. (2 cr; prereq regis med or Δ) Davis, Elliott, Franks, Hoffman
Problems of infancy, childhood, and adolescence such as attachment disorders, developmental delays, child abuse, attention deficit disorders, disruptive behavior disorders, and eating disorders.

BhSc 5402. Human Problems in Family Medicine: Adulthood I. (2 cr; prereq regis med or Δ) Davis, staff
Problems of adulthood such as anxiety disorders, adjustment disorders, somatoform disorders, chronic pain, mood disorders, sleep disorders, and sexual dysfunctions. Emphasis on how these problems are demonstrated in a family practice setting. Assessment and treatment is described as relevant to family practice.

BhSc 5403. Human Problems in Family Medicine: Adulthood II. (2 cr; prereq regis med or Δ) Davis, staff
Problems of adulthood such as personality disorders, addictions, schizophrenia, compulsive gambling, sex offenders, and dementia and delirium. Emphasis on how these problems are demonstrated in a family practice setting. Assessment and treatment is described as relevant to family practice.

Graduate Courses

BhSc 5262. Topics in Medical Behavioral Sciences. (2 cr; prereq regis med) Davis, staff
Intensive study of problems at the interface of behavioral sciences and clinical medicine. Topics have included alcoholism, death and dying, suicide.

BhSc 5432. Clinical Interpretation of Psychological Tests. (4 cr; prereq PsyA 5851 or #) Davis, Hoffman
Application and interpretation of selected personality and intelligence tests in clinical setting. Case material from students practicum experiences and instructors files.

BhSc 5501. Problems in Medical Behavioral Science. (Cr or [may be repeated for max 10 cr; no more than 6 cr can be applied to a Graduate School program]; open to med students as elective and to qualified upper div and grad students with #)
Independent study on a tutorial, seminar, or lecture basis. Investigative work, lecture material, and/or reading and discussions will be based on the interests and capabilities of the individual student.

BhSc 5514-5515-5516. Topics in Medical Social Psychology. (3 cr each; prereq #)
Series of electives on various topics in medical behavioral science. Typically these include the social psychology of deviance, alternatives in health care delivery, and family dynamics.

BhSc 5554. Deviance and Medicalization. (4 cr; prereq Soc/Psych major with 90 cr or grad) Analysis of increasing medicalization of deviance and other human problems in contemporary society. Role of medical model in defining and treating social and psychological problems.

Biochemistry and Molecular Biology (MdBc)

Professor

Paul M. Anderson, Ph.D.
Lester R. Drewes, Ph.D., *head*
Joseph R. Prohaska, Ph.D.

Associate Professor

Subhash C. Basek, Ph.D., *adjunct*
David J. Eide, Ph.D.
Thomas E. Huntley, Ph.D.
Wilmar L. Salo, Ph.D.

Assistant Professor

Benjamin L. Clarke, Ph.D.
Jon M. Holy, Ph.D. (joint with Anatomy and Cell Biology)
Kathryn E. McLane, Ph.D. (joint with Chemistry)

Courses with components in biochemistry and molecular biology (Med 5120, Med 5221, Med 5222, Med 5223) introduce students to the molecular basis of cell life processes. This includes an examination of the central molecules of life—DNA, RNA, and protein; methods for exploring protein and genes and the power of recombinant DNA technology; interplay between three-dimensional structure and biological activity (function); generation and storage of metabolic energy; biosynthesis of macromolecules; and transmission and expression of genetic information. Advanced courses cover biochemical aspects of endocrinology, nutrition, neurochemistry, and various other topics related to specific tissues or organ systems. Those areas of biochemistry and molecular biology most closely related to the medical sciences and clinical medicine are emphasized.

An elective course in neurobiochemistry (MdBc 5501) expands on basic aspects of this important medical field.

Graduate Courses

MdBc 5501. Neurobiochemistry. (2 cr; prereq Chem 3311 or Chem 5337 or Med 5120 or Med 5221 or #) Drewes

Current concepts in neurobiochemistry, including topics on anatomical and compositional properties of brain; membranes and transport; neurotransmission; receptors and signal transduction mechanism; energy, carbohydrate, protein, lipid, and nucleic acid metabolisms; development and diseases of the CNS.

MdBc 8151. Biochemistry Seminar. (1 cr; prereq grad major in biochemistry or chemistry or #) Current topics in biochemistry.

MdBc 8291. Current Research Techniques. (1-3 cr; prereq grad major in biochemistry or chemistry or #) Research projects in biochemistry, each to be carried out in the research lab of an individual faculty member.

MdBc 8666. Doctoral Pre-Thesis Credits. (Max 18 cr per qtr, 11 cr per summer term; doctoral student who has not passed oral prelims)

MdBc 8777. Thesis Credits: Master's. (1-16 cr [max 11 cr per summer term; open to grads first registered in the Graduate School]) Thesis research and development.

MdBc 8888. Thesis Credits: Doctoral. (1-36 cr [max 18 cr per qtr, 11 cr per summer term; open to grads first registered in the Graduate School]) Doctoral dissertation research and preparation.

Family Medicine (FMed)

Professor

Ronald D. Franks, M.D.

Clinical Professor

James L. Anderson, M.D.
Malcolm L. McCutcheon, M.D.

Associate Professor

James G. Boulger, Ph.D.
Byron J. Crouse, M.D., *head*

Assistant Professor

Gerald L. Hill, M.D.

Clinical Assistant Professor

Jeffrey Adams, M.D.
Daniel Benzie, M.D.
Bruce Dahlman, M.D.
Thomas Day, M.D.
David Hutchinson, M.D.
Gerald Konrad, M.D.
Roger Waage, M.D.

Clinical Coordinator

Thomas Day, M.D. (Family Medicine)
James Mongé, M.D. (Surgery)
Alan Johns, M.D. (Internal Medicine)
John Mathers, M.D. (Obstetrics/Gynecology)
Rahul Aggarwal, M.D. (Pediatrics)

Clinical Professor

Raymond Christensen, M.D.
Mark Eckman, M.D.
Philip Eckman, M.D.
Thomas Elliott, M.D.
Glen Holt, M.D.
Roderick Hood, M.D.
Theodore Johnson, M.D.
Joseph Leek, M.D.
John Mathers, M.D.
James Mongé, M.D.
Clyde Olson, M.D.
Ben Owens, M.D.
Robert Tygart, M.D.

Clinical Associate Professor

Johannes Aas, M.D.
 Martha Aas, M.D.
 Richard Adams, M.D.
 Rahul Aggarwal, M.D.
 Craig Anderson, M.D.
 Upali Aturaliya, M.D.
 Joel Bamford, M.D.
 Charles Barbee, M.D.
 Kenneth Broman, M.D.
 Michael Bronson, M.D.
 James Brueggemann, M.D.
 Frank Budd, M.D.
 David Camenga, M.D.
 Jo Ann Chalgren, M.D.
 H. Chris Chapman, M.D.
 Terrence Clark, M.D.
 Lee Cohen, M.D.
 George Crow, M.D.
 Robert Dalton, M.D.
 Matthew Eckman, M.D.
 Fredrick Ekberg, M.D.
 Gerald Engelsgerd, M.D.
 William Fleeson, M.D.
 Richard Goese, M.D.
 Walter Gower, M.D.
 Carl Griesy, M.D.
 William Grohs, M.D.
 Stephen Hadley, M.D.
 J. Patrick Hart, Ph.D.
 Theodore Harwood, M.D.
 Richard Hellman, M.D.
 Micheal Hieb, M.D.
 Douglas Hiza, M.D.
 John Holcomb, M.D.
 Thomas Holm, M.D.
 H. Curtis Hutchens, M.D.
 Alan Johns, M.D.
 James Krook, M.D.
 Roderick Krueger, M.D.
 Theodore Kubista, M.D.
 Thomas Kunze, M.D.
 Jerome Kwako, M.D.
 Michael LaBerge, M.D.
 Robert Leff, M.D.
 Darrell Leier, M.D.
 Walter Leino, M.D.
 Thomas Loo, M.D.
 Donald Mersch, M.D.
 Thomas Myers, M.D.
 Robert Niedringhaus, M.D.
 Jay Parker, D.O.
 Ernest Peaslee, M.D.
 Alan Peterson, M.D.
 Gregory Peterson, M.D.
 William Portilla, M.D.
 Ricard Puumala, M.D.
 John Schrock, M.D.
 James Sebastian, M.D.
 Robert Sellers, M.D.
 Carl Sjoding, M.D.
 Michael Slag, M.D.
 Dennis Soukup, M.D.
 David Sproat, M.D.
 James Thompson, M.D.
 Stephen Towle, M.D.
 Linda Van Etta, M.D.

Neal Vanstrom, M.D.
 Robert Wahman, M.D.
 Per Wickstrom, M.D.
 Joanna Woyciehowska, M.D.
 Norman Yunis, M.D.
 Timothy Zager, M.D.
 Sheralyn Zlonis, M.D.

Clinical Assistant Professor

David Albright, M.D.
 Paul Anderson, M.D.
 Vicki Anderson, M.D.
 David Arvold, M.D.
 Judith Arvold, M.D.
 Peter Austin, M.D.
 Johan Bakken, M.D.
 Michael Bayer, M.D.
 Charles Bertel, M.D.
 Timothy Bonner, M.D.
 Cathy Brenner, M.D.
 David Brenner, M.D.
 Roderick Brown, M.D.
 Mark Carlson, M.D.
 Stephen Carlson, M.D.
 David Choquette, M.D.
 J. Joseph Davis, M.D.
 Michael Debevec, M.D.
 Robert Donley, M.D.
 Jed Downs, M.D.
 Charles Drexler, M.D.
 Thomas Edwards, M.D.
 Timothy Egan, M.D.
 Robert Erickson, M.D.
 Steven Eyer, M.D.
 Carol Farchmin, M.D.
 Peter Franklin, M.D.
 David Gangeness, Pharm.D.
 Craig Gilbertson, M.D.
 Mark Glazier, M.D.
 Mark Goellner, M.D.
 Richard Gustafson, M.D.
 Stephen Harrington, M.D.
 Stuart Hazel, M.D.
 Burton Helleloid, M.D.
 Carl Heltné, M.D.
 Richard Helvig, M.D.
 William Himango, M.D.
 Peter Hindle, M.D.
 Robert Hollenhorst, M.D.
 Michael Huska, M.D.
 Kenneth Irons, M.D.
 Wayne Jarvis, M.D.
 Ronald Johnson, M.D.
 Thomas Kaiser, M.D.
 Elizabeth Kelley, M.D.
 Gale Kerns, M.D.
 Gary Kindt, M.D.
 Terry Klemek, M.D.
 Bruce Knutsen, M.D.
 James Koberstein, M.D.
 Maria Kundel, M.D.
 Ray Kundel, M.D.
 Steven Kuross, M.D.
 Douglas Lane, M.D.
 James Langager, M.D.
 Rodney Langseth, M.D.
 Larry LeMaster, M.D.
 Wade Lillegard, M.D.

CURRICULUM

John Lynch, M.D.
Michael Maddy, M.D.
Daniel Mareck, M.D.
Edward Martinson, M.D.
Philip Miner, M.D.
Greggory Mix, M.D.
Michael Mollen, M.D.
Richard Nash, M.D.
Marvin Nevenon, M.D.
Skott Nielsen, M.D.
Ingrid Nisswandt-Larsen, M.D.
G. Alan Norris, M.D.
Rodney Olson, M.D.
John Oujiri, M.D.
David Pearson, M.D.
Peter Person, M.D.
Christian Peterson, M.D.
Gary Peterson, M.D.
Leslie Riess, M.D.
Jerry Rogers, M.D.
Thomas Rollie, M.D.
George Rounds, M.D.
Thomas Russ, M.D.
Robert Rutka, M.D.
Richard Rysavy, M.D.
David Saarinen, M.D.
Charles Schotzko, M.D.
William Schwartau, M.D.
Malcolm Scott, M.D.
Paul Severson, M.D.
Allan Sill, M.D.
Thomas Silvestrini, M.D.
Robert Sjoberg, M.D.
Daniel Skorich, M.D.
Harvey Smith, M.D.
Theresa Smith, M.D.
Steven Squillace, M.D.
Jon Stephenson, M.D.
John Streitz, Jr., M.D.
Christine Swensen, M.D.
Walter Swentko, M.D.
Kim Thompson, M.D.
Robert Tilden, M.D.
Margaret Torreano, M.D.
Kevin Treacy, M.D.
William Van Druten, M.D.
John Van Etta, M.D.
Michael Van Norstrand, M.D.
Paul Van Pernis, M.D.
Thomas Wiig, M.D.
Paul Windberg, M.D.
Frank Wolf, M.D.
Thomas Wyne, M.D.
Simon Zadina, M.D.
Timothy Zager, M.D.
Paul Zimmerman, M.D.

Clinical Instructor
Glenn Albin, M.D.
David G.A. Alexander, M.D.
Michael Asbell, M.D.
Gregory Bachhuber, M.D.
Gail Baldwin, M.D.
Nils Batdorf, M.D.
Brian Bergeron, M.D.
James Berlin, M.D.
Joseph Bianco, M.D.
Daniel Billman, M.D.

Laura Boehlke Bray, M.D.
Mark Boyce, M.D.
Mary Boylan, M.D.
Bruce Bray, M.D.
Timothy Burke, M.D.
Daniel Campbell, M.D.
Joel Carter, M.D.
Randall Cousins, M.D.
Thomas Cunningham, M.D.
James Deegan III, D.P.M.
Lori DeFrance, M.D.
Christopher Delp, M.D.
Bruce DeRauf, M.D.
Lynn Didrikson, M.D.
Richard Dobbs, M.D.
Peter Dunphy, M.D.
Bradley Edgerton, M.D.
Steven Erlemeier, M.D.
Ana Fernandez-Pokorny, M.D.
Bruce Garbisch, M.D.
Michael Gibbons, M.D.
William Gitar, M.D.
David Gordon, M.D.
Mark Gray, M.D.
Donald Grossbach, M.D.
Katherine Guthrie, M.D.
David Halsted, M.D.
Ellen Halverson, M.D.
Kathryn Halverson, M.D.
Steven Hansen, M.D.
Gordon Harvieux, M.D.
Joel Haugen, M.D.
Sharon Hayward, M.D.
Michael Heck, M.D.
Charles Helleloid, M.D.
Barbara Hemenway, M.D.
Stephen Hielala, M.D.
B.D. Kion Hoffman, M.D.
Monte Hoffman, M.D.
Patricia Hook Virnig, M.D.
Thomas Howard, M.D.
Jean Hoyer, M.D.
Michael Johnson, M.D.
Scott Johnson, M.D.
Richard Kanoff, M.D.
Gary Kennedy, M.D.
John Knott, M.D.
Jay Knuths, M.D.
Leon Kohn, M.D.
Richard Krull, M.D.
Michael Lucca, M.D.
David Luehr, M.D.
Kirk Lufkin, M.D.
Roger Luhn, M.D.
Robert Lund, M.D.
Jeffrey Lyon, M.D.
Stephen Marchuk, M.D.
David Mast, M.D.
Howard McCollister, M.D.
Robert McGeachie, M.D.
David McKee, M.D.
David McNaney, M.D.
Mark Monson, M.D.
Kevin Murphy, M.D.
Donald Muzzi, M.D.
Wade Nelson, M.D.
Michael Neudecker, M.D.

Mark Neustel, M.D.
 Douglas Newman, M.D.
 Glenn Nordehn, M.D.
 Margaret O'Connor, M.D.
 Elizabeth Liljebblad, M.D.
 Audrey Park-Skinner, M.D.
 Thomas Patnoe, M.D.
 Gary Peterson, M.D.
 Lisa Prusak, M.D.
 Lynn Quenemoen, M.D.
 Mark Rathke, M.D.
 Lawrence Reich, M.D.
 Russell Reichert, M.D.
 Susan Relf, M.D.
 Hugh Renier, M.D.
 Michael Rich, M.D.
 Elizabeth Riesgraf, M.D.
 Graham Ritts, M.D.
 Ann Rock, M.D.
 Ann Rogotzke, M.D.
 Edward Rosenbaum, M.D.
 Robert Rutka, M.D.
 Michael Ryan, M.D.
 Scott Rysdahl, M.D.
 Paul Sanford, M.D.
 Michael Savage, M.D.
 William Schnell, M.D.
 Patrick Schoenfolder, M.D.
 Thomas Shuey, Jr., M.D.
 G. David Spoelhof, M.D.
 Keith Stelzer, M.D.
 Gary Stelzer, M.D.
 Peter Stenehjem, M.D.
 Anne Stephen, M.D.
 Robert Stubenvoll, M.D.
 Patrick Sura, M.D.
 Peder Svingen, M.D.
 Christine Swensen, M.D.
 Kevin Thornton, M.D.
 Knute Thorsgard, M.D.
 Laura Trombino, M.D.
 William Turner, M.D.
 Mary Ulmanic-Bianco, M.D.
 Rodolpho Urias, M.D.
 Michael Van Scoy, M.D.
 Arden Virnig, M.D.
 David Webb, M.D.
 William Witrak, M.D.
 Charles Wolfe, M.D.
 Scott Wolff, M.D.
 Mark Young, M.D.

Clinical Lecturer

Diane Bjerke-Nelson, M.S.
 Barbara Braun, Ph.D.
 Pamela Crouse, R.N.
 Bruce Hustad, D.D.S.
 Ruth Strom McCutcheon, N.P.
 Paul Remark, Ph.D.
 William Sommerness

Clinical Emeritus

Byron Backus, M.D.
 Lloyd Backus, M.D.
 Charles Bagley, M.D.
 Robert Bergan, M.D.
 Warren Brooker, M.D.
 Cyrus Brown, M.D.

Gerald Cotton, M.D.
 George Cowan, M.D.
 Wayne Daley
 Malcom Fifield, M.D.
 Robert Goldish, M.D.
 Vernon Harrington, M.D.
 Dwight Hoeg, M.D.
 Harold Leppink, M.D.
 Howard Meyer, M.D.
 Julie Moller, M.D.
 John Sanford, M.D.
 John Streitz, M.D.
 Paul VanPuffelen, M.D.

Family Medicine Preceptor

Deborah Allert, M.D.
 Mary Amon, M.D.
 Anthony Amon, M.D.
 Craig Anderson, M.D.
 Vicki Anderson, M.D.
 Julie Andreatti, M.D.
 Niles Batdorf, M.D.
 Janet Beckman, M.D.
 Craig Benson, M.D.
 Daniel Benzie, M.D.
 James Berlin, M.D.
 Dale Berry, M.D.
 Mark Bettich, M.D.
 Ronald Beyer, M.D.
 Joseph Bianco, M.D.
 Mary Bianco, M.D.
 Barbara Bonkoski, M.D.
 Robert Bosl, M.D.
 Mark Boyce, M.D.
 Randall Card, M.D.
 Gary Carlson, M.D.
 Stephen Carlson, M.D.
 Steven Carlson, M.D.
 Robert Chalgren, M.D.
 Ross Chambers, M.D.
 H. Chris Chapman, M.D.
 Raymond Christensen, M.D.
 Lee Cohen, M.D.
 Randall Cousins, M.D.
 Thomas Cunningham, M.D.
 Bryan DeLage, M.D.
 Jenny Delfs, M.D.
 David Detert, M.D.
 Kurt Devine, M.D.
 Lynne Didrickson, M.D.
 Ann Doberstein, M.D.
 Peter Dunphy, M.D.
 Robert Dybvig, M.D.
 Thomas Edwards, M.D.
 John Eikens, M.D.
 Kristi Elliott, M.D.
 Nancy English, M.D.
 Carl Erickson, M.D.
 Deborah Erickson, M.D.
 Peter Eriksson, M.D.
 Carol Farchmin, M.D.
 Robin Fisher, M.D.
 David Freeman, M.D.
 Daniel Fuglestad, M.D.
 Lauren Fuller, M.D.
 Laurel Gamm, M.D.
 Bruce Garbisch, M.D.
 Scott Gerling, M.D.

CURRICULUM

Daron Gersch, M.D.
Craig Gilbertson, M.D.
David Goodwin, M.D.
Monica Goodwin, M.D.
Mark Gray, M.D.
Douglas Griffin, M.D.
Donald Grossbach, M.D.
Mark Gustafson, M.D.
Richard Gustafson, M.D.
Kathryn Halverson, M.D.
Steven Harrington, M.D.
James Harrison, M.D.
Burton Haugen, M.D.
Joel Haugen, M.D.
Howard Hays, M.D.
Rod Hays, M.D.
Richard Helvig, M.D.
Barbara Hemenway, M.D.
Paul Hendrickson, M.D.
Peter Henry, M.D.
Michael Hieb, M.D.
Steven Hietala, M.D.
Douglas Hiza, M.D.
Timothy Hogan, M.D.
Patricia Hook Virnig, M.D.
James Hover, M.D.
Jean Hoyer, M.D.
Brenda Hurtt, M.D.
David Hutchinson, M.D.
John Ipsen, M.D.
Kenneth Irons, M.D.
Sarah Israelson, M.D.
Kevin Jefferies, M.D.
Kelly Jewett, M.D.
Kristin Johnson, M.D.
Margaret Johnson, M.D.
Mark Johnson, M.D.
Michael Johnson, M.D.
Ronald Johnson, M.D.
Terry Johnson, M.D.
Timothy Johnson, M.D.
David Johnsrud, M.D.
Howard Josephs, M.D.
Phillip Kaupa, M.D.
Gary Kennedy, M.D.
Terry Klemek, M.D.
Jay Knaak, M.D.
Francille Knowles, M.D.
Terence Knowles, M.D.
A.A. Koeller, M.D.
Gerald Konrad, M.D.
Heidi Korstad, M.D.
Julianne Koski, M.D.
Kathryn Kramer, M.D.
Rodney Langseth, M.D.
Aaron Larson, M.D.
Jonathan Larson, M.D.
Richard Larson, M.D.
Walter Leino, M.D.
Kelli Leland, M.D.
Lawrence Lemaster, M.D.
Timothy LeMaster, M.D.
Michael Liebe, M.D.
Roger Lindholm, M.D.
Herman Louters, M.D.
David Luehr, M.D.
Helle Lukk, M.D.
Timothy Lund, M.D.
John Lynch, M.D.
Lynn MacLean, M.D.
Daniel Malkovich, M.D.
John McCue, M.D.
Shawn McMahon, M.D.
Gregory McNamara, M.D.
John Merchlewitz, M.D.
Donald Mersch, M.D.
Michael Mollen, M.D.
Warren Monson, M.D.
Lyle Munneke, M.D.
Dean Myers, M.D.
John Myers, M.D.
Sarah Nelson, M.D.
Michael Neudecker, M.D.
Douglas Newman, M.D.
Dean Nissen, M.D.
Ingrid Nisswandt, M.D.
Margaret O'Connor, M.D.
Craig Oien, M.D.
Nancy Olsen, M.D.
Alan Olson, M.D.
Robert Olson, M.D.
Rodney Olson, M.D.
Elizabeth Liljebald, M.D.
John Oujiri, M.D.
Daniel Palmquist, M.D.
Steven Park, M.D.
Susan Paulson, M.D.
Nancy Peltola, M.D.
Bradley Peterson, M.D.
Dennis Peterson, M.D.
Gary Peterson, M.D.
Randy Peterson, M.D.
Thomas Peterson, M.D.
Brian Pfeifer, M.D.
Steven Phillipson, M.D.
Robert Pierpont, M.D.
Diane Pittman, M.D.
Lisa Prusak, M.D.
Ricard Puumala, M.D.
Victoria Puumala, M.D.
Terri Radovich, M.D.
Hugh Renier, M.D.
Elizabeth Riesgraf, M.D.
Jerry Rogers, M.D.
James Rogers, M.D.
Bonnie Rohr, M.D.
Thomas Rollie, M.D.
Edward Rosenbaum, M.D.
George Rounds, M.D.
Jon Rudberg, M.D.
Susan Rudberg, M.D.
Robert Rutka, M.D.
Richard Rysavy, M.D.
Scott Rysdahl, M.D.
David Saarinen, M.D.
Charles Schotzko, M.D.
Malcolm Scott, M.D.
Jeff Scrivener, M.D.
Robert Sellers, M.D.
Carl Sjoding, M.D.
Harvey Smith, M.D.
David Spoelhof, M.D.
Keith Stelter, M.D.
Gary Stelzer, M.D.

Jon Stephenson, M.D.
 Kevin Stiles, M.D.
 Lynn Stottler, M.D.
 Sandra Stover, M.D.
 Deborah Strand, M.D.
 Anita Strei, M.D.
 David Strobel, M.D.
 Patrick Sura, M.D.
 Christine Swensen, M.D.
 Paul Terrill, M.D.
 Kim Thompson, M.D.
 Knute Thorsgard, M.D.
 Margaret Torreano, M.D.
 Edward Vandenberg, M.D.
 Darla VanHeerde, M.D.
 Paul Van Pernis, M.D.
 Jeri Vergeldt, M.D.
 Charles Vergona, M.D.
 Arden Virnig, M.D.
 Blaise Vitale, M.D.
 John Walsh, M.D.
 Joseph Walz, M.D.
 Douglas Watkins, M.D.
 Robert Westin, M.D.
 Steven Winselman, M.D.
 Matthew Yelle, M.D.

The department offers coursework in basic, supportive, and applied areas. All students should be able to competently take a complete history and perform a complete physical examination by the end of their first year. Diagnostic skills will be strengthened throughout the second year, primarily through didactic lectures and clinical involvement with selected patients. The family practice preceptorship enables the student to assess practice characteristics of a number of family physicians in different locations.

Required Courses—First Year

FMed 5100. Computers in Family Medicine. (1 cr; prereq regis med) Crouse, staff
 Using current technology; developing skills to adapt to new technologies and modes of practice (i.e., managed care). Computer literacy, information access, applications in family medicine education and practice.

FMed 5105. Physical Diagnosis. (4 cr; prereq regis med) McCutcheon, staff
 Medical history taking and the physical examination of patients with emphasis on the range of normal findings from the newborn to the elderly. Introduction to abnormal findings associated with major disease syndromes of the human organ system.

FMed 5121-5122-5123. Preceptorship I. (1 cr each; prereq regis med) Boulger, Crouse
 Students spend periods with a family practice physician in the area observing problems encountered in this type of practice and the methods by which health care is delivered. Emphasis of each preceptorial period correlated with corresponding material presented in 5105.

FMed 5205. Introduction to Family Medicine. (4 cr; prereq regis med) Crouse, staff
 Lectures, seminars, and clinical conferences on major disease syndromes affecting human organ systems.

FMed 5305. Preventive Medicine and Community Health. (3 cr; prereq regis med) J Anderson, staff
 Health and high-level wellness with special reference to definition, assessment, and maintenance of healthy lifestyle. Overview of disease prevention with special reference to community health issues in epidemiology, environment, and public health. Exposure to community preventive health programs.

Required Courses—Second Year

FMed 5201-5202-5203. Introduction to Family Medicine. (4 cr each; prereq regis med) Crouse, staff
 Lectures, seminars, and clinical conferences on major disease syndromes affecting human organ systems.

FMed 5441-5442-5443. Clinical Rounds and Clerkship. (2 cr each; prereq regis med) Crouse, staff
 Clinical practicum, hospital-based, covering core material in family practice, internal medicine, obstetrics, pediatrics, surgery. Students observe and help diagnose illnesses, both in the hospital and clinic, examine patients, and help deliver health care.

FMed 5461-5462-5463. Preceptorship II. (1 cr each; prereq 5123, regis med) Boulger, Crouse
 Students spend periods of each week with a family practice physician in the Duluth-Superior and outlying areas observing how health care is delivered. Emphasis of each preceptorial period correlated with material presented in clinics and seminars on clinical medical sciences.

FMed 5501. Clinical Pathology Pharmacology Conferences. (1 cr; prereq regis med or #) Adams, Crouse
 Use pathology, pharmacology, and laboratory medicine to work through a differential diagnosis for an unknown clinical case.

Graduate Courses

FMed 8100. Clinical Family Medicine. (Cr or [cr cannot be applied to a Graduate School program]; prereq Δ) Crouse, Day
 Supervised care of patients of all ages emphasizing continuous, primary, preventive, acute, and chronic care in all general diagnostic categories.

Interdisciplinary (Med)

Required Courses—First Year

Med 5114. Small Group Problem-Based Learning I. (6 cr; prereq regis med) Wittmers, staff
Developing skills and strategies for self-directed lifelong learning. Clinical cases exploring a range of learning issues from basic and clinical sciences. Three to four small-group meetings per week facilitated by a faculty tutor. Participation in information searching, faculty consultations, and peer discussions addressing learning issues defined in the small-group sessions.

Med 5115. Small Group Problem-Based Learning II. (4 cr; prereq 5114, regis med) Wittmers, staff

Developing skills and strategies for self-directed lifelong learning. Clinical cases exploring a range of learning issues from basic and clinical sciences. Three to four small-group meetings per week facilitated by a faculty tutor. Participation in information searching, faculty consultations, and peer discussions addressing learning issues defined in the small-group sessions.

Med 5120. Cell and Molecular Biology. (6 cr; prereq regis med) Adams, Drewes, Stauffer, Wittmers
Basic cellular organelles and their functions, structures and function of biomolecules, basis of molecular biology, cell physiology. Cell organelles, amino acids, proteins, enzymes, nucleic acids, lipids, carbohydrates, biological membranes. Replication, transcription, and translation of genetic information; recombinant DNA/RNA technology. Tricarboxylic acid cycle and oxidative phosphorylation precedes discussion of membrane transport. Mechanisms used for cell signaling provides introduction to endocrinology. Nerve conduction mechanisms.

Med 5220. Renal, Respiratory, and Acid-Base Regulation. (4 cr; prereq 5222, regis med) Downing, Hellman, Keener, Leino, Mohrman, Wittmers
Maintenance and regulation of the human internal environment by respiratory and renal organ systems. Histology of the upper airways, lungs, kidney, and urinary system; respiratory gas exchange; kidneys' role in excretion and reabsorption of components in extracellular fluid and maintenance of the acid-base balance in internal milieu. Clinical acid-base problem solving. Integrative lab dealing with cardiovascular-respiratory adjustments to exercise.

Med 5221. Metabolism: Mechanisms and Regulation. (7 cr; prereq regis med) Haller, Heller, Prohaska, Salo
Digestion and absorption of nutrients and regulation of their subsequent use in basic metabolic processes sustaining normal body structure and function. Nutrition; gastrointestinal function; carbohydrate, protein, lipid, and mineral metabolism; regulation of metabolic processes to support cellular integrity and growth. Structure of organs and tissues involved in relation to their functions.

Med 5222. Cardiovascular Science. (4 cr; prereq regis med or grad) Heller, Leino, McCutcheon, Mohrman, Prohaska

Comprehensive overview of anatomical, biochemical, and physiological aspects of the heart, blood vessels, and blood. Emphasis on normal structural and functional features of the cardiovascular system and processes underlying regulatory mechanisms. Lectures, supplemental reading material, and scheduled exercises, including clinical correlates.

Med 5223. Neuroscience. (10 cr; prereq regis med) Drewes, Forbes, Severson, Stauffer
Comprehensive overview of medically related anatomy, physiology, and biochemistry of the human nervous system.

Med 5224. Reproduction: Structure and Function. (2 cr; prereq regis med) Haller, Holy
Structure and function of male and female reproductive systems. Central regulation of reproduction, normal structure and function of the reproductive system, pregnancy, parturition, lactation. Reference will be made to previous discussions in developmental anatomy and embryology as well as processes of growth and development.

Med 5454. Human Immunology. (4 cr; prereq regis med) Haller, Lukasewycz
Structure and function of bone marrow and various lymphatic structures or tissues. Hematopoiesis, diffuse lymphatic tissue, lymphatic nodules, tonsils, Peyer's patches, appendix, lymph nodes, thymus, spleen. Innate immunity and delineation of acquired immunity. Concept of antigens; structure, function, and genetics of immunoglobulins; immunological reactions; diagnostic lab procedures; transfusion immunology and complement cascade. B- and T-cell maturation sequences and markers; role of histocompatibility antigens in triggering immune response. Role of interleukins and interferons. Immunology of AIDS, clinical hypersensitivity reactions, tumor immunity. Neuroimmunomodulation.

Undergraduate and Graduate Courses

Med 3998. Topics in Human Biology and Behavior. (Cr ar; prereq #) Ziegler, staff
Advanced undergraduates can study in depth normal human biology and behavior. During the academic year, the student may elect to enroll in one or several subtopics of the following: gross anatomy, histology, developmental anatomy, neuroanatomy, biochemistry, microbiology, physiology, biometry and biostatistics, psychology, and sociology. No basic science clinical correlation. Special examinations are prepared for undergraduates.

Med 5000. Independent Study. (No cr; prereq regis med)
For selected medical students working toward an M.D. who are pursuing independent study (e.g., remedial coursework, repeating a course, medical leave). Recommended by the Scholastic Standing Committee or assistant dean for student affairs.

Med 5001. Basic Science I. (No cr; prereq regis med)
For selected medical students working toward an M.D. who are continuing work in their first year. Recommended by the Scholastic Standing Committee or assistant dean for student affairs.

Med 5002. Basic Science II. (No cr; prereq regis med)
For selected medical students working toward an M.D. who are continuing work in their second year. Recommended by the Scholastic Standing Committee or assistant dean for student affairs.

Med 5003. Research. (No cr; prereq regis med)
For selected medical students working toward an M.D. who are doing research over an extended period of time. Recommended by the Scholastic Standing Committee or assistant dean for student affairs.

Med 5004. Directed Study. (No cr; prereq regis med)
For selected medical students working toward an M.D. who are in a supervised program preparing for the National Boards Examination. Recommended by the Scholastic Standing Committee or the assistant dean for student affairs.

Med 5011. Alcoholism and Physicians. (4 cr; prereq regis med or #) Brissett, Knych, Wittmers
Alcoholism in American society. Social-psychological, pharmacological, physiological, and clinical aspects of alcoholism emphasized through clinical and didactic learning experiences.

Med 5023. Seminars in Indian Health. (1 cr [cr cannot be applied to a Graduate School program]; prereq regis med or #)
Causes of morbidity and mortality among American Indians.

Medical and Molecular Physiology (PhsI)

Professor

Lloyd Beck, Ph.D., *emeritus*
Lois J. Heller, Ph.D.

Associate Professor

Edwin W. Haller, Ph.D.
John Keener, Ph.D., *adjunct*
David E. Mohrman, Ph.D.
Edward K. Stauffer, Ph.D.
Lorentz E. Wittmers, Jr., M.D., Ph.D., *interim head*

Assistant Professor

John Nichols, Ph.D., *adjunct*

Clinical Professor

Johann Ruegg, M.D., Ph.D.
Yuri Lupandin, M.D., Ph.D.

Clinical Associate Professor

Harold Hofstrand, M.D.
Gabriele Pfitzer, M.D.
Johan Thyberg, M.D., Ph.D.

Physiology is the science that studies the principles governing the functions of biological systems such as the nervous, cardiovascular, renal, respiratory, and endocrine systems. A number of course hours are devoted to demonstrating the applicability of physiology to various clinical disciplines through integrative sessions that emphasize basic physiologic principles.

Undergraduate and Graduate Courses

PhsI 5202. Readings in Physiology. (Cr ar; prereq 5927, 5928, 5929 or 5541, 5542, #) Wittmers, staff
Topics in physiology selected for each student; written reviews prepared and discussed.

PhsI 5203. Research in Physiology. (Cr ar; prereq Δ) Wittmers, staff
Use of lab techniques and equipment used for research in various subspecialties of physiology, including spinal cord neurophysiology, cardiovascular physiology, endocrinology, respiratory and transport processes, electrophysiology, and renal physiology.

PhsI 5211. Literature Seminar. (1-4 cr; prereq 5927 or #) Wittmers, staff
Oral presentation of written literature review and research data. Specific subject content of student presentations reflect research interests and results of thesis research.

PhsI 5601. Physiology of Organ Systems. (5 cr; prereq [Biol 3154, Biol 3245], [Chem 3311 or Chem 5336] or #) Haller, staff
Survey of physiologic functions and interrelationships of organ systems (musculoskeletal, cardiovascular, renal, respiratory, nervous, endocrine, reproductive) in mammals.

PhsI 5927-5928-5929. Human Physiology. (2/6/6 cr, \$5907-5908-5909; prereq 5541, 5542, #; not open to med students) Wittmers, staff
Major organ systems. Integrated approach.

PhsI 8401. Physiology of Aging. (2 cr; prereq 5541, 5542, or 5927, 5928, 5929, #) Heller
Overview of several theories concerning the physiological processes that appear to set the limits of maximum human life span.

PhsI 8405. Muscle Physiology. (2 cr; prereq 5541, 5542 or 5927, 5928, 5929, #) Stauffer
Overview of physiological processes involved in skeletal muscle contraction from subcellular events to nerve-controlled function of whole muscle.

PhsI 8415. Topics in Endocrinology. (2 cr; prereq 5541, 5542 or 5927, 5928, 5929, #) Haller
Selected topic of current endocrine research interest examined in depth; historical background, questions posed by current research, and implications of current research for future development in the area.

Phsl 8441. Transport Processes. (2 cr; prereq 5927, 5928, 5929, #) Haller, Wittmers
In-depth, quantitative approach to transport processes in biological systems.

Phsl 8777. Thesis Credits: Master's. (1-16 cr [max 11 cr per summer term])
Thesis research and development.

Phsl 8888. Thesis Credits: Doctoral. (1-36 cr [max 18 cr per qtr, 11 cr per summer term])
Doctoral dissertation research and preparation.

Medical Microbiology and Immunology (MicB)

Professor

Arthur G. Johnson, Ph.D., *head*
Richard J. Ziegler, Ph.D.

Associate Professor

Alice Adams, Ph.D.
Omelan A. Lukasewycz, Ph.D.

Assistant Professor

Louise B. Hawley, Ph.D.

Clinical Associate Professor

Mark R. Eckman, M.D.

The medical microbiology and immunology courses familiarize students with the concepts basic to understanding infectious diseases and their management. The characteristics of the important pathogenic members of the microbial world—bacteria, viruses, fungi, and parasites—are discussed, with emphasis on communicability, invasive properties, toxigenicity, and lab identification. The multifaceted immune response of the host to infectious agents is defined and characterized. In addition, the aberrant response of the immune system resulting in allergic and pathological reactions is addressed.

Required Courses—Second Year

MicB 5701. Basic Microbiology. (3 cr; prereq regis med or #) Adams, Hawley, Johnson, Ziegler, clinical staff

Basic characteristics of bacteria, viruses, fungi, and parasites, including morphology, growth, metabolism, replication, and genetics.

MicB 5702. Infectious Diseases. (7 cr; prereq regis med or #) Hawley, Johnson, Ziegler, clinical staff
Attributes of pathogenicity, interaction with host defenses, diagnosis, and control of medically important microorganisms in reference to their involvement with various organ systems.

Graduate Courses

MicB 5545. Immunobiology. (3 cr; prereq Biol 3245 or #) Johnson

The immune system and the cells and molecules which work in concert to keep us free from disease; aberrations resulting in immune disorders.

MicB 5553. Problems in Medical Microbiology and Immunology. (1-5 cr [may be repeated for max 10 cr]; open to med students as elective and to qualified upper div and grad students with #) Adams, Hawley, Johnson, Lukasewycz, Ziegler
Independent study on tutorial basis. Emphasis on basic and clinical microbiology problems under study at the UMD School of Medicine, including immunology. Investigative work and appropriate reading arranged with tutorials consistent with interests and capabilities of individual students.

MicB 8554. Advanced Immunology and Immunobiology. (2 cr; prereq #) Johnson
Detailed study of mechanisms involved in immunologic defense as related to structure of lymphoid tissue; cellular interactions and consequences of immunologic interactions. Emphasis on concepts and current reading.

MicB 8777. Thesis Credits: Master's. (1-16 cr [max 11 cr per summer term])
Thesis research and development.

MicB 8888. Thesis Credits: Doctoral. (1-36 cr [max 18 cr per qtr, 11 cr per summer term])
Doctoral dissertation research and preparation.

Pathology and Laboratory Medicine (Path)

Professor

Arthur C. Aufderheide, M.D.
Patrick C. J. Ward, M.D., *head*

Associate Professor

David J. Blomberg, M.D.

Clinical Professor

Thomas A. Stolee, M.D.

Clinical Associate Professor

Ronald L. Abler, M.D.
Michael Zlonis, M.D.

Clinical Assistant Professor

Saras Aturaliya, M.D.
Thomas C. Nelson, M.D.
Geoffrey A. Witrak, M.D.

Human pathology is the study of anatomic changes in body tissues occurring in disease states. Taught in the second year, this study spans three quarters. The first quarter deals with general principles; the last two quarters cover diseases of various organ systems. Correlation between anatomic changes and clinical signs and symptoms under disease

conditions is emphasized. Special effort is made to integrate subject matter with course content taught simultaneously in other disciplines.

Required Courses—Second Year

Path 5805. Principles of Human Pathology. (10 cr; prereq regis med) Aufderheide, Blomberg, Ward, staff

Fundamentals of pathology and pathophysiology, including inflammation, repair, immunopathology, and neoplasia. Gross pathology and microscopic slides, current autopsy materials, and surgical pathology specimens used. Attendance at autopsies encouraged and facilitated when possible.

Path 5806-5807. Special and Clinical Human Pathology. (7/6 cr; prereq regis med) Aufderheide, Blomberg, Ward, staff

Pathology of major organ systems. Lab data, as related to the patient and the disease process, is integrated with basic pathology. Emphasis on the pathophysiology of disease processes as it relates to the patient. Interpretation of lab data taught in parallel with the anatomic pathology of the various organ systems.

Pharmacology (Phcl)

Professor

Richard M. Eisenberg, Ph.D., *head*

George J. Trachte, Ph.D.

Associate Professor

Edward T. Knych, Jr., Ph.D.

Jean F. Regal, Ph.D.

Kendall B. Wallace, Ph.D.

Pharmacology is the science that deals with the actions of drugs, chemicals, and other biologically active agents on biological processes. The sequence of courses in pharmacology deals with principles of drug action; prototype drugs and their congeners and how each of these drugs affects biochemical and physiological processes; the manner and mechanism whereby drugs can ameliorate or correct pathological processes; clinical toxicology; and drugs used in emergency situations. Because drugs only alter existing biochemical, physiological, or pathological processes rather than produce de novo effects, an extensive knowledge of these related disciplines will normally be required as preparation for the study of pharmacology.

Required Courses—Second Year

Phcl 5101-5102-5103. Pharmacology. (7/5/5 cr; prereq regis med) Eisenberg, Knych, Regal, Trachte, Wallace

Analysis of the effects of pharmacologic agents on living systems; major classes of drugs; concepts of chemotherapy; characteristic pharmacologic agents, their reactions, and therapeutic applications.

Undergraduate and Graduate Courses

Phcl 3001. Drugs and Health. (3 cr; prereq Chem 1110-1111-1112, organic chemistry course or equiv, Phsl 1043 or #) Trachte, staff

Elementary course in pharmacology. Actions and use of drugs in selected health conditions.

Phcl 5204. Pharmacology Seminar. (1 cr; prereq #) Regal, staff

Presentation of selected research problems and current journal articles.

Phcl 5216. Immunopharmacology. (2 cr; prereq MicB 5555, MicB 5556 or equiv or #) Regal, staff

Purported mediators of the inflammatory process, actions of mediators on components of immune system, and physiological response to these mediators. Models for development of drugs useful in inflammatory disease; mechanisms of drugs currently used. Lectures, assigned readings, discussion.

Phcl 5410-5411. Advanced Pharmacology. (2 cr each; prereq 5101, 5102 or equiv or #) Eisenberg, Knych, Regal, Trachte, Wallace

Comprehensive lectures and discussions of principles of drug disposition; drug receptor interactions; mechanism of action of selected drugs with particular emphasis on current advances and methodologies.

Phcl 5501. Problems in Pharmacology. (Cr ar [may be repeated for max 10 cr; no more than 6 cr can be applied to a Graduate School program]; open to med students as elective and to qualified upper div and grad students with #) Eisenberg, Knych, Regal, Trachte, Wallace

Independent study on a lecture or tutorial basis.

Investigative work, lecture material, and/or appropriate reading and discussions designed according to the interest and capabilities of the individual students.

Phcl 8666. Doctoral Pre-Thesis Credits. (Max 18 cr per qtr, 11 cr per summer term; doctoral student who has not passed oral prelims)

Phcl 8777. Thesis Credits: Master's. (1-16 cr [max 11 cr per summer term; open to grads first registered in the Graduate School]) Thesis research and development.

Phcl 8888. Thesis Credits: Doctoral. (1-36 cr [max 18 cr per qtr, 11 cr per summer term; open to grads first registered in the Graduate School]) Doctoral dissertation research and preparation.

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 H. Bryan Neel III, Rochester, Vice Chair
 Wendell R. Anderson, Wayzata
 Julie A. Bleyhl, Madison
 William E. Hogan II, Minnetonka
 Jean B. Keffeler, Minneapolis
 Hyon T. Kim, St. Anthony
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 Associate Dean for Academic Affairs