

DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE (GRAD)

Graduate work in the Department of Pathology and Laboratory Medicine is offered through the Pathobiology and Translational Science graduate program to those interested in acquiring more extensive knowledge of disease pathogenesis. Major emphasis is given to the laboratory investigation of molecular and cellular mechanisms responsible for disease initiation, progression, and treatment. Students are given the opportunity to undertake candidacy for the doctor of philosophy degree. Participation in research activities leading to an original dissertation is required of all advanced degree candidates.

Prospective candidates must hold a bachelor's degree from an accredited college or university. Admission to the program is through the Biologic and Biomedical Sciences program (<http://bbbsp.unc.edu/>).

The department is located across multiple buildings on the UNC campus and offers well-equipped, internationally recognized laboratories for research and advanced work in investigating the mechanisms of diseases.

Please visit the graduate program's website (<https://www.med.unc.edu/pathology/>) for more graduate program information.

Clinical Professors

Frederic Askin, Surgical Pathology, Pulmonary Pathology
Michelle Aurelius, Forensic Pathology
Peter Banks
Thomas W. Bouldin, Neuropathology, Ocular Pathology, Neurotoxicology
Russell R. Broaddus, Molecular Pathogenesis of Endometrial Cancer
Leslie G. Dodd, Surgical Pathology, Cytopathology
Ronald J. Falk, Glomerular Disease, Lupus, Vasculitis, Dialysis
George Fedoriw, Hematopathology; Applications of Flow Cytometry
Paul Gooze, Dermatopathology
Margaret L. Gulley, Molecular Diagnostics, Oncology, Epstein-Barr Virus
J. Charles Jennette, Renal Pathology, Immunopathology
Kathleen A. Kaiser-Rogers, Clinical Cytogenetics
David G. Kaufman, Human Origins of DNA Replication, Interactions Between Human Endometrial Epithelial and Stromal Cells
Susan J. Maygarden, General Surgical Pathology, Cytopathology, Prostate Carcinogenesis
Melissa B. Miller, Molecular Diagnostics, Antimicrobial Resistance, Molecular Epidemiology of MRSA
Volker Nickeleit, Renal Pathology, Fibronectins
Yara Park, Transfusion Medicine
Charles M. Perou, Breast Cancer, Genomics, Microarrays, Tumor Classification, Drug Resistance
John L. Schmitz, Flow Cytometry, HIV, Diagnostic Immunology, Sexually Transmitted Diseases
Jan Silverman, Cytopathology, Gastrointestinal Pathology, Genitourinary Pathology
Harsharan K. Singh, Cytopathology, Fine Needle Aspiration Biopsy, Renal Pathology
Scott V. Smith, Surgical Pathology, Cardiovascular Pathology, Pediatric Pathology
James A. Swenberg, Chemical Carcinogenesis, Toxicology, Mass Spectroscopy, DNA Damage and Repair, Endogenous DNA Damage

Leigh B. Thorne, Molecular Pathology, Autopsy Pathology
Karen E. Weck, Molecular Genetic Pathology
Wendell Yarbrough, Otolaryngology/Head and Neck Surgery

Clinical Associate Professors

Jessica K. Booker, Genetics, Breast Cancer
Benjamin Calhoun, Breast Pathology
Georgette A. Dent, Hematopathology, Medical Education
Kevin Greene, Surgical Pathology of the Liver and Gastrointestinal Tract
Nabila Haikal, Forensic Pathology
Jonathon W. Homeister, Leukocyte Trafficking, Inflammatory Vascular Disease, Thrombosis and Hemostasis, Cardiovascular Pathology, Autopsy Pathology
Alina Iuga, Histopathology; Inflammation and Neoplastic Disorders of the Digestive System
Matthew Karafin, Transfusion Medicine
Nicole L. Korpi-Steiner, Clinical Chemistry
Stephanie P. Mathews, Hematopathology
Jason Merker, Molecular Pathology
Siobhan M. O'Connor, Breast Pathology, GYN Pathology, Cytopathology
Lori R. Scanga, Surgical Pathology, Cytopathology
Dimitri G. Trembath, Surgical Pathology and Neuropathology
Susan Weiss, Transfusion Medicine, Coagulation
Herbert C. Whinna, Mechanisms of Hemostasis and Thrombosis, Biochemistry and Vascular Biology of Blood Coagulation, Protein Structure-Function
David C. Williams Jr., Hematopathology, NMR Spectrophotometry, and Structural Biology

Clinical Assistant Professors

Kevin Alby, Clinical Microbiology
Sue Ann Berend, Cytogenetics
Sandra Bishop-Freeman, Forensic Toxicology
Christine Bookhout, Surgical Pathology
Justin Brower, Forensic Toxicology
Steven Cotten, Clinical Chemistry
Jonathan Galeotti, Hematopathology
Johann D. Hertel, Cytopathology
Kimberly Janssen, Forensic Pathology
Jayson Miedema, Dermatopathology
Nathan Montgomery, Hematopathology and Molecular Genetic Pathology
Vincent J. Moylan Jr., Cardiac Pathology and Autopsy Pathology
Craig Nelson, Forensic Pathology, Water-Related Deaths, Including Drowning of All Kinds and Particularly Scuba, Rebreather, and Freediving Deaths
Lori Ramkissoon, Clinical Cytogenetics, Molecular Genetics
Stefanos Rentas, Molecular Diagnostics
T. Danielle Samulski, Gynecologic Pathology, ENT Pathology, and Cytopathology
Lauren Scott, Forensic Pathology, Preventive Health, Especially Suicide and Accident Prevention, the Value of Autopsy in Medical Education
Bart Singer, Surgical Pathology
Susan Venuti, Forensic Pathology
Eric T. Weimer, Histocompatibility, Flow Cytometry and Clinical Microbiology/Immunology
Sara E. Wobker, Genitourinary Pathology
Sam Wu, Dermatopathology

Clinical Instructors

Shelby Currier, Pathologists' Assistant

Nicola Gerken, Pathologists' Assistant

Steve Holmes, Examination of Simple and Complex Specimens, Surgical Pathology

April E. Kemper, Autopsy Pathology, Surgical Pathology

Andre Phelan, Pathologists' Assistant: Surgical Pathology Training for Residents and Students

Research Professors

Frank C. Church, Thrombosis and Hemostasis, Macromolecular Protein Structure-Function, Molecular Pathology

Claire Doerschuk, Diseases Affecting the Airways of the Lung

Rosann A. Farber, Genetic Instability in Cancer, Human Molecular Genetics, Microsatellite Instability

Craig A. Fletcher, Vascular Biology

Virginia L. Godfrey, Veterinary Pathology, Animal Models of Genetic Disease, Autoimmunity

Tracy M. Heenan, Laboratory-, Exotic- and Companion-Animal Medicine

Mehmet Kesimer, Mucin Glycobiology and Airway Epithelial Pathobiology

Nigel Key, Thrombosis and Hemostasis

Christopher P. Mack, Transcriptional Regulation in the Cardiovascular System, Smooth Muscle Cell Biology

Nigel Mackman, Thrombosis and Hemostasis

Nobuyo Maeda, Molecular Genetics of Atherosclerosis, Transgenic Laboratory Animals as Model Systems, Molecular Evolution

Valerie Murrah, Oral, Head, and Neck Pathology

Shanmugam Nagarajan, Immunologic and Inflammatory Mechanisms of Diseases in Atherosclerosis, Vasculitis, and Glomerulonephritis

Timothy C. Nichols, General Cardiology, Cardiac Catheterization, Percutaneous Transluminal Coronary Angioplasty

Joan M. Taylor, Adhesion Signaling, Cardiovascular Disease

Melissa Troester, Molecular Studies with Human Populations

Cyrus Vaziri, Regulation of DNA Replication, S-Phase Checkpoints, and Post-Replication DNA Repair on Mammalian Cells

Bernard E. Weissman, Tumor Suppressor Genes

Alisa S. Wolberg, Cellular and Molecular Mechanisms in Hemostasis and Thrombosis

Hong Xiao, Immune-Mediated Glomerular Disease and Vasculitis

Maimoona A. Zariwala, Genetic Analysis of Patients With Primary Ciliary Dyskinesia (PCD)

Research Associate Professors

Brian Cooley, Thrombosis, Vascular Injury, Microsurgery

Matthew Flick, Elucidating Mechanisms Linking Coagulation and Fibrinolytic Factors to Inflammatory, Infectious, and Malignant Disease

Andrew Gladden, Epithelial Cell Biology; Reproductive Tract Development and Neoplasia

Ajay Gulati, Pediatric Gastroenterology

Peiqi Hu, Immune-Mediated Kidney Disease

Masao Kakoki, Prevention of Cardiovascular Diseases

Jiandong Liu, Cardiovascular Biology

Stephanie A. Montgomery, Comparative Pathology and Animal Histopathology

Li Qian, Cardiovascular and Stem Cell Biology

Steven Shipley, Comparative Medicine, Infectious Disease

Young E. Whang, Androgen Receptor, Prostate Cancer

Scott Williams, Stem Cell and Developmental Biology

Research Assistant Professor

Silvio Antoniak, Protease-Activated Receptors in Cardiovascular Diseases, Myocarditis, and Heart Failure Animal Models

Pablo Ariel, Director of the Microscopy Services Laboratory

Hannah Atkins, Comparative Medicine

Xue Bai, Molecular and Functional Roles of RhoGaps in Hypertension and Metabolism Regulation

Victoria Baxter, Pathogenesis of and Host Immune Response to Infectious Disease, Particularly Encephalomyelitic Arboviruses; Animal Model Development

Jessica Bowser, Dynamics of Epithelial Integrity and Regeneration at the Interface of Inflammation and Cancer, Molecular and Biochemical Mechanisms of Endometrial Cancer Progression

Meghan Free, Nephrology and Hypertension

Natalia Isaeva, Otolaryngology

Yukako Kayashima, Atherosclerosis

Feng Li, Cardiovascular Biology

C. Tyler Long, Comparative Medicine

Sushant Patil, Bioinformatics

Reinhardt-Boris Reidel, Airway Protein Function in Health and Disease

Allison Rogala, Comparative Medicine, Host-Microbial Interactions

Jonathan Schisler, Translational Research in Patients with Myocardial Infarcts

Morika Williams, Comparative Medicine

Yang Yang, DNA Damage and Repair

Yuchen Yang, DNA Damage and Repair

Research Instructor

Diane Armao, Neuropathology

Adjunct Professors

Albert Baldwin, Biology

Jared Block, Hematology and Hematopathology

William B. Coleman, Breast Cancer Epigenetics, Biology of Liver Stem Cells, Hepatocarcinogenesis, Cancer Molecular Diagnostics

Peter H. Gilligan, Diagnostic Bacteriology, Pulmonary Disease in Cystic Fibrosis, Toxin Mediated Diarrheal Disease

M. David Goodman, Medical Education and Autopsy Pathology

H. Michael Jones, Medical Education at Medical Student and Resident Level, Medical History, Autopsy Pathology, Research Support

William Kaufmann

Myla Lai-Goldman, Personalized Molecular Diagnostics

Chad A. Livasy, Surgical Pathology

Roger Lundblad, Consultant

C. Ryan Miller

Judith N. Nielsen, Animal Health Maintenance, Diagnosis and Eradication

Howard M. Reisner, Immunogenetics of Blood Coagulation, Immunochemistry

Gary J. Smith, Prostate Cancer, Cancer Cell-Tissue Microenvironmental Interaction, Angiogenesis

Richard Tidwell

Carol Weida, Cytopathology and Anatomic Pathology

Adjunct Associate Professors

Delores Grant, Cancer Research

W. Carl Jacobs, General Pathology

Thomas Lightfoot, American Red Cross Blood Services

Christopher McKinney, General Pathology

Keith Nance, General Pathology

Jay S. Raval, Transfusion Medicine

Nobuyuki Takahashi, Animal Models of Hypertension, Preeclampsia, Diabetic Nephropathy and Obesity

Adjunct Assistant Professors

Edward Bahnson, Vascular Biology, Diabetes and Metabolic Syndrome

Bal Dhungel, Lymphoproliferative Disorders

Aaron Hartman, Genitourinary and Nephropathology

Michal Kamionek, General Pathology

Emily Maambo, General Pathology

William Oliver, Forensic Pathology

Avani Pendse, Surgical Pathology

Tamiwe Tomoka, General Pathology

Professors Emeriti

Nadia Malouf Anderson

C. Robert Bagnell Jr.

Dwight Bellinger

Stuart Bentley

Debra A. Budwit

John D. Butts

John F. Chapman Jr.

Myra L. Collins

Marila Cordeiro-Stone

Robert E. Cross

Frederic G. Dalldorf

Cora-Jean S. Edgell

James D. Folds

Donald T. Forman

Joe W. Grisham

Catherine A. Hammett-Stabler

John E. Hammond

Susan T. Lord

William W. McLendon

James R. Pick

Marjorie S. Read

Harold Roberts

Kinuko I. Suzuki

Michael Topal

PATH

Advanced Undergraduate and Graduate-level Courses

PATH 426. Biology of Blood Diseases. 3 Credits.

An introduction to the biology and pathophysiology of blood and the molecular mechanisms of some human diseases: anemias; leukemias; hemorrhagic, thrombotic, and vascular disorders; and HIV disease/AIDS. Honors version available.

Rules & Requirements

Requisites: Prerequisites, BIOL 205; or BIOL 103 and BIOL 104 and BIOL 240; or permission of the instructor for students lacking the prerequisite.

Grading Status: Letter grade.

Same as: BIOL 426.

PATH 462. Experimental Pathology. 1-9 Credits.

Hours, credits, and instructor to be arranged on an individual basis.

Hands-on research experience in a predetermined instructor's laboratory.

Students learn and apply specific techniques and participate in investigations of molecular mechanisms responsible for disease processes (pathobiology). Contact the director of graduate studies in pathology for information. May be repeated.

Rules & Requirements

Grading Status: Letter grade.

PATH 464. Light Microscopy. 3 Credits.

Permission of the instructor. Course focuses on practical fundamentals of light microscopy including optics, contrast mechanisms, fluorescence, laser scanning confocal microscopy, photography, and digital imaging.

Graduate-level Courses

PATH 713. Molecular and Cellular Pathophysiological Basis of Disease: Mechanisms of Disease. 3 Credits.

A graduate course on cell injury and pathogenesis of disease with emphasis on basic mechanisms at the molecular, cellular, and organismal levels. Three lecture hours with a complementary two-and-a-half-hour laboratory each week.

Rules & Requirements

Requisites: Co-requisite, PATH 714L.

Grading Status: Letter grade.

PATH 714L. Molecular and Cellular Pathophysiological Basis of Disease: Laboratory I. 2 Credits.

A graduate-level laboratory course on basic mechanisms of disease pathogenesis, emphasizing cell and tissue-based examples of major disease mechanisms.

Rules & Requirements

Requisites: Pre- or corequisite, PATH 713.

Grading Status: Letter grade.

PATH 715. Molecular and Cellular Pathophysiological Basis of Disease: Systemic Pathology. 3 Credits.

A graduate-level laboratory course on systemic pathology, emphasizing diseases of major organ systems. A follow-up to PATH 713/714L. Three lecture hours (three credits) with a complementary two-and-a-half-hour laboratory (two credits) each week.

Rules & Requirements

Requisites: Co-requisite, PATH 716L.

Grading Status: Letter grade.

PATH 716L. Molecular and Cellular Pathophysiological Basis of Disease: Laboratory II. 2 Credits.

A graduate-level laboratory course on mechanisms of systemic disease pathogenesis, emphasizing cell and tissue-based examples of diseases of the major organ systems.

Rules & Requirements

Requisites: Pre- or corequisite, PATH 715.

Grading Status: Letter grade.

PATH 723. Practical Considerations for Translational Research. 2 Credits.

Permission of the instructor. A multi-disciplinary course providing students principles involved in translating basic science into clinically applicable diagnostics and therapies to improve human disease outcomes. The course is focused on bioinformatics, bioethics, trial design, FDA approval, and commercialization of laboratory diagnostics.

Rules & Requirements

Grading Status: Letter grade.

PATH 725. Cancer Pathobiology. 3 Credits.

Permission of the instructor. This course examines pathobiological features of cancer. An interdisciplinary approach draws from epidemiology, genetics, molecular biology, and clinical medicine to investigate cancer etiology, pathogenesis, prevention, and treatment.

Rules & Requirements

Grading Status: Letter grade.

PATH 726. Human Environmental Disease. 1-3 Credits.

This course will study human disease processes that are induced or exacerbated by our environment. Environmental disease stressors include solar radiation, air and water pollution, bioreactive substances in foods, pesticides, metals, dusts, particles, and allergens. Lectures will emphasize epidemiology, mechanisms of toxicity, and human disease pathogenesis.

Rules & Requirements

Grading Status: Letter grade.

PATH 766. Current Topics in Cardiovascular Biology. 3 Credits.

Permission of the instructor. Second-year graduate students only. This manuscript-based course will emphasize recent advances in heart and blood vessel development, the molecular mechanisms that regulate cardiovascular cell function, and current methodologies in the cardiovascular field. It will be team taught by members of UNC's McAllister Heart Institute.

Rules & Requirements

Grading Status: Letter grade.

PATH 767. Molecular and Cellular Biology of Cardiovascular Diseases. 3 Credits.

Second year graduate students or permission of the instructor. Course reviews the molecular, cellular, and organismal pathogenesis of cardiovascular disease. It is team-taught by faculty with topic expertise and stresses primary literature and current methodologies. May be taken as a companion to PATH 766 or on its own.

Rules & Requirements

Grading Status: Letter grade.

PATH 770. Mouse Efficacy and Disease Models. 3 Credits.

The Mouse Efficacy and Disease Models class is designed for second to third year students who intend on performing in vivo animal research. This course is intended to familiarize graduate students in the issues associated with the development and interpretation of mouse models and also an introduction to alternative models.

Rules & Requirements

Requisites: Prerequisites, Students must be earning a degree in a Biological & Biomedical Sciences Program (BBSP) with preference given to students in the Pathobiology and Translational Science Graduate Program; students should also have selected a thesis lab prior to enrolling in this class.

Grading Status: Letter grade.

PATH 792. Seminar in Carcinogenesis. 2 Credits.

Permission of the instructor. Survey of classical and current literature on selected critical issues in carcinogenesis. Students discuss experimental methods and observations as well as theories and generalizations. Two seminar hours a week.

Rules & Requirements

Grading Status: Letter grade.

Same as: TOXC 792.

PATH 801. Cell Cycle Regulation and Cancer. 3 Credits.

This journal club-style discussion course will focus on molecular events that regulate normal cell cycle progression, and on how deregulation of the cell cycle leads to cancer. Classes will follow the development of the cell cycle field chronologically, learning how current concepts and paradigms have evolved through scientific inquiry.

Rules & Requirements

Grading Status: Letter grade.

Same as: GNET 801.

PATH 850. Scientific Writing in Pathobiology and Translational Science. 1 Credits.

The students will develop a research plan based on their thesis project and write a 6-page grant in the style of a NRSA F31 application. Students will learn to edit and critique their fellow student's proposals which will help prepare the students for writing and editing their preliminary exam and future grant applications. Restricted to students currently earning a degree in a Biological & Biomedical Sciences Program (BBSP) with preference given to students in the Pathobiology and Translational Science Graduate Program.

Rules & Requirements

Grading Status: Letter grade.

PATH 890. Special Topics in Pathology. 1-3 Credits.

A study in special fields under the direction of the faculty. Offered as needed for presenting material not normally available.

Rules & Requirements

Repeat Rules: May be repeated for credit. 6 total credits. 3 total completions.

Grading Status: Letter grade.

PATH 900. Research in Pathology. 2-12 Credits.

Permission of the department. This is a research course in which advanced students in pathology carry on investigations on mechanisms of disease. Six or more laboratory hours a week, to be arranged. May be repeated.

Rules & Requirements

Repeat Rules: May be repeated for credit.

Grading Status: Letter grade.

PATH 920. Seminar in Interdisciplinary Vascular Biology. 1 Credits.

Permission of the instructor. Participants in the Interdisciplinary Vascular Biology Training Program only. Students will be required to present their thesis work as a formal seminar, give an introductory lecture to introduce their project (in cooperation with their thesis advisor), and to attend and discuss the seminars of other students.

Rules & Requirements

Repeat Rules: May be repeated for credit. 6 total credits. 6 total completions.

Grading Status: Letter grade.

PATH 940. Pathobiology and Translational Science Seminar. 1 Credits.

A series of scientific seminars by graduate students, Post-doctoral Fellows, research faculty, and others in the Department of Pathology and Laboratory Medicine. Students will develop the skills necessary to deliver an effective and engaging oral scientific presentation of their research. They will become proficient in understanding the pathogenesis of the wide range of diseases being studied in the department, and the methodologies employed to determine the pathogenesis of those diseases.

Rules & Requirements

Repeat Rules: May be repeated for credit. 7 total credits. 7 total completions.

Grading Status: Letter grade.

PATH 993. Master's Research and Thesis. 3 Credits.

May be repeated.

Rules & Requirements

Repeat Rules: May be repeated for credit.

PATH 994. Doctoral Research and Dissertation. 3 Credits.**Rules & Requirements**

Repeat Rules: May be repeated for credit.

Contact Information

Department of Pathology and Laboratory Medicine

Visit Program Website (<http://www.med.unc.edu/pathology/>)

Director of Graduate Studies

Andrew B. Gladden

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Student Services Manager

Angel Truesdale

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Chair

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