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://bbsp.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
Russell R. Broadus, Molecular Pathogenesis of Endometrial Cancer
Leslie G. Dodd, Surgical Pathology, Cytopathology
Ronald J. Falk, Glomerular Disease, Lupus, Vasculitis, Dialysis
George Fedorov, Hematopathology, Applications of Flow Cytometry
Paul Googe, Dermatopathology
J. Charles Jennette, Renal Pathology, Immunopathology
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
James A. Sweenberg, 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

Kevin Alby, Clinical Microbiology
Jessica K. Booker, Genetics, Breast Cancer

Clinical Assistant Professors

Thomas Alexander
Janet Baranello
Sue Ann Berend, Cytogenetics
Sandra Bishop-Freeman, Forensic Toxicology
Amy Brownlee
Benjamin Cho
Mariama Evans
Jonathan Galeotti, Hematopathology
Johann D. Hertel, Cytopathology
Kimberly Janssen, General Surgical Pathology, Cytopathology
Steven Johnson
Donna Kanavy
Staci Keene
Vanessa Moreno
Craig Nelson, Forensic Pathology, Water-Related Deaths, Including Drowning of All Kinds and Particularly Scuba, Rebreather, and Freediving Deaths
Lori Ramkisson, Clinical Cytogenetics, Molecular Genetics
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
Tam Sneddon
Susan Venuti, Forensic Pathology
Alisha Ware
Sam Wu, Dermatopathology

Clinical Instructors

Michelle Bartlett, Pathologists’ Assistant
Kimberly Calabrese, Pathologists’ Assistant
Shelby Currier, Pathologists’ Assistant
Nicola Gerken, Pathologists’ Assistant
**Research Professors**

Claire Doeschuk, Diseases Affecting the Airways of the Lung  
Craig A. Fletcher, Vascular Biology  
Matthew Flick, Elucidating Mechanisms Linking Coagulation and Fibrinolytic Factors to Inflammatory, Infectious, and Malignant Disease  
Virginia L. Godfrey, Veterinary Pathology, Animal Models of Genetic Disease, Autoimmunity  
Ajay Gulati, Pediatric Gastroenterology  
Tracy M. Heenan, Laboratory-, Exotic- and Companion-Animal Medicine  
Melhem 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  
Nobuyo Maeda, Molecular Genetics of Atherosclerosis, Transgenic Laboratory Animals as Model Systems, Molecular Evolution  
Valerie Murrah, Oral, Head, and Neck Pathology  
Timothy C. Nichols, General Cardiology, Cardiac Catheterization, Percutaneous Transluminal Coronary Angioplasty  
Volkert Nickeleit, Renal Pathology, Fibronectins  
Li Qian, Cardiovascular and Stem Cell Biology  
Rani Sellers  
Jonathan Serody  
Harsharan K. Singh, #Cytopathology, Fine Needle Aspiration Biopsy, Renal Pathology 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  
Gregory Wilkerson  
Alisa S. Wolberg, Cellular and Molecular Mechanisms in Hemostasis and Thrombosis  
MaimoonA. Zariwala, Genetic Analysis of Patients With Primary Ciliary Dyskinesia (PCD)

**Research Associate Professors**

Silvio Antoniak, Protease-Activated Receptors in Cardiovascular Diseases, Myocarditis, and Heart Failure Animal Models  
Pablo Ariel, Director of the Microscopy Services Laboratory  
Andrew Gladden, Epithelial Cell Biology; Reproductive Tract Development and Neoplasia  
Peiqi Hu, Immune-Mediated Kidney Disease  
Feng Li, Cardiovascular Biology  
Jiandong Liu, Cardiovascular Biology  
Steven Shipley, Comparative Medicine, Infectious Disease  
Young E. Whang, Androgen Receptor, Prostate Cancer  
Scott Williams, Stem Cell and Developmental Biology  
Melinda Yates

**Research Assistant Professor**

Hannah Atkins, Comparative Medicine  
Jessica Bowser, Dynamics of Epithelial Integrity and Regeneration at the Interface of Inflammation and Cancer, Molecular and Biochemical Mechanisms of Endometrial Cancer Progression  
Ilana Galen

**Adjunct Professors**

Albert Baldwin, Biology  
Bryan Dangott  
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

**Adjunct Associate Professors**

Delores Grant, Cancer Research  
David G. Kaufman  
Thomas Lightfoot, American Red Cross Blood Services  
Christopher McKinney, General Pathology  
Stephanie Montgomery  
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  
Viktoria Baxter  
Nikia Laurie  
Brian Le  
Nathan Montgomery  
Avani Pendse, Surgical Pathology  
Ricky Thompson  
Tamiwe Tomoka, General Pathology  
Patrick Wilson
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
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, bioactive 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 730. Cancer Immunology. 2 Credits.
The goal of this graduate-level course is to learn about recent advances in the field, acquire specialized knowledge and to develop a foundation of critical thinking skills in cancer immunology. The course format will combine lectures and in-class discussion of assigned readings, with particular emphasis on state-of-the art research methods. Students should be familiar with modern concepts of immunology and should consult with the course director before enrolling. The course meets for half a semester.

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 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. 6 total credits. 3 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/)

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