

*Graduate School of  
Biomedical Sciences*

*1994-1996 Catalog*



University of North Texas  
Health Science Center at Fort Worth

## ***Information Guide***

UNT Health Science Center Switchboard	817- 735-2000
Graduate School of Biomedical Sciences, Admissions Office, ME1-804 <i>Admissions information, applications and status reports for new and former students</i>	817-735-2560
Office of Student Affairs, ME1-116	817-735-2505
Financial Aid Office, ME1-116	817-735-2520





**University of North Texas  
Health Science Center at Fort Worth**  
Graduate School of Biomedical Sciences

## **1994-1996 Graduate Catalog**

University of North Texas  
Health Science Center  
Graduate School of Biomedical Sciences  
3500 Camp Bowie Boulevard  
Fort Worth, Texas 76107-2699  
817-735-2560

This catalog is an official bulletin of the University of North Texas Health Science Center Graduate School of Biomedical Sciences and is intended to provide general information. It contains policies, regulations, procedures and fees in effect as the publication went to press. The health science center reserves the right to make changes at any time to reflect current board policies, administrative regulations and procedures, amendments by state law and fee changes. Information provided by this catalog is subject to change without notice and does not constitute a contract between the University of North Texas Health Science Center Graduate School of Biomedical Sciences and a student or an applicant for admission.

Students are responsible for observing the regulations contained herein; therefore, they are urged to read this catalog carefully. This catalog does not contain all institutional rules, regulations and policies for which a student is responsible. Students should also consult the Graduate Student Handbook.

The health science center reserves the right to withdraw a student for cause at any time.

The University of North Texas Health Science Center at Fort Worth is an equal opportunity/affirmative action institution. It is the policy of the health science center not to discriminate on the basis of race, color, religion, sex, age, national origin, disability, or disabled veteran or veteran of the Vietnam era status, in its educational programs, activities, admissions or employment policies. Questions or complaints should be directed to the Equal Opportunity Office, 817-735-2354.

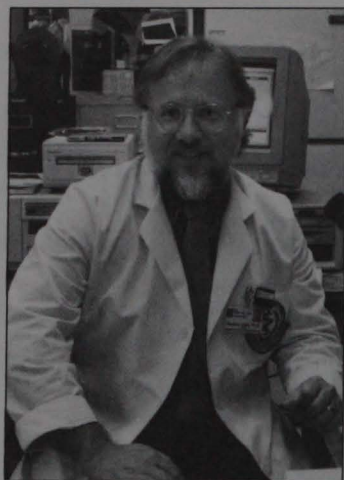
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**AUG 1 2 1994**

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## Dean's Message



Graduate study requires a genuine intellectual curiosity, individual initiative and a commitment to self-discipline. The path you have chosen is not easy but full of challenges and opportunities. As you embark on scientific discovery, keep in mind the broader picture of the science of life, health and prevention of disease.

The Graduate School of Biomedical Sciences is a community of scholars dedicated to creating an environment that is stimulating, creative and meaningful. Our faculty are recognized nationally and internationally for their research programs which utilize state-of-the-art methodology and instrumentation.

There are currently six centers of excellence at the University of North Texas Health Science Center where our faculty share common goals and ideas. These centers are Texas Institute for Research and Education on Aging, Substance Abuse Institute of North Texas, North Texas Eye Research Institute, Wound Healing Research Institute, Institute for Forensic Medicine and Center for Osteoporosis Prevention and Treatment. These institutes are positioned to provide leadership in biotechnology and biomedical research well into the future.

We are indeed pleased of your interest in our graduate school and graduate programs. The challenge of new research advances are in your hands and we await the opportunity to share our knowledge and experience with you.

Together we will shape a healthier world for tomorrow.

A handwritten signature in dark ink that reads "Thomas Yorio". The signature is fluid and cursive, with the first name "Thomas" and last name "Yorio" clearly legible.

Thomas Yorio, Ph.D.



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# Administration

## Board of Regents

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 Vice Chair, Irving  
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 Nancy Halbreich, Dallas  
 Joe Kirven, Dallas  
 Lucille G. Murchison, Dallas  
 Billie L. Parker, Fort Worth  
 Don L. Rives, Austin

## Chancellor

Alfred F. Hurley, Ph.D.

## University of North Texas Health Science Center at Fort Worth

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 President  
 Benjamin L. Cohen, D.O.,  
 Vice President for Health  
 Affairs, Executive Dean of  
 the Texas College of  
 Osteopathic Medicine  
 Mike Ferguson Jr., C.P.A.,  
 Vice President for Fiscal and  
 Administrative Affairs

J. Warren Anderson, Ed.D.,  
 Associate Dean for  
 Educational Planning and  
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 Michael W. Davenport, C.P.A.,  
 Associate Vice President for  
 Development  
 Edward E. Elko, Ph.D.,  
 Associate Dean for  
 Student Affairs  
 Robert Gracy, Ph.D.,  
 Associate Dean for Basic  
 Sciences and Research  
 Dan Jensen,  
 Associate Vice President for  
 Governmental Affairs  
 T. John Leppi, Ph.D.,  
 Associate Dean for Medical  
 Student Admissions

Deborah Blackwell, D.O.,  
 Assistant Dean for Clinical  
 Affairs  
 Richard Inman, Assistant Vice  
 President for Fiscal Affairs

## Graduate School of Biomedical Sciences

Thomas Yorio, Ph.D.,  
 Dean  
 Carla J. Lee,  
 Senior Administrative  
 Assistant to the Dean

## UNT Health Science Center Administrative Staff

Don Beeson,  
 Police Chief  
 Betty Belton,  
 Registrar  
 Bobby R. Carter,  
 Director of Library Services  
 Pat Casey,  
 Director of Institutional  
 Budgets and Grants  
 Management  
 W. Rand Horsman,  
 Director of Human Resource  
 Services  
 Sam Magill,  
 Director of Information  
 Technology Services  
 Harry J. Marek,  
 Director of Physical Plant  
 Lane Nestman,  
 Director of Purchasing and  
 Central Services  
 Greg McQueen, Assistant to the  
 Vice President for Academic  
 Affairs, Director of  
 International Health-Related  
 Programs  
 James Sims, Ph.D.,  
 Safety Officer  
 Glenn Sparks, R.N., Director of  
 Quality Assurance  
 Albert Srubar Jr., C.P.A.,  
 Controller  
 Glenda A. Tucker,  
 Director of Financial Aid

## The Graduate Council Elected Members

James L. Caffrey, Ph.D.,  
 Associate Professor,  
 Physiology  
 Patrick R. Cammarata, Ph.D.,  
 Associate Professor,  
 Anatomy and Cell Biology  
 H. Fred Downey, Ph.D.,  
 Professor, Physiology  
 Ben G. Harris, Ph.D.,  
 Professor, Biochemistry and  
 Molecular Biology  
 Andras G. Lacko, Ph.D.,  
 Professor, Biochemistry and  
 Molecular Biology  
 John D. Lane, Ph.D.,  
 Professor, Pharmacology  
 John C. Licciardone, D.O.,  
 Assistant Professor,  
 Public Health and  
 Preventive Medicine  
 Tony Romeo, Ph.D.,  
 Assistant Professor,  
 Microbiology and  
 Immunology

Two student members  
 consisting of current President  
 and Vice President of the  
 Graduate Student Association.

## Ex-Officio Members

Bobby R. Carter  
 Benjamin L. Cohen, D.O.  
 Thomas Yorio, Ph.D.



# 1994-95 Academic Calendar

	FALL 94	SPRING 95	SUMMER I 95	SUMMER II 95
<b>ADMISSIONS</b>				
Application deadline. All application materials must be submitted for consideration.	July 14	Nov 22	April 14	April 14
<b>SCHEDULE CHANGES</b>				
Last day for change of schedule other than a drop	Sept 1	Jan 6	June 7	July 12
First day that a student may drop a course. Written consent of the instructor is required.	Sept 15	Feb 1	June 12	July 17
Last day to drop a course or withdraw from the health science center with a grade of W for courses that a student is not passing	Oct 7	Feb 24	June 16	July 21
After this date, a grade of WF may be recorded				
Beginning this date, instructors may drop student with a grade of student with a grade of WF for non-attendance	Oct 10	Feb 28	June 28	Aug 3
Last day to drop a course with consent of the instructor	Nov 4	March 31	June 29	Aug 4
First day that a student may request a grade of incomplete	Nov 14	April 10	June 30	Aug 7
Last day to withdraw from the health science center. Process must be completed by 5 p.m. in the Registrar's Office	Nov 30	April 21	June 29	Aug 4
<b>IMPORTANT CLASS DAYS</b>				
Classes begin. *Combined TCOM/Graduate School classes begin earlier.	Aug 29*	Jan 17*	June 5	July 10
12th class day (Fall & Spring)/4th class day (Summer I & II)	Sept 14	Feb 2	June 8	July 13
Final examinations	Dec 12-16	May 8-12	July 7	Aug 11
<b>FEE PAYMENT DEADLINES</b>				
First installment. 50 % of Fall and Spring tuition and all fees are due upon deadline. Summer session tuition must be 100% paid upon deadline date.	Aug 26	Jan 13	Due upon registration	Due upon registration
Second installment, 25%	Sept 30	Feb 20	—	—
Third installment, 25%	Nov 4	April 3	—	—
Payment deadline for tuition, fees and other charges to avoid blocks and delinquent payment fees. Late charges will be assessed.	Dec 2	April 28	—	—
<b>REFUNDS</b>				
<i>Note: If all courses for the semester are dropped, see Withdrawal Refunds, below.</i>				
Last day for refund of any course dropped	Sept 14	Feb 2	June 8	July 13
Last day for any partial refund of tuition upon withdrawal	Sept 23	Feb 20	June 13	July 18
<b>WITHDRAWAL REFUNDS</b>				
Last day for 100% refund	Aug 26	Jan 13	June 2	July 7
Last day for 80% refund	Sept 2	Jan 23	June 7	July 12
Last day for 70% refund	Sept 9	Jan 30	—	—
Last day for 50% refund	Sept 16	Feb 6	June 12	July 17
Last day for 25% refund	Sept 23	Feb 13	—	—

## 1994-95 Academic Calendar

	FALL 94	SPRING 95	SUMMER I 95	SUMMER II 95
<b>GRADUATION DEADLINES</b>				
Last day to file graduate degree application for graduation without late fee	Sept 30	Feb 14	—	—
Last day for MS and PhD candidates to complete tool requirement	Dec 16	May 12	—	—
Last day for MS and PhD degree applicants for graduation to 1. file original copy of thesis, problem in lieu of thesis or dissertation in graduate dean's office; 2. file application for degree (late fee charged); 3. pay all graduation fees; 4. remove grades of I in all courses required for degree (exceptions: thesis and dissertation). See Graduate Catalog for degree application instructions.	Nov 1	Mar 20	—	—
Last day for departments to report to the graduate dean's office the results of final comprehensive examination for graduating MS and PhD students	Nov 1	Mar 20	—	—
Last day for MS and PhD degree applicants for graduation to return all final copies of previously filed thesis, problems in lieu of thesis and dissertation to graduate dean's office	Nov 29	April 21	—	—
Last day for graduation applications completing all requirements for MS degree with thesis or doctoral degree to complete final comprehensive examination and to file original copy of thesis or dissertation in graduate dean's office to avoid registration requirement for fall, spring or summer semester	Aug 11	Dec 16	—	—
Commencement	Dec 16	June 3	—	—

## 1995-96 Academic Calendar

	FALL 95	SPRING 96	SUMMER I 96	SUMMER II 96
<b>ADMISSIONS</b>				
Application deadline. All application materials must be submitted for consideration.	July 14	Nov 22	April 12	April 12
<b>SCHEDULE CHANGES</b>				
Last day for change of schedule other than a drop	Aug 29	Jan 19	June 5	July 10
First day that a student may drop a course. Written consent of the instructor is required.	Sept 13	Feb 1	June 10	July 17
Last day to drop a course or withdraw from the health science center with a grade of W for courses that a student is not passing. After this date, a grade of WF may be recorded	Oct 4	Feb 23	June 17	July 19
First day instructors may drop student with a grade of WF for non-attendance	Oct 7	Feb 29	June 26	July 25
Last day to drop a course with consent of the instructor.	Nov 6	Mar 29	June 27	July 26
First day a student may request a grade of Incomplete	Nov 12	April 8	June 26	July 25
Last day to withdraw from the health science center. Process must be completed by 5 p.m. in the Registrar's Office	Nov 29	April 26	June 27	July 29



# 1995-96 Academic Calendar

	FALL 95	SPRING 96	SUMMER I 96	SUMMER II 96
<b>IMPORTANT CLASS DAYS</b>				
Classes begin. *Combined TCOM/Graduate School classes begin earlier.	Aug 28*	Jan 16*	June 3	July 8
12th class day (Fall & Spring)/4th class day (Summer I & II)	Sept 10	Jan 31	June 6	July 11
Final examinations	Dec 9-13	May 6-10	July 5	Aug 9
<b>FEE PAYMENT DEADLINES</b>				
First installment. 50 % of Fall and Spring tuition and all fees are due upon deadline. Summer session tuition must be 100% paid upon deadline date.	Aug 25	Jan 12	Due upon registration	Due upon registration
Second installment, 25%	Sept 29	Feb 19	—	—
Third installment, 25%	Nov 3	March 25	—	—
Payment deadline for tuition, fees and other charges to avoid blocks and delinquent payment fees. Late charges will be assessed.	Dec 2	April 26	—	—
<b>REFUNDS</b>				
<i>Note: If all courses for the semester are dropped, see Withdrawal Refunds, below.</i>				
Last day for refund of any course dropped	Sept 13	Feb 2	June 5	July 11
Last day for any partial refund of tuition upon withdrawal	Sept 20	Feb 12	June 11	July 16
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Last day for 80% refund	Sept 1	Jan 22	June 5	July 10
Last day for 70% refund	Sept 8	Jan 29	—	—
Last day for 50% refund	Sept 15	Feb 5	June 10	July 15
Last day for 25% refund	Sept 22	Feb 12	—	—
<b>GRADUATION DEADLINES</b>				
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Last day for MS and PhD candidates to complete tool requirement.	Dec 13	May 10	—	—
Last day for MS and PhD degree applicants for graduation to 1. file original copy of thesis, problem in lieu of thesis or dissertation in graduate dean's office; 2. file application for degree (late fee charged); 3. pay all graduation fees; 4. remove grades of I in all courses required for degree (exceptions: thesis and dissertation). See Graduate Catalog for degree application instructions.	Nov 1	Mar 22	—	—
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Last day for MS and PhD degree applicants for graduation to return all final copies of previously filed thesis, problems in lieu of thesis and dissertation to graduate dean's office	Nov 29	April 19	—	—
Last day for graduation applications completing all requirements for MS degree with thesis or doctoral degree to complete final comprehensive examination and to file original copy of thesis or dissertation in graduate dean's office to avoid registration requirement for fall, spring or summer semester	Aug 9	Dec 13	—	—
Commencement	Dec 14	June 1	—	—



# One/The Health Science Center

## Overview

The University of North Texas Health Science Center at Fort Worth is the learning center of choice for 475 students and 1,433 osteopathic medical school graduates. The talents and energies of some 175 faculty members, 300 volunteer physicians and 780 staff members are dedicated to the fulfillment of the health science center's mission.

Located in the heart of Fort Worth's cultural district, the UNT Health Science Center is a 15-acre, \$71 million medical care/research complex. The center contains two schools: the Texas College of Osteopathic Medicine and the Graduate School of Biomedical Sciences.

The medical school's 400 students - 90 percent of whom, by law, must be Texas residents - follow an innovative curriculum based on the century-old osteopathic traditions of training primary care physicians and teaching the art and science of healthy living. They train alongside physicians in clinics, hospitals and private practices, each experiencing about 3,800 hours of patient care before graduation. Their education emphasizes comprehensive primary care, the unique benefits of osteopathic diagnosis and treatment, patient education, disease prevention, good nutrition and fitness, and sensitivity to the cost of health care to the patient and society.

The health science center works to meet the health care needs of its neighbors through community clinics, outreach programs and free screenings. More than 140,000 visits are made each year to the center's 22 clinics and laboratories by patients of all ages - from prenatal to pediatrics to geriatrics - many of whom are indigent or live in medically underserved neighborhoods in Tarrant County.

More than 70 students are pursuing their M.S. and Ph.D. degrees in the health science center's Graduate School of Biomedical Sciences. Students specialize



in areas such as anatomy and cell biology, microbiology and immunology, biochemistry and molecular biology, pharmacology and physiology.

The University of North Texas Health

Science Center strives to create knowledge as well as teach it. Among the center's physicians and scientists are nationally funded research faculty members who are leaders in areas such as



the biochemistry of aging, vision, heart disease, substance abuse, wound healing and cancer. These faculty members support the activities of six research centers of excellence established at the health science center: The Texas Institute for Research and Education on Aging, North Texas Eye Research Institute, Substance Abuse Institute of North Texas, Wound Healing Institute, Institute for Forensic Medicine and Center for Osteoporosis Prevention and Treatment. Cumulative active research grants and contracts exceed \$17 million.

The center has one of the most advanced medical libraries in the southwest. The Gibson D. Lewis Health Science Library has virtually 100 percent of the world's current medical information available through a sophisticated computer-search system and communications network.

### ***Texas College of Osteopathic Medicine***

The UNT Health Science Center's osteopathic medical school is a national leader in achieving the critical 21st century goal of producing primary care and family medicine physicians. Osteopathic medical students learn to consider the family, not just the individual, and the prevention of disease, not just the treatment, in providing comprehensive, professional health care. More than three-fourths of the medical school graduates choose careers in primary care medicine. About 60 percent of the graduates stay in Texas with one-third practicing in towns of less than 25,000 residents. Graduates who choose to specialize bring their osteopathic approach to fields as diverse as aerospace medicine and health transplant surgery. Information on admission into TCOM can be obtained from the Office of Medical Student Admissions (817)735-2204.

### ***Graduate School of Biomedical Sciences***

The Graduate School of Biomedical Sciences is committed to achieving excellence in education, research and service. The graduate school offers students opportunities to earn advanced degrees in biomedical sciences. Faculty have been involved in graduate student training since 1975 through a relationship with the University of North Texas graduate program. In 1993, degree granting authority was given to the UNT Health Science Center for Master of Science and Doctor of Philosophy degrees in the biomedical sciences. The graduate school provides an innovative educational environment that encourages rigorous investigation in areas of health science research, exemplary teaching skills and service to the community.

Graduate students receive a portion of their training with osteopathic medical students, providing an opportunity to gain insight into contemporary medicine, particularly in areas of primary care. The graduate school, in conjunction with the Texas College of Osteopathic Medicine, has a further goal to train students for D.O./M.S. and D.O./Ph.D. degrees for future careers as physician scientists in academic medicine. Biomedical science graduates fill positions in health science centers, colleges and universities, community health centers, federal agencies and industry.

### ***History of the Graduate School***

Texas College of Osteopathic Medicine began in 1970 as a private school. In 1972, TCOM's basic science courses were taught at North Texas State University (now the University of North Texas) in Denton. In addition to the basic sciences faculty hired by TCOM, certain additional North Texas faculty were contracted to participate in teaching these courses. All

TCOM basic science faculty had full or associate graduate faculty status at the university. These appointments were important because they permitted TCOM basic science faculty to mentor graduate students either in the biomedical sciences master's degree program, or Ph.D. students in biology or biochemistry (chemistry).

The successful collaboration of the two schools earned the confidence of state government leaders. In 1975, TCOM became a state-supported medical school under the jurisdiction of the governor-appointed North Texas State Board of Regents.

By 1977, TCOM had expanded its basic sciences faculty several-fold, with these new faculty also receiving joint appointments and graduate faculty status at North Texas. As a result, an increased number of students were accepted into the university's graduate program under the mentorship of TCOM faculty. However, the graduate program remained under the administration of the university.

Over the years, TCOM grew in physical facilities and basic and clinical sciences faculty. In addition, the number of graduate students seeking training in the health sciences also grew.

In 1992, TCOM was training more than 70 graduate students seeking either the M.S. degree in biomedical sciences or the Ph.D. in biological sciences or biochemistry. These students received virtually all their training at TCOM, in courses taught by TCOM faculty and in laboratories on the TCOM campus in Fort Worth. It was recognized that it would benefit those students trained by TCOM faculty to have their degrees in biomedical sciences awarded by a health science center. UNT and TCOM then requested the Texas Higher Education Coordinating Board to transfer the M.S. degree in biomedical sciences and degree-granting authority from the university to the medical school, which was geared to evolve into a health



science center, and to establish a Ph.D. degree in biomedical sciences.

On May 22, 1992, the Board of Regents authorized the University of North Texas and the Texas College of Osteopathic Medicine to jointly request the Texas legislature to redesignate the Fort Worth medical school as the University of North Texas Health Science Center at Fort Worth. The board also approved expansion of the TCOM Mission Statement to include the training of biomedical scientists. In a subsequent action on August 28, 1992, the Board of Regents endorsed the request to transfer from UNT to the proposed UNT Health Science Center, the Department of Biomedical Sciences and authority to award the master of science degree in biomedical sciences. The board also authorized the presentation of this request to the Texas Higher Education Coordinating Board, together with a request for a new doctoral degree in biomedical sciences.

On July 15, 1993, the Texas Higher Education Coordinating Board approved the request to transfer the M.S. degree in biomedical sciences and the Department of Biomedical Sciences from UNT and to establish a Graduate School of Biomedical Sciences at the proposed UNT Health Science Center.

During the summer of 1993, the Texas Legislature unanimously approved the redesignation of TCOM as the University of North Texas Health Science Center, specifying that the center would continue to be a separate and independently functioning institution, not a department or school within the university. Governor Ann Richards signed the legislation into law, which became effective August 31, 1993.

The request for a Ph.D. in biomedical sciences was approved on October 28, 1993, and as of November 1, 1993, the UNT Health Science Center began offering both M.S. and Ph.D. degrees in biomedical sciences.

### ***Gibson D. Lewis Health Science Library***

Biomedical science graduate students receive a full range of library services. These include borrowing privileges, individual and group study areas, computer searches, reference help, document delivery services, print indexes, personal instruction in the use of the library and a vast collection of books, journals and audio-visual materials.

All UNT Health Science Center graduate students must have I.D. badges to borrow materials and gain access to the various study rooms in the library.

This new and attractive facility features the latest technical advances in computerized operations. The 53,500-square-foot library has seating for more than 600 people and is open 99.5 hours a week. There are 10 professional librarians and 25 support staff. The library collection contains more than 120,000 volumes, including about 4,500 audiovisual titles and 2,100 serial subscriptions. The library uses the Library Information System (LIS) to provide access to the library's collections and to a subset of the National Library of Medicine's MEDLINE. LIS may be accessed in the library or by a computer modem. Library instruction on LIS and other library services are readily available. Reference service and mediated computer searches are provided by four reference librarians with access to more than 200 databases. The photocopy service provides same-day or next-day service for journal articles in the library collection. Copy cards are available for purchase. Usually, the graduate student's mentor will provide a copy card at no expense to the student. The library has applied for membership in the Copyright Clearinghouse Center to ensure compliance with the copyright law.

The Gibson D. Lewis Health Science Library is a member of the South Central Academic Medical Libraries Consortium. This five-state regional consortium

provides access to all 14 academic medical/health science center libraries in Texas, Arkansas, Louisiana, Oklahoma and New Mexico. Moreover, the library has been a Resource Library in the National Network of Libraries of Medicine, Bethesda, Maryland since 1991. Interlibrary loan service is available for requests for materials not owned by the library from all of these sources.

The library's collections in the basic sciences support the research and instruction programs of the faculty and students. As the major source of current primary research information, journals have received the highest priority in the development of these collections.

### ***Special Centers of Excellence***

#### ***Texas Institute for Research and Education on Aging***

Contributing to the better health of the nation's aging society through innovative and interdisciplinary clinical care, teaching and research has long been a priority of the UNT Health Science Center and its sister institution in Denton, the University of North Texas. The Texas Institute for Research and Education on Aging is one of the most recent collaborations dedicated to this mission.

Established in 1992 and unique to this region of Texas, the institute now involves more than 40 faculty members from a variety of disciplines at UNT Health Science Center and UNT. Students, postdoctoral fellows, residents, visiting scientists and health and social service practitioners from both institutions also participate.

The institute focuses on four primary areas: the biology of aging, geriatric care and practice, the development of a long-term care system and health promotion for older adults. Activities have already



gained national recognition, attracting the attention of leading researchers from the National Institutes of Health and respected scholars from other major universities.

The institute sponsors pilot research grants as well as a number of international conferences and seminars. An external review program brings scientists, physicians and administrators to both campuses to update faculty members on new opportunities and to review ongoing and proposed programs. The institute also publishes a newsletter and maintains a registry of volunteers available for aging research.

### ***Institute for Forensic Medicine***

The Institute for Forensic Medicine, established in the early 1980s, is an academic and research partnership between UNT Health Science Center's Department of Pathology and DNA/Identity Laboratory, the University of North Texas and the Tarrant County Medical Examiner's Office.

The institute's goals are to increase the quantity and scope of research projects in forensic medicine as well as the number of graduate students studying toxicology, molecular biology and criminalistics. The collaborative strength and variety of the institute's teaching and research activities provide students a comprehensive training arena and build the health science center's forensic medicine research funding.

### ***Substance Abuse Institute of North Texas***

The Substance Abuse Institute of North Texas, established in 1993 by the UNT Health Science Center's Department of Pharmacology and the Department of Psychiatry and Human Behavior, is a consortium of professionals with expertise in substance abuse. Scientists and

physicians in physiology, pathology, public health/preventive medicine, general and family practice and medicine also participate.

The institute's missions are to foster clinical and basic science research, train professionals whose efforts focus on the prevention and treatment of substance abuse and serve as an information resource for area substance abuse treatment programs. The institute hosts research conferences and cosponsors seminars with area substance abuse prevention groups and the pharmaceutical industry. The industry also regularly sponsors visits by international scholars to the health science center and the Fort Worth/Dallas Metroplex and provides faculty consultants to state, federal and international agencies. Outreach programs involving many institutions from the North Texas area are being developed.

### ***North Texas Eye Research Institute***

The North Texas Eye Research Institute, formed in 1992, includes faculty experts in anatomy and cell biology, biochemistry and molecular biology, pharmacology and medicine.

Examples of institute initiatives include a Distinguished Scientist Seminar Program cosponsored with Alcon Laboratories, a course in ocular pharmacology and research collaborations with hospitals and industries concerned with vision problems. Areas of research include aging, cataracts and diabetic complications; glaucoma and glaucoma medications; courses and therapies of retinal dystrophies; and the normal and abnormal relationships between photoreceptor cells, retinal pigment epithelium and retinal gila and retinal neovascularization problems.

### ***Wound Healing Research Institute***

The Wound Healing Research Institute

seeks to improve and enhance the quality of health, well-being and productivity of all people through research, education and service activities.

Its five-fold mission includes: expanding knowledge of the process of injury and wound healing using novel *in vitro* models and molecular biology techniques; testing innovative applications of hyperbaric medicine, growth factor therapy and cell replacement therapy on problem wounds as alternatives to amputation and permanent disability; training graduate and medical students, interns and residents in new and interdisciplinary approaches to problem wounds; disseminating knowledge and experience through courses, seminars, conferences and symposia as a part of continuing medical education; and evaluating new pharmaceuticals and devices through all phases of the FDA approval process.

Support for the institute's various projects comes from federal, state and private agencies and organizations. Basic science departments of general and family practice, medicine, pathology, surgery and hyperbaric medicine are some of the participants in the institute.

### ***Center for Osteoporosis Prevention and Treatment***

The center was established in 1994 by the Division of Rheumatology in the Department of Medicine to foster collaborative research between clinical and basic science faculty. Osteoporosis is an epidemic in America, resulting in widespread concern about the ability of the health care system to cope with this growing problem. Basic science departments, the Department of Public Health and Preventive Medicine, the Department of Obstetrics and Gynecology and other departments of the medical school may participate with varying degrees of involvement.



# Two/Admission

## Application

An application for admission can be obtained from the graduate office or by writing to:

Graduate School of Biomedical Sciences  
UNT Health Science Center at Fort Worth  
3500 Camp Bowie Boulevard  
Fort Worth, Texas 76107-2699

All applicants applying for the first time to the Graduate School of Biomedical Sciences must pay a non-refundable application fee: \$25 for U.S. citizens, \$50 for non-U.S. citizens. The fee must be paid in U.S. currency. This application fee is valid for one year from the application date.

## Deadlines

The following deadlines for submission of complete application materials apply to all students seeking on-time registration:

Fall 1994 Semester: July 14, 1994  
Spring 1995 Semester: November 22, 1994  
Summer Session I 1995: April 14, 1995  
Summer Session II 1995: April 14, 1995  
Fall 1995 Semester: July 14, 1995  
Spring 1996 Semester: November 22, 1995  
Summer Session I 1996: April 12, 1996  
Summer Session II 1996: April 12, 1996

**It is highly recommended that non-U.S. citizens apply well in advance of these deadlines to allow preparation of immigration documents.**

## Requirements for Admission

### General Admission Requirements

All applicants for admission to the Graduate School of Biomedical Sciences must meet the following requirements,

whether or not admission to a specific degree program is sought.

1. The applicant must hold a bachelor's degree or its equivalent from a regionally accredited institution.
2. Specific grade point average (GPA) requirements for non-degree and degree-seeking students follow. The GPA is calculated by dividing the total number of grade points earned by the total number of semester hours attempted (A equals four grade points, B equals three, C equals two, D equals one, F equals zero).

• **Non-Degree Students.** The applicant must have at least a 3.0 GPA on the last 60 undergraduate semester hours of course work before receiving the bachelor's degree, or a 2.8 GPA on all undergraduate work, in order to receive unconditional admission to the Graduate School of Biomedical Sciences. Applicants who have already completed a master's degree must have at least a 3.0 GPA on the master's or meet the undergraduate GPA standards just listed in order to be admitted. *Non-degree seeking students will be allowed to take only 15 semester credit hours.*

- **Degree-Seeking Students.** The applicant must have at least a 3.0 GPA on the last 60 undergraduate semester hours of course work before receiving the bachelor's degree, or a 2.8 GPA on all undergraduate work, in order to be considered for admission to the Graduate School of Biomedical Sciences. Applicants who have already completed a master's degree must have at least a 3.0 GPA or meet the undergraduate GPA standards just listed in order to be admitted unconditionally.
3. All students seeking a graduate degree are required to take the Graduate Record Examination (GRE). Specific requirements are listed later in this section.

4. The applicant may be required to take entrance examinations, either oral, written, or both, before admission to the Graduate School of Biomedical Sciences is granted.
5. The health science center requires an applicant from a foreign country to demonstrate satisfactory proficiency in oral and written English before being granted admission. Prospective applicants should inquire at the nearest American Embassy, Consulate or Information Center in order to arrange for whatever language examination may be required.
6. To be considered for admission, the applicant should file the following four official credentials with the dean of the Graduate School of Biomedical Sciences at the address given above:
  - complete official transcripts from all colleges or universities attended
  - an application for admission to the Graduate School of Biomedical Sciences
  - official scores from the Educational Testing Service on the required entrance test (see below)
  - the application fee
7. An applicant who has attempted graduate work at another institution within the six-year period immediately before first enrollment in the Graduate School of Biomedical Sciences but has not received a graduate degree will be required to make up any grade point deficiency below a B average either at the institution at which graduate work was attempted or at the health science center. (See "Time Limitations" in the Master's Degree Program section of this catalog for details concerning validity of previous graduate work.)
8. Admission to the Graduate School of Biomedical Sciences does not imply candidacy for a graduate degree.
9. Applicants for admission are furnished written notification of their admission status by the dean of the Graduate





School of Biomedical Sciences.

Statements by other university officers concerning the applicant's admissibility are not valid until confirmed by the dean in writing.

10. Students who are admitted to a graduate degree program and do not enroll in the semester for which they have applied must contact the Graduate School of Biomedical Sciences to have their file re-evaluated.

### ***Other Admission Requirements***

In addition to meeting the general requirements for admission stated above, applicants also must meet the following requirements.

1. An applicant desiring to pursue graduate work in any subdiscipline field whose undergraduate record does not show completion of the courses prerequisite to this subdiscipline will be required to make up such deficiencies in a manner prescribed by the student's major department.

2. Students wishing to change from one subdiscipline field to another must make application in the office of the graduate dean and must meet all specific program admission requirements for the new subdiscipline.

### ***Graduate Record Examination Requirements***

All students seeking admission to a graduate degree program are required to take the Graduate Record Examination (GRE). Applicants to the D.O./Ph.D. or D.O./M.S. programs may substitute an appropriate Medical College Admissions Test (MCAT) score with the approval of the dean. Only official score reports from the Educational Testing Service are acceptable.

Students must meet the Graduate School of Biomedical Sciences' minimum test requirements. For degree-seeking students, a satisfactory score on the GRE must be submitted before or during the first semester of study. Until the admission test requirement is met, the graduate student is granted provisional admission only. If the test requirement is not met by the end of the first semester of enrollment, provisional admission will be canceled, and the student will thereafter be limited to taking a total of 15 semester credit hours.

The following procedures govern provisionally admitted students who have not taken the GRE.

1. Students provisionally admitted to a degree program in the fall semester without the GRE must take the test in October. (Note: the sign-up date is in late August or in the first few days of September. Consult the GRE information bulletin for further information.) Early registration for the spring semester will not be permitted if an October score is not received from the Educational Testing Service. Regular



registration for the spring semester also will be blocked unless the GRE provision is met.

2. Students provisionally admitted to a degree program in the spring semester without the GRE must take the test in February. Early registration for the summer and/or fall semesters is not possible for students admitted with this provision. Regular registration for the summer and fall terms will be blocked accordingly.
3. Students provisionally admitted to a degree program in the summer without the GRE must take the test by October. Registration in the fall semester will be permitted without the GRE submission of a score. Early registration for the spring semester is not possible for students admitted with this provision. Regular registration for the spring term will also be blocked.

In no case may the student who has not met the GRE or MCAT requirements (1) be admitted to candidacy for any degree, (2) file application to receive such degree, or (3) be permitted to enroll in courses such as thesis, dissertation, problem in lieu of thesis, internship, practicum, etc.

The GRE or MCAT requirements may be waived by the graduate dean for the individual student only in exceptional cases and only on petition by the student to the graduate dean.

### ***Admission of Continuing Students***

A continuing student is defined as a student who enrolls one time during four consecutive semesters. Example: enrolls Summer I 1994; no enrollment Summer II 1994, Fall 1994 or Spring 1995; re-enrolls Summer I 1995.

Continuing students do not need to reapply to the Graduate School of

Biomedical Sciences to enroll if they meet both of the following conditions:

1. The student has not received a degree from the health science center since last enrollment.
2. The student does not have any current blocks on his or her record, i.e., GRE or academic.

Students meeting these conditions are eligible for registration during early registration. Instructions are available in the Graduate School Schedule of Classes.

To gain entry to regular registration, students should bring to registration at the time specified in the Graduate School Schedule of Classes a copy of their last health science center grade slip or health science center ID card. An Advising Clearance Form will be available for each student before registration.

Students who are unsure that they meet all of the above conditions for re-enrollment should contact the Graduate School of Biomedical Sciences before the registration period.

### ***Readmission of Former Graduate Students***

Students who previously have been admitted to the Graduate School of Biomedical Sciences but have not enrolled here once during the last four consecutive semesters (i.e., Fall, Spring, Summer I and Summer II) must follow these re-enrollment procedures:

1. File an admission application
  2. Submit transcripts from all colleges attended (if any) since leaving the health science center, showing eligibility to re-enroll at each institution
- Former students who have not enrolled elsewhere since leaving the health science center and are in good academic standing are required only to submit an admission application.

### ***Courses Taken for Doctoral Credit by Students Completing the Master's Degree***

Students completing the master's degree at the health science center who plan to continue work toward the doctorate degree are required to submit application for readmission to the Graduate School of Biomedical Sciences in doctoral status. Those who wish to begin taking courses to be credited on the doctorate before receiving the master's degree must declare this intention in the office of the graduate dean at the time of registration in doctoral status, so that doctoral work may receive proper credit. Final acceptance of such work will not be granted until the student has secured full admission to a specific doctoral program of study.

### ***Admission of Students to Non-Degree Status***

The health science center recognizes that some students may wish to be admitted to the Graduate School of Biomedical Sciences for the purpose of taking courses not necessarily leading to an advanced degree. Admission to the Graduate School of Biomedical Sciences will be granted subject to the following provisions.

1. The applicant must meet all of the general admission requirements described above.
2. The student in this status is required to receive credit in all graduate (5000 and 6000) courses taken, and must maintain an average of B on all such courses attempted.
3. A student who is admitted to non-degree status has no assurance that work completed under this status will be applicable toward degree requirements should he or she subsequently be admitted to a degree program at the



health science center. *A maximum of 15 semester hours* earned before admission to a degree program may be counted toward degree requirements. Exceptions to this policy can be approved only by the graduate dean upon recommendation of the student's advisory committee. Completion of departmental graduate courses by non-degree students does not obligate the Graduate School of Biomedical Sciences to grant admission to a degree program at a later date, unless all general and specific requirements for admission to that program have been met.

4. A student who wishes to change from non-degree status to degree status must have satisfactory GRE/MCAT scores on file in the Graduate School of Biomedical Sciences.

### ***Admission Requirements for International Students***

Applicants who are not U.S. citizens should apply for admission at least six months before the anticipated enrollment date, and should arrange to have test scores and transcripts in the graduate school at least 60 days before the enrollment date. If transferring from a college or university they must meet all normal UNT Health Science Center transfer admission requirements. Specific requirements are detailed below.

The health science center will not issue immigration papers for student visas until all admission credentials have been received and approved. A \$50 (U.S.) application fee is required and must be submitted with the application for admission. This fee is subject to change at any time.

Applicants who are graduates of foreign colleges or universities must present the following six entrance papers:

- application forms for admission to the Graduation School of Biomedical Sciences accompanied by \$50 (U.S.) application fee
- official forms showing a minimum score of 550 on Test of English as a Foreign Language (TOEFL) or evidence of successful completion of a non-credit intensive course in English from the University of North Texas Intensive English Language Institute
- official transcripts from each college or university attended, with official English translation
- proof of financial resources available, filed with application for admission
- transfer credit from foreign universities. The amount of such credit that can be applied to a degree earned at the health science center will be determined by the graduate dean on recommendation of the student's advisory committee and major department or division. Recognition by the health science center of graduate credit earned elsewhere does not imply that degree credit will be allowed automatically.
- English screening examination (see details below)

### ***English Screening Examination***

All international students and non-exempt permanent residents whose native language is not English are required to take the University of North Texas English Language Proficiency Screening Test after arrival at the health science center and before registering for classes. Information about test dates, times and locations is available from the International Student and Scholar Office at UNT or through the Graduate School of Biomedical Sciences at the health science center.

Exemptions from this test are made only for students who hold a bachelor's or graduate degree from an accredited

U.S. college or university, or have completed four years of study at an accredited U.S. four-year secondary school. This screening test requirement is not eliminated by TOEFL scores or scores on other standardized tests (i.e., GRE), by English classes taken at other institutions or by completion of an intensive English program at another institutions.

Students may take the screening test only one time for the semester of admission. Students may not retake the test later to get better results or to try to eliminate the requirement for English language classes mandated by the test.

A student's performance on the UNT English Language Proficiency Screening Test determines the student's eligibility for (1) full-time health science center graduate study, (2) part-time health science center graduate study and part-time non-credit English as a Second Language (ESL) course work, or (3) full-time ESL course work (requiring additional fees). If ESL courses are required, they must be taken during the semester the screening test is taken. Required ESL courses may not be postponed and must receive first priority in the student's course scheduling. Students who do not successfully complete the required ESL course work during the first semester of enrollment will have restricted course registration or be blocked from further enrollment in the health science center.



## Three/Academic Policies

The general policies of the Graduate School of Biomedical Sciences are determined by the Graduate Council and administered by the dean.

Standards, fees and other requirements may be modified at any time by the Graduate Council.

### **Absence for Religious Holidays**

In accordance with state law, students absent due to the observance of a religious holiday may take examinations or complete assignments scheduled for the day missed within a reasonable time after the absence if the student has notified the instructor of each class of the date of the absence within the first 15 days of the semester.

Religious Holy Day Request Forms may be found in the Graduate Student Handbook. Instructor(s) may require a letter of verification of the observed holy day(s) from the religious institution.

Only holidays or holy days observed by a religion for which the place of worship is exempt from property taxation under Section 11.20 of the Tax Code may be included. A student who is excused under this provision may not be penalized for the absence, but the instructor may respond appropriately if the student fails to satisfactorily complete the assignment or examination.

### **Academic Misconduct**

Cheating and plagiarism are types of academic misconduct for which penalties are described and assessed under the health science center's Code of Student Conduct and Discipline. (See Graduate Student Handbook.)

The term "cheating" includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests or examinations; (2) dependence upon the aid of sources specifically prohibited by the instructor in writing papers, preparing

reports, solving problems or carrying out other assignments; and (3) the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the health science center.

The term "plagiarism" includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. Plagiarism also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Specific penalties can be assigned by a faculty member for certain cases of academic misconduct (including cheating and plagiarism). These penalties include: giving a failing grade for the test or assignment; reducing or changing the grade for the test, assignment or course; requiring additional academic work not required of other students; and assigning a failing grade in the course. Other specific penalties can be recommended by a faculty member to the appropriate administrative/academic authority, including denial of the degree, expulsion from the health science center or revocation of a degree already granted.

All graduate students are responsible for making themselves aware of the definitions and implications of academic misconduct. For further information on academic misconduct, penalties and appeal procedures, the student should refer to the Code of Student Conduct and Discipline in the Graduate Student Handbook.

### **Appeal Processes**

Specific policies and procedures have been established for students seeking to appeal a grade in a course, denial of admission, qualifying or comprehensive examination scores or seeking an extension of time to complete a degree.

The grade appeal policy and procedures are listed below. The policy and procedures for requesting an extension of time to complete a degree are available through the office of the graduate dean.

Appeals concerning admission to graduate school should be addressed to the graduate dean.

Advice concerning how to pursue appeals on any other matter can be sought from the graduate dean.

### **Grade Appeal Policy and Procedures**

1. Any graduate student who believes that a grade has been inequitably awarded should first contact the instructor who awarded the grade in order to discuss the issue and attempt to resolve the differences. Any instructor no longer associated with the health science center at the time of the appeal will be represented in these proceedings by the chair of the department in question. The student who is unable to resolve the differences with the instructor has 30 days following the first class day of the succeeding semester to file a written appeal with the chair of the instructor's department, or of the equivalent administrative unit.
2. The chair may follow any of the four procedures below, or a combination of them.
  - The chair may confer with the instructor.
  - The chair may request that the instructor submit a written reply to the student's complaint.
  - The chair may conduct a meeting of the two parties.
  - The chair may refer the case directly to the appropriate departmental committee, as outlined below.

In following any of the first three procedures noted above, the chair should make a judgment on the merits of the case and recommend a specific



action in regard to the disputed grade. Either the student or the instructor may appeal the recommendations of the chair.

3. The appropriate departmental committee to hear cases sent directly to it by the chair or appealed to it by either the student or the instructor shall be constituted as follows and shall perform the following four duties.

- It shall be an *ad hoc* committee consisting of three faculty members. Two of the members will be chosen from the department in which the grade is being questioned, one by the student and the other by the instructor. If either party to the dispute declines to choose a member of the committee, the department chair will select that member. The third faculty member of the committee, who will serve as chair, will be chosen either from within or outside the department by agreement of the student and the instructor. If they cannot agree upon a third member, the member shall be chosen by the chair of the department, with the provision that the student and the instructor may agree to stipulate that the third member of the committee be chosen from a related department or academic administrative unit rather than from the department in question.
- This *ad hoc* committee should require written statements from each participant in the dispute. Judgments may be rendered upon the basis of these statements, upon other evidence submitted in support of the statements and upon the basis of oral hearing, if such a hearing seems necessary.
- The committee must make a recommendation for disposition of the case within 30 days of its appointment.
- All records in the case will be filed with the chair of the department in which the grade was originally awarded.

4. Either party to the dispute has 15 days following the rendering of the *ad hoc* committee's recommendation to appeal that recommendation to the dean of the graduate school, if the appeal is based solely upon alleged violations of established procedures. Substantive matters, up to and including the refusal of the instructor to act in accordance with the *ad hoc* committee's recommendation or the student's refusal to accept the verdict, may not be appealed to the graduate dean.

5. The dean of the graduate school will, after a review of the submitted written materials (and oral hearings if desired), make within 15 days a ruling about procedural questions. The ruling may be appealed by either the student or the instructor to the Graduate Council of the graduate school.

- The Graduate Council will have 30 days from the date of its appointment to complete its work.
- The Graduate Council shall operate within the guidelines set out for departmental *ad hoc* committees above.
- All rulings made by the Graduate Council regarding procedural questions shall be final.
- All documents related to the case shall be returned to the chair of the originating department for departmental files.

### ***Application for Graduate Degree***

It is the responsibility of the student to keep aware of progress toward the degree and to file the appropriate degree application in the office of the graduate dean. Consult the Academic Calendar for the proper dates. The applicant's grade point average on all graduate work attempted must be at least 3.0 for the application to be accepted.

Because of the time required to receive transcripts, students otherwise eligible for graduation who complete their last course

or courses elsewhere will not graduate at the end of the semester or summer session in which the work is completed, but will receive their degrees at the close of a subsequent graduate school semester or summer session.

Information concerning graduation fees is furnished on request by the office of the graduate dean, and is contained in the annual Tuition and Fee Register, available from the graduate office. Students anticipating graduation should consult the Academic Calendar for final dates for payment of fees and meeting other graduation requirements.

### ***Auditing***

With the written permission of the department chair and the dean of the graduate school, an individual fully eligible to enroll in the graduate school may sit in a class as an auditor without receiving graduate credit. The auditor's name will not be entered on the class roll, and the instructor will not accept any papers, tests or examinations.

Attendance as an auditor may not be made the basis of a claim for credit in the course. Students who are enrolled for credit may audit classes without payment of additional fees; others pay an auditor's fee as shown in the Tuition and Fee Register. Only one audit fee is required per semester regardless of the number of courses audited.

Permission cards for auditors are not available during the official registration period, but may be requested in the graduate school office after classes begin.

A person 65 years of age or older may enroll as an auditor and observer without credit and without payment of an audit fee if space is available and if approved by the department chair and the dean. Such enrollment entitles the person to library privileges, but not the use of laboratory equipment and supplies, health and hospital benefits.



## ***Class Attendance***

*Regular and punctual class attendance is expected.* Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students at the semester's beginning by a *written notice*. Any instructor who informs

students *in writing* about the necessity of class attendance may request of the Registrar that a student be dropped from the course with a grade of WF upon the accumulation of the stated number of absences. If the instructor-initiated drop action falls within the time that the student is eligible to drop with instructor consent and without penalty, the Registrar's Office notifies the student that a WF will be recorded unless the student initiates the drop procedure, in which case a W will be assigned.

Departments and similar academic units have authority to establish a department-wide or course-wide policy, so long as the policy is in accord with the above stipulations.

## ***Commencement Exercises***

Commencement exercises are held in August, December and June. Diplomas are mailed to candidates after graduation has been verified.

## ***Concurrent Enrollment at another Institution***

Graduate students must secure written permission from the graduate dean before registering for any course or courses at another institution while registered for any courses at the health science center.

Failure to secure the required permission for concurrent enrollment prior to registration at the second institution may cause the health science center to refuse degree credit for the work taken elsewhere. In no case may the combined total of semester hours enrolled for at the two institutions exceed the maximum load permitted to graduate students.

## ***Course Changes***

### ***Adding Courses***

Graduate students must initiate all requests for adding courses in the office of the dean of the Graduate School of Biomedical Sciences. Consult the Academic Calendar for dates during which adds are allowed.

### ***Dropping Courses***

Students who wish to drop a course before the 12th class day (summer term, fourth class day), must do so in the Registrar's Office. After the 12th/fourth class day students must first receive the written consent of their instructor before





dropping a course. The instructor may withhold consent for students to drop for any reason providing the instructor has informed students *in writing* at the beginning of the semester.

The grade of W is recorded for any course dropped with the instructor's consent before the end of the sixth week of classes (summer term, eight class sessions). After that time the student must have a passing grade in order for the instructor to assign a grade of W for a dropped course; otherwise, the grade WF is recorded.

Instructors may drop students with grades of WF from courses for non-attendance at any time after the sixth week of classes (summer term, eight class sessions). See "Class Attendance" above.

Drop procedures must be completed by 5 p.m. on the deadline dates specified in the Academic Calendar. After these dates a student may not drop a course for any reason.

## Courses of Instruction

Courses normally meet one hour per week in lecture for each semester hour of credit. For the exceptions, the course descriptions in each department will explain meeting times.

Individual courses of instruction are subject to change or withdrawal at any time and may not be offered each semester of every year. Any course may be withdrawn from current offerings if the number of registrants is too small to justify conducting the course.

## Enrollment Certification

Enrollment verification and loan deferments are completed in the Registrar's Office based upon the student's having registered and paid tuition and fees according to the following criteria.

*Full Time:* long semester, 12 or more hours; summer session, 3 hours per term.

International students may also request the International Student and Scholar Office (ISSO, Kendall Hall, Room 103, University of North Texas, Denton, TX) to issue letters of enrollment for the use of foreign governments, embassies, scholarship agencies and banks. See the graduate office of the health science center for details.

## Final Examinations

Faculty members are expected to administer final examinations at the designated times during the final week of each long semester and during the specified day of each summer term.

If a final examination is not given in a particular course, the faculty member is expected to use the final examination period for summary, evaluation or other productive purposes.

Students who have as many as three final examinations scheduled on one day may appeal to the graduate dean to reschedule one of those examinations on another day during the final examination period.

## Grading System

Courses numbered 5000 or higher ordinarily are taken by students working toward master's and doctoral degrees; those numbered 6000 or higher are open principally to doctoral students.

The Graduate School of Biomedical Sciences' grading system uses the letters A, B, C, D, F, P, NP, I, PR, W, WF and Z. The letter Z is used to indicate that a grade was not properly received and/or recorded for a course.

- A** Excellent work; four grade points for each semester hour. (90-100)
- B** Good work; three grade points for each semester hour. (80-89)
- C** Fair work; two grade points for each semester hour. (70-79)
- D** Passing work; one grade point for

each semester hour. Courses in which the grade is D may not be counted toward a graduate degree. (60-69)

- F** Failure; given when a student 1. has failed the course while still officially enrolled at the end of the semester; 2. is failing in a course and misses the final examination without satisfactory explanation; or 3. stops attending class without completing an official drop or withdrawal. (59 and below)
- P** Passed; a credit grade 1. on pass/no pass option; 2. in selected graduate individual problems and research courses.
- NP** Not passed; a failing grade on the pass/no pass option; nonpunitive.
- I** Incomplete; a nonpunitive grade given only during the last one-fourth of a semester and only if a student is 1. passing the course; 2. has justifiable reason why the work cannot be completed on schedule; and 3. arranges with the instructor to finish the course at a later date by completing specific requirements which the instructor must list on the grade sheet. For information on removal of I, see "Removal of I" below.
- PR** Assigned at the close of each semester or summer term in which the graduate student is enrolled in thesis (5950) or dissertation (6950). No credit hours are shown when the grade of PR is assigned. When the thesis or dissertation has been completed and submitted to the graduate dean, appropriate grades and credit hours will be shown on the student's record for the required number of enrollments.
- W** Drop or withdrawal without penalty. Given when a student drops a course or withdraws from the graduate school according to the dates in the academic calendar. See regulations for dropping and withdrawing.
- WF** Drop or withdrawal with failing grade. May be assigned after the



dates listed in the academic calendar. See regulations for dropping and withdrawing.

At the graduate level, no semester credit hours and no grade points are allowed for grades D, F, I, NP, P, PR, W, WF or Z.

A complete record of all previously used grades and grading systems is detailed on the official transcript.

### **Grade Point Average**

The overall grade point average (GPA) is used to determine student class loads, eligibility for admission to the graduate school and certain programs and eligibility for graduation. It is calculated by dividing the total number of grade points by the total number of semester hours attempted. All GPA calculations are subject to postaudit and correction by the Registrar's Office.

The number of semester hours attempted includes all courses with grades of A, B, C, D, F and WF unless replaced by a later grade. Courses with grades of I, NP, P, PR, W or Z are not counted as courses attempted.

### **Quality of Work Required**

The graduate student must maintain a 3.0 GPA on all courses that receive graduate credit, whether or not the courses are to be applied toward a graduate degree.

The student whose GPA earned at another institution is below 3.0 will be required to make up the deficiency either at the other institution or at the health science center. This regulation applies not only to graduate work attempted elsewhere before the student was first admitted to the Graduate School of Biomedical Sciences, but also to graduate work attempted elsewhere after the student's admission at the health science center.

Students must make satisfactory progress toward completion of degree requirements in order to remain in good standing within a specific degree program. Students whose progress is unsatisfactory may be removed from the program by the graduate dean on recommendation of the major department.

### **Probation and Suspension**

A student who fails to maintain the required GPA of 3.0 on all courses carrying graduate credit may initially be subject to academic probation. If the student's grades do not improve, the student may be subject to suspension for a period of up to one calendar year before becoming eligible to re-enroll for further graduate courses. Graduate work completed elsewhere during a period of graduate suspension at the health science center may not be counted for graduate credit at the health science center.

The student whose graduate school GPA falls below 3.0 must make up the deficit, either by repeating courses in which the grades are low, or by completing other graduate school courses with grades high enough to bring the graduate school GPA up to 3.0. Low grades made in graduate courses at the health science center may not be duplicated at other institutions.

### **Course Duplications**

A student may enroll for a course a second or subsequent time and have it counted as part of the semester's load. If a course is repeated, the last grade recorded will be considered by the graduate dean in certifying the student's eligibility for graduation.

The responsibility for initiating the official recording of a grade duplication lies entirely with the student. In the absence of such a request the registrar will include a repeated course in the student's cumulative record of hours attempted and grade points earned.

### **Grade Changes**

No grade except "I" may be removed from a student's record once properly recorded. Changes are not permitted after grades have been filed except to correct clerical errors.

Requests for error correction must be initiated immediately after the close of the semester for which the grade was recorded.

A faculty member who believes that an error has been made in calculating or recording a grade may submit *in person* a request for a grade change to the department chair and the graduate dean. The registrar accepts requests for grade changes from the graduate dean.

### **Grade Reports**

A grade report for each student is mailed to the student's permanent address at the close of each semester. It includes a statement of current academic status. If the grade report of the academic status is believed to be in error, the student should contact the Registrar's Office within 30 days.

At midsemester in the long sessions, instructors may provide individual written warnings to students who are doing unsatisfactory class work. These warnings are mailed from the Registrar's Office upon request of the instructor.

### **Pass/No Pass Grading**

Any department of the health science center may elect to assign pass/no pass grades in graduate-level courses in which the student is engaged in individual research and is not attending an organized class, and in thesis, dissertation and problems courses. The student should inquire at the office of the Graduate School of Biomedical Sciences at the time of registration for such courses whether a letter grade or a pass/no pass grade will be granted. Pass/no pass grades are not



taken into account in computing the student's graduate grade point average.

### ***Removal of I***

A student may remove a grade of "I" within one year of receiving the initial grade by completing the stipulated work, obtaining signatures of the instructor and the graduate dean (on a permit form from the dean's office), paying a \$5 fee at the Cashier's Office and returning the permit form to the instructor. The instructor then files the permit form in the Registrar's Office, along with the grade, and the grade point average is adjusted accordingly. If a student does not complete the stipulated work within the time specified (not to exceed one year after taking the course), the instructor may change the grade of "I" to a grade of F, if appropriate. The GPA is adjusted accordingly.

A student who could not complete final examinations because of illness may remove a grade of "I" without payment of the fee. The graduate dean is authorized to waive the fee upon certification of illness signed by the attending physician.

### ***Open Records Policy***

Pursuant to the provisions and intent of Article 6252-17a, Texas Civil Statutes, known as the Open Records Act, and the Family Educational Rights and Privacy Act of 1974 as amended, known as the Buckley Amendment, the graduate school has established a policy relating to the accessibility of information in the custody of the University of North Texas Health Science Center.

Student records that include general information concerning the student and the student's individual relationship to the educational institution are available on request to health science center personnel who have an educational interest in the records, the student, and the student's parent or legal guardian if the student is a

dependent for income tax purposes of the parent or legal guardian.

For information regarding the health science center's policy on access to records and to request accessibility to center records, contact the designated Custodian of Public Records, Office of the Vice President and General Counsel, UNT Health Science Center.

### ***Policies***

Policies and regulations are explained or printed in full in the Graduate Student Handbook, available in the graduate office. All health science center policies are subject to change throughout the year.

### ***Student Load***

Graduate students may schedule as many as 16 hours during any semester of the regular session, or seven hours in any summer term, if in the latter case the seven-hour load includes a four-hour laboratory course. For purposes of fulfilling the graduate residence requirement, a load of 12 semester hours is considered to be a full load.

Special restrictions apply to the load permitted to graduate teaching fellows and teaching assistants. The total load of course enrollment and teaching assignment may not exceed 16 semester hours in any long semester. Approval of the graduate dean is required for loads in excess of this amount, but approval will not be granted for a combined load in excess of 18 semester hours.

### ***Summons***

In the event a student's conduct or behavior is found to be in violation of a published policy or regulation, a summons may be issued. A summons is an official request that the student appear before a health science center administrator. It is always important and must have the student's immediate attention. Failure

to answer a summons can result in disciplinary action.

### ***Withdrawal from the Health Science Center***

A student may withdraw from the health science center at any time prior to the deadline in the academic calendar by making a request in the Registrar's Office. For withdrawals processed by the relevant deadline, the grade of W is recorded for each course in which a withdrawn student was enrolled. After this date a withdrawn student receives a grade of W only for those courses in which there were passing grades at the time of withdrawal; otherwise the grade WF is recorded.

Official dates and deadlines for withdrawing are specified in the Academic Calendar.

### ***Refund of Tuition in Case of Drops or Withdrawals***

Depending on the date of the drop or withdrawal, students may be eligible for full or partial refund of tuition. The amount of the refund is regulated by state law.



# Four/Master's Degree Program

## General Requirements

The candidate must earn 30 or more hours of graduate credit, depending upon the specific degree requirements. These degree requirements are determined by the graduate catalog currently in force at the time the student's degree plan is approved by the graduate dean.

Consult subsequent sections of this publication for the specific course requirements for the master's degree.

## Level of Work Required

A maximum of 15 semester hours earned in non-degree or certification status before admission to a degree program may be counted toward degree requirements.

Exceptions to these limitations are granted only by the graduate dean on request of the student's major department.

## Time Limitations

All requirements for the master's degree must be completed within six years.

As individual courses exceed this time limit they lose all value for degree purposes. Credits that are more than six years old at the time of first registration for graduate work are not transferable from other institutions.

Time limits are strictly enforced. Students exceeding the time limit may be required to repeat the comprehensive exam, replace out-of-date credits with up-to-date work, and/or show other evidence of being up-to-date in their major fields. Students anticipating that they will exceed the time limit should apply for an extension *before* the normal time period to complete the degree expires. Holding a full-time job is not considered in itself sufficient grounds for granting an extension.

Time spent in active service in the U.S. armed forces will not be used in computing the time limit. However, career

members of the armed forces should consult the graduate dean concerning the credit given to work completed before or during active military service.

## Use of Transfer Credit and Extension Credit

Subject to the approval of the graduate dean and the department concerned, a student who holds a bachelor's degree and who has been admitted to the Graduate School of Biomedical Sciences may apply toward a master's degree up to six semester hours of graduate work completed elsewhere.

Subject to the approval of the graduate dean and the department, Graduate School of Biomedical Sciences extension credit may be applied toward the master's degree in the same ratio as transfer credit stated above, or in combination with transfer credit, so long as the total number of semester hours of combined transfer and extension credit does not exceed the limits stated above. Extension and correspondence credit earned at other institutions will not be counted toward a graduate degree at the health science center.

It is the student's responsibility to make sure that official transcripts of courses completed elsewhere are furnished to the office of the graduate dean, and that graduate credit has been assigned by the other institution or institutions to whatever courses are to be counted toward the health science center degree. Such courses, although listed on the health science center degree plan, will not be counted toward the degree until official transcripts showing graduate credit have been received and the credit has been approved by the graduate dean. All transfer courses are subject to the time limitation described above.

If transfer credits do not show a B average, the student is required to make up the deficiency either at the institution where the credit was earned or at the

UNT Health Science Center.

In accordance with the rules of the Texas Higher Education Coordinating Board, at least one-third of the semester hours required for any graduate degree must be completed in course work on the health science center campus.

## Master's Program Requirements

Each student is responsible for the completion of the master's program according to the procedures that follow. Each item must be completed in the sequence and time period indicated. See the graduate office regarding paperwork when completing each step.

1. Acceptance into the graduate school.  
If a student has been accepted on probation, he or she must take a minimum of eight credit hours of formal graduate course work during the first regular semester of enrollment. A minimum GPA of 3.0 must be obtained.
2. Before registration in the second semester, the student must select a supervising professor and a graduate advisory committee. The graduate office will notify all new students of this deadline one month prior to the end of each semester. The committee will consist of the supervising professor and at least two other professors.
3. The committee will meet to approve a degree program for the student prior to registration in the second semester. Course work deficiencies will also be stipulated at this time. In addition, the student and the committee will select Option 1 (BMSC 5950, Thesis) or Option 2 (BMSC 5920, 5930, Problem in Lieu of Thesis). A master's degree resulting from selection of Option 2 will be considered as a terminal degree in the University of North Texas Health Science Center, Graduate School of Biomedical Sciences.

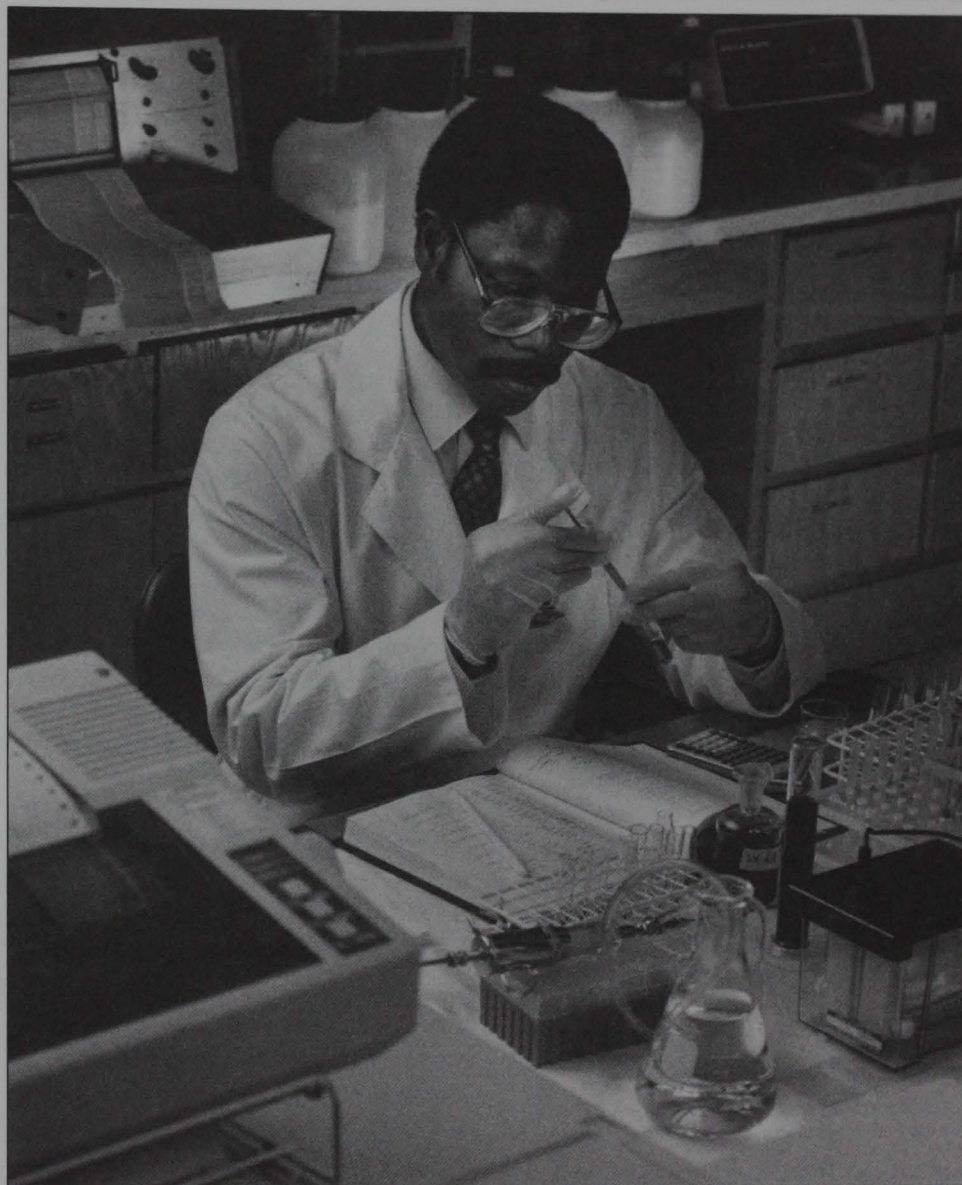


The requirements set by the graduate school are that a minimum of 30 hours of credit must be taken for thesis and 36 hours for problem in lieu of thesis of which 15-20 must be in core courses plus six hours of thesis. The use of Special Problem course numbers (i.e. 5900, 5910) is **limited to a maximum of six hours.**

4. Before the end of the student's second regular semester, a **research proposal** should be approved by the committee.
5. A student must maintain continuous enrollment in a minimum of three credit hours of thesis during each long semester and at least one summer session until the thesis has been accepted by the dean of the graduate school. Students must maintain continuous enrollment once work on the thesis has begun.

Failure to maintain continuous enrollment will either invalidate any previous thesis credits or will result in the student being dropped from the degree program unless granted an official leave of absence by the graduate dean for medical or other exceptional reasons.

6. The completed thesis or problem in lieu of thesis will be submitted to the committee at least two weeks before the deadline required by the graduate school.
7. A formal seminar pertaining to the thesis or research problem will be presented in the department in the student's last semester.
8. A final oral examination over the thesis or research problem and related work will be given by the committee immediately following the seminar.
9. **Three** copies of the thesis or problem in lieu of thesis are required for graduation.





# Five/Doctoral Degree Program

## General Requirements

The candidate must earn a minimum of 60 hours of graduate credit beyond the master's degree or 90 hours beyond the bachelor's degree.

This quantitative requirement must be regarded as a minimum. The quantity of course work to be completed by each candidate is arranged individually by the supervisory committee, subject to the approval of the graduate dean, and may be modified both as to quantity and as to type during the progress of the student's course work.

## Residency Requirement

Every candidate for the doctoral degree must complete the appropriate residency requirement at the health science center. The minimum residency requirement consists of two consecutive long semesters at the health science center's graduate school (fall and the following spring, or spring and the following fall), or a fall or spring semester and one adjoining summer session at UNT. During the long semesters a minimum of 9 hours must be taken. During the combined summer terms a minimum load of 9 semester hours must be taken. Some departments have established more stringent residence requirements appropriate to their programs.

## Level of Work Required

A maximum of 15 semester hours earned in non-degree or certification status before admission to a degree program may be counted toward doctoral degree requirements. Exceptions to this limitation are granted only by the graduate dean on request of the student's major department.

## Time Limitations

All work to be credited toward the doctoral degree beyond the master's

degree must be completed within a period of 10 years from the date doctoral credit is first earned. No course credit beyond the master's degree that is more than 10 years old at the time the doctoral program is completed will be counted toward the doctorate.

Time limits are strictly enforced. Students exceeding the time limit may be required to repeat the comprehensive exam, replace out-of-date credits with up-to-date work, and/or show other evidence of being up-to-date in their major and minor fields. Students anticipating that they will exceed the time limit should apply for an extension *before* their ninth year of study. Holding a full-time job is not considered in itself sufficient grounds for granting an extension.

Time spent in active military service of the United States will not be considered in computing these time limits. However, career members of the armed forces should consult the graduate dean concerning credit given to work completed before or during active military service.

## Transfer and Extension Work

Depending on the student's previous preparation and needs, as many as 24 hours of advanced study beyond the master's degree or its equivalent completed at another institution may be accepted and credited toward the doctorate, providing the candidate's advisory committee recommends acceptance of transfer credit to the graduate dean.

The student beginning doctoral study at the health science center should bear in mind that transfer credit is not allowed on the doctorate until all requirements governing admission to candidacy have been met and that such credit must in all cases be individually evaluated by the supervisory committee, recommended by the major department and approved by the graduate dean. The rule governing the

time limit for doctoral credit applies also to transfer credits. Extension credit earned elsewhere may not be applied toward the doctorate at the health science center.

If transfer credits earned either before or after the first doctoral enrollment at the health science center do not show a 3.0 GPA, the student is required to make up the deficiency either at the institution where the credit was earned or at the health science center.

In order to be applied to a doctoral program at the health science center, courses completed elsewhere must have been taken at an institution that offers the doctoral degree in the area in which the courses were taken, or in a closely related area.

In accordance with the rules of the Texas Higher Education Coordinating Board, at least one-third of the semester hours required for any graduate degree must be completed in course work on the campus of the UNT Health Science Center.

## Degree Plan

A degree plan listing all courses should be completed by the student, approved by the student's advisory committee and department chair, and submitted to the graduate dean at an early point in the student's progress toward the degree, preferably soon after the first full semester of doctoral study has been completed.

The major professor and committee members are chosen on the advice of the department or division chair or graduate advisor in the major area. All subsequent requests for degree plan changes must be submitted in writing by the major professor to the graduate dean.

Doctoral degree requirements listed in the graduate catalog currently in force at the time the student's degree plan is approved by the graduate dean are those that need to be completed by the student.

Courses listed on the degree plan must carry letter grades, with the exception of



those courses in which the student is engaged in individual research and is not attending an organized class. These courses, with the approval of the student's doctoral committee, may be assigned pass/no pass grades with the completion of the proper form.

### ***Qualifying Examination and Admission to Candidacy***

The student who has completed all courses required for the degree (exclusive of dissertation) and has satisfied all admission and tool subject requirements should request that the major professor arrange for the qualifying examination to be held. Consult the graduate advisor in the major area for information about the qualifying examination requirement.

Ordinarily no dissertation enrollment is permitted until this examination has been passed. Students are admitted to candidacy for the doctoral degree by the graduate dean upon successful completion of the qualifying examination and other requirements.

### ***Dissertation Requirement***

A dissertation is required of all candidates for the doctorate. In general, 12 hours of credit are allowed for the dissertation. The student is required to enroll for dissertation credit under the course number BMSC 6950 and must maintain continuous enrollment in 6950 until the dissertation has been completed and submitted to the graduate dean. Enrollment in 6950 is limited to nine hours in each long term. Grades of PR will be recorded at the end of each semester or term of enrollment until the dissertation is filed with the Graduate School of Biomedical Sciences and approved by the graduate dean. Appropriate grades and credit hours will then be shown on the student's record. Three hours of dissertation enrollment are required during at least one summer

session to maintain continuous enrollment.

Before the dissertation proposal defense is convened, the major professor should request that the graduate dean appoint a health science center graduate faculty member to serve as a university member on the student's dissertation advisory committee. The university member will be a signing member of the student's dissertation committee with the full rights and responsibilities of any other committee member.

Before beginning the dissertation, the student should also consult the graduate office for information concerning the proper form for preparation of the paper.

When the dissertation is completed and has received preliminary approval of the advisory committee, the student's major professor will schedule the final comprehensive examination and notify the Graduate School of Biomedical Sciences of the date and time of the examination. The dissertation may not be submitted to the graduate dean until this examination has been passed.

No dissertation credit will be recorded until the dissertation has been approved by the student's advisory committee, submitted to the office of the graduate dean and finally approved by the graduate dean. Instructions for submission of the dissertation may be obtained from the office of the graduate dean.

### ***Continuous Enrollment***

A student must maintain continuous enrollment in a minimum of three semester hours of thesis or dissertation during each long semester and at least one summer semester until the thesis or dissertation has been accepted by the dean of the Graduate School of Biomedical Sciences.

Doctoral students must maintain continuous enrollment subsequent to passing the qualifying examination for admission to candidacy. Master's students

must maintain continuous enrollment once work on the thesis has begun.

### ***Doctoral Program Requirements***

Each student is responsible for the completion of the doctoral program according to the procedures below. Each item must be completed in the sequence and time period indicated. See the graduate office regarding paperwork when completing each step.

1. A major professor should be selected by the student at the earliest possible time, in any event, before enrollment in the student's second long semester.
2. The student should meet with the intended major professor for guidance until a doctoral committee and degree plan are established.
3. A major professor and the student should select at least four doctoral committee members from the graduate faculty.<sup>1</sup> The student has the responsibility for obtaining the agreement of the professors (using the Designation of Doctoral Advisory Committee Form) and will complete this before enrollment in the third long semester.

<sup>1</sup> University Member - The Graduate Council requires that *at least one university member* in addition to the other members of the doctoral student's committee, chosen from outside the student's major department, should be incorporated into the process of developing and writing the doctoral dissertation, from the formal or substantive inception of the topic through the comprehensive examination and final approval of the dissertation. The university member, or members, should take part in any formal hearing ("proposal defense") at which the topic is approved and should have a vote on the acceptance of the proposal. He or she should be a voting member of the final examination committee and should sign the dissertation fly pages.

Graduate faculty members should proceed to develop and adopt statements of policies and procedures for the implementation of the policy stated above, taking into account the individual needs of the various departments and addressing specifically the question of when and how the university member or members have first contact with and participate in the dissertation process.

Exceptions to this policy may be approved by the Graduate Council upon recommendation by the graduate dean.



4. The committee should meet and evaluate all credentials of the student pertinent to the development of the degree program. An approved degree plan will then be submitted to the chair of the department and to the Dean of the Graduate School of Biomedical Sciences. The committee should meet with the student as needed to discuss progress, but must meet at least once per academic year. **The doctoral committee has sole responsibility for quality control of the student's Ph.D. program.**
5. **A degree plan must be filed before the student can enroll for his or her second academic year.**
6. A research proposal must be approved by the doctoral committee as soon as possible after completion of the degree plan.
7. A student must maintain continuous enrollment in a minimum of three credit hours of dissertation during each long semester and one summer semester until the dissertation has been accepted by the dean of the graduate school.

Failure to maintain continuous enrollment will either invalidate any previous dissertation credits or will result in the student being dropped from the degree program unless granted an official leave of absence by the Graduate Dean for medical or other exceptional reasons.
8. The student will notify his committee upon passing the tool subject requirement in accordance with regulations set forth by the Graduate Council and the Graduate School of Biomedical Sciences.
9. Written and oral qualifying examinations intended to establish the student's candidacy for the Ph.D. degree will be administered by the committee upon fulfillment of the tool and course work requirements. Qualifying examinations must be

completed at least nine months before the intended graduation date. Results of the qualifying examinations will be sent to the graduate school in writing. Each student is required to write and defend a grant proposal as a minimum qualifying exam. Individual departments may have additional qualifying exam requirements, which are indicated in their graduate program descriptions.

10. Upon completion of the research and after consultation with the major professor, the student will submit a rough draft of the dissertation to the committee members at least one month before the graduate school deadline for receipt of the final draft and at least two weeks before the final defense. Committee members should return corrected drafts to the

student as soon as possible. Working through committee members at all times, the student and major professor will resolve comments arising from the rough draft and incorporate them into a final draft.

11. During the final semester before graduation, the student will present a formal departmental seminar on the research. This seminar should be scheduled immediately before the final defense.
12. The doctoral committee will administer the final examination and sign final copies of the dissertation. The committee will notify the graduate dean of the final examination results.
13. **Three** copies of the dissertation will be submitted to the graduate dean by deadline date.





# Six/Dual-Degree Programs

## Joint D.O./Ph.D.

### General Description

The dual-degree program is a course of study by which a student may concurrently pursue the D.O. degree through the Texas College of Osteopathic Medicine and the Ph.D. degree through the Graduate School of Biomedical Sciences. The program is normally six years in duration. At the end of this time, the student is expected to have completed the curriculum requirements for the D.O. degree in accordance with TCOM policies and for the Ph.D. degree in accordance with policies of the graduate school and the relevant department of the University of North Texas Health Science Center as they apply to the second degree.

### Format

The general format of the dual-degree program is depicted in the attached diagram and explained below. While the format depicted may be regarded as the standard working format, it is understood that deviations from this format that meet the curriculum requirements are also acceptable.

**Block 1.** Block 1 consists of the preclinical years for the D.O. degree. During Block 1, the student will complete the first five semesters of the D.O. curriculum and will pass Part 1 of the United States Medical Licensing Examination (USMLE). During this block the student will register only at TCOM. An exception to this rule is if the student wishes to register for graduate courses which are not part of the D.O. curriculum during this block. In this case, the student will register for such graduate courses through the graduate school. During Block 1 the student will select a graduate advisory committee, and will file an approved graduate degree plan of at least 45 credit hours with the graduate school.

**Block 2.** Block 2 consists of two years dedicated to graduate study. In order to maintain enrollment at TCOM during this block, the student will register for a three-hour course in directed studies each semester of this block. (Hours for directed studies will not apply toward the Ph.D.) However, the major course load for the student during Block 2 will be through the Graduate School of Biomedical Sciences. Thus, during Block 2 the student is expected to complete all course work required for the Ph.D. degree, with the exception of dissertation, pass the qualifying examination for the Ph.D. degree and have an approved dissertation research proposal.

**Block 3.** During Block 3, the student will complete the required clinical rotations and electives and will pass Part 2 of the USMLE. During this block, the student may also continue work toward the Ph.D. dissertation.

At the end of Block 3 the student is expected to have completed the curriculum required for the D.O. degree and to have completed at least 45 additional hours of graduate courses under the Graduate School of Biomedical Sciences as required for the second degree, including the research dissertation. Following completion of the curriculum required for both degrees, the student is awarded the D.O. degree through TCOM and the Ph.D. through the Graduate School of Biomedical Sciences of the UNT Health Science Center.

### Entrance Requirements

The entrance requirements for the dual-degree program are identical to those for the D.O. program at TCOM and the Ph.D. program in the Graduate School of Biomedical Sciences as described in the respective catalogs, with the following exceptions:

- An overall undergraduate GPA of at least 3.0 is required.

- A competitive GRE or MCAT score is required.

### Cost of the Program

Since dual-degree students are enrolled at UNT Health Science Center throughout the six years of study, they will pay the standard medical school tuition during each block. They also pay the hourly tuition rate for all courses not required for the D.O. degree, i.e., the 45 or more credit hours required for the second degree.

### Financial Assistance

The health science center will provide financial assistance to all students applying and selected for the dual-degree program. The minimal financial assistance will consist of a fellowship in an amount sufficient to pay all tuition costs during Block 2 and usually a graduate stipend during this time.

### Administration of the Program

Since the dual-degree program requires the student to follow a separate curriculum in each of two schools, each school will have administrative authority over the student's degree program.

## Joint D.O./M.S.

Some students may elect to take a joint D.O./M.S. degree. Students in this program receive up to 24 hours of credit for their didactic medical basic science courses toward their M.S. degree and take six semester credit hours of thesis. See Chapter Four for requirements of the M.S. degree program that must be met for the joint program. The graduate office will help the students select a major department and mentor to assist students in preparing a degree program.



# Seven/Fiscal and Financial Aid Policies

## Tuition and Mandatory Fees

The amounts shown below are subject to change without notice by action of the Texas Legislature or the University of North Texas Board of Regents. For current information on tuition and fees, see the Graduate School of Biomedical Sciences' Tuition and Fee Register printed for the particular academic year in which enrollment is planned, or inquire in the graduate office.

The UNT Board of Regents has been granted the authority, within established guidelines, to set graduate tuition rates by program.

Graduate tuition is \$38 per credit hour for in-state residents and \$174 per credit hour for out-of-state students. To calculate costs for graduate courses, use the table below.

Students are responsible for payment of the charges listed in the table below.

## Admission Application Fee

All applicants new to the University of North Texas Health Science Center must pay a \$25 (U.S. residents) or \$50 (foreign students) non-refundable admission application fee.

## Option to Pay Tuition by Installment

The Texas Legislature has the authority

to modify or eliminate installment payment of tuition at each regular or called legislative session.

The health science center allows the payment of tuition and fees during the fall and spring semesters through the following alternatives:

- full payment of tuition and fees upon registration or by the payment deadline for early registration; or
- one-half payment of tuition and fees upon registration, or by the payment deadline for early registration, with separate one-fourth payments before the start of the sixth and 11th class weeks. *Note:* All course-related or optional fees are paid with the initial installment payment.

## Fees (Non-Refundable) for Payment of Tuition by Installment

Handling fee: \$15

Delinquent payment fee: \$15

See Graduate School Schedule of Classes for procedures and policies concerning installment payment of tuition.

## Tuition and Fee Payments

Tuition and fee payments may be made by cash, cashier's check, money order or personal check.

## Tuition and Fee Policies

Tuition covers graduate work. It and the various fees provide limited health

services and admission to various center-sponsored events. Course-related fees and materials are additional. Students must purchase their own textbooks and supplies.

Fees charged for application, late registration, duplication of records, graduation and regalia, late filing for graduation, replacement diplomas and miscellaneous items are noted in the 1994-95 Tuition and Fee Register available at the graduate office.

## Residency Regulations for Tuition Purposes

Rules and regulations for determining residency status are specified under Title III of the Texas Education Code and are available in the health science center Office of Medical Student Admissions and the Graduate School of Biomedical Sciences. In general, students must physically reside in Texas for the 12-month period immediately preceding their initial registration in an educational institution in Texas. Other factors may be considered for residency determination for tuition.

Students who are not legal residents of Texas must pay non-resident tuition including the statutory tuition charges and standard health science center fees approved by the UNT Board of Regents. Admission requirements for non-residents are the same as for resident students.

## TUITION AND MANDATORY FEES

	TEXAS RESIDENTS	NON-RESIDENTS	
Tuition per semester hour	\$38	\$174	Minimum of \$100 in long semesters; \$50 in summer terms
General use fee per semester hour	\$6	\$6	Maximum \$60
Student service fee per semester hour	\$6	\$6	Maximum \$72
Activities Center fee	\$25	\$25	
Computer fee	\$25	\$25	
Medical fee	\$25	\$25	
Identification card fee	\$5	\$5	One-time fee; replacement ID cards are \$5
Property damage deposit	\$10	\$10	One-time charge, refundable on graduation or final withdrawal.

Tuition rates for non-resident and foreign students must be determined not later than January 1 of each odd-numbered year by the Texas Higher Education Coordinating Board. The tuition rate is currently set at \$174 per semester credit hour.



Certain residency exceptions do not affect actual residency status but do allow for a non-resident tuition exemption. Refer to "Tuition and Fee Waivers" section of this chapter for further information.

### ***Responsibility of the Student***

The student is responsible for knowing residence status and for registering under the proper status. Any questions concerning residency must be discussed with the proper authority in the graduate office before registration.

Any student erroneously classified as a resident will be reclassified and will be required to pay all out-of-state tuition due. Attempts to evade non-resident fees may subject the student to the statute penalty and to possible disciplinary action.

### ***Change of Status: Non-resident to Resident***

A student who is at any time classified as a non-resident retains non-resident status until reclassification as a resident is applied for and is officially approved by the registrar.

### ***Change of Status: Resident to Non-resident***

Students who are classified as residents but become non-residents by virtue of any change of domicile must notify the registrar of such change immediately. Students who believe they have been erroneously classified have the opportunity for appeal. The appeal is to be made to the authority by whom the original classification was assigned, either in the graduate office or in the Registrar's Office.

### ***Tuition and Fee Waivers***

Several exemptions and waivers are available to qualifying students. Brief descriptions of these are listed below. Waiver refunds must be requested during

the semester application is made. Such requests must be made before the 12th class day in long semesters and the fourth class day in summer terms. Requests for retroactive refunds cannot be honored. Additional information and applications are available in the graduate office.

### ***Exemptions and Waivers***

1. Certain veterans, dependents, etc., of the U.S. armed forces are exempted from payment of tuition.
2. Certain orphans of members of the U.S. armed forces, Texas National Guard and Texas Air National Guard are exempted from payment of tuition.
3. Certain students from other nations of the American hemisphere are exempted from payment of tuition.
4. Deaf or blind students are exempted from payment of tuition.
5. Children of disabled firemen, peace officers, employees of the Texas Department of Corrections and game wardens are exempted from payment of tuition.
6. Children of U.S. prisoners of war or persons missing in action are exempted from payment of tuition.
7. Resident rather than non-resident tuition is applied to teachers and professors of Texas state institutions of higher education, their spouses and their children.
8. Resident rather than non-resident tuition is applied to a teaching or research assistant provided the student is employed at least one-half time by the health science center in a position that relates to the degree sought.
9. Resident rather than non-resident tuition is applied to a non-resident holding a health science center competitive academic scholarship of at least \$200 for the academic year for which the student is enrolled.

10. Students who are concurrently enrolled in more than one public institution of higher education in Texas may pay a reduced tuition rate at the health science center.
11. Certain health science center fees are waived for UNT or health science center full-time employees, their spouses and their dependents.
12. Certain health science center fees are waived for students enrolled only in off-campus courses.

### ***Tuition and Fee Refunds***

A student who drops a course or withdraws from the graduate school within certain time periods may be entitled to a partial refund of tuition and fees. These refunds are calculated according to the category and time schedule listed below. Application fees, late registration charges, fee for student identification card, delinquent payment fees, and installment handling fees are non-refundable. Any financial obligation to health science center must be resolved before any refunds will be made.

### ***Class Drops***

Refunds are made for any course dropped through the 12th class day for the long semester and through the fourth class day in the summer (see Academic Calendar for dates). The semester's first class day is always the first official day of classes for the graduate school and not the first day of an individual's class.

To calculate the refund for a class dropped, take the fee paid for the original hours and subtract the fee shown in the Tuition and Fee Register for the new number of hours. The difference between the two is the amount of the refund. *Note:* If all classes for the semester are dropped, see "Schedule of Withdrawal Refunds" in this catalog.



## ***Withdrawal from the Graduate School of Biomedical Sciences***

Withdrawal refunds are determined by the number of enrolled semester credit hours at the time of withdrawal. Withdrawal percentages are applied to the total amount of tuition and fees as prescribed by state law, not the amount paid. The withdrawal schedule and percentages of refund shown below pertain to total withdrawal for the semester. The withdrawal schedule and the percentages of refund are mandated by the Texas Legislature. The semester's first class day is always the first official graduate school day of classes and not the first day the individual attends class. A withdrawal refund is based on the day of withdrawal, regardless of the date the class first meets. See the Academic Calendar in this catalog for the dates classes begin.

Additional information may be found in the Tuition and Fee Register or by contacting the graduate office.

### ***Refund of Property Damage Deposit***

A student who does not return to the university because of a transfer, graduation or withdrawal from school must request refund of the property damage deposit; the refund is not automatic. If not claimed within four years after the last enrollment date, the deposit is nonrefundable and the proceeds are used to fund scholarships and activities.

Request for refund of this deposit should be made to the graduate office.

## ***Schedule of Withdrawal Refunds***

UNT Health Science Center shall refund a percentage of tuition and mandatory fees to students withdrawing from the institution during a fall or spring semester according to the following withdrawal schedule:

Before first day of class	100%
During the first five class days	80%
During the second five class days	70%
During the third five class days	50%
During the fourth five class days	25%
After the fourth five class days	None

## ***General Financial Policies***

The UNT Health Science Center is a state-supported institution subject to state laws. Extension of credit is prohibited and all financial obligations to the health science center must be paid when due. Tuition and fees are subject to change by action of the Texas Legislature or the UNT Board of Regents.

### ***Correction of Errors***

Students are responsible for any additional amounts due the health science center resulting from auditing and correction of records after registration fees have been paid including all registration assessment errors, change from off-campus to on-campus classes, invalid employment waivers, etc.

### ***Payments by Third Party***

Checks issued by a third party in payment of a student's tuition, fees or other charges should be made payable to either the student or to both the student and the health science center. Arrangements may be made with the graduate office in cases where cash

amounts should not be made available to the student.

## ***Returned Checks***

A returned check is defined as any check returned to the health science center unpaid due to no fault of the bank or the university.

Upon receipt of a returned check, notification is mailed to the issuing party or the individual in whose behalf the check was issued. The address on the check and/or the address in the official health science center records is used.

## ***Financial Aid***

The health science center provides several methods of assisting students in financing their education. Applications and complete descriptions of all programs, requirements and qualifications are available at the Financial Aid Office, Medical Education Building 1, Room 116, 817-735-2520.

### ***Application Period and Deadlines***

The financial aid application period begins January 1 of each year for the following academic year. Students must apply by the following priority dates in order to ensure first consideration for awards.

Fall semester: June 1  
Spring semester: October 1  
Summer semesters: April 1

Tape exchange data from outside processing agencies and all other required documentation must be on file and complete in the Financial Aid Office before these priority dates.



## **General Eligibility Requirements**

Before any Title IV assistance is granted (Federal Pell Grant, Federal Supplemental Educational Opportunity Grant, Federal College Work Study, Federal Perkins Loan or Federal Stafford Loan), general eligibility and program requirements must be met. To be eligible for financial aid you must meet the following criteria:

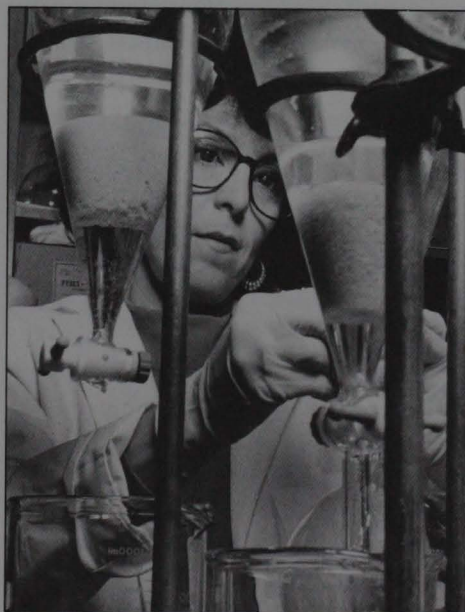
1. establish financial need through the appropriate need analysis form
2. be accepted by the graduate school for admission in good standing if you are a new or transfer student
3. not be in default on any Title IV loan (Federal Perkins or Federal Stafford) or owe a refund or repayment on educational funds received at any institution
4. be a U.S. citizen or permanent resident of the United States
5. be registered for the draft with the Selective Service if you are a male at least 18 years old born after December 31, 1959, and you are not a member of the armed services
6. enroll in at least a half-time class load (for most programs)
7. use all funds received through financial aid for educational purposes
8. show reasonable academic progress toward a degree

## **Special Conditions for Financial Aid Recipients**

1. Students who withdraw from classes must go to the Financial Aid Office for official clearance before leaving the health science center.
2. Any refunds that result from withdrawal from the health science center may be credited or applied to the programs of assistance from which money was originally awarded.

Additional repayment of funds disbursed to students who withdraw may be required.

3. Official transcripts are not issued to any student who has an unpaid account or owes a delinquent student loan at the health science center.
4. Federal and state regulations require that each student must maintain reasonable academic progress to be eligible for financial aid programs. Reasonable academic progress is defined in both quantitative and qualitative measures. The quantitative measure requires an undergraduate to:
  - complete all course degree requirements within a maximum of 125 semester credit hours of enrollment, and
  - complete a minimum number of the required course hours each semester of enrollment as defined below.



## **Other Assistance Programs**

Available student financial aid programs are described below. If additional information is needed, contact the Financial Aid Office.

### **Loan Programs**

#### **Federal Perkins Student Loan**

The Federal Perkins Student Loan is federally funded. Awards are based upon available funds, financial need, academic standing and at least half-time enrollment. Maximum and aggregate limits are imposed based upon classification status.

Repayments begin six months after termination of at least half-time enrollment, and general repayment criteria vary depending upon the time the funds are borrowed from the program.

#### **Hinson-Hazlewood Loan**

This loan is for Texas residents and is based upon financial need and enrollment of at least half-time in good academic standing. Maximum and aggregate limits are imposed based upon classification status. Repayment criteria vary depending on the time the funds are borrowed.

#### **Federal Stafford Loan**

All Federal Stafford Loans are awarded based upon financial need, academic standing and at least half-time enrollment. Maximum and aggregate limits are imposed based upon classification status. Repayment criteria vary depending upon the time the funds are borrowed.



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### ***Short-Term Loans***

A student may apply for short-term loans of up to \$500 for each long semester or \$250 for a summer session. A student must meet the following criteria:

1. Maintain reasonable academic progress
2. Be enrolled at least half-time
3. Demonstrate a means of repayment
4. Secure a co-signer if required. This co-signer must submit a notarized Co-Signer Statement of Responsibility and may not be a health science center student
5. Have no delinquent prior student loans
6. Pledge to use the funds for direct educational expenses

All short-term loans have a five percent interest rate. A signed Promissory Note is the official notification of a loan due date, which is determined by the Financial Aid Office.

### ***Employment***

#### ***Federal College Work Study Program***

Eligibility for the Federal College Work Study Program is determined by financial need, academic standing and at least half-time enrollment. Students awarded the Federal College Work Study Program can go to Human Resource Services to be referred for job interviews. Most positions require 15 - 20 hours of work per week. Referrals for job interviews are based upon availability of funds, student work skills, educational background and interest. Eligibility must be determined each semester to continue in the Federal College Work Study Program.

### ***Benefits for Veterans***

Students who have served on active duty may be eligible for educational benefits from the federal Department of Veterans Affairs.

The Department of Veterans Affairs also provides educational assistance to widows and children of veterans who died while in service or after discharge from a service-connected disability, and wives and children of veterans who have a service-connected disability considered to be total and permanent in nature. Forms and information concerning certification for VA benefit purposes are available in the Registrar's Office.

Veterans with specific questions concerning the administration of benefits should contact the regional VA office in Waco, 800-827-2012.

### ***Hazelwood Act for Texas Veterans***

Application forms and information on tuition waivers for qualified veterans are available in the Registrar's Office, Medical Education Building 1, Room 502.



### **Student Affairs**

Staff members of the Office of Student Affairs are available for general counseling or information and assistance with any phase of campus life. In emergency situations (such as death in the family) special assistance can be provided for notification of professors, medical withdrawal, etc. The office provides policy interpretation and rights adjustment upon request, handles disciplinary and social adjustment problems, and provides self-development opportunities and enrichment activities.

### **Health Insurance Program**

A group student health insurance plan is offered by a non-university-affiliated carrier for students enrolled at the health science center. Application forms are available in the Office of Student Affairs. *It is compulsory for all students to carry medical and hospitalization insurance.* See the graduate office for details.

### **International Student Health Insurance Policy**

*All international students are required to have health insurance before enrolling at the graduate school.* Evidence of health insurance coverage must be presented to the international student advisor before registration. Coverage must be in effect continuously from the time the student initially enrolls at the health science center through all enrollment periods until final separation from the health science center.

### **Identification Card Regulations**

The identification card is distributed after all fees have been paid. The card entitles the bearer to access to all health science center facilities and serves as an identification for clinic and health services.

Lost ID cards may be replaced for a \$5 charge.

The card is void upon termination or interruption of enrollment and when not properly encoded.

Fraudulent use of the ID card subjects the user to a fine of \$2,000 and up to one year in jail (Class A Misdemeanor). Anyone who uses the ID card to give false information to a police officer is subject to a fine of \$200 (Class C Misdemeanor).

### **Liability**

The health science center is not responsible for and does not assume any liability for loss of or damage to personal property. A student may want to provide personal insurance coverage for possessions on campus.

### **Motor Vehicle Regulations**

People who operate motor vehicles and bicycles on the health science center campus must comply with the Texas Uniform Traffic Code and the published

center regulations regarding vehicle and bicycle use, parking, display of decals and penalties for violation. See Graduate Student Handbook for details on parking policies.

### **Organizations Policy**

The University of North Texas Health Science Center recognizes the right of any group of students, faculty or staff to form a voluntary organization for purposes not forbidden by the laws of the United States or the state of Texas. All organizations that include enrolled students as members must be registered with the Office of Student Affairs if they will use any university facilities, space or grounds for meetings.

Policies regulating the organization, functioning, sponsorship and privileges of registered or recognized organizations are available in the Office of Student Affairs.

An active Graduate Student Association is present on campus and students are encouraged to participate in this important organization.





# Nine/Curriculum and Course Descriptions

The Graduate School of Biomedical Sciences offers both the M.S. and Ph.D. degrees in biomedical sciences. The graduate school encourages students to acquire a broad base of knowledge in those disciplines that flourish in the environment of a health science center and requires each student to pursue specialized research and study in a particular area of biomedical science. The training students obtain equips them for professional careers in health science centers, universities and industry. Although students obtain a degree in biomedical sciences, a concentration in a subdiscipline may be chosen from: anatomy and cell biology; biochemistry and molecular biology; microbiology and immunology; pharmacology; and physiology.

The M.S. in biomedical sciences requires a minimum of 30 credit hours.

The Ph.D. in biomedical sciences requires a minimum of 90 credit hours.

## Core Curriculum Requirements

Entering students to the graduate program are expected to complete the core requirements described as follows. For those students entering the Ph.D. program with an M.S. degree, the core program will be determined by the student's Ph.D. degree committee. In some instances, students may be required to take additional courses or a request to waive a core requirement depending on their background. This shall be determined by the student's committee and approved by the graduate dean.

## M.S. Core Program

BMSC 5960 Biomedical Ethics: 1 credit  
 BMSC 5950 Master's Thesis: 3 to 6 credits  
 BMSC 5940 Seminar in Current Topics: 1 to 3 credits  
 Three core courses: 3 of 5 subdiscipline core listings: 9 to 12 credits  
 Electives: 9 to 12 credits

## Ph.D. Core Program

BMSC 5960 Biomedical Ethics: 1 credit  
 BMSC 5940 Seminar in Current Topics: 1 to 3 credits  
 BMSC 5970 Techniques in Biomedical Science: 3 credits  
 BMSC 6010 Seminar for Doctoral Students: 3 credits  
 BMSC 6940 Individual Research: 3 to 24 credits  
 BMSC 6950 Doctoral Dissertation: 3 to 12 credits  
 Three core courses: 3 of 5 subdiscipline core listings (two outside major subdiscipline): 9 to 12 credits  
 Electives: 25 to 36 credits

In addition, Ph.D. students must demonstrate competency in a research tool by taking computer science courses, or they must have taken advanced mathematics and/or computer sciences (BMSC 6500 and 6510 or the equivalent). Students must demonstrate a competency in biostatistics.

## Core Courses

### Anatomy and Cell Biology

ANAT 5010 Gross Anatomy: 12 credits  
 ANAT 5110 Histology: 6 credits  
 ANAT 5120 Medical Neuroscience: 5 credits  
 ANAT 6020 Biomedical Cell & Molecular Biology I: 4 credits  
 ANAT 6030 Biomedical Cell & Molecular Biology II: 4 credits

### Biochemistry and Molecular Biology

BIOC 5010 Biochemical Principles & Metabolism: 7 credits  
 BIOC 5425 Advanced Biochemistry: 4 credits

### Microbiology and Immunology

MICR 5020 Medical Microbiology and Immunology: 6 credits  
 MICR 5030 Microbial Metabolism: 3 credits

### Pharmacology

PHRM 5010 Introduction to Pharmacology: 8 credits  
 PHRM 5030 Principles of Pharmacology: 3 credits  
 PHRM 6080 Receptors and Drug Action: 4 credits

### Physiology

PSIO 5020 Medical Physiology: 8 credits  
 PSIO 6070 Endocrine Physiology: 3 credits



## Course Descriptions

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### BIOMEDICAL SCIENCES (BMSC)

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**Graduate Faculty:** Agarwal, Alvarez-Gonzalez, Aschenbrenner, Barker, Barron, Berman, Caffrey, Cammarata, Chaitin, Chester, Coleridge, Cook, Dory, Downey, Easom, Eisenberg, Elko, Emmett-Oglesby, Forster, Fungwe, Gaugl, Gonzalez, Gracy, Grant, Gwartz, B. Harris, E. Harris, Kaman, Kurtz, Lacko, Lal, Lane, Licciardone, Luedtke, Lurie, Mallet, Martin, McConathy, Nicholson, Orr, Putthoff, Quist, Raven, Romeo, Roque, Rubin, Rudick, Scheel, Schneider, Schunder, Sheedlo, Shi, Shores, Stern, Turner, Wordinger, Wu, Yorio

**Adjunct Graduate Faculty:** Alcon Laboratories, Inc: Clark, DeSantis, Garner, McCartney, Pang; Baylor College of Dentistry: Guo, Kress, Niessen, Shulman; Osteopathic Medical Center of Texas: Zachariah; Presbyterian Hospital of Dallas: Babb, Pawelczyk; Texas Lutheran College: Squires

UNT Health Science Center maintains a reciprocal agreement with the University of North Texas regarding graduate faculty status to allow cross-committee assignments.

Prerequisite requirements may be waived on an individual basis as determined by department.

#### **5080. Radiation Safety.**

1 hour. Radiation sources, interaction of radiation with matter and human tissues, radiation measurement and dosage, instrumentation, regulations, and practical and safety procedures.

#### **5200. Biostatistics.**

6 hours. Statistical methods and experimental design; descriptive statistics; data presentation; parametric and non-parametric methods of hypothesis testing including two-sample tests, analysis of variance, regression and correlation analyses; introduction to multivariate statistics. Competency with computer statistical packages is developed.

#### **5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department chair. May be repeated for credit.

#### **5920-5930. Problem in Lieu of Thesis.**

3 hours each. In lieu of a thesis, the candidate must complete one or both of the problems courses. As part of the requirements for each course, the student must present in writing a formal report based upon the work done in the course, which must be approved by the advisory committee and filed in the graduate school. This report must be prepared according to instructions given in the manual for preparing the thesis. One copy of each paper is to be submitted to the graduate dean.

#### **5940. Seminar in Current Topics.**

1 hour. Specialized weekly lectures on topics of current interest by students, faculty and/or invited speakers. May be repeated for credit.

#### **5950. Thesis.**

3-6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit.

#### **5960. Biomedical Ethics.**

1 hour. Covers major ethical issues in biomedical sciences, including: authorship and intellectual property; conflict of interest; data selection/research design; privacy and confidentiality; discrimination and sexual harassment; misconduct and whistle-blowing; animals in research; human subjects in research; implication of funding sources for research.

#### **5970. Techniques in BMS.**

3 hours (may be repeated for credit). An interdisciplinary practical course in techniques. Students will participate in four four-week rotations in laboratories demonstrating up-to-date techniques in biomedical sciences. A listing of the techniques of participating laboratories is available upon request from the graduate school.

#### **6010. Seminar for Doctoral Candidates.**

3 hours. Demonstration of competence in a specific area of biomedical science as evidenced by criteria established by the faculty of each discipline.

#### **6500. Computer Applications in Science and Medicine.**

3 hours. Use of computers in the scientific and medical fields. Special attention is given to hardware configurations; using word processing, spreadsheets and databases; charting and graphing statistical data; and discussion of cross-platform issues. Practical integration of different software tools is addressed. Enrollment is limited.



**6510. Automated Information Resources in Science and Medicine.**

3 hours. Extensive training on the Internet, Library Information System (LIS), and MEDLINE is provided. Instruction is provided on creating correctly formatted bibliographies for journal article publication. Other search engines and databases such as Grateful Med and Current Contents are discussed. Prerequisite: BMSC 6500 or equivalent. Enrollment is limited.

**6900-6910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department chair. May be repeated for credit.

**6940. Individual Research.**

1-12 hours. Doctoral research of independent nature. 24 hours credit required.

**6950. Doctoral Dissertation.**

3, 6 or 9 hours. To be scheduled with consent of department. 12 hours credit required. No credit assigned until dissertation has been completed and filed with the graduate office. Doctoral students must maintain continuous enrollment in this course subsequent to passing qualifying examination for admission to candidacy. May be repeated for credit.

**6990. Postdoctoral Research.**

1-3 hours. For postdoctoral fellows to further training and research experience in developing and solving research problems independently. May be repeated for credit.

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**ANATOMY AND CELL BIOLOGY (ANAT)**

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*James Turner, Ph.D., Chair*

**Graduate Faculty:** Agarwal, Aschenbrenner, Cammarata, Chaitin, Kurtz, Moorman, Orr, Roque, Rudick, Sheedlo, Schunder, Turner, Wordinger

**5010. Gross Anatomy.**

12 hours. A complete study of the gross morphological features of the human body. Lecture material and dissection are organized regionally. Lectures are presented by anatomy department faculty supplemented by clinical faculty correlations for each region. There is a radiologic component in the laboratory consisting of representative X-rays, CAT scans and MRIs; clinical faculty in radiology present correlations. Each student is required to participate fully in dissection of a human cadaver for successful completion of the course.

**5110. Medical Histology and Cell Biology.**

6 hours. A thorough study of the cells, tissues and organs of the human body is presented. Laboratory sessions stress the interpretation of tissue morphology based on principles derived from modern molecular and cellular biology. Tissue sections are examined by means of light microscopy in the laboratory. Pertinent electron microscopic data are included when deemed necessary.

**5120. Medical Neuroscience.**

5 hours. Principles of neuroanatomy and neurophysiology fundamental to an understanding of basic clinical neurology. In addition to clinical case studies and presentations in neuropharmacology and neuroradiology, laboratory dissection of human brain material is an important component of the course. Prerequisites: ANAT 5010 and ANAT 5110.

**5210. Embryology.**

3 hours. Anatomical development of the human from fertilization to full term. Emphasis is on the early development and subsequent formation of organs and organ systems. Clinical presentations are integrated into the lectures to introduce the student to the more common congenital malformations. A library research paper is required.

**5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department. May be repeated for credit.

**6020. Biomedical Cell and Molecular Biology I.**

4 hours. Discussion of historical and current experimental information relating to the structure and function of eukaryotic animal cells. The cell membrane, nucleus, genetic translation, cytoskeleton, cellular organelles and extracellular matrix are presented in relation to cell growth and energetics as well as to cell motility and regulation of cell metabolism. Emphasis is on the critical evaluation of research papers and the integration of molecular biology, biochemistry and cell biology.

**6030. Biomedical Cell and Molecular Biology II.**

4 hours. An intensive laboratory course designed to give students the expertise to perform basic techniques currently utilized in cell and molecular biology. Techniques will include plasmid preparation; isolation of cDNA inserts from various plasmids; extraction of nucleic acids; agarose gel electrophoresis; Northern and Southern blot analyses; cDNA cloning; sequencing



and analysis; PCR amplification; protein gel electrophoresis; and immunoblot analysis. Enrollment is limited.

**6040. Advances in Ocular Biology.**

3 hours. Emphasis is on the current literature and contemporary approaches dealing with current topics in ocular biology. Each semester will focus on one or several research areas. Prerequisite: ANAT 6060.

**6050. Visual Sciences Seminar.**

1 hour. A monthly presentation by a visiting distinguished visual scientist. The seminar will be preceded by a journal club where articles relating to the seminar will be discussed.

**6060. Introduction to Ocular Biology.**

Basic developmental, structural and functional characteristics of the retina and the various visual pathways will be covered. In addition, current topics relating to understanding visual functions and techniques used for these studies will be discussed.

**6070. Biochemistry and Molecular Biology of the Eye.**

3 hours. Basic mechanisms of function of the lens, cornea and retina will be discussed in detail. Particular emphasis will be given to the phototransductive process and RPE function.

**6690. Special Problems in Anatomy and Cell Biology.**

1-3 hours. For students capable of developing a problem independently through conferences and activities directed by the faculty. Problem chosen by the student with the consent of the instructor and the department chair.

**6699. Special Problems in Ocular Research.**

1-3 hours. For students capable of developing a problem independently through conferences and activities directed by the faculty in areas of visual sciences. Problem chosen by the student with the consent of the instructor and the department chair.

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**BIOCHEMISTRY AND MOLECULAR BIOLOGY (BIOC)**

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*Walter J. McConathy, Ph.D., Acting Chair*

**Graduate Faculty:** *Berman, Cook, Dimitrijevic, Dory, Easom, Fungwe, Gracy, Grant, B. Harris, Kudchodkar, Kulkarni, Lacko, McConathy, Rao, Wu, Yüksel*

**Adjunct Graduate Faculty:** *Clark, Zachariah*

**5010. Biochemical Principles and Metabolism.**

7 hours. An introduction to the chemical structure and processes related to living systems. A survey of intermediary metabolism.

**5020. Clinical Biochemistry.**

3 hours. A study of the biochemical principles utilized in the laboratory diagnosis of disease. Includes laboratory experience in the testing of normal and pathological specimens and review of selected biochemical disorders by clinicians.

**5425. Advanced Biochemistry.**

4 hours. Topics include structure and function of nucleic acids and proteins, lipids, carbohydrates and regulation of metabolism. Tools for structural studies will be considered and current research reports in this area will be discussed.

**5455. Advanced Molecular Biology.**

3 hours. Molecular mechanisms of cellular processes and their regulation. Emphasis is on the current literature and contemporary approaches to the study of these processes.

**5510. Signal Transduction.**

2 hours. Current publications in the general area of receptor-signal transduction will be discussed in the journal club format. Students are required to participate in presentation and discussion of current articles.

**5520. Enzyme Regulation and Mechanism.**

2 hours. Current topics in the areas of Enzyme Mechanism and Regulation will be discussed, based on student and faculty presentations of literature articles.

**5530. Structure and Function of Proteins.**

2 hours. Topics will include the isolation of proteins from tissue, their structural and functional characterization, effects of natural and synthetic mutants on the structure, stability and function of proteins. Prerequisite: BIOC 5010.



**5540. Advanced Lipoprotein Metabolism.**

2 hours. Presentation and discussion of recent research findings and literature reports in lipoprotein metabolism and related areas. Prerequisite: BIOC 5010.

**5680. Selected Topics in Biochemistry.**

1-3 hours. Current research interests in the field of biochemistry.

**5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with consent of the instructor and department. May be repeated for credit.

**5940. Seminar in Current Biochemistry.**

1 hour. A study of current literature; current research emphasized. Required of all graduate biochemistry students in each semester of graduate residence.

**6680. Advanced Techniques in Biochemistry.**

1 hour. Methods and instrumentation currently used in biochemical analyses. Presented in four-week minicourses consisting of 8 hours of lecture and 24 hours of laboratory. Topics vary from year to year but will include among others, protein sequencing and amino acid analysis, nucleic acid sequencing, tissue culture, monoclonal antibody production, column chromatography, radioisotopes, peptide synthesis and gel electrophoresis and electrofocusing.

**6690. Current Topics in Biochemistry and Molecular Biology.**

1-3 hours. Emphasis on the current literature and contemporary approaches dealing with current topics in Biochemistry and Molecular Biology. Each semester will focus on one or several research areas. Prerequisite: BIOC 5425.

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**MICROBIOLOGY AND IMMUNOLOGY (MICR)**

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*Michael Emmet-Oglesby, Ph.D., Acting Chair*

**Graduate Faculty:** Alvarez-Gonzalez, E. Harris, Nicholson, Romeo

**5020. Medical Microbiology and Immunology.**

6 hours. Medical microbiology, basic and clinical immunology and infectious diseases are studied in eight modules consisting of lectures, laboratories and problem-solving medical cases with laboratory demonstrations and examples. In addition, 28 medical

cases are solved by computer-assisted instruction. The course covers bacteria, viruses, fungi and parasites and related diseases.

**5050. Host-Parasite Relationships in Infectious Diseases.**

3 hours. Emphasis on pathogenicity, pathogenesis, and the host's innate and acquired resistance to infection. Lectures, conferences, literature review and selected laboratory exercises are utilized for student instruction. Demonstration of independent student initiative is an essential part of this course and a special project is required. Prerequisite: MICR 5020.

**5060. Advanced Clinical Immunobiology.**

3 hours. Areas covered include immunopharmacology, diagnosis of immunodeficiencies, recent concepts in allergy, cancer immunotherapy and other recent advances in clinical immunology. Prerequisite: MICR 5010.

**5100. Cultivation and Identification of Mammalian Cells.**

4 hours. Practical aspects of cultivation of mammalian cells including medium preparation, cell passage and sterility testing. It includes cultivation and identification of *chlamydia* and herpes simplex viruses from patient specimens.

**5200. Medical Virology.**

2 hours. Combination of formal lecture and student presentations on current topics including virus multiplication, viral genetics, induction and action of interferon, pathogenesis and epidemiology of virus infections.

**5800. Microbial Metabolism.**

3 hours. Biochemistry and molecular biology of viruses, bacteria and higher organisms, including gene biochemistry and gene expression.

**5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department. May be repeated for credit.

**6020. Advances in Microbiology and Immunology I.**

3 hours. Advanced course in microbiology covering the latest techniques such as molecular biology and biochemistry applied to microbial systems. Prerequisite: MICR 5020.

**6030. Advances in Microbiology and Immunology II.**

3 hours. Course consists of a survey of current advances in the field of immunology, employing current research manuscripts as a basis for course material. Topics covered may vary from year to year. Example of topics include generation of antibody diversity,



interleukins and signal transduction in immune cells, ontogeny of the immune response, antigen processing and presentation and mechanisms of autoimmunity.

#### **6040. Advanced Techniques in Microbiology and Immunology.**

3 hours. Methods and instrumentation currently used in microbiology and immunology. Presented as a rotation course through several faculty laboratories featuring hands-on methodology and techniques.

#### **6080. Advances in Virology.**

3 hours. Course is designed to cover modern culture techniques, molecular biology, host-virus interaction, interferon and antivirals among other topics. Prerequisite: MICR 5020.

#### **6650. Current Topics in Microbiology and Immunology.**

3 hours. A consideration of findings in the most recent literature—microbiology, immunology, parasitology and virology. Course will follow a small group interactive format, student's presentations and panel discussions. Prerequisite: MICR 5020.

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### **PATHOLOGY (PATH)**

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*Stephen Putthoff, D.O., Chair*

**Graduate Faculty:** Eisenberg, Putthoff

#### **5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department. May be repeated for credit.

#### **6330. Pathology I.**

11 hours. Incorporates the general fields of study known classically as basic and systematic pathology. Approach is primarily at organ levels after an introductory phase emphasizing fundamental pathophysiology. The latter encompasses processes associated with inflammation/repair, cell injury and death, infection, fluid/hemodynamic derangement and neoplasia. Subsequent systems approach illustrates major diseases and disorders encountered in the practice of medicine. Throughout, the language of medicine is emphasized as well as clinical features and differential diagnoses, where appropriate. Ultimately the student should be able to recognize, understand and predict the general effects of those pathologic processes encountered in clinical medicine.

#### **6331. Pathology II.**

3 hours. This course encompasses all environmental, nutritional, toxicologic and forensic topics. These lifestyle-related diseases are core pathologic elements in modern society and merit separate and specific consideration in our curriculum. The impact of diet, substance abuse, industrial disorders and trauma of disparate types is extraordinary and will be considered comprehensively in this course. Autopsies are an integral part of Pathology II and all students will be expected to attend necropsy sessions at the Tarrant County Medical Examiner's Office. An autopsy report on a participatory case is required as well. The goal of these latter activities is to correlate clinical data and the course of disease with necropsy findings.

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### **PHARMACOLOGY (PHRM)**

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*Harbans Lal, Ph.D., Chair*

**Graduate Faculty:** Elko, Emmett-Oglesby, Forster, Lal, Lane, Luedtke, Martin, Quist, Yorio

**Adjunct Graduate Faculty:** De Santis, Garner, McCartney, Pang

#### **5010. Introduction to Pharmacology.**

8 hours. Introduction to the pharmacological basis of drug action. Both lectures and laboratory experiences are included, with emphasis on drug mechanisms and fundamental principles including physiochemical properties of drugs, drug receptor interactions, pharmacokinetics, pharmacodynamics, pharmacogenetics and drug interactions.

#### **5020. Advanced Pharmacology.**

3 hours. A continuation of PHRM 5010, covering specific drug classes and emphasizing molecular basis for drug action and basic principles of pharmacology and toxicology. Prerequisite: PHRM 5010.

#### **5030. Principles of Pharmacology.**

3 hours. Topics include drug disposition, pharmacokinetics, drug metabolism, drug tolerance, drug interactions and receptor mechanisms.

#### **5050. Introduction to Toxicology.**

3 hours. The interrelationships of natural and synthetic agents to biologic systems are compared with the resulting toxicological response of the organism. Identification of causative agents and determination of limits of detection and safety are discussed. The principles of instrumentation methods and their use in a toxicological laboratory are described.



**5060. Experimental Toxicology.**

3 hours. Lecture and laboratory experience emphasizing adverse reactions to chemicals and drugs, environmental hazards and analytical techniques for detection of foreign substances in biological fluids and tissues. Includes qualitative and quantitative laboratories, identification of causative agents and metabolic studies of toxic agents. Visits to professional laboratories specializing in toxicology are included.

**5070. Behavioral Pharmacology.**

4 hours. Drugs that modify behavior are studied from the standpoint of the behavioral and neurochemical events in the brain that mediate the effects of psychoactive drugs. A daily laboratory on an arranged basis provides experience in the techniques of objectively quantifying drug effects on behavior in rats.

**5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department. May be repeated for credit.

**6020. Advances in Molecular Pharmacology.**

3 hours. An in-depth review of the current literature on modern pharmacology and signal transduction of drug receptors. Oral reports and written reviews required. Prerequisite: ANAT 6020.

**6030. Advances in Behavioral Pharmacology.**

3 hours. Directed, in-depth study of current research literature with an emphasis on behavioral pharmacology. Oral reports and written reviews required. Prerequisite: PHRM 5070.

**6040. Advanced Techniques in Pharmacology.**

3 hours. Methods and instrumentation currently used in pharmacology. Presented in modular units of approximately 3-4 weeks duration.

**6050. Ocular Pharmacology.**

3 hours. Review of pharmacological principles and therapeutic approaches regarding ocular diseases and eye organ systems.

**6080. Receptors and Drug Action.**

4 hours. In-depth course of drug receptor pharmacology and receptor classes. Emphasis on techniques for studying receptor function, second messenger signalling and molecular pharmacology.

**6699. Current Topics in Pharmacology.**

1-3 hours. Review of current topics in pharmacology including

pharmacology of aging, ocular pharmacology, behavioral pharmacology and new drugs on the horizon.

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**PHYSIOLOGY (PSIO)**

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*Peter B. Raven, Ph.D., Chair*

**Graduate Faculty:** Barron, Caffrey, Downey, Gaugl, Gwartz, Jones, Kaman, Mallet, Raven, Scheel, Shi

**Adjunct Graduate Faculty:** Babb, Pawelczyk, Squires

**5020. Medical Physiology.**

8 hours. The study of organ system physiology with special emphasis on control mechanisms and the maintenance of homeostasis. Primary emphasis is placed on cardiovascular, muscular, gastrointestinal and renal function. Discussion sections, laboratory exercises and guest lectures utilized.

**5100. Cardiovascular Physiology I.**

3 hours. Designed to familiarize the student with current concepts and progress in human cardiovascular function. Topics include molecular basis of myocardial contraction, electrochemical coupling, regulation of myocardial mechanics and ventricular performance, the peripheral circulation and the vessel wall, local regulation of tissue blood flows, and neural control of the circulation. Prerequisite: PSIO 5020.

**5110. Cardiovascular Physiology II.**

3 hours. Continuation of PSIO 5100. Topics include capillary and lymphatic dynamics, control of blood pressure, coronary blood flow, splanchnic blood flow, regulation of cardiac output and specific cardiovascular perturbations. Prerequisite: PSIO 5100.

**5200. Respiratory Physiology.**

3 hours. Designed as an in-depth study of the functional anatomy and physiology of the respiratory system with emphasis on the human. Topics presented by students, followed by class discussions including pulmonary mechanics and blood flow. Respiratory blood gases and neurohumoral control of ventilation. Prerequisite: PSIO 5020.

**5300. Renal Physiology.**

3 hours. This course familiarizes the student with current concepts and progress in human renal function. Topics include the body fluids, the renal vascular bed, glomerular filtration, tubular function, acid-based physiology, renal pathophysiology and the history of renal physiology. Prerequisite: PSIO 5020.



**5900-5910. Special Problems.**

1-3 hours each. For students capable of developing a problem independently through conferences and activities directed by the instructor. Problem chosen by the student with the consent of the instructor and department. May be repeated for credit.

**6020. Advances in Cardiovascular Physiology I.**

3 hours. Directed, in-depth study of current research literature with emphasis on the heart. Oral reports and written reviews are required. Prerequisite: PSIO 5100.

**6030. Advances in Cardiovascular Physiology II.**

3 hours. Directed, in-depth study of current research literature with emphasis on the peripheral circulation. Oral reports and written reviews are required. Prerequisite: PSIO 5110.

**6040. Advanced Techniques in Cardiovascular Physiology.**

3 hours. Methods and instrumentation currently used in cardiovascular research. Presented in modular units of approximately 3-4 weeks duration. Credit: 1 hour per module. May be repeated for credit as topics vary. Prerequisite: PSIO 5020.

**6060. Cardiovascular Regulation During Exercise.**

3 hours. The course will provide an integrative physiological basis of blood pressure regulation during exercise. The mechanisms to be discussed include "central command" and the "exercising muscle pressor reflex" and their integration with basic hemodynamic responses to exercise.

**6070. Advanced Endocrine Physiology.**

3 hours. An interactive survey of modern endocrinology presented largely from the current primary literature. The scope will focus on mechanisms and will extend from molecular biology (hormone interactions with genes, receptors, ion channels, second messengers, etc.) to systematic control (feedback, secretion, distribution, metabolic clearance rate, etc.) Broad topic areas discussed will be determined in part by class interests.

**6080. Advanced Autonomic Physiology.**

3 hours. This course will cover anatomy, neurotransmitters, and cellular mechanisms of the autonomic nervous system with special emphasis on the peripheral systems. Parasympathetic and sympathetic control of physiological function will be discussed with system emphasis determined in part by student interests. Current research literature combined with up-to-date reviews will be used to spur discussions which will focus on mechanisms extending from molecular biology to systemic control. Individual student interests will be used to determine special topic areas for the last half of the course. Prerequisites: ANAT 5120, PSIO 5020.

**6090. Myocardial Metabolism: Concepts and Controversies.**

3 hours. Comprehensive overview of current scientific issues related to heart muscle metabolism and function. Specific topics include: control of myocardial substrate metabolism; ATP synthesis and utilization; myocardial ischemia, "stunning," and "hibernation;" advanced techniques for studying myocardial metabolism. Prerequisites: BIOC 5010, PSIO 5020.

**6699. Current Topics in Physiology.**

1-3 hours. Survey of literature, oral presentations and written reports.

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**PUBLIC HEALTH AND PREVENTIVE MEDICINE (PHPM)**

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*John G. Mills, D.O., M.P.H., M.S., F.A.O.C.P.M., F.A.C.P.M., Chair*

**Graduate Faculty:** *Chester, Gonzalez, Licciardone, Schneider, Taylor, Weiss*

**Adjunct Graduate Faculty:** *Guo, Kress, Niessen, Shulman*

**5100. Principles of Epidemiology**

3 hours. Introduction to epidemiology, including factors governing health and disease in populations. Course covers concepts, principles and methods of epidemiological investigation, for infectious and non-infectious diseases and cause inferences. Course format consists of lectures supplemented with directed discussion exercises.

**5110. Behavioral Epidemiology**

3 hours. Introduction to the basic knowledge of the behavioral sciences as they are applied to the practice of public health and epidemiologic applications. Course covers overview of each discipline with a perspective on social, cultural and behavioral factors with respect to approaches to measurement, terminology and analytic methods.

**5130. Principles of Public Health**

3 hours. Course presents overview of the complex and many-faceted field of public health. The course covers the structure of the public health system from a federal, state and local perspective and explores each of the component disciplines of public health.

**5135. Methods in Public Health.**

3 hours. Introduces the basic principles and technical knowledge of the public health discipline. The course outlines the major causes of morbidity; population-based measurement of the incidence and impact of specific health problems; environmental and occupational health risks; and health policy and management.



**5140. Field Studies in Public Health**

3 hours. Topics of special nature or of interest to students with specific topic area of problem focus: i.e., health education, maternal and child care, dental health, environmental health, health administration, nutrition, preventive medicine and epidemiology. Course includes field experience to observe public health role models and project presentation.

**5145. Seminar in Public Health Practice.**

3 hours. Advanced seminars designed to meet needs of students to combine opportunities for interaction and collaboration between public health professionals, faculty and students, and to combine public health-related activities with clinical practice, research and community work.

**5200. Health Administration.**

3 hours. Basic concepts and theories of health care organizational environment, context structure, processes, performance and administrative functions of systems analysis. Course covers planning, programming, budgeting and personnel management as they apply to public health administration.

**5300. Environmental Health.**

3 hours. An introduction of the environmental determinants of health. Consideration is given to water supply and waste water disposal, open and closed air quality control, solid and hazardous wastes, sanitation and the regulatory framework for environmental health risks.

**5400. Community Health.**

3 hours. Introduction to general principles of health planning and program development of community-based public health programs oriented toward a perspective that links together strategies to address public health problems, with practical techniques and tools for community needs assessment and program evaluation.

**5930. Seminar in Dental Health.**

3 hours. Seminars focus on principles of dental public health, patterns of dental health care financing, need and demand and use of dental services in community-based public health programs.



# Ten/The Graduate Faculty and Their Research

**Neeraj Agarwal, Ph.D.**

The Post-graduate Institute of Medical Education and Research; Assistant Professor, Department of Anatomy and Cell Biology

The molecular mechanisms of photoreceptor cell death in various retinal dystrophies and molecular genetics of retinal pigment epithelium (RPE) specific cDNAs (via subtraction hybridization) involved in RPE-photoreceptor interaction under normal and retinal dystrophic condition.

**Rafael Alvarez-Gonzalez, Ph.D.**

University of North Texas; Assistant Professor, Department of Microbiology and Immunology

Enzymology and biological significance of protein: (ADP-ribose) transfer reactions. Our primary focus is on a DNA-dependent protein covalent modification reaction catalyzed by poly (ADP-ribose) polymerase (PARP) [E.C. 2.4.2.30], an enzyme that modulates chromatic structure and function in early neoplastic cells. An *in vitro* reconstituted enzyme system with purified PARP and deoxyNAD analogs as ADP-ribose substrates has recently been developed in this laboratory. This system allows chemical dissection of the synthesis of ADP-ribose polymers into individual reactions of initiation, elongation and branching. This approach should continue to generate information to better understand the molecular role of poly (ADP-ribosyl)ated-proteins in the early stages of carcinogenesis. Other enzymes currently under investigation include bacterial toxins with mono(ADP-ribosyl) transferase activity, e.g., cholera and pertussis toxin.

**John Aschenbrenner, Ph.D.**

Baylor University; Associate Professor, Department of Anatomy and Cell Biology

Ultrastructure of central nervous system. Specifically the histopathology and role of growth factors in central

nervous system trauma including experimental autoimmune encephalomyelitis, the animal model for Multiple Sclerosis.

**Barbara Barron, Ph.D.**

University of Nebraska Medical Center; Assistant Professor, Department of Physiology

Both *in vivo* and *in vitro* experiments are conducted to study hormonal and neurotransmitter interactions in the autonomic and cardiovascular systems and their relations to each other and cardiovascular diseases such as hypertension, shock and cardiomegaly. Research centers on the interaction of endogenous opioid peptides and catecholamines in the peripheral autonomic nervous system and the cardiovascular system. Specific projects currently supported involve the analysis of enkephalins in heart tissue and plasma after various manipulations to either decrease or increase autonomic stimulation to the heart (i.e. changes due to physiological stress of the cardiovascular system: exercise, hypertension, shock, etc.). In addition, the ability of heart tissue to release enkephalins *in vitro* is being evaluated by superfusion studies. Future work will involve the analysis of opioid peptides and their receptors in the heart and peripheral nerves in association with hypertension, exercise, shock and aging. Both anesthetized and conscious animal models will be used to better determine the physiological mechanisms served by opioid peptides in the cardiovascular and peripheral autonomic systems.

**Michael B. Berman, Ph.D.**

University of Connecticut; Research Associate Professor, Department of Biochemistry and Molecular Biology and Department of Anatomy and Cell Biology

Mechanisms of non-healing corneal and skin wounds. Such wounds cause significant morbidity and suffering and, in the case of the skin, even loss of limbs as from diabetes or other arteriosclerotic

diseases. Use of animal models of corneal ulceration, methods of cell biology, biochemistry and molecular biology. Faulty regulation of the enzyme urokinase-like plasminogen activator (uPA) results in failure of epithelial adhesion, abnormally-sustained proteinase secretion and activation and degradation of extracellular matrix, to result in non-healing ulcers.

**James L. Caffrey, Ph.D.**

University of Virginia; Associate Professor, Department of Physiology

Endocrine and neuroendocrine responses which enable the organism to cope with circulatory stress. Concentration on interactions between the sympathetic nervous system and endogenous opioids in the regulation of the heart and peripheral vasculature. Stress results in profound activation of the pituitary-adrenal and sympatho-adrenal axes and the rapid release of steroids, catecholamines and opioids (dynorphins, enkephalins and endorphins). Identification of significant opioid concentrations in the myocardium which respond to changes in the functional autonomic environment of the heart. Studies suggest that cardiac opioids may be important to our understanding of congestive heart failure, silent myocardial ischemia, ventricular fibrillation and the myocardial and circulatory depression observed in circulatory shock. They may also have significant implications for understanding the cardiovascular consequences of drug abuse.

**Patrick Cammarata, Ph.D.**

Hunter College, City University of New York; Associate Professor, Department of Anatomy and Cell Biology

Mechanism(s) of ocular diabetic complications, including sugar cataract development. Inositol lipid metabolism, myo-inositol transport and regulation, phosphoinositide turnover and second messenger release, protein kinase C



activation, eicosanoid synthesis and regulation, osmoregulation.

**Michael Chaitin, Ph.D.**

Florida State University;  
Associate Professor,  
Department of Anatomy and Cell Biology

Retinal photoreceptor and pigment epithelial cell cytoskeletons. Photoreceptor differentiation and renewal mechanisms, and retinal degenerations. Studies utilize electron microscopy, immunoelectron microscopy, biochemical and *in situ* hybridization techniques.

**Thomas J. Chester, M.D.**

Stanford University School of Medicine,  
M.P.H. University of Washington;  
Associate Professor, Department of Public Health and Preventive Medicine

Effects of appropriate immunizations and pre-travel patient education on the incidence of illness in international travelers. Emphasis is placed on effect of pre-travel education on the incidence of traveler's diarrhea. Research is also planned for analyzing ergonomic factors relating to upper extremity cumulative trauma disorders caused by the use of the computer mouse.

**Samuel T. Coleridge, D.O.**

University of Health Sciences;  
Professor and Chair,  
Department of Family Medicine

Emergency medical systems operating in urban, suburban and rural areas. Studies of violence from a multidisciplinary perspective.

**Paul F. Cook, Ph.D.**

University of California at Riverside;  
Professor, Department of Biochemistry and Molecular Biology

Determination of enzyme mechanism using steady-state kinetic and spectroscopic probes. Studies are being conducted in NAD-malic enzyme, phosphofructokinase, aspartase, protein kinase and the multienzyme complex cysteine synthase. Studies are directed toward the determination of enzyme mechanism. This

includes a determination of the order of addition of reactants to and release of products from enzyme (kinetic mechanism), location of slow steps along the reaction pathway, modulation by allosteric effectors, and a description of the chemical interconversion of reactant and products including the chemical nature of the rate-limiting transition state and the role of the enzyme as a catalyst. The primary technique used is steady-state kinetic studies and these are complemented with pulse-chase, isotope exchange, deuterium and heavy atom isotope effect studies, pH studies and the use of spectroscopic probes such as fluorescence, CD and NMR, etc. Enzymes presently being studied include the oxidative decarboxylases malic enzyme, isocitrate and 6-phosphogluconate dehydrogenases, phosphofructokinase, cAMP protein kinase, and the enzymes of cysteine metabolism in *Salmonella*.

**S. Dan Dimitrijevic, Ph.D.**

University of Bath;  
Research Assistant Professor, Department of Biochemistry and Molecular Biology

Structure-function relationships of natural products. The role of cell-matrix interactions in wound healing and aging, specifically in eye (cornea-anterior segment) and skin tissue. Development, characterization and use of human tissue equivalents as *in vitro* models. Skin and eye diseases and pharmacological intervention. Intracellular calcium mobilization during the functions of the anterior segment epithelia.

**Ladislav Dory, Ph.D.**

McGill University;  
Associate Professor, Department of Biochemistry and Molecular Biology

Regulation of the synthesis and secretion of apolipoproteins. Investigation of the regulation of expression of apolipoprotein E in peripheral tissues and its role in targeting peripherally-derived cholesterol to the liver. The interaction

of apoE-containing lipoproteins with lipolytic enzymes and other plasma lipoproteins is also a focus of this research. There are at least two sites of regulation of apoE expression at the post-transcriptional level: 1) a site of sorting (apparently affected by HDL and cAMP), downstream from the site of synthesis, which determines the extent of secretion and intracellular degradation, or transport to organelles such as peroxisomes (no effect on rates of synthesis), and 2) a mechanism acting at the level of synthesis (PKC), where the primary effect is a reduced rate of synthesis (although no change in mRNA levels). In light of these observations, the role of the various second messengers in the regulation of apoE expression in macrophages and other cells is actively investigated. Studies are planned to examine apoE processing in macrophages and compare it to hepatocytes (which secrete most of the newly synthesized apoE) and steroidogenic cells, such as adrenal and Leydig cells, which secrete only a very small portion (< 5%) of the newly synthesized apoE. Peroxisomal (and other organelle) localization of apoE will be further examined with the goal of understanding its role in cellular organelles.

**H. Fred Downey, Ph.D.**

University of Illinois at Urbana-Champaign;  
Professor, Department of Physiology

Mechanisms controlling coronary blood flow in the normal and diseased heart. Of particular interest are the differential effects of lack of oxygen (hypoxia) and lack of blood flow (ischemia) on the coronary circulation and on heart function and metabolism. The laboratory also investigates cardiovascular responses to nicotine and tobacco products.



**Richard A. Easom, Ph.D.**

University of Glasgow;  
Assistant Professor, Department of  
Biochemistry and Molecular Biology

Regulation of insulin secretion. The understanding of Langerhans is fundamental to our comprehension and future treatment or cure of Type II diabetes mellitus. D-glucose is the predominant physiological regulator of insulin secretion but this response is modulated by other hormones including the neurotransmitter acetylcholine and enteric peptides. Current research focus on the role of the  $\text{Ca}^{2+}$ /Calmodulin-dependent enzymes, myosin light chain kinase and the multifunctional protein kinase II, in glucose induced insulin secretion and the role of the cytoskeleton in this process. Experimental models include isolated pancreatic islets and clonal  $\beta$ -cell cultures.

**Arthur Eisenberg, Ph.D.**

State University of New York at Albany;  
Associate Professor,  
Department of Pathology

DNA probe methodologies; HPV subtype identification; Human Genome Projects; genetic diagnostics and treatment and flow cytometry for cell and chromosomal sorting.

**Edward E. Elko, Ph.D.**

University of Tennessee Medical Units  
Professor, Department of Pharmacology

Physiological and pharmacological control of intraocular pressure. Specific focus upon pharmacotherapeutics of prolonged elevated intraocular pressure which leads to glaucoma and blindness with emphasis on the physiological role and pharmacotherapeutic control of autonomic adrenergic receptors in the regulation of normal and elevated intraocular pressure.

**Michael W. Emmett-Oglesby, Ph.D.**

State University of New York at Buffalo;  
Professor and Acting Chair, Department of  
Microbiology and Immunology

Drug tolerance and withdrawal. An animal model has been developed that is

useful for investigation of subjective events that occur during drug withdrawal. Additional studies focus on the mechanisms of development of tolerance after chronic use. The research involves training animals to detect the stimulus properties of drugs (i.e., the presence or absence of a perceived drug effect). This laboratory also investigates the fundamental variables that control the detection of drug stimuli.

**Michael J. Forster, Ph.D.**

Bowling Green State University;  
Associate Professor,  
Department of Pharmacology

Neurobiology of aging and decline of cognitive, sensory and motor functions in rodent models. A series of longitudinal studies focuses on identification of biological factors which accelerate or decelerate these brain functions, using behavioral testing techniques applied across the lifespan in individual animals. Factors under study which may retard brain aging include 1) lifelong dietary restriction (an intervention which may slow certain aging processes), 2) neurotropic factors, and 3) antioxidant chemicals. Factors of current interest which may accelerate brain aging include neuroimmunological processes and ethanol exposure.

**Thomas V. Fungwe, Ph.D.**

Texas Tech University;  
Research Assistant Professor, Department  
of Biochemistry and Molecular Biology

Cholesterol metabolism and regulation of lipoproteins and apolipoproteins. Nutritional factors mediating regulation of synthesis and secretion of lipoproteins and apolipoproteins. Research involves the synthesis and secretion of the very low density lipoproteins by the intact liver and the role of sterols in this process. Other research involves post-transcriptional regulation of apo AI and apo E, with emphasis on regulation in the hepatocyte.

**John F. Gaugl, Ph.D.**

University of California at Berkeley;  
Associate Professor,  
Department of Physiology

Description of factors that control right coronary arterial circulation. Previous assumptions that right coronary blood flow responds to neural and hormonal stimuli, or to increases in myocardial work, in the same manner as left coronary blood flow appear to be wrong. This laboratory characterizes changes in right coronary flow and right ventricular oxygen extraction during increases in right ventricular work imposed by augmented heart rate, and right ventricular preload and afterload. Future investigations will be conducted to specify how changes in physiological conditions, such as oxygen supply and degree of autonomic tone, modify the normal right coronary and ventricular responses to augmented ventricular work. A secondary area of interest is the involvement of endogenous opioids in cardiac and peripheral vascular control.

**Robert W. Gracy, Ph.D.**

University of California at Riverside;  
Professor, Department of Biochemistry  
and Molecular Biology

Aging: Biochemical and molecular biological basis and physiological consequences. Four primary areas are being explored. First, the molecular basis for the accumulation of abnormal protein in aging cells is being examined by a comparison of the structural and functional properties of selected enzymes. The second program deals with cytogerontology and impaired immune function with age. The third program deals with wound healing in the elderly. This program examines why elderly individuals exhibit impaired ability to repair wounds such as decubitus ulcers and bones. The study explores the use of growth factors and selected enzymes for possible use in treatment of wounds. The fourth project is designed to assess vision



impairment in the aging process. Cataracts, glaucoma and diabetic retinopathy account for severe disabilities of our aging population. The biochemical basis for changes in the eye during aging are being explored. All four of the above research programs have considerable overlap with regard to methods and span a wide range from very basic biochemical studies to applied clinical studies. A variety of interventions and new products are being examined as part of an ongoing Applied Enzymology program in Biotechnology.

**Stephen R. Grant, Ph.D.**

University of Tennessee;  
Assistant Professor, Department of  
Biochemistry and Molecular Biology

IL-8 Chemotactic receptor expression and its role in human neutrophil surveillance function. Research efforts have been directed toward establishing the temporal relationship between cell surface interleukin receptor signaling and the requirements for IL-8 chemotactic receptor gene activation. The research plan includes: 1) characterization of up-regulation for both IL-8 and IL-8 receptor message synthesis by northern analysis 2) studies on IL-8 chemotactic receptor signal transduction during late stage neutrophil proliferation and differentiation protocols, 3) delineating the individual roles of myeloid and lymphoid interleukin receptor signaling in the development of an paracrine/autocrine induction process for chemotactic receptor cell surface expression, and 4) establishment of a human neutrophil model to study the dynamics of cell surface expression of the IL-8 chemotactic receptor during maturation events require for neutrophil surveillance function.

**Patricia A. Gwartz, Ph.D.**

Thomas Jefferson University;  
Associate Professor,  
Department of Physiology

Research emphasizes neural control of cardiac contractile function and coronary blood flow. Chronically instrumented conscious dog model is used to examine neural control mechanisms at rest, during exercise, transient myocardial ischemia, peripheral vascular insufficiency and hypertension. Additional studies examine the cardiac and coronary vascular adaptations that occur as a result of exercise training.

**Elizabeth Harris, Ph.D.**

UT Southwestern Medical Center at Dallas;  
Associate Professor, Department of  
Microbiology and Immunology

The effect of hyperbaric oxygen (HBO) on the immune system and isolated lymphocytes in a specially developed high pressure chamber for tissue culture incubation are studied. Studies include: the mechanism of HBO protection against lethal endotoxin shock in guinea pigs, effect on the tumor necrosis factor cascade, and effects on related lymphocyte and macrophage functions. Lymphocyte functions of special interest include natural killer activity and antigen induced lymphokines in relationship to stress, emotions, hormones and drug or alcohol effects. Infections caused by slime production *Staphylococcus epidermidis* are being studied in a joint project with Alcon Laboratories, Inc.

**Ben G. Harris, Ph.D.**

Oklahoma State University;  
Professor, Department of Biochemistry  
and Molecular Biology

Biochemistry of parasitic helminths. Research interests are in the area of regulation of carbohydrate metabolism in parasitic helminths. The parasite primarily studied is the roundworm, *Ascaris suum*. Projects involve physico-chemical, kinetic and structural characterization of regulatory enzymes governing the utilization of

carbohydrates in the essentially anaerobic parasites. Some of the enzymes being studied are phosphofructokinase and malic enzyme. Current projects involve x-ray crystallographic studies of malic enzyme, sequence studies on both malic enzyme and phosphofructokinase, and structural studies on both enzymes.

**Robert Kaman, Ph.D.**

Virginia Polytechnic Institute; Associate  
Professor, Department of Physiology

Worksite health promotion may be the best way to attack the problem of rising employee health care costs. As this expense rises, companies find themselves struggling to maintain employee health benefits without losing profitability. Health promotion which provides programs to encourage healthy behaviors has been shown to be effective in lowering risk for illness among participants, improving productivity, and reducing illness-related absenteeism. Research is designed to quantify those outcomes by studying company records for health care expenditures, absenteeism and productivity.

**Bhalchandra J. Kudchodkar, Ph.D.**

University of Saskatchewan;  
Research Associate Professor, Department  
of Biochemistry and Molecular Biology

Lipid and lipoprotein metabolism. Elevated blood cholesterol and other lipids are transported as components of plasma lipoproteins. Increased amounts of low density lipoproteins (LDL) and low levels of high density lipoproteins (HDL) are major risk factors for CHD. Both LDL and HDL are composed of a number of discrete subpopulations. The physiological and pathological role(s) of these lipoprotein subfractions is the focus of our investigation.

**Gopal Kulkarni, Ph.D.**

Indian Institute of Science;  
Research Assistant Professor, Department  
of Biochemistry and Molecular Biology



Molecular biology of parasitic helminths. Current research focuses on the molecular cloning functional expression and genetic analysis of key regulatory enzymes involved in the carbohydrate metabolism in the parasitic nematode *Ascaris suum*. As a basis for the study of molecular architecture of these enzymes to aid in rational drug design, site-directed mutagenesis and biochemical characterization of mutant enzyme forms are proposed.

**Andras G. Lacko, Ph.D.**

University of Washington;  
Professor, Department of Biochemistry  
and Molecular Biology

Plasma lipoprotein metabolism.

Research interests include the regulation of plasma lipid transport in humans and in rats. Studies are focused on the rate limiting steps of the reverse cholesterol transport pathway: the lecithin: cholesterol acyltransferase (LCAT) reaction. Research is currently conducted in the following areas: 1) Structure/function recombinant wild type and mutant forms of LCAT; 2) Factors influencing the rate of reverse cholesterol transport in human subjects.

**Harbans Lal, Ph.D.**

University of Chicago;  
Professor and Chair,  
Department of Pharmacology

Studies are aimed at identifying drugs that are efficacious in the treatment or prevention of the loss of cognitive dysfunction associated with aging. Additional studies are directed at identifying drugs that are efficacious in the treatment of acute withdrawal and protracted recovery phases of alcoholism. Gender differences in alcohol withdrawal and responses to useful treatment modalities are especially emphasized. Rodent models of anxiety and the acquisition and retention of learned behaviors are used in these studies. This research has relevance in that, in the

one case, it may lead to drugs that are effective in treating memory impairment associated with aging or Alzheimer's disease and, in the second, may provide preclinical data that will be relative to the treatment of alcoholism and the prevention of continuous alcohol abuse in humans.

**John D. Lane, Ph.D.**

Indiana University School of Medicine;  
Professor, Department of Pharmacology

Behavioral neuroscience. The primary aim of this laboratory is to understand neurochemical events which mediate and/or respond to specific components of well-defined animal behaviors. This is accomplished by analyzing neurotransmitter turnover and receptors in animals subjected to behavioral paradigms, based on the premise that changes in neurochemical parameters reflect dynamic changes in neuronal activity. Novel areas of recent work include 1) the cloning and sequencing of genes for important brain proteins, predominantly receptors; and 2) the analysis of ongoing behavior by *in vivo* electrochemistry which assesses neurochemical events associated with specific animal activities (e.g. cocaine self-administration).

**John C. Licciardone, D.O.**

Kirksville College of Osteopathic  
Medicine, M.S. Ohio State University  
College of Medicine;  
Assistant Professor, Department of Public  
Health and Preventive Medicine

Epidemiologic and clinical research in areas such as health services, clinical outcomes, patient satisfaction, quality of health care and preventive medical services. Current efforts are being focused on developing practice-based research in primary care medicine. Other fields of research include collegiate drug and alcohol programs, occupational health and safety, and the health of international travelers.

**Robert R. Luedtke, Ph.D.**

University of Pennsylvania;  
Assistant Professor,  
Department of Pharmacology

Antipsychotic drugs that are used to treat neuropsychiatric illness, including schizophrenia, have been found to be high affinity antagonists for dopamine receptors. Recent studies have established that there are multiple subtypes of dopamine receptors. Pharmacologic, Immunologic and Molecular Genetic approaches are being used to study the extent of genetic polymorphism of dopamine receptor genes, to develop a panel of anti-receptor antibodies that are specific for each of the dopamine receptor subtypes, to genetically engineer cell lines for the expression of a homogeneous population receptors using the baculovirus expression system, to study the molecular mechanisms responsible for dopamine receptor expression and regulation, and to understand the molecular basis for the interaction between antipsychotic drugs and dopamine receptors.

**Robert T. Mallet, Ph.D.**

George Washington University;  
Assistant Professor,  
Department of Physiology

Research programs are directed toward defining the interrelationships between energy metabolism and contractile function in heart muscle. His ongoing studies are exploring the mechanisms for improvement of cardiac cellular calcium transport by metabolic substrates, and are developing experimental treatments to preserve survival and recovery of ischemic and post-ischemic heart. Methodologies include both *in vivo* and isolated perfused heart models as well as state-of-the-art analytical techniques.

**Michael W. Martin, Ph.D.**

University of Texas at Houston;  
Assistant Professor,  
Department of Pharmacology

Molecular mechanisms of neurotrans-



mitter, hormone and growth factor transduction. The research applies biochemical and molecular approaches to investigate adaptive changes that occur in membrane receptors and their coupling to signal transduction apparatus using animal models and cultured cell systems. The aim of these studies is to understand how cells, especially neurons, modulate their sensitivity to extracellular chemical signals. These fundamental regulatory processes are important not only for normal cellular activity, but also may be the underlying mechanisms responsible for the development of tolerance/dependence to benzodiazepines, alcohol, cocaine and other drugs of abuse in humans.

**Walter J. McConathy, Ph.D.**

University of Oklahoma  
School of Medicine;  
Associate Professor and Acting Chair,  
Department of Biochemistry and  
Molecular Biology

Structure and function of human apolipoproteins/lipoproteins in health and vascular disease. Currently, the focus is on the interactions of Lp(a) [lipoprotein (a)] and with the subendothelial extracellular matrix using biochemical, molecular and cell biology techniques. Other areas of interest include interactions of apolipoproteins C-II, C-III, and E with lipoprotein (LPL); development and application of analytical microprocedures to monitor events at the molecular level; role of immunoglobulins in lipid metabolism; Alzheimer's disease; phylogeny and ontogeny of the plasma lipid transport system; and the relationships between plasma lipids, nutrition and various pathological states.

**Stephen J. Moorman, Ph.D.**

Colorado State University;  
Assistant Professor,  
Department of Anatomy and Cell Biology

Developmental neurobiology and spinal cord regeneration. Research focuses on transduction of environmental

signals into meaningful behaviors of the neuronal growth cone and the oligodendrocyte leading edge during development.

**Wayne Nicholson, Ph.D.**

University of Wisconsin at Madison;  
Assistant Professor, Department of  
Microbiology and Immunology

Molecular biology of bacterial sporulation. Research is focused on the mechanism by which spores of the soil bacterium *Bacillus subtilis* exhibit high resistance to ultraviolet (UV) radiation. When struck by UV light, DNA inside spores accumulates a unique type of thymine dimer which is rapidly and accurately repaired during the first moments of spore germination. The novel DNA repair system involved is being studied using a combination of bacterial genetics and recombinant DNA approaches.

**Edward Orr, Ph.D.**

University of California at Berkeley;  
Associate Professor,  
Department of Anatomy and Cell Biology

Significance and roles of histamine and nervous system-associated mast cells in control of blood-nervous system barriers, in autoimmune diseases of nervous tissues, and in nervous system trauma.

**Steven L. Putthoff, D.O.**

University of Health Sciences;  
Associate Professor and Chair,  
Department of Pathology

DNA probes, concepts and conclusions; forensic evidence; Human Genomes; lipid pneumonia due to nasal application of Vaseline (R).

**Eugene Quist, Ph.D.**

University of British Columbia;  
Associate Professor,  
Department of Pharmacology

Mechanisms of regulation of cardiac function. Goals are to further understand molecular mechanisms by which cholinergic and adrenergic receptor agonists regulate cardiac function. The influence

of these agents on phosphoinositide metabolism and cyclic AMP production is being studied. Experiments are also directed at determining the mechanism and physiological relevance of NAD activation of adenylate cyclase.

**G.S. Jagannatha Rao, Ph.D.**

Indian Institute of Science;  
Research Assistant Professor, Department  
of Biochemistry and Molecular Biology  
Biochemistry of parasitic helminths.

Research interests are in the area of enzymology and protein chemistry, with particular emphasis on enzyme mechanisms, allosteric regulation, x-ray crystallography, protein phosphorylation and dephosphorylation. Studies include Aspartate transcarbamylase, a key regulatory enzyme of the pyrimidine biosynthetic pathway, phosphofructokinase, a key allosteric enzyme of carbohydrate metabolism, and NAD-malic enzyme, involved in energy production in *Ascaris suum*, Calcineurin, a calmodulin-dependent protein phosphatase and O-acetylserinesulfhydrylase from *salmonella typhimurium*. These enzymes have been purified and characterized by kinetics, chemical modification, physicochemical studies including fluorescence, circular dichroism and x-ray crystallography.

**Peter B. Raven, Ph.D.**

University of Oregon;  
Professor and Chair,  
Department of Physiology

Cardiovascular regulation of the human during exercise and orthostasis. Aerobic fitness, weight training and aging have all been shown to affect regulation of blood pressure during exercise and orthostasis. Indeed orthostatic hypotension is a chemical syndrome which affects 25% of the population over the age of 65 years. By using invasive and non-invasive procedures integrative physiological mechanisms of cardiovascular regulation of the human are investigated during dynamic exercise and gravitational stress



in both young and elderly individuals with varying levels of aerobic fitness.

**Tony Romeo, Ph.D.**

University of Florida;  
Assistant Professor, Department of  
Microbiology and Immunology

Molecular biology and regulation of stationary phase metabolism. As bacteria enter the stationary phase, alterations in the global pattern of gene expression profoundly alter cell physiology and metabolism. The glycogen biosynthesis pathway in *Escherichia coli* is being studied by genetic and molecular biological approaches to identify general regulators of stationary phase metabolism. The mechanisms by which these regulatory factors control glycogen biosynthesis and other stationary phase processes are also being studied.

**Rouel Roque, M.D.**

University of the Philippines;  
Assistant Professor,  
Department of Anatomy and Cell Biology

Cellular changes in brain/retinal injury and neovascularization, and factors that may be involved in these changes: growth factors, cytokines, cell adhesion molecules, and extracellular matrices.

**Bernard Rubin, D.O.**

Chicago College of Osteopathic Medicine;  
Professor, Department of Medicine

Clinical research involving innovative techniques for the treatment of osteoporosis, rheumatoid arthritis, osteoarthritis and fibromyalgia syndrome. Therapeutic protocols involve combinations of pharmaceutical products and nontraditional medical therapies with outcomes measured by biological markers and quality of life assessments.

**Victoria Rudick, Ph.D.**

Ohio State University;  
Associate Professor,  
Department of Anatomy and Cell Biology

Mechanism(s) of targeting secretory proteins in polarized epithelial cells and

regulation of organelle biosynthesis, particularly the Golgi Apparatus.

**Konrad W. Scheel, Ph.D.**

University of Mississippi  
School of Medicine;  
Professor, Department of Physiology

Investigation of chronic increase in blood flow (velocity) as a stimulus for coronary and/or collateral growth; identification, characterization and quantitation of the effects of myocardial forces on epicardial and intramural collateral flow in hearts with native and mature collaterals; and effects of changes in coronary venous pressure on perfusion of the collateral dependent myocardium.

**Daniel J. Schneider, M.D.**

University of California at Los Angeles,  
M.P.H., University of California at Berkeley;  
Professor and Director,  
Health Assurance Development Unit

Dynamics of learning, especially in early childhood and in groups, whereby healthful behavior is assured. Research focuses on general learning processes, methods for provision of learning and learning processes with respect to specific diseases such as benign hypertension, over eating, smoking and drug abuse (including alcoholism), violence, teen pregnancy, and sexually transmitted diseases.

**Mary Schunder, Ph.D.**

Baylor University;  
Associate Professor,  
Department of Anatomy and Cell Biology

Role of Vitamin D, Vitamin D metabolites and lipids in calcium transport in gut epithelium. Techniques include transmission and scanning electron microscopy with various histochemical techniques.

**Harold Sheedlo, Ph.D.**

Memphis State University;  
Research Assistant Professor,  
Department of Anatomy and Cell Biology

Effects of retinal pigment epithelial (RPE) and glial cell factors on photoreceptor cell development *in vivo* and *in*

*vitro*; development of a controlled release mechanism for these factors in culture and mammalian eyes, effects of aging on RPE and glial cell function.

**Xiangrong Shi, Ph.D.**

Yale University;  
Science Associate,  
Department of Physiology

Arterial and cardiopulmonary baroreflexes and their interaction in the regulation of blood pressure; Body fluid and volume-regulating hormonal responses to physical exercise and various environmental challenges; Aging-related adaptations of body fluid and cardiovascular regulation; Impact of acute exercise and chronic training on blood volume and cardiovascular function.

**Paul A. Stern, D.O.**

University of Health Sciences;  
Professor and Chair,  
Department of Anesthesiology

Research has included clinical demonstration of total intravenous anesthesia; Monitoring intraoperative anesthesia; Electron spin resonance determining mechanism of general anesthesia; Effect of total parenteral nutrition on the blood:gas partition coefficient of volatile anesthetic agents.

**James E. Turner, Ph.D.**

University of Tennessee;  
Professor and Chair,  
Department of Anatomy and Cell Biology

Mechanisms of RPE function in health and disease. RPE transplantation studies in retina disease and aging, trophic factor production, photoreceptor cell survival and age related changes.

**Robert Wordinger, Ph.D.**

Clemson University;  
Associate Professor and Vice Chair,  
Department of Anatomy and Cell Biology

The role of growth factors in mammalian embryo implantation differentiation and development. Emphasis on immunohistochemical localization of basic growth factor at both the light and electron



microscopic level. *In vitro* cell culture to correlate autocrine and paracrine functions.

**Ming-Chi Wu, Ph.D.**

University of Wisconsin;  
Associate Professor, Department of  
Biochemistry and Molecular Biology

Regulation of blood cell differentiation.

Major research projects conducted in this laboratory are centered on the hematopoietic growth factors and their roles in the regulation of myelopoiesis. Current studies include: (a) regulation of CSF biosynthesis: studying the signal transduction mechanism of interleukins and other mediators in induction and stimulation of CSF production; transcriptional and post-translational control of CSF biosynthesis are the area of interest; (b) molecular cloning and expression of CSFs and other cytokines using the Baculoviral-Insert Cell Expression system, (c) purification and characterization of a novel leukemia cell differentiation factor (LDF) and investigation of their mechanism of action in inducing leukemia differentiation and (d) Molecular cloning and expression of the new LDF and comparative studies on structure, receptors and functions between LDF and other differentiation factors such as IL-6, oncostatin M and leukemia inhibitory factor.

**K. Ümit Yüksel, Ph.D.**

University of North Texas;  
Research Assistant Professor, Department  
of Biochemistry and Molecular Biology

Structure function relationships in aging proteins. Living cells retain a fine balance by continuous synthesis and degradation of proteins, i.e., protein turnover. In older cells proteins are retained longer, while synthesis may also be reduced. Nascent proteins immediately become targets from chemical modifications which damage (i.e. age) and mark them for proteolytic degradation. Determination of how these covalent post-translational modifications trigger pro-

teolysis and what effects they have on structure and function of proteins.

Triose- and glucose-phosphate isomerase from various species provide valuable experimental models. Techniques utilized include protein sequencing, molecular modeling, circular dichroism (CD) and nuclear magnetic resonance (NMR) spectroscopy.

**Thomas Yorio, Ph.D.**

Mt. Sinai School of Medicine;  
Professor and Vice Chair,  
Department of Pharmacology

Characterization of mechanisms whereby epithelial cells regulate their membrane permeability to electrolytes and water, particularly, the processes involved in the actions of antidiuretic hormone (vasopressin) and aldosterone in renal epithelia. Understanding the cellular mechanisms that may be coupled to ion and fluid transport in the ciliary process. An ocular tissue responsible for aqueous humor formation. Regulation of intraocular pressure and factors contributing to glaucoma.



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### ***Statement on Diversity***

The Nondiscrimination/Equal Employment Opportunity and Affirmative Action policy affirms the requirement for every member of the UNT Health Science Center community to comply with existing Federal and State equal opportunity laws and regulations.

In any case, the UNT Health Science Center has long been an open, tolerant and democratic institution, very proud of its commitment to personal and academic excellence but unpretentious in the atmosphere of its campus in its willingness to accept all of the members of the health science center community at their face value as fellow human beings.

The increasing diversity of the members of the UNT Health Science Center community is one of this institution's greatest strengths. Differences of race, religion, age, gender, culture, physical ability, language and nationality make it a microcosm of the nation as a whole, reflecting the values of our pluralistic society. As an educational institution, the UNT Health Science Center is committed to advancing the ideas of human worth and dignity by teaching respect for human beliefs or values and encouraging open discussions. Hatred or prejudice, and harassment of any kind are inconsistent with the health science center's educational purposes.

The UNT Health Science Center is strongly committed to the ethical principle that every member of the community enjoys certain human and constitutional rights, including the right to free speech. As a community of scholars, the UNT Health Science Center is also dedicated to maintaining a learning environment that is nurturing, fosters respect and encourages growth among the cultures and individuals represented here. Individuals who work, study, live and teach within this community are expected to refrain from behaviors that threaten the freedom and respect every individual deserves.

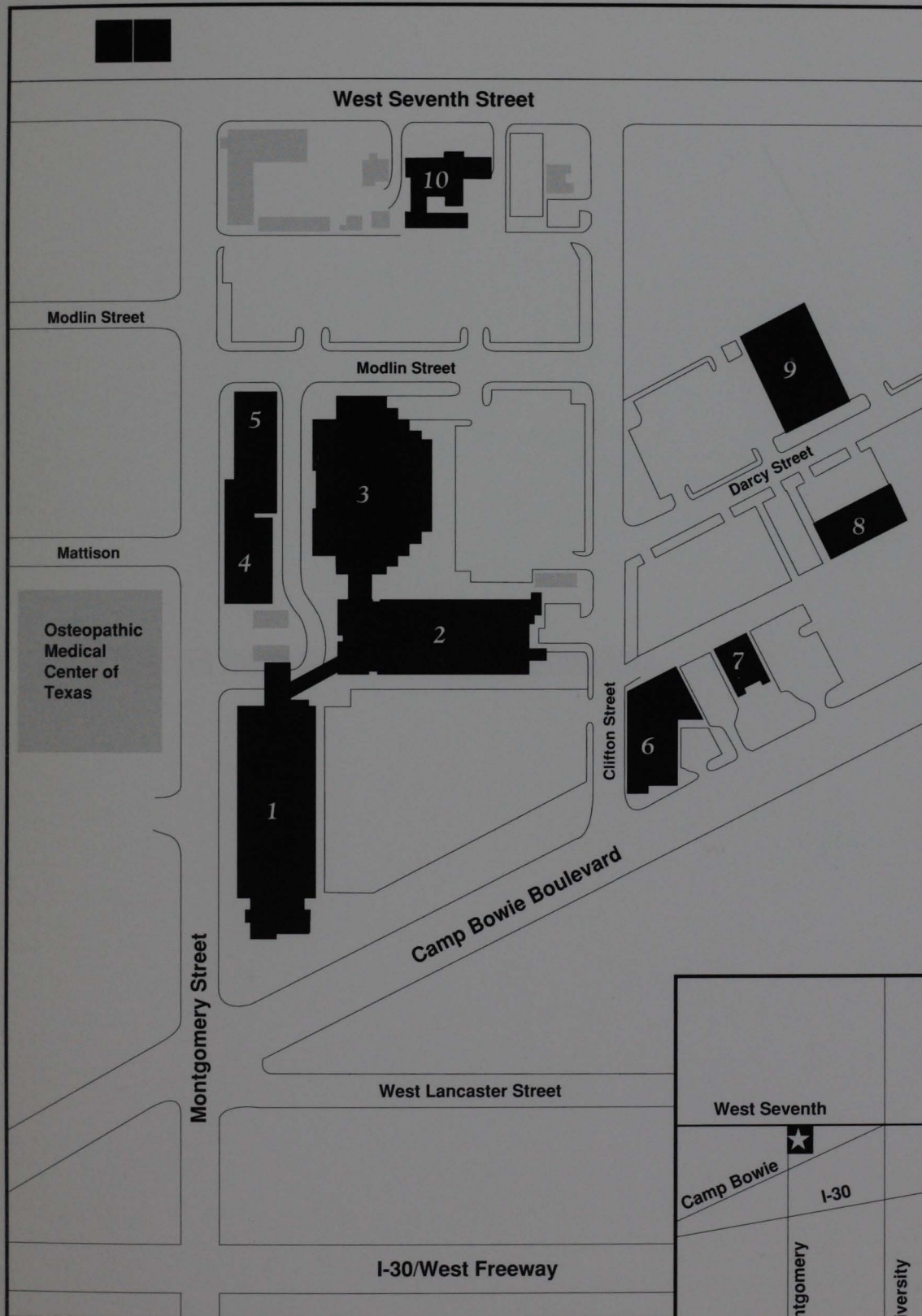
### ***Americans with Disability Act***

The University of North Texas Health Science Center does not discriminate on the basis of an individual's disability and complies with Section 504 and Public Law 101-336 (Americans with Disabilities Act) in its admissions, accessibility, treatment and employment of individuals in its programs and activities.

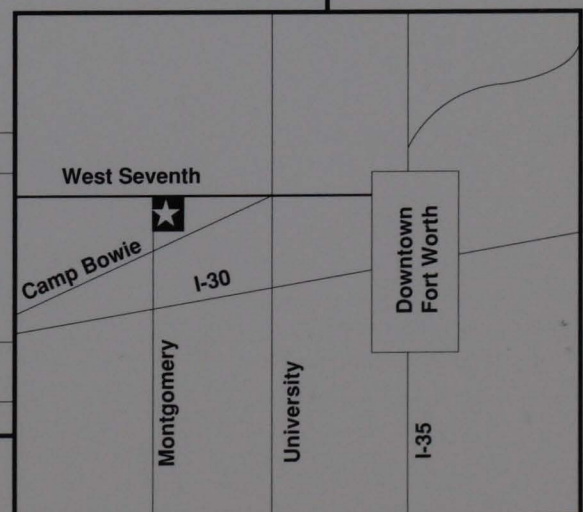
The University of North Texas Health Science Center provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law, who are otherwise qualified to meet the institution's academic and employment requirements. For assistance contact the Graduate School of Biomedical Sciences at 817-735-2560.



# Campus Access Map



1. Medical Education Building 1
2. Medical Education Building 2
3. Gibson D. Lewis Health Science Library
4. Central Family Practice Clinic
5. Surgery Clinic
6. Pediatric Clinic
7. Psychiatry and Human Behavior Clinic
8. Physical Plant
9. General Services Building
10. Founders' Activity Center







**University of North Texas  
Health Science Center at Fort Worth**

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