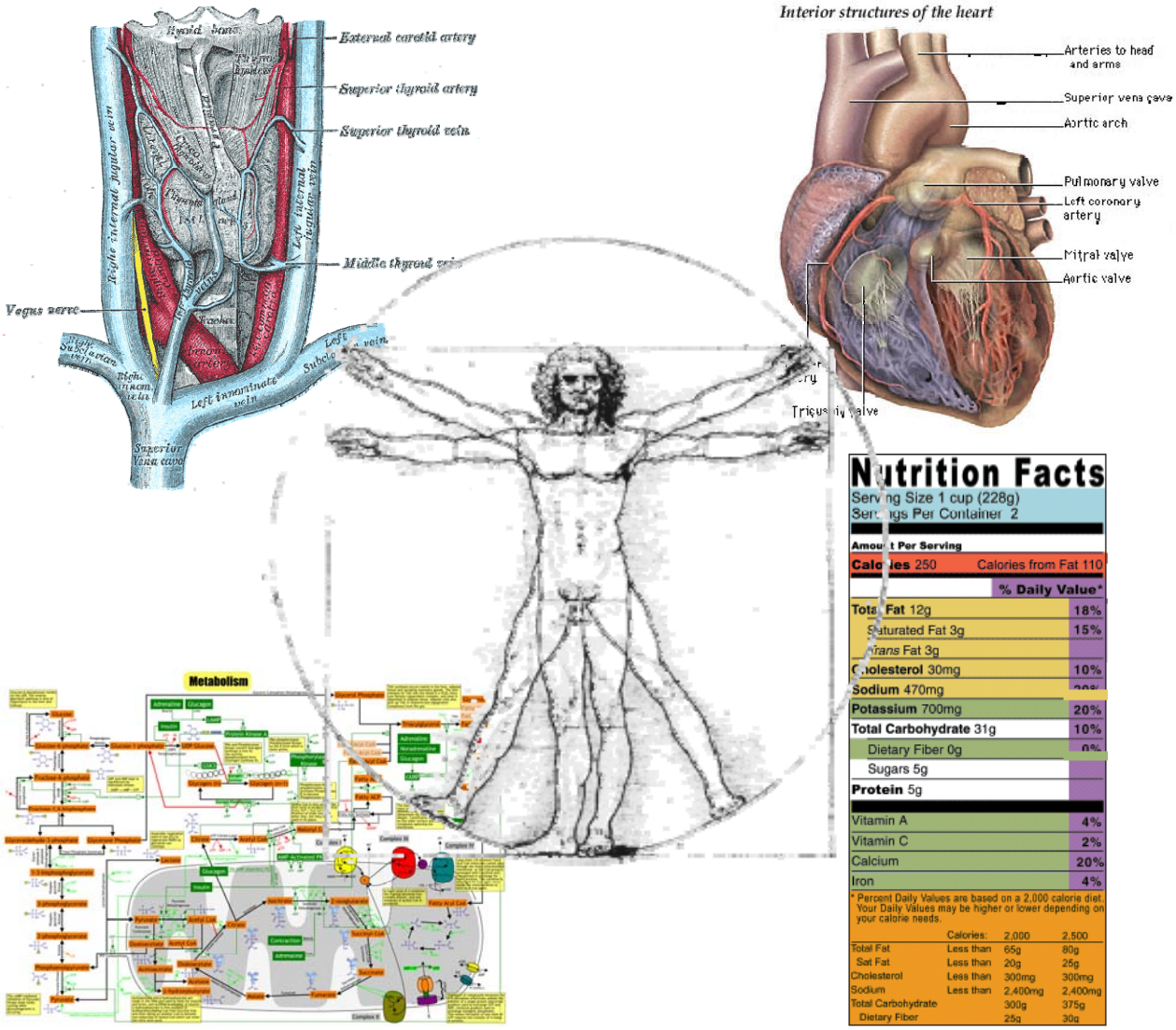
USF HEALTH

Graduate and Postdoctoral Affairs
School of Biomedical Sciences
College of Medicine



Graduate Certificate
in
Metabolic & Nutritional Medicine

MNM

Graduate Certificate

Metabolic & Nutritional Medicine

MNM

Purpose of the Certificate: This graduate certificate is directed towards health-care professionals who have an interest in the medical aspects of metabolic and nutritional medicine from both clinical care and basic research perspectives and who wish to extend their knowledge in these areas of medicine as part of a continuous process of delivering advanced health care.

Certificate Description: Considered the vanguard of the new millennium in which science truly complements the art of medicine, integration of the traditional "basic science" and "clinical science" disciplines that form the foundation of the traditional medical curriculum has been the objective in training clinicians who strive to understand the molecular and physiological bases of disease and the aging process with the objective of developing and implementing new approaches to retard and potentially reverse the aging process in patients using new therapies and preventative measures such as nutritional intervention and complementary and alternative medicine (CAM).

Recent changes in the focus of research and scholarship in the biomedical sciences has directed attention to the development and training of clinicians in "translational medicine" who are able to cross the barriers of traditional disciplines and embrace the concepts of interdisciplinary approaches to treating the aging process and associated diseases. The new Graduate Certificate in Metabolic & Nutritional Medicine (MNM) in the College of Medicine, has been developed to provide a novel interdisciplinary and concentrated program of study that is designed for practicing clinicians and other experienced health-care professionals who are committed to developing their theoretical and practical expertise in this rapidly evolving field of medical care and who value the interdisciplinary approach to the medical sciences.

Metabolic Medicine can be defined as a group of overlapping areas of clinical practice with common dependence on a detailed understanding of basic biochemistry and metabolism together with other cellular processes. It therefore falls within the areas of expertise of many of the clinical disciplines that emphasize nutritional disorders, inborn errors of metabolism (IEM) and pathophysiological changes. Examples of these areas include disorders of nutrition, IEM, disorders of lipid metabolism and CV risk assessment, disorders of calcium metabolism and bone and diabetes and decreases in cognitive skills.

The Metabolic & Nutritional Medicine certificate focuses on the application of the principles of metabolic and nutritional medicine to the aging process in humans, but has applications to all stages of development. Studies have indicated that the aging process cannot be conceptualized by probing a solitary gene or individual metabolic pathways, but should best be addressed at the systems level. Biological examples of aging include not only the sum total of shortened telomeres, the array of denatured proteins and modified DNA molecules but also examples of the oxidative damage to mitochondria and programmed cell death or apoptosis. In addition, the aging process also results in alterations in key regulatory nodes critical for maintaining the integrity of the organism. A dynamic progression, aging increases imbalances in the organism as a result of degenerating biological processes.

A regenerative medicine approach to clinical care provides an integrative methodology to optimize the body's endogenous mechanisms of self-repair together with the inclusion of proven exogenous treatments and technologies that have been demonstrated to influence the aging process. This novel graduate certificate focuses on the functional and regenerative medicine components of the major disciplines that comprise the "basic and clinical sciences" in traditional medical school curricula and includes courses that integrate endocrinology, cardiovascular disease, intermediary metabolism, genetics, immunology, neurobiology, pharmacology, nutrition and physiology with biomedical aging. These clinically-oriented subject areas have been combined to provide both a solid foundation and include the most recent advances in metabolic and nutritional medicine. The rigorous program is designed to enable participants to expand and enhance their medical skills for the future clinical practice of metabolic and nutritional medicine.

The main objectives of the Metabolic and Nutritional Medicine graduate certificate are to:

- Provide advanced scientific and clinical training for several areas of medicine which require greater knowledge than delivered in most organ-based specialties. For example, these include the subject area of biochemistry and molecular biology, genetics, endocrinology, cardiovascular physiology, immunology, cancer and nutrition.
- Further develop the clinical training of physicians and other health-care practitioners who wish to include metabolic and nutritional medicine in their current practices.
- Support the academic progress and development of Metabolic and Nutritional Medicine as an advanced specialization.

The interdisciplinary nature of the certificate promotes a broad intellectual focus that is required of current and future professional and graduate students in the clinical sciences. A novel feature of the certificate is that all course materials are delivered using a concentrated lecture format combined with extensive "web casts" and relevant practical experience that encourages active participation by all students enrolled in the program.

Relationship to the USF Strategic Plan:

The proposed Graduate Certificate in Metabolic & Nutritional Medicine will contribute to the University's strategic plan in the following goals and strategies:

Goal 1

Expanding world-class interdisciplinary research, creative and scholarly endeavors.

- Promote nationally and internationally distinctive and prominent research and graduate programs.

The Metabolic & Nutritional Medicine certificate represents a new, integrated graduate program that primarily focuses on the translational aspects of the basic and clinical sciences components of the traditional medical curriculum and expands access to courses and material that are normally only available to students enrolled in professional medical programs or previous graduates of professional medical programs. In addition, the combination of the "concentrated" course format together with extensive webcasts and practical experience represents a new approach to delivering courses of this type in the State of Florida.

Goal II

Promoting globally competitive undergraduate, graduate and professional programs that support interdisciplinary inquiry, intellectual development, knowledge and skill acquisition, and student success through a diverse, fully- engaged, learner-centered campus environment.

- Create and support globally competitive, relevant and distinctive academic programs that address the changing needs of the region, state and nation through innovative approaches to curriculum development and delivery,
- Provide increased access to excellence in higher education for students who demonstrate the aptitude to succeed,
- Enhance and expand the talent pool by shaping the enrollment profile of USF's graduate student body to reflect that found at a pre-eminent research university.

The Metabolic & Nutritional Medicine Graduate Certificate represents a new and distinctive academic endeavor by virtue of its component courses and their associated content. The innovative courses and method of instructional delivery will address the region's and state's need for more clinicians and health-care professionals that are trained in regenerative, metabolic and nutritional medicine. The inclusion of modern distance education technologies will significantly expand access to these courses by students who substantially exceed the minimum entry qualifications for USF's graduate programs and are unable to register for the College's traditional courses owing to geographical or career scheduling limitations. In addition, students who successfully complete the program will have demonstrated substantial academic ability and will be well-prepared to continue their education in USF's translational doctoral program, resulting in an expanded applicant pool.

Program (Major): Graduate Certificate in Metabolic and Nutritional Medicine

Requirements: The proposed curriculum is attached and features a combination of eight clinically-oriented courses. Program participants are required to select four (4) courses form the list such that the certificate can be completed in approximately one year. For admission, students must meet the minimum qualifications of the Graduate School. In addition, program applicants must possess either a M.D. degree or a Ph.D. degree or their equivalent in the health sciences from a regionally accredited institution. The majority of students typically applying to this type of program significantly exceed these minimums.

Total Hours: 12 credit hours; 180 total contact hours

Budget Account Number: USF01HSC10000-610601-000000-0000000

Proposed Catalog Copy: This innovative, interdisciplinary certificate program, the first in the State of Florida to provide an integrated approach to the subject areas of metabolic and nutritional medicine and incorporating both didactic and distance education techniques, is designed for individuals who wish to gain advanced training in the medical disciplines of endocrinology, cardiovascular disease, intermediary metabolism, genetics, immunology, pharmacology, nutrition, neurobiology, physiology and biomedical aging. These courses provide program participants with an extensive background in the basic and clinical sciences related to metabolic and nutritional medicine.

The certificate has been constructed to prepare individuals for future translational endeavors in metabolic and nutritional medicine. The certificate is also designed to fulfill the increasing demand for trained individuals in the specialty of regenerative medicine and is founded on the premise that future clinicians, educators and researchers in the regenerative medical sciences will require extensive interdisciplinary training in order to develop novel solutions to current biomedical problems.

The interdisciplinary curriculum has been organized to provide the background training that will equip students with the essential tools for a successful practice in the areas of metabolic and nutritional medicine. The program requires 12 credit hours, which can be completed in a minimum of three semesters of study. The four required courses provide both foundation and advanced training and represent an integrated approach to metabolic and nutritional medicine. Students can select from ten different courses to tailor the program to their future career goals. All the courses are provided in both an intense lecture and "on-line" or distance format expanding access to students who may experience geographical or scheduling limitations. The program also features an extensive array of web casts to further supplement the lecture material together with a broad array of clinical experiences.

Accreditation:
Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION
Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements:
1. A M.D., D.O., Ph.D., D.P.T. or D.N.P. degree or their equivalent from a regionally accredited university in the health sciences or a Master's degree or the equivalent in a biomedical science field from a regionally accredited university.

Program Faculty:
All the program faculty involved in the delivery of the associated courses are senior M.D.- and/or Ph.D.-level instructors who have a minimum of 8-years experience in clinical practice and medical education.

DEGREE PROGRAM REQUIREMENTS
The following table indicates the courses and their associated credit hours that student's must successfully complete to be awarded the Graduate Certificate in Metabolic & Nutritional Medicine.

School of Biomedical Sciences
College of Medicine
Graduate Certificate in
Metabolic & Nutritional Medicine

Certificate Curriculum:

Courses **(select any four)**	**Credit**
	Credit
GMS 6XXX Clinical Approach to Endocrinology (*Smith/Barber*)	3
GMS 6XXX Diabetes and Coronary Heart Disease" (*Smith/Barber*)	3
GMS 6XXX Integrated Clinical Neurobiology (*Smith/Barber*)	3
GMS 6XXX Nutrition and Metabolism (*Smith/Barber*)	3
GMS 6XXX Functional Medicine and Infectious Disease (*Smith/Barber*)	3
GMS 6XXX Autoimmune Diseases and Cognitive Function (*Smith/Barber*)	3
GMS 6XXX Laboratory Fundamentals and Adjunct Cancer Therapies (*Smith/Barber*)	3
GMS 6XXX Clinical Nutrition (*Barber*)	3
TOTAL PROGRAM CREDITS (minimum)	**12**

Graduate Certificate in Metabolic & Nutritional Medicine

Course descriptions:

GMS 6XXX "Clinical Approaches to Endocrinology" (3 cr. hrs)

The course focuses on the function of the human endocrine system and examines factors that influence hormone function and physiological hormone balance. Clinical approaches to achieving hormone homeostasis are emphasized including examples of appropriate hormone replacement therapies.

GMS 6XXX "Diabetes and Coronary Heart Disease" (3 cr. hrs)

The course examines fundamental aspects of diabetes, coronary heart disease and inflammation critical to understanding the factors that result in degraded cardiovascular tone and the biochemical and cellular mechanisms relevant to the correct maintenance of carbohydrate metabolism and the role of inflammation in the progression of various diseases.

GMS 6XXX "Integrated Clinical Neurobiology" (3 cr. hrs)

The course introduces the major principles of neurology and the role of neurotransmitters in cellular function and communication between various cell types and also focuses on the importance of gastrointestinal health in relationship to the immune system and neurotransmitter function.

GMS 6XXX "Nutrition and Metabolism" (3 cr. hrs)

The course provides a detailed discussion of the experimental analysis of human nutrition together with a discussion of the methods used in detoxification of exogenous toxins. In addition, the course focuses on a critical analysis of the roles of fatty acid and amino acid metabolism in organ homeostasis.

GMS 6XXX "Functional Medicine and Infectious Disease" (3 cr. hrs)

This course covers advanced human nutrition together with the utilization of various botanical supplements that have been applied to metabolic and nutritional medicine. A functional approach to infectious diseases will also be explored.

GMS 6XXX "Autoimmune Diseases and Cognitive Function" (3 cr. hrs)

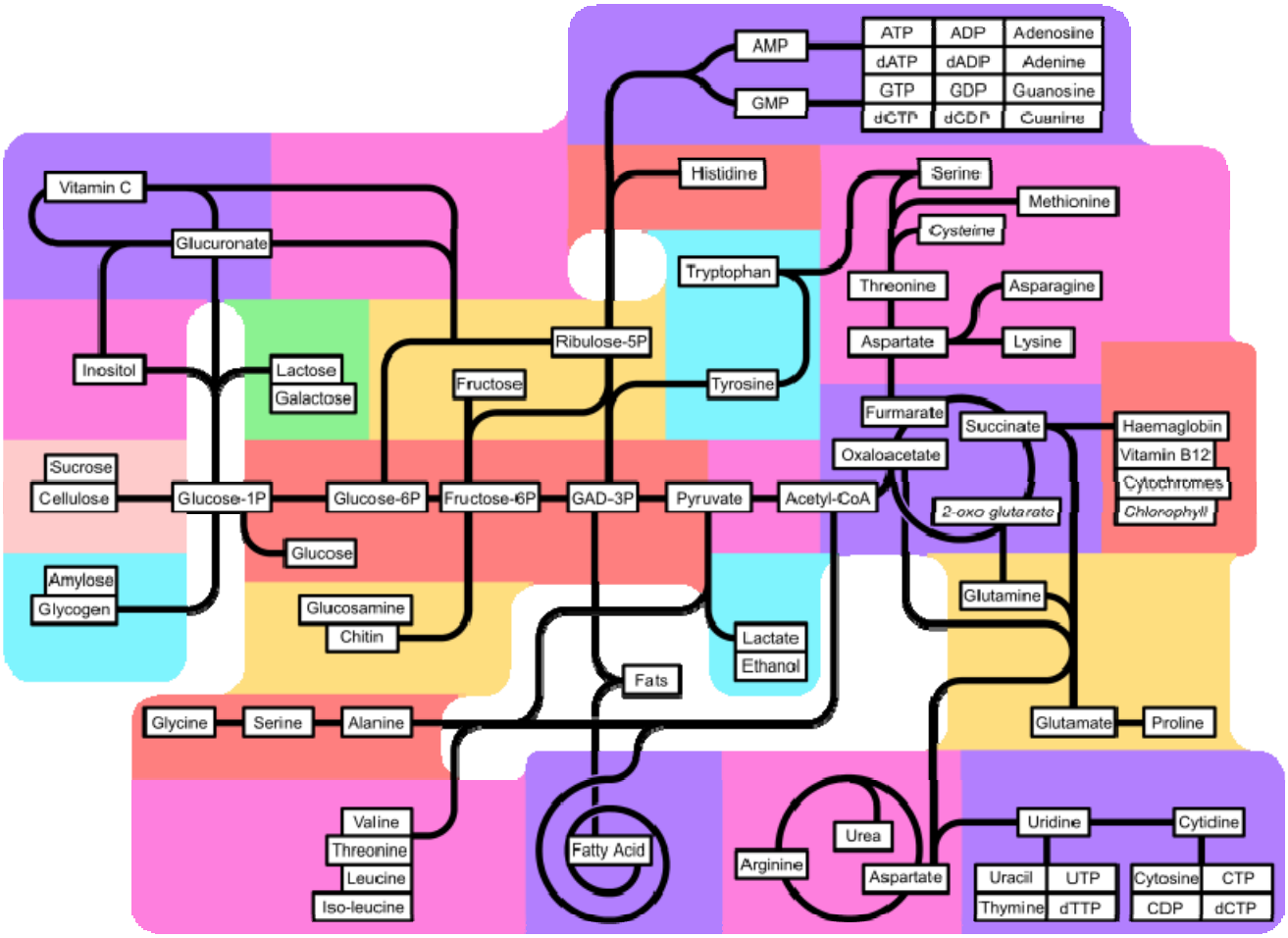
Basic and clinical aspects of memory enhancement and memory loss are described together with the major physiological changes that result from various autoimmune diseases. Also discussed are the critical roles of mitochondria in cellular energy metabolism, the common causes of oxidative stress and the consequences of heavy metal toxicity.

GMS 6XXX "Laboratory Fundamentals and Adjunct Cancer Therapies" (3 cr. hrs)

This course presents and extensive review of clinical laboratory fundamentals as part of the disease diagnosis process. Also included are discussions of the major psychiatric diseases together with an introduction to the subjects of sports medicine and addiction medicine. The course emphasizes the experimental basis for factual knowledge in modern medical physiology, the therapies designed to reverse adverse cellular functions and adjunct therapies for cancer management.

GMS 6XXX "Clinical Nutrition" (3 cr. hrs)

A course that is designed to provide a thorough foundation in all aspects of human nutrition and which emphasizes the close relationship between nutrition and various chronic diseases. Course topics include the properties of major nutrients, obesity, weight management, nutrition during the life cycle, vitamins, enteral and parenteral nutrition and nutritional aspects of specific diseases, including cardiovascular disease and cancer.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Vitamin C
Glucuronate
Histidine
Serine
Methionine
Cysteine
Tryptophan
Threonine
Asparagine
Aspartate
Lysine
Ribulose-5P
Inositol
Lactose
Galactose
Fructose
Tyrosine
Furmarate
Succinate
Haemaglobin
Vitamin B12
Cytochromes
Chlorophyll
Oxaloacetate
Sucrose
Cellulose
Glucose-1P
Glucose-6P
Fructose-6P
GAD-3P
Pyruvate
Acetyl-CoA
2-oxo glutarate
Glucose
Amylose
Glycogen
Glucosamine
Chitin
Glutamine
Lactate
Ethanol
Fats
Glycine
Serine
Alanine
Glutamate
Proline
Valine
Threonine
Leucine
Iso-leucine
Fatty Acid
Urea
Arginine
Aspartate
Uridine
Cytidine
Uracil
UTP
Thymine
dTTP
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Graduate Programs in
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