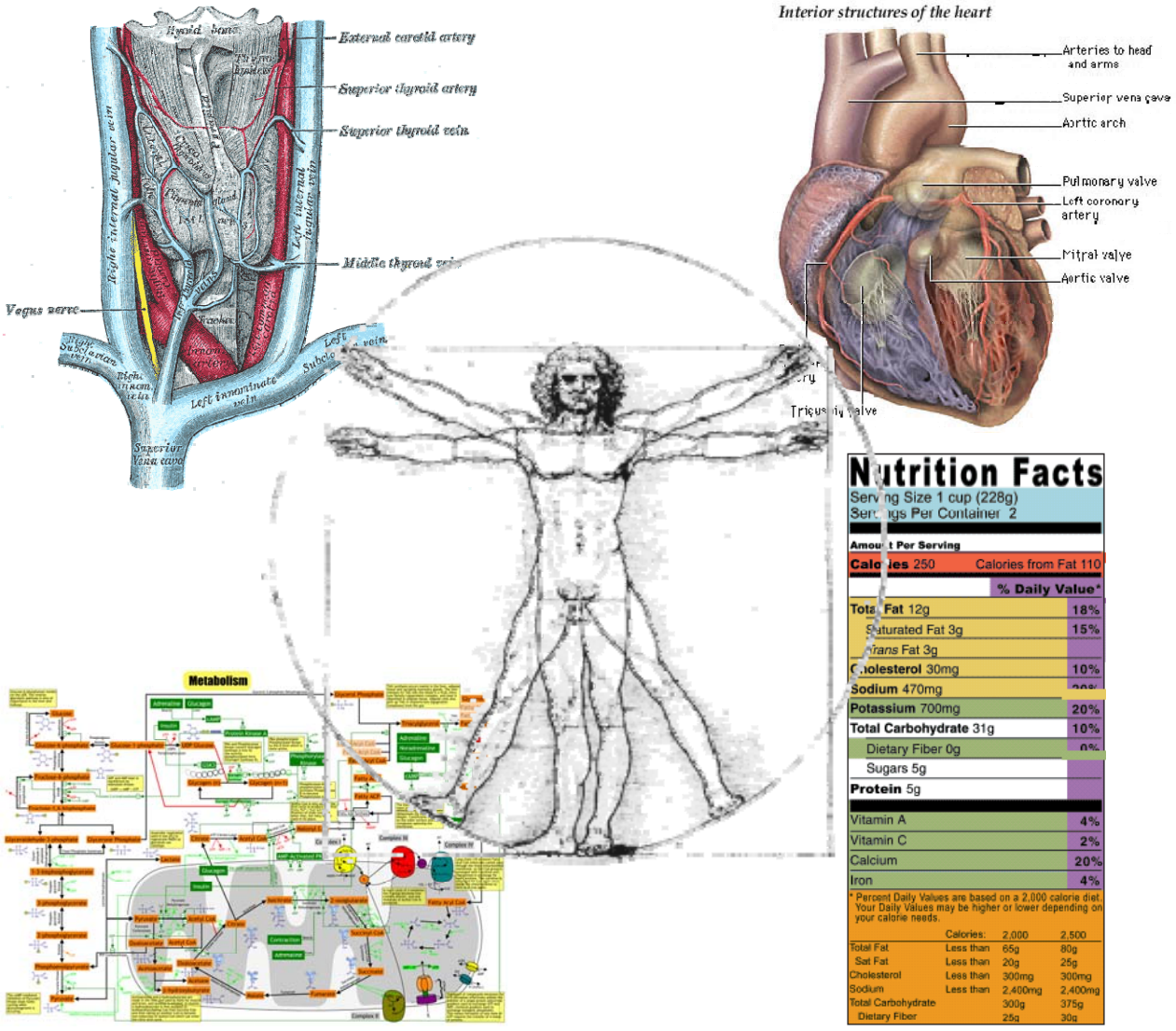
USF HEALTH

Graduate and Postdoctoral Affairs
School of Biomedical Sciences
College of Medicine



Master's Program in Medical Sciences
Metabolic & Nutritional Medicine Concentration

MNM

Graduate Curriculum: New Concentration

M.S. in Medical Sciences:
Metabolic & Nutritional Medicine Concentration

MNM

Concentration 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 concentration in Metabolic & Nutritional Medicine (MNM), within the Master's Program in Medical Sciences 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 program 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 retard the aging process. This novel graduate

concentration 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, pharmacology, nutrition, physiology and biomedical ethics 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 curriculum 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 concentration 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 program 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 Master's concentration 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 Master's concentration 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 Master's concentration represents a new and distinctive academic concentration by virtue of its component courses and their associated content. The innovative curriculum 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): M.S. in Medical Sciences

Requirements: The proposed curriculum is attached and features a combination of a clinical intensive core course, eight required courses and a selection of several electives (five), that can be completed in approximately two years. 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: 32 credit hours; 480 total contact hours

Budget Account Number: USF01HSC10000-610601-000000-0000000

Proposed Catalog Copy: This innovative, interdisciplinary 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, physiology and biomedical aging. The program also features a clinical internship and an introduction to health sciences ethics. These courses provide program participants with an extensive background in the basic and clinical sciences related to metabolic and nutritional medicine.

The program has been constructed to prepare individuals for future translational endeavors in metabolic and nutritional medicine. The program 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 designed 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 32 credit hours, which can be completed in a minimum of four semesters of study. Nine required courses provide both foundation and advanced training while two courses provide a final integrated approach to metabolic and nutritional medicine together with exposure to important ethical considerations in the health sciences. Students can also select from five elective 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 M.S. degree in Medical Sciences with a concentration in Metabolic & Nutritional Medicine.

School of Biomedical Sciences
College of Medicine
M.S. in Medical Sciences
Metabolic & Nutritional Medicine Concentration

Program Curriculum:

Core Course

	Credit
GMS 6XXX Clinical Intensives in Metabolic & Nutritional Medicine (*Smith/Barber*)	3

Required Courses

Year 1

SEMESTER I

	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
Total Semester Credits	**9**

SEMESTER II

	Credit
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
Total Semester Credits	**9**

Year 2

SEMESTER I

	Credit
GMS 6XXX Laboratory Fundamentals and Adjunct Cancer Therapies (*Smith/Barber*)	3
GMS 6871 Health Sciences Ethics (*Barber*)	2
Total Semester Credits	**5**

ELECTIVES (2 or more required, can be taken in any semester offered)

	Credit
GMS 7930 Biomedical Aging (*Dajani*)	3
GMS 6XXX Clinical Nutrition (*Barber*)	3
GMS 7930 Aging and Neuroscience (*Dajani*)	3
GMS 6XXX Medical Sciences Independent Study (*Smith/Barber*)	3
GMS 7910 Directed Research (*Smith/Barber*)	3

TOTAL PROGRAM CREDITS (minimum) 32

Master's Program in Medical Sciences
Metabolic & Nutritional Medicine Concentration

Course descriptions:

Core Course:

GMS 6XXX "Clinical Intensives in Metabolic and Nutritional Medicine" (3 cr. hrs)
A course focusing on the applied aspects of metabolic and nutritional medicine that includes extensive patient contact and mentoring from qualified clinical experts in the field of metabolic and nutritional medicine. The course is designed to provide practical experience that will develop the diagnostic and therapeutic skills of the clinical practitioner.

Required Courses:

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 6871 "Health Sciences Ethics" (2 cr. hrs)
A case-based course designed to convey standards of ethical conduct in biomedical research and clinical practice and to promote discussion of some of the "challenges" facing investigators in such areas as stem cell therapies, recombinant DNA technology, pharmaceutical trials and current medical applications of biotechnology. Major topics will include ethics of human research; study design, data acquisition and human subjects; studies involving genetic information or gene therapy; use of human tissues and samples in research; research involving animals; conflicts of interest; research misconduct and HIPAA requirements.

Elective Courses:

GMS 7930 "Biomedical Aging" (3 cr. hrs)
Students will focus on how genetic and environmental factors contribute to the process of biological aging. The class consists of didactic lectures, literature review and debates on how biomedical advances, from the discovery of antibiotics to calorie restriction, contribute to human longevity.

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.

GMS 7930 "Aging and Neuroscience" (3 cr. hrs)
This course is designed to cover current topics in neuroscience with emphasis on diseases associated with the aging process such as neurodegenerative diseases and inflammation. Special sections are devoted to cutting edge experimental approaches in the treatment of Alzheimer's Disease, Parkinson's Disease and the applications of stem cell therapy.

GMS 6XXX "Medical Sciences Independent Study" (3 cr. hrs)
A course that allows students to focus, "in-depth", on individually-selected topics in metabolic and nutritional medicine under the guidance of a program faculty member.

GMS 7910 "Directed Research" (3 cr. hrs)

Master's Program in Medical Sciences: Metabolic & Nutritional Medicine Concentration

The program in Metabolic & Nutritional Medicine makes extensive use of web broadcasts to supplement the educational activities provided by the various lecture courses. Currently, all the past web casts from the last three years are archived and readily accessible to registered students in the program and can be reviewed to expand and enhance the student's comprehension of the program material. In addition to the web casts, supplemental material for many of the topics is also accessible in the archives. The currently available web casts, their presenters and topics are listed. Web casts are added to the archive on a regular basis as they become available.

The webcast requirements for the program and various courses can be completed using one of two options:

1. Students can attend the webcasts live. Individuals can access the course portal to obtain Webcast Information. The associated list provides information as to when all of the live webcasts will be held (students should also be receiving weekly emails from instructors concerning the webcast availability and how to access the webcasts)
2. Students can watch the webcasts in the archive section of the website by clicking on Webcast Archive once they have followed the access instructions. There are webcasts archived from February 2005 to the present day. Live webcasts are also archived within the same week as they were live. Students who view any of the archived webcasts are requested to please contact the instructor with only the original date to have the information inserted into the system.

Web Broadcast Archive

Date	*Presenter*	*Title*
3/7/05	James Wilson	Adrenal Fatigue
4/11/05	Ronald Rothenberg	Testosterone Replacement
7/25/05	David Zava	Pros & Cons of Saliva Testing
9/19/05	Ronald Rothenberg	Testosterone Replacement Therapy
1/10/06	David Zava	Hormone Testing in Saliva and Dried Blood Spots
1/30/06	Patrick Hanaway	Case Studies for Applying Estrogen Metabolism in Clinical Practice
2/21/06	James Wilson	Adrenal Fatigue
4/14/06	Ronald Rothenberg	Some Things I've Learned in 9 Years of Anti-Aging Practice
3/21/06	Eldred Taylor	Question and Answer: Scientific Evidence-Based Approach to BHRT
7/10/06	Ronald Rothenberg	DHEA and Nutrition
9/11/06	Patrick Hanaway	Estrogen Metabolism
10/2/06	Pamela Smith	PMS and Peri-Menopause
10/24/06	Ronald Rothenberg	Anti-Aging Emergency Room
11/20/06	Eldred Taylor	Quantifying Stress
1/29/07	James Wilson	Adrenal Fatigue

2/6/07	David Zava	Progesterone versus MPABC
2/12/07	Patrick Hanaway	Estrogen Metabolism
2/20/07	Ronald Rothenberg	The Fusion of Anti-Aging and Emergency Medicine
3/12/07	Ronald Rothenberg	Hormones – Nuts and Bolts
4/30/07	Michael Collins	Clinical Compounding Pearls
5/7/07	Patrick Hanaway	GUT and IBS
6/5/07	Pamela Smith	Thyroid Case Studies and Thyroid Hormones
7/10/07	Ronald Rothenberg	Adult Stem Cells
7/17/07	David Zava	Progesterone versus Synthetic Progestins
7/23/07	Eldred Taylor	Quantifying Stress
8/7/07	Patrick Hanaway	Nutritional Evaluation
8/20/07	Ronald Rothenberg	HGH
8/27/07	Ronald Rothenberg	Thyroid Optimization
9/25/07	James Wilson	Adrenal Fatigue
11/27/07	Ronald Rothenberg	Growth Hormone Replacement Therapy for Adult GH Deficiency: Current Literature and Clinical Practice
3/24/08	Michael Collins	The Basics of Bases
4/7/08	David Zava	Where's the Hormone? Body Fluid and Tissue Distribution of Sex-steroid Hormones Following Different Routes of Administration
4/14/08	Michael Collins	Clinical Compounding Pearls
5/6/08	Ronald Rothenberg	The Nuts and Bolts of Hormone Management
5/12/08	Eldred Taylor	How to Change Your Practices
5/19/08	Thomas Guilliams	The A.R.K.
5/27/08	Andrew Heyman	Practice Building
6/9/08	Eldred Taylor	Question and Answer Session
6/17/08	Nick Saunders	Lipidology and the Metabolic Syndrome
6/23/08	Patrick Hanaway	Optimal Nutritional Assessment
6/30/08	James Paoletti	Differentiation and Treatment of Hypothyroidism
7/7/08	Stephen Sinatra	Question and Answer Session
7/22/08	James LaValle	Question and Answer Session
7/28/08	Pamela Smith	Ask the Professor Days
8/5/08	Lyra Heller	Botanicals
8/11/08	Mark Houston	Q & A Session on Hypertension, Lipids, Metabolic Syndrome and Vascular Aging
8/19/08	James Wilson	Review and Continuation of Adrenal Fatigue
8/25/08	Patrick Hanaway	EstroGenomics and Estrogen Metabolism
9/9/08	Thomas Guilliams	Understanding Fatty Acids and Their Targets
9/23/08	George Gillsom	Transmethylation
10/6/08	Catherine Willner	MS: 2D or not 2D
10/7/08	Pamela Smith	Dosing Recommendations for HRT
10/20/08	Stephen Sinatra	Q & A Session
10/27/08	Ronald Rothenberg	Vitamin D Deficiency: The Forgotten Hormone
11/3/08	Eric Braverman	Parathyroid Hormone
11/17/08	Russell Blaylock	Inflammation, Cytokines and Disease
11/24/08	Andrew Heyman	IV Therapies
12/1/08	Eric Braverman	Cognitive Decline Begins with Loss of Brain Speed
12/16/08	Pamela Smith & Sahar Swidan	Dosing Recommendations for HRT - Part #2
12/22/08	Michael Collins	Solving Problems for Women
1/5/09	Shari Lieberman	Question & Answer Session
1/12/09	James LaValle	Phytotherapy
1/20/09	James Wilson	Chronic Fatigue Syndrome & Fibromyalgia
1/26/09	Robert Rountree	The Role of Brassica Vegetables and Glucosinolates in Detoxification

Program Faculty:

Pamela W. Smith, M.D., M.P.H., spent her first 20 years of practice as an emergency medicine physician at the Detroit Medical Center. She is board certified in Anti-Aging Medicine and is the Director of the Fellowship in Anti-Aging, Regenerative, and Functional Medicine which is the only fellowship of its kind in the United States. She is an internationally known speaker and author of "HRT: The Answers", "Vitamins: Hype or Hope?", "Demystifying Weight Loss," and "What You Must Know about Vitamins, Minerals, Herbs, and More." She has also published in medical journals and has won awards for teaching.

Michael J. Barber, D.Phil., is a Distinguished University Health Professor of Molecular Medicine and Associate Dean for Graduate and Postdoctoral Affairs in the College of Medicine at the University of South Florida and director of the "Clinical Nutrition", "Health Sciences Ethics" and "Medical Sciences Independent Study" courses. He has published over 140 peer-reviewed articles and book chapters and has extensive experience of medical and graduate student instruction in biochemistry, molecular biology and molecular medicine and the design and implementation of distance learning courses and graduate programs.

Nagwa Dajani, M.D., Ph.D., is an Assistant Professor in the Department of Neurosurgery and Director of the Aging and Neuroscience and Women's Health concentrations in the Master's in Medical Sciences Graduate Program in the College of Medicine at the University of South Florida. She has extensive experience in teaching both medical and graduate students and directs a number of courses including "The Biology of Aging" and "Aging and Neuroscience".

Guest Faculty:

Bill Anton, B.S., Ph.D. (HON), is a Senior Lecturer and Consultant in Integrative Medicine and coordinator of the course in Anti-Aging Medicine at Swinburne University, Graduate School of Melbourne in Melbourne, Australia. Dr. Anton is also CEO and a consultant at PathLab (Australia) as a clinical and nutritional biochemist and endocrinologist. He is a Medical Research Director of Life-Source Anti-Aging Clinics in Melbourne and Sydney and has been practicing anti-aging medicine for over ten years.

Thomas J. Barnard, M.D., FCCFP (EM), FAAFP, CAQ, (Geriatrics), FABAAM, adjunct clinical professor of family medicine, University of Western Ontario, adjunct professor of Human Biology and Nutritional Sciences, University of Guelph. Consultant and Medical Director, Aura Medical Restorative Spa, Leamington, Ontario, Canada. Chief Scientific Officer, See Yourself Well, Inc. and author of "Defeating Diabetes" published 2003.

Eric R. Braverman, M.D., is the Director of The Place for Achieving Total Health (PATH) Medical, New York City, NY, a full-service family health care integrative medical practice. He is also President of Total Health Nutrients and author of several books.

Ben Brown, M.D., is the Director of the Integrative Medicine Family Medicine Residency Program at the University of California, School of Medicine in San Francisco. He is also director of Global Medicine for the same university. Dr. Brown has also spent 15 years of his professional career near the Thai-Burma border on international medical missions work. He has worked with Dr. Dean Ornish and has won numerous awards as a teacher, author, and lecturer.

George Gillson, M.D., Ph.D., received a Ph.D. from university of Alberta before earning his M.D. from University of Calgary. He practiced Family Medicine for six years and is now the

President and Medical Director of Rocky Mountain Analytical Laboratory in Alberta Canada. He is the co-author of "You've Hit Menopause, Now What?"

Robert Goldman, M.D., D.O., Ph.D., FAASP, FAOASM, is cofounder and Chairman of the Board of the American Academy of Anti-Aging Medicine. He has served as Special Advisor to the President's Counsel on Physical Fitness & Sports. He also founded and served as President of the National Academy of Sports Medicine.

Thomas Guilliams, Ph.D., is Director of the Point Institute of Nutraceutical Research, which is the research arm of Ortho Molecular Products, where he serves as the VP/Director of Science and Regulatory Affairs. He is also a clinical instructor for the UW-Madison School of Pharmacy. His focus is on the evidence-based approach to nutraceuticals.

Patrick Hanaway, M.D., founded Family to Family: Your Home for Whole Family Health in Asheville, NC, and is currently Medical Director for Genova Diagnostics. Dr. Hanaway has lectured extensively across the US and in Europe on the clinical application of nutrition and genomics, particularly in the areas of digestion, oxidative stress, inflammation, and achieving long-term wellness.

Lyra Heller, M.A., is an anthropologist with 35 years of experience and expertise in the areas of complementary and alternative medicine. She is also a co-founder of Metagenics, Inc., a life sciences company and leading developer and manufacturer of science-based nutraceuticals and medical foods sold to healthcare practitioners worldwide. A board member of the American Herbal Products Association (AHPA), Lyra also maintains a private consulting practice in Los Angeles, CA, and is the co-author of “Good for You! Smart Choices for Hormone Health!”

Mark Houston, M.D., SCH, FACP, FAAHA, is associate clinical professor of clinical medicine at Vanderbilt University School of Medicine and Director of a hypertension institute in Nashville, TN. He has published over 120 peer-reviewed medical articles, three books, and numerous textbook chapters.

Jim LaValle, R.Ph., C.C.N., N.D., has 18-plus years of clinical practice experience in the field of natural therapeutics and functional medicine, is author of 14 books, the latest being "Cracking The Metabolic Code" and is an adjunct professor in the College of Pharmacy, University of Cincinnati.

Shari Lieberman, Ph.D., is a board certified clinical nutritionist. She is contributing editor to the American Medical Association's Fifth Edition of Drug Evaluations. She is author of numerous books and is a faculty member of the University of Bridgeport School of Nutrition.

Jim Paoletti, R.Ph., FIACP, FACA, is a compounding pharmacist with over 20 years of experience with bio-identical hormones. He is the Director of Provider Education for ZRT Laboratory, where he serves as a consultant for practitioners and develops educational programming for health professionals.

David Perlmutter, M.D., is a board-certified neurologist in private practice in Naples, FL, where he serves as Medical Director of the Perlmutter Health Center. He has contributed extensively to the world medical literature with publications appearing in such journals as The Journal of Neurosurgery and Archives of Neurology. Dr. Perlmutter is the author of Brain Recovery.com, “The Better Brain Book” and “Raise a Smarter Child by Kindergarten”.

Ronald Rothenberg, M.D., is Clinical Professor and Course Director of Preventative and Family Medicine, University of California, San Diego School of Medicine. He is the author of “Forever Ageless” and has recently been featured in the University of California M.D. television series.

Robert Rountree, M.D., practices family medicine in Boulder, CO, IS board certified, and is an adjunct clinical faculty of the Institute for Functional Medicine in Gig Harbor, WA. He is also a Diplomat of the American Board of Holistic Medicine and is co-author of numerous books including: “The New Breastfeeding Diet” (McGraw-Hill, in press) and “A Natural Guide to Pregnancy and Postpartum Health” (Avery, 2002).

Paul Savage, M.D., is the founder and Chief Medical Officer of BodyLogicMD. He is double board certified by both the American Board of Emergency Medicine and the American Academy of Anti-Aging Medicine.

Stephen T. Sinatra, M.D., F.A.C., C.M.S., is Assistant Clinical Professor of Medicine at University of Connecticut School of Medicine. He is board certified in Cardiology and Internal Medicine and is the former Chief of Cardiology at Manchester Memorial Hospital. He has authored several books, including “Lose to Win”, “Heartbreak and Heart Disease”, “Optimum Health”, and “The Coenzyme Q10 Phenomenon”.

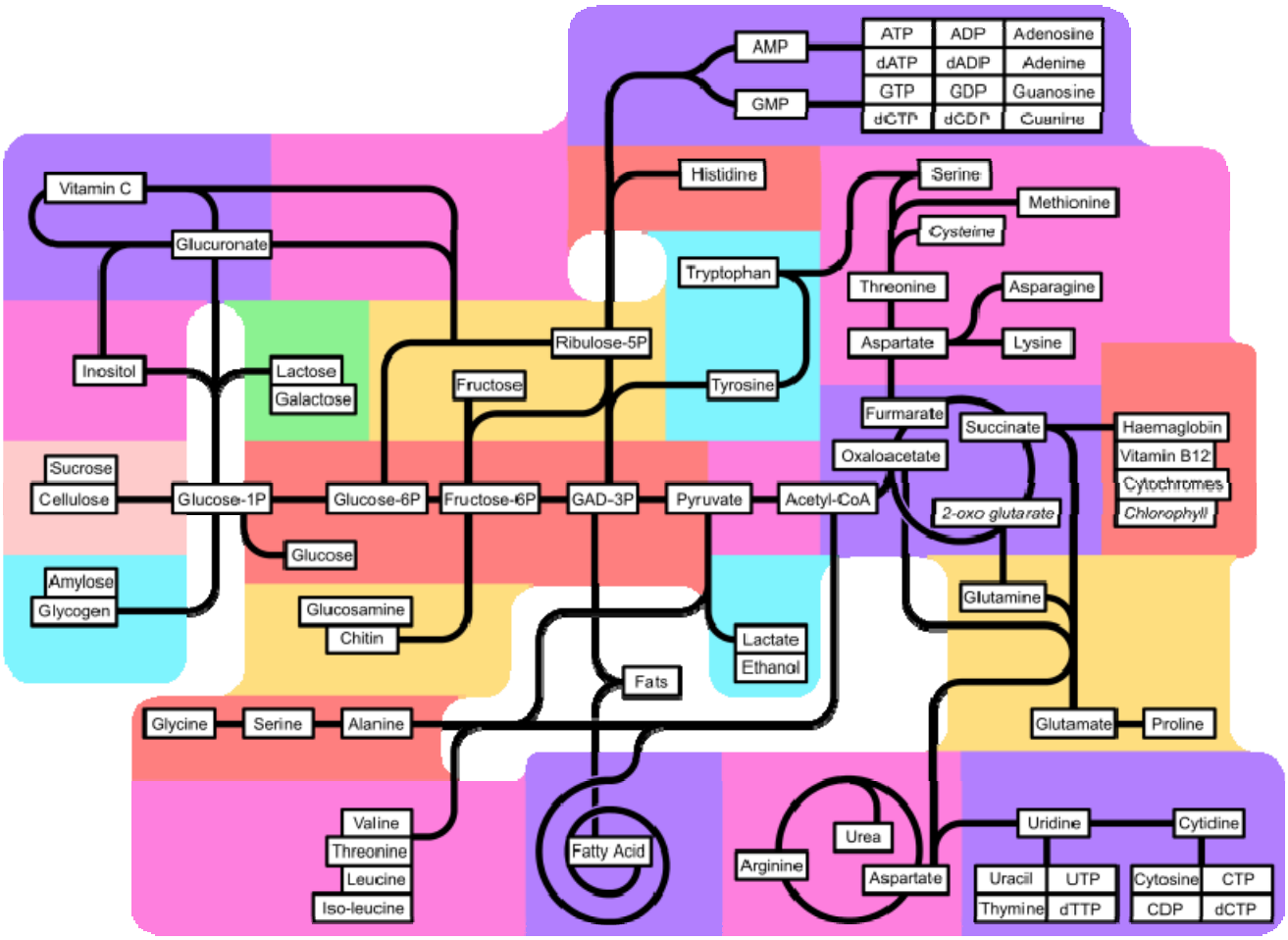
Sahar Z. Swaidan, Pharm.D., BCPS is the President and CEO of both Pharmacy Solutions and NeuroPharmacology Consultants, Inc. in Ann Arbor, MI. She is a board certified pharmacotherapy specialist working in the field of chronic pain management. She is also the Clinical Pharmacy Specialist on the inpatient Head-Pain Unit at Chelsea Comm. Hospital, and is a Clinical Associate Professor of Pharmacy at the Univ. of MI.

Eldred Taylor, M.D., is a board-certified obstetrician/gynecologist, Director of Integrative Medicine at De Kalb Medical Center in Decatur, GA., and an Assistant Clinical Professor at Emory University School of Medicine, and co-author of “Are Your Hormones Making You Sick?”

Catherine Willner, M.D., is Chair of the American Academy of Neurology Pain Section's Scientific Committee. She is certified by the American Board of Psychiatry and Neurology. Dr. Willner has published several studies in the field of Neurology and Pain Management. She practices Neurology.

James L. Wilson, N.D., D.C., Ph.D., Director of Research at Immunogenics Company of America in Tucson, AZ; President of Future Formulations in Tucson, AZ; author of “Adrenal Fatigue: The 21st Century Stress Syndrome”.

David T. Zava, Ph.D., is the Author of "What Your Doctor May Not Tell You about Breast Cancer” and is a research scientist. His work includes the study of basic hormonal regulation of breast cancer and the symptoms, signs, syndromes, and disease of Western society. He is well published in both of these areas. He is also the President and Director of ZRT Laboratory in Oregon.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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
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dCTP

Graduate Programs in
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