Introduction to Dietetics & Integrative Medicine / models for IFMNT education

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OBJECTIVES

1. Review a definition and perspective of the advanced dietetics specialty of integrative and functional medical nutrition therapy (IFMNT).

2. Identify the foundational Ten Tenets of Integrative and Functional Medical Nutrition Therapy based in systems biology.

3. Understand the role of dietary supplements in the practice of IFMNT and the need for trained nutrition professionals in their recommendations.

4. Be able to identify effective models for advanced training in IFMNT available to the RD/RDN DIFM Member.
The dietitian-nutritionists trained in the advanced specialty of integrative and functional medical nutrition therapy (IFMNT) provide a unique holistic approach to modulating chronic disease pathophysiology toward wellness.
1. Review a definition and perspective of the advanced dietetics specialty of integrative and functional medical nutrition therapy (IFMNT)
Review

The Next Generation of Dietitians: Implementing Dietetics Education and Practice in Integrative Medicine

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Key Words: interprofessional education, dietetics and integrative medicine, integrative medicine, nutrition and dietetics education, future practice

Integrative medicine is a quickly expanding field of health care that emphasizes nutrition as a key component. Dietitians and nutritionists have an opportunity to meet workforce demands by practicing dietetics and integrative medicine (DIM). The purpose of this article is to describe a DIM education program and practicum. We report the results of an interprofessional nutrition education and practicum program between the University of Kansas Medical Center (KUMC) Department of Dietetics and Nutrition and KU Integrative Medicine. This partnered program provides training that builds on the strong foundation of the Nutrition Care Process and adds graduate-level educational and practicum experiences in foundational integrative medicine knowledge, including nutritional approaches from a systems biology perspective, nutrigenomics, and biochemistry as the core knowledge to understand the root cause of a chronic disorder and to choose appropriate nutritional tools for interventions. This interprofessional KUMC program provides a dietetic internship, master’s degree, and graduate certificate in DIM and fulfills a need for dietitians and nutritionists who seek careers practicing in an integrative medicine setting. The program fulfills expanding workforce needs to provide quality health care for patients with chronic illnesses.

INTRODUCTION

dietary changes [6–15]. But if nutritional interventions are to address the chronic disease epidemic, a well-trained workforce
Who is DIFM?
The Integrative RDNs

Dietitians in Integrative and Functional Medicine are advanced specialty nutrition practitioners whose core philosophy centers around a holistic, personalized approach to health and healing. Our members integrate a variety of nutrition therapies including whole foods, tailored supplements and mind body modalities in clinical practice.

DIFM 2015  www.integrativeRD.org
Complexity of human health

Pattern Recognition
Scientific Evidence-Based

...reviews the evidence from randomized, controlled trials; cohort and case-controlled studies; and observational studies, which can also provide valuable evidence, and takes into account the number of studies that have provided consistent outcomes of support..

Diabetes Care January 2002 vol. 25 no. 1 148-198
Practice-based evidence promotes the value of the knowledge and evidence gained from the practitioner’s clinical experiences and observations.
...help us unravel the complexity of causal forces in our varied populations and the ecologically layered community and societal circumstances of public health practice.

We seek a more evidence-based public health practice, but too much of our evidence comes from artificially controlled research that does not fit the realities of practice.
2. Identify the foundational *Ten Tenets of Integrative and Functional Medical Nutrition Therapy* based in systems biology
The etiology of the current chronic disease epidemic is often due to a lifetime of poor diet and lifestyle choices as well as harmful environmental exposures.

Ten Tenets of Integrative Nutrition
University of Kansas Medical Center
KU Integrative Medicine
Dietetics and Integrative Medicine Project

“First do no harm”

1. Individualized Integrative Medical Nutrition Therapy (MNT) optimizes wellness.

2. Genomic uniqueness contributes to individualized integrative MNT interventions in addition to practice and evidence based medicine.

3. Listening to the patient’s story creates therapeutic client-provider relationships to maximize health outcomes.

4. Whole foods and targeted nutrients* with minimal contamination specific for the individual provide the basis of integrative MNT interventions.

5. Whole foods and targeted nutrients* can act as epigenetic messages to promote wellness - “Food as epigenetic medicine.”

6. Whole foods and targeted nutrients* can reduce toxin damage to metabolism.

7. Whole foods and targeted nutrients* can manage chronic disease inflammation.

8. Correct nutritional insufficiencies as well as deficiencies to optimize nutrient metabolism and lower risk of chronic disease.

9. Beliefs and community relationships influence nutritional health (mind-body).

10. Integrative MNT Assessment builds upon the conventional approach to chronic disease by evaluation of body systems, gut ecology and nutrient utilization.

*Targeted nutrients: therapeutic use of isolated or combined nutrients that can be administered as dietary supplements, medical foods, topical cutaneous, intramuscular or intravenous injections.
Individualized Integrative Medical Nutrition Therapy (MNT) optimizes wellness.
Genomic uniqueness of an individual contributes to integrative MNT interventions in addition to practice and evidence base medicine.
Listening to the patient’s story is the basis of the therapeutic relationships between providers and their clients to maximize health outcomes.
“Food as epigenetic messaging—Food is information” – wellness is promoted by targeted food and nutrients intervention for an individual
Randy Jirtle: In 2003, he provided convincing molecular evidence that maternal dietary supplementation of Agouti viable yellow (A^vy) mice with methyl donors (i.e. folic acid, choline, vitamin B_{12}, and betaine) altered the coat color distribution and disease susceptibility in genetically identical offspring by increasing DNA ...
Low-contaminated whole foods and targeted nutrients specific for the individual provide the basis of integrative MNT.
Correct nutritional insufficiencies as well as deficiencies to optimize nutrient metabolism and lower risk of chronic disease.
Vitamin D Deficiency

...estimated 85% of people in the U.S. are Vitamin D Deficient and Many Scientists and Researchers Consider this an unrecognized Global Epidemic

CDC 2015
Manage chronic disease inflammation through food and targeted nutrients.
TOTAL INFLAMMATORY LOAD

Inflammatory Total Load

Baseline Health

Infection

Healthy maintenance

Injury

Acute Response

Infection

Acute Stress

Chronic Response
Long-term response

Chronic injury

Chronic infection

Chronic Stress
Antigens, toxins, emotions, insomnia, VAT, Adrenal Stress
Use of targeted nutrient therapies can reduce toxin damage to metabolism.
Lipid-soluble (nonpolar) toxins are stored in adipose (fat) tissue and contribute to increased mobilized toxin load with weight loss.

**Toxins**
- Oxidation
- Reduction
- Hydrolysis
- Hydration
- Dehalogenation

**Reactions**
- Riboflavin (Vit B2)
- Niacin (Vit B3)
- Pyridoxine (Vit B6)
- Folic acid
- Vitamin B12
- Glutathione
- Branched-chain amino acids
- Flavonoids
- Phospholipids

**Nutrients used**
- Sulfation
- Glucuronidation
- Glutathione conjugation
- Acetylation
- Amino acid conjugation
- Methylation

**Excretory derivatives**
- Glycine
- Taurine
- Glutamine
- N-Acetyl/cysteine
- Cysteine
- Methionine

**Antioxidant protective nutrients and plant derivatives**
- Carotenoids (Vit A)
- Ascorbic acid (Vit C)
- Tocopherols (Vit E)
- Selenium
- Copper
- Zinc
- Manganese

**Secondary tissue damage**
- Thiols (found in garlic, onions, cruciferous vegetables)
- Bioflavonoids
- Sillymann
- Pycnogenol

**Endotoxins**
- End products of metabolism
- Bacterial endotoxins

**Exotoxins**
- Drugs (prescription, OTC, recreational)
- Agricultural chemicals
- Food additives
- Household chemicals
- Pollutants/contaminants
- Microbial

**Free radicals**
- Superoxide

**Intermediary metabolites**
- (more polar, less lipid-soluble)
Science based mechanisms

Sarcopenia
Loss of muscle mass

Fig. 1. Hypotheses for the pathogenesis of impaired muscle function in malnutrition.
Science based mechanisms

Eicosanoid Cascade of Essential Fatty Acids

Primary control of inflammation and immune regulation
Science based mechanisms

Methylation

Supplementation Cycle: "The Methylation Pathway," KnowYourGenetics.com
Beliefs and community relationships influence nutritional health (mind-body).
#10

Know when you are not the expert. Collaborate with other members of the integrative care team.
3. Understand the **role of dietary supplements** in the practice of IFMNT and the **need for trained nutrition professionals in their recommendations**
B Vitamins

Structure
Co-factors to structural formation

Synthetic or Natural Bioactive Forms?

Vitamin B12
cyanocobalamin? (synthetic) or adenocobalamin (natural) or hydroxycobalamin (natural)? methylcobalamin (natural)?
Phytonutrients

Structure
Co-factors to structural composition
Structural components

Function
Key co-factors throughout metabolism and especially epigenetic effects on immune response, reproduction and cell signaling
Minerals

**Macronutrients**: N, K, Ca, Mg, P, S, Na, (Si)

**Micronutrients**: Cl, Fe, B, Mn, Zn, Cu, Mo, Ni

**Structure**

Co-factors to structural composition

Structural components

- Magnesium Oxide?
- Magnesium Citrate?
- Magnesium Glycinate?
- Magnesium Threonate?
Fats and Oils
Phospholipids

Structure
Primary structural components of all cell membrane, connective tissue

Function
• Primary controlling factor of the immune response regarding inflammation – acute and chronic
• Primary influence on hormonal function (prostaglandins)
• Primary component of brain and brain function
4. Be able to identify effective models for advanced training in IFMNT that are available to the RD/RDN
• ACADEMIC PROGRAMS/DEGREES
• ACADEMIC PROGRAMS/DEGREES (NON-ACCREDITED)
• CERTIFICATIONS
• ADDITIONAL TRAINING
University of Kansas Medical Center:
Dietetics & Nutrition / KU Integrative Med Clinic

- Dietetic Internship/M.S.: Clinical, Integrative Track
- Graduate Certificate in Dietetics & Integrative Medicine (12hrs.)
- Dietetics & Nutrition Fellowship (2-3 Fellows/year)
Introduction

The Dietetics and Integrative Medicine graduate certificate program offers an opportunity for graduate students with bachelor's or master's degrees in dietetics, nutrition, biological sciences or health professions to acquire knowledge to function as a skilled advisor to the patient and a collaborative member of multidisciplinary health care teams; professionals working effectively with integrative and conventional medical practitioners.

The Institute of Functional Medicine defines dietetics within integrative medicine as personalized medical nutrition therapy for prevention and treatment of chronic disease that embraces conventional and complementary therapies. Dietetics within integrative medicine reaffirms the importance of the therapeutic relationship, a focus on the whole person, lifestyle, biochemical individuality and environmental influences.

Admission Requirements

Qualified applicants meet one of the following criteria:

1. Completed an accredited dietetic internship program and are enrolled in a graduate program in Dietetics and Nutrition.

2. Enrolled in a graduate health profession major.

3. Registered Dietitian or other health professional seeking post bachelor's or master's degree education.

All applicants must:

1. Complete prerequisite courses in Medical Nutrition Therapy and Genetics or obtain consent prior to enrollment to determine if possible to enroll in a course before prerequisite courses are completed.

2. Have a cumulative undergraduate or graduate GPA of 3.0 or greater.

3. Submit application to the program as directed on the department web site including official college transcripts, 3 recommendation letters, resume, and official score report from the Graduate Record Examination. GRE scores are valid for 5 years. Application deadlines: Feb. 1 for summer semester admission or May 15 for fall semester admission.

Certificate Curriculum

A web-based 12 hour program over 4 consecutive semesters:

DN 880 Dietary & herbal supplements (3 hrs.) - summer;

DN 881 Introduction to dietetics & integrative medicine (3 hrs.) - fall;

DN 882 A nutrition approach to inflammation & immune regulation (3 hrs.) - spring; and

DN 980 Nutrigenomics and nutrigenetics in health and disease (3 hrs.) - summer

DN 880 Dietary & herbal supplements

Develop skills to partner with patients in making dietary supplement decisions. Explore the safe, efficacious use of botanicals and supplements in nutritional support of aging, maternal health and wellness. Discussions on supplementation in the prevention and treatment of chronic disease include: arthritis, cancer, cardiovascular, diabetes, digestive, mood and renal disorders.

DN 881 Intro. to dietetics & integrative medicine

Introduction to principles of guiding dietetics and integrative medicine, assessing, diagnosis, intervention, monitoring, and evaluating an individual client to restore function; focusing on the unique nutritional imbalances characteristic of chronic disease pathophysiology; supporting individuals with persistent symptoms; preventing chronic disease.

DN 882 A nutrition approach to inflammation & immune regulation

Inflammation and immune dysregulation are common in chronic disease. The course presents a dietetics and integrative medicine approach to identify underlying causes of inflammatory and immune related conditions and associated nutritional influences; applies personalized nutritional interventions as powerful modulators of the pathophysiology of inflammatory and immune responses.

DN 980 Nutrigenomics & nutrigenetics in health & disease

A review of nuclear receptors and their mechanisms of action with specific examples of regulation by nutrients, amino acid control of gene expression, lipid sensors, selenoprotein expression, and functional genomic studies (e.g., atherosclerosis, cancer, obesity, metabolic syndrome, Type 2 diabetes mellitus, and inflammation) with relationships to nutrient intake and polymorphisms.
**Graduate Certificate in Dietetics & Integrative Medicine**

<table>
<thead>
<tr>
<th>Fall Semester 2013 – 11 hours</th>
<th>Spring Semester 2014 – 11 hours</th>
<th>Summer Semester 2014 – 6 hours</th>
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</thead>
<tbody>
<tr>
<td>DN 817 Seminar in Dietetics &amp; Nutrition I – 1 hr.</td>
<td>DN 818 Seminar in Dietetics &amp; Nutrition I – 1 hr.</td>
<td>DN 880 Dietary &amp; Herbal Supplements – 3 hr.*</td>
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<tr>
<td>DN 825 Medical Nutrition Therapy I – 3 hr.</td>
<td>DN 826 Medical Nutrition Therapy II – 3 hr.</td>
<td>DN 819 Scientific Writing for Nutrition – 1 hr.</td>
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<tr>
<td>DN 822 Management in Dietetics &amp; Nutrition I – 2 hr.</td>
<td>DN 823 Management in Dietetics &amp; Nutrition II – 2 hr.</td>
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<tr>
<td>DN 841 International Nutrition – 1 hr.</td>
<td>DN 842 US Public Health Nutrition – 1 hr.</td>
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<tr>
<td>DN 827 Practicum – 4 hr. (graded S/U) 496 hours supervised practice</td>
<td>DN 827 Practicum – 4 hr. (graded S/U) 496 hours supervised practice</td>
<td>DN 827 Practicum – 2 hr. (graded S/U) 248 hours supervised practice</td>
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**Year 2 – End of year 2 graduate student completes MS degree and DIM certificate**

<table>
<thead>
<tr>
<th>Fall Semester 2014 – 10 hours</th>
<th>Spring Semester 2015 – 10 hours</th>
<th>Summer Semester 2015 – 4 hours</th>
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<tbody>
<tr>
<td><strong>DN 881 Introduction to Dietetics and Integrative Medicine – 3 hr.</strong>*</td>
<td><strong>DN 882 A Nutrition Approach to Inflammation and Immune Regulation – 3 hr.</strong></td>
<td><strong>DN 980 Nutrigenomics and Nutrigenetics in Health and Disease – 3 hr.</strong>*</td>
</tr>
<tr>
<td>DN 895 Macronutrients &amp; Integrative Metabolism – 3 hr.</td>
<td>DN 896 Micronutrients &amp; Integrative Metabolism – 3 hr.</td>
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<tr>
<td>DN 834 Methods of Research in Nutrition – 3 hr.</td>
<td>BIOS Principles of Statistics in Public Health – 3 hr.</td>
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<tr>
<td>DN 899 Thesis – 1 hr.**</td>
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<tr>
<td><strong>Non-thesis replace 3 hr. DN 899 with DN 854 in fall or spring semester</strong></td>
<td><strong>Non-thesis option requires additional 3 hour elective course</strong></td>
<td><strong>52 graduate hours completed over 2 years for thesis option; 55 hours for non-thesis option</strong></td>
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*Required courses for DIM Certificate

**Updated May 8, 2013**
The dietitian-nutritionists trained in the advanced specialty of integrative and functional medical nutrition therapy (IFMNT) provide a unique holistic approach to modulating chronic disease pathophysiology toward wellness.
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