

SEMESTER AT SEA COURSE SYLLABUS

Colorado State University, Academic Partner

Voyage:	Fall 2022
Discipline:	Food Science and Human Nutrition
Course Number and Title:	FSHN 340 Food as Preventive Medicine
Division:	Upper
Faculty Name:	Chris Melby
Semester Credit Hours:	3

Prerequisites: One (1) introductory biology course AND one (1) introductory nutrition course preferred or consent of instructor

COURSE DESCRIPTION

“Let food be thy medicine and medicine be thy food” – Hippocrates.

In this course, we will explore the function of food consumption patterns, individual foods, and specific food constituents (nutrients and phytochemicals) in the promotion of health and the prevention and treatment of chronic disease, including heart disease, diabetes, and cancer. A portion of the course will focus on foods, nutrients, and their contributions to reducing risk for infectious disease. As we voyage to different parts of Africa and Asia, we will examine the cultural origins of local food practices as well as the mechanisms through which such food patterns and food components are used to treat various medical conditions. The efficacy of foods purported to provide health benefits will be examined within the context of nutrient availability and metabolism, as well as results of published scientific studies. Students will develop skills in critically examining the quality of the evidence.

LEARNING OBJECTIVES

Upon the completion of this course, students will be able to:

- Understand the ways in which dietary patterns impact health and chronic disease.
- Discuss the consequences of malnutrition and methods of renourishment.
- Contrast and compare various plant-based dietary patterns: Mediterranean, Healthy American Plate, DASH, and vegetarian eating styles.
- Discuss the biochemical mechanisms by which plant-derived nutrients and phytochemicals exert beneficial health effects.
- Evaluate the impact of plant- and animal-based medicine on health and the environment.
- Discuss the evolution of the human diet and evaluate the evidence for the Paleo- and other high protein diet trends on health outcomes.

- Examine and evaluate the current literature regarding dietary patterns and specific for the treatment of obesity, diabetes, cardiovascular disease, and cancer.
- Understand the origins and current practices of nutrition related traditional medical practices in the SAS counties we visit.

REQUIRED TEXTBOOKS:

AUTHOR: Smith, Bea
 TITLE: Eating Plants - What's in it for me?
 PUBLISHER: Bea Healthy
 ISBN #: 978-0692184592
 DATE/EDITION: 2018

TOPICAL OUTLINE OF COURSE

Embarkation Day – September 9

- 1: Welcome to the Course:
 - Voyage Community Values
 - Course Objectives
 - Discussion of the following:
 - World Views on Health and Disease
 - The Central Role of Nutrition in Health Promotion/Disease Prevention
 - What is your view of health?
- 2: Nutrition-related diseases
 - Film: Food Matters
 - Concepts of Disease Pathogenesis
 - Risk factors for disease development- associations do imply causality
 - Film: Food Matters
- 3: Discussion of common health problems and diseases
 - Risk factors for disease development-associations do not imply causality
- 4: Evolutionary basis for ancestral dietary patterns to optimize health?
 - Paleo vs Mediterranean vs vegetarian vs ketogenic dietary patterns for health and disease risk reduction
- 5 The global nutrition transition- shift from ancestral dietary patterns to more commercially-prepared foods; Global double burden of disease- over and undernutrition
 - Protein-Calorie Malnutrition
- 6: Iron-deficiency anemia
 - Vitamin A deficiency and epithelial cell damage

Treatment of nutrient deficiencies, with special emphasis on malnourished children

- 7:** Plant-based dietary patterns- Pros
 - Amino acid complementation to enhance protein quality
 - Phytonutrients
 - Sustainability
- 8:** Plant-based dietary patterns- Cons
- 9:** Plant based diets- phytonutrients and reduced disease risk
- 10:** Summary of port experiences with food and nutrition.
- 11:** Metabolic Syndrome
 - Visceral adiposity vs subcutaneous adipose tissue
- 12:** Type 2 Diabetes- Global epidemic
 - Lipid and Glucose toxicity- inflammation
 - Insulin resistance and its consequences
 - Dietary approaches to prevent and treat type 2 diabetes
- 13:** Dietary approaches to prevent and treat type 2 diabetes (continued)
 - Low glycemic index foods, low-carbohydrate diets
 - Vinegar, phytonutrients, exercise
- 14:** Coronary Heart Disease- Global epidemic
 - Risk factors—beyond blood cholesterol
 - Lipoprotein metabolism
 - Racial and ethnic differences in risk for heart disease
- 15:** Coronary Heart Disease (continued)
 - Dietary approaches to prevent and treat coronary heart disease
 - Introduction to food patterns and disease prevalence in India
- 16:** Hypertension—yet another global epidemic
 - Lifestyle factors contributing to hypertension and its sequelae
- 17:** Dietary approaches to prevent and treat Hypertension- not just a matter of salt
 - DASH Diet- Reduced sodium but increased intakes of calcium, magnesium, potassium
- 18:** Cancer- world-wide prevalence
 - Does the global distribution provide clues to causes?
 - Not a single disease—but commonalities of cancer in different tissues and organs

- 19: Dietary patterns and constituents to prevent cancer
Dietary fiber, cruciferous vegetables, phytonutrients, green tea catechins
- 20: Other dietary approaches to treat cancer
Low carbohydrate, ketogenic diets: Implications of the Warburg effect
- 21: Gut microbiome, dysbiosis and disease risk
Dietary approaches to modify the gut microbiota
Intestinal health
- 22: Summary of Port Experiences
Body weight regulation- genetics, epigenetics, behavior
Neuroregulation of appetite
- 23: Dietary approaches to reduce hunger, enhance satiation, maintain weight loss.
- 24: Student oral presentations of medicinal plants
- 25: Final Exam

Disembarkation Day – December 22

FIELD WORK

Semester at Sea® field experiences allow for an unparalleled opportunity to compare, contrast, and synthesize the different cultures and countries encountered over the course of the voyage. In addition to the one field class, students will complete a Comparative Experiential Project that span multiple countries.

Field Class & Assignment

STUDENTS: Field Class proposals listed below are not finalized. Confirmed ports, dates, and times will be posted to the [Fall 22 Courses and Field Class page](#) when available.

Field Class attendance is mandatory for all students enrolled in this course. Do not book individual travel plans or a Semester at Sea sponsored trip on the day of your field class.

Field Classes constitute 20% of the contact hours for each course.

Field Class Title: Medicinal Foods and Eating Patterns

Outcomes:

In this course, we explore the function of food consumption patterns, individual foods, and specific food constituents (nutrients and phytochemicals) in the promotion of health and the prevention and treatment of malnutrition and specific chronic diseases, including heart disease, diabetes, and cancer. Major outcomes of this course include the students being able to:

- Understand the ways in which dietary patterns impact health and chronic disease.
- Discuss the consequences of malnutrition and methods of re-nourishment.
- Contrast and compare various plant-based dietary patterns: Omnivorous, Mediterranean, Healthy American Plate, DASH, Paleo, and vegetarian eating styles.
- Discuss the biochemical mechanisms by which plant-derived nutrients and phytochemicals exert beneficial health effects.
- Discuss the evolution of the human diet and evaluate the evidence for the Paleo- and other high protein diet trends on health outcomes.
- Understand the origins and current practices of nutrition related traditional medical practices in the SAS counties we visit.

Activities: (will use only one)

- Activity 1: Partner with a local university or culinary school to learn how the local commonly consumed foods in the port country/city are prepared. This would involve taking a trip to a local food market and enrolling in a cooking class (or partner with a university to use their cooking facilities) with emphasis on healthy cuisine. Identify key nutrients in each of the foods prepared, experience the flavors while discussing the health benefits of the various components used in these foods. Seek to determine the influence of religious beliefs on food consumption patterns in this region. Identify foods and/or food constituents thought to have medicinal values.
- Or Activity 2: Students will visit a local public health agency to identify the major health problems present in country/city. Then journey to two different food markets and talk to vendors about the types of plants, special concoctions, and home remedies that are available in the country that are thought to have medicinal value. Document these purported medicinal foods by taking photographs. Evaluate the evidence for such medicinal claims by examining the scientific literature that supports or refutes these claims.

Assessment:

Students will prepare by participating in class discussion and viewing course materials related to the country in which the field class occurs. They will be graded on two outcomes with the field class activity counting for 20% of their course grade:

- Participation and engagement with course instructor during the field class (10% of course grade).
- A 5-6 minute oral presentation to the class with appropriate slides focused on a specific commonly used plant, spice, or other food purported to have medicinal values that was identified at one of the markets. The presentation should include a critique of its value as a medicinal food based on knowledge of the food's phytochemical contents and evidence from the scientific literature for or against its efficacy to improve health or treat a specific illness. This presentation is due no later than 7 days following completion of the field class (10% of course grade).

Comparative Experiential Project

The CEP is the required comparative assignment that span multiple countries. The Comparative Experiential Project constitutes at least 5% of the grade for each course.

Project Expectations: Port visits will enhance course material by allowing you to experience local food and food customs, as well as observe health-related habits of the local citizens. As you are eating and in country, be sure to sample local cuisine, observe local food habits, and talk to locals about food sources, choices, and customs.

Food Journey Field Assignment. At 5 different ports (not including the port of the Field Class), you will keep a diary along with photos or short videos of your foods consumed. We will share experiences in post-port oral discussions in class. You will need to write a 2-page summary report with pictures of your foods consumed and discuss these foods relative to their palatability and potential to impact health positively or negatively. Reports must be typed, single-spaced, using a 12- point Arial font. This project will constitute 10% of your course grade.

METHODS OF EVALUATION

EVALUATION SUMMARY

20% Field Class	100 points
20% Independent Field Assignment	100 points
20% Exam 1	100 points
20% Exam 2	100 points
10% Class Participation	50 points
10% Personal Diet Evaluation	<u>50 points</u>
	500 points

GRADING SCALE

The following Grading Scale is utilized for student evaluation. Pass/Fail is not an option for Semester at Sea® coursework. Note that C-, D+ and D- grades are also not assigned on Semester at Sea® in accordance with the grading system at Colorado State University (the SAS partner institution).

Pluses and minuses are awarded as follows on a 100% scale:

<u>Excellent</u>	<u>Good</u>	<u>Satisfactory/Poor</u>	<u>Failing</u>
97-100%: A+	87-89%: B+	77-79%: C+	Less than 60%: F
93-96%: A	83-86%: B	70-76%: C	
90-92%: A-	80-82%: B-	60-69%: D	

ATTENDANCE/ENGAGEMENT IN THE ACADEMIC PROGRAM

Attendance in all Semester at Sea® classes, including the Field Class, is mandatory. Students must inform their instructors prior to any unanticipated absence and take the initiative to make up missed work in a timely fashion. Instructors must make reasonable efforts to enable students to make up work which must be accomplished under the instructor's supervision (e.g., examinations, laboratories). In the event of a conflict in regard to this policy, individuals may appeal using established CSU procedures.

CLASSROOM CLIMATE

Semester at Sea® is committed to the Voyage Community Values. Consequently, the classroom environment is founded on mutual respect, community, and an aim toward equity. The Voyage Community Values support the creation of a collaborative and vibrant community. Our community is the foundation of our learning, critical inquiry, and discovery. Each member of this course has a responsibility to uphold these values when engaging with one another.

With that, please review the following Voyage Community Values:

- **Well-Being:** We commit to the health, safety and well-being of ourselves, all members of our voyage community, *and* members of the communities we will visit.
- **Interconnectedness:** We understand our actions and attitudes have an impact locally and globally. We always seek to positively affect the planet and the people around us near and far.
- **Respect:** We honor the inherent dignity of *all people* with an abiding commitment to freedom of expression, scholarly discourse and the advancement of knowledge. We have the right to be treated, and the responsibility to treat others, with fairness and equity.
- **Inclusion:** We ensure inclusive environments that welcome, value, affirm and embrace *all people* within the shipboard community and in each country we visit.
- **Integrity:** We are honest and ethical in all of our interactions, including our academic work. We hold ourselves accountable for our actions.
- **Excellence:** We model the highest academic standards of preparation, inquiry and knowledge and consistently seek to understand complex issues and express informed opinions with courage and conviction.

LEARNING ACCOMMODATIONS

Semester at Sea® provides academic accommodations for students with diagnosed learning disabilities, in accordance with ADA guidelines. Students who will need accommodations in a

class, should contact ISE to discuss their individual needs. Any accommodation must be discussed in a timely manner prior to implementation.

A letter from students' home institutions verifying the accommodations received on their home campuses (dated within the last three years) is required before any accommodation is provided on the ship. Students must submit verification of accommodations to their Student Services advisor as soon as possible, but no later than two months prior to the voyage. More details can be found within the **Course Registration Packet**, posted to the student portal prior to registration.

STUDENT CONDUCT CODE

The foundation of a university is truth and knowledge, each of which relies in a fundamental manner upon academic integrity and is diminished significantly by academic misconduct. Academic integrity is conceptualized as doing and taking credit for one's own work. A pervasive attitude promoting academic integrity enhances the sense of community and adds value to the educational process. All within the University are affected by the cooperative commitment to academic integrity. All Semester at Sea[®] courses adhere to this Academic Integrity Policy and Student Conduct Code.

Depending on the nature of the assignment or exam, the faculty member may require a written declaration of the following honor pledge: "I have not given, received, or used any unauthorized assistance on this exam/assignment."

RESERVE BOOKS FOR THE LIBRARY

AUTHOR: Wildman
TITLE: Nutraceuticals and Functional Foods
PUBLISHER: CRC Press
ISBN #:0 8493-6409-4
DATE/EDITION: 2007/2nd

AUTHOR: Shibamoto
TITLE: Functional Foods and Health
PUBLISHER: Am. Chemical Soc (Oxford Press)
ISBN:
DATE:2008

AUTHOR: Bagchi, Preuss and Swaroop
TITLE: Nutraceuticals and functional foods in human health and disease prevention
PUBLISHER: CRC Press
ISBN #: 91-4822-3721-0
DATE/EDITION:2016

AUTHOR: Rotblatt M and Zimet I
TITLE: Evidence-based herbal medicine
Publisher: Hanley and Belfus Medical
ISBN:1-56053-447-8
DATE/EDITION: 2002/1

FILMS

Title of Film: Food Matters
Distributor Amazon

Title of Film: Like Water for Chocolate
Distributor: Touchstone Home Video

Title of file (Documentary): A Place at the Table
Distributor: Amazon Prime

Film: Forks Over Knives
Distributor: Amazon

ELECTRONIC COURSE MATERIALS

Ibrahim M, Zambruni M, Melby C, Melby P: Impact of childhood malnutrition on host defense and infection. *Clinical Microbiology Reviews* 30:919-971, 2017

M. Guasch-Ferré, J. Salas-Salvadó, E. Ros, R. Estruch, D. Corella, M. Fitó, M.A. Martínez-González. The PREDIMED trial, Mediterranean diet and health outcomes: How strong is the evidence? *Nutrition, Metabolism & Cardiovascular Diseases* 2017; 27, 624e632

José Abellán Alemán, María Pilar Zafrilla Rentero, Silvia Montoro-García, Juana Mulero, Alfonso Pérez Garrido, Mariano Leal, Lucía Guerrero, Elena Ramos,² and Luis Miguel Ruilope. Adherence to the “Mediterranean Diet” in Spain and Its Relationship with Cardiovascular Risk (DIMERICA Study). *Nutrients*. 2016 Nov; 8: 680. doi: 10.3390/nu8110680

M Christina-Maria Kastorini, Demosthenes B. Panagiotakos Christina Chrysohoou, Ekavi Georgousopoulou, Evangelia Pitaraki, Paolo Emilio Puddu, Dimitrios Tousoulis, Christodoulos Stefanadis Christos Pitsavos. Metabolic syndrome, adherence to the Mediterranean diet and 10- year cardiovascular disease incidence: The ATTICA Study. <https://doi.org/10.1016/j.atherosclerosis.2015.12.025>

Miguel Ángel Martínez-González, Maria Soledad Hershey, Itziar Zazpe, and Antonia Trichopoulou. Transferability of the Mediterranean Diet to Non-Mediterranean Countries. What Is and What Is Not the Mediterranean Diet. *Nutrients*. 2017; 9: 1226. doi: 10.3390/nu9111226

Appel LJ, Moore, TJ, Obarzanek E, et al; DASH Collaborative Research Group. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med.* 1997;336(16):1117-1124.

P. Saneei, A. Salehi-Abargouei, A. Esmailzadeh, L. Azadbakht. Influence of Dietary Approaches to Stop Hypertension (DASH) diet on blood pressure: A systematic review and meta-analysis on randomized controlled trials *Nutrition, Metabolism & Cardiovascular Diseases.* 2014; 24, 1253e1261 <https://doi.org/10.1016/j.numecd.2014.06.008>

Nathenson P. The DASH diet: a cultural approach. *Nursing* 2017, 47:57.

Dori Steinberg, Gary G. Bennett, Laura Svetkey. The DASH Diet, 20 Years Later *JAMA.* 2017;317(15):1529-1530. doi:10.1001/jama.2017.1628

H Chiara Frazzoli, Guy Bertrand Pouokam, Alberto Mantovani, Orish Ebere Orisakwe. Health risks from lost awareness of cultural behaviours rooted in traditional medicine: An insight in geophagy and mineral intake. *Science of the Total Environment* 566-567; 1465-1471 DOI 10.1186/s12906-017-1886-x

Maria L Marco, Dustin Heeney, Sylvie Binda. Christopher J Cifelli, Paul D Cotter, Benoit Foligne ´, Michael Ga ´nzle, Remco Kort, Gonca Pasin, Anne Pihlanto , Eddy J Smid and Robert Hutkins. Health benefits of fermented foods: microbiota and beyond. *Curr Opin Biotechnol* 2017; 44:94-120. <https://doi.org/10.1016/j.copbio.2016.11.010>

Zewdneh Shewamene, Tinashe Dune and Caroline A. Smith. The use of traditional medicine in maternity care among African women in Africa and the diaspora: a systematic review. *2017 BM Complementary Med* 17:382. DOI 10.1186/s12906-017-1886-x

Andrea Pieroni, Manuel Pardo-de-Santayana, Fabio Firenzuoli, and Cassandra L. Quav The European Heritage of Folk Medicines and Medicinal Foods: Its Contribution to the CAMs of Tomorrow Evidence-Based Complementary and Alternative Medicine. Volume 2013, Article ID 827521, 2 pages. DOI: <http://dx.doi.org/10.1155/2013/827521>

Frank LK, Kröger J, Schulze MB, Bedu-Addo G, Mockenhaupt FP, Danquah I. 2014 Dietary patterns in urban Ghana and risk of type 2 diabetes *Br J Nutr.* Jul 14;112(1):89-98. doi: 10.1017/S000711451400052X.

Krah E, de Kruijf J, Ragno L. Integrating Traditional Healers into the Health Care System: Challenges and Opportunities in Rural Northern Ghana. *J Community Health.* 2018 Feb;43(1):157-163. doi: 10.1007/s10900-017-0398-4.

Dulce M. Jiménez-Aguilar & Michael A. Grusak, Evaluation of Minerals, Phytochemical Compounds and Antioxidant Activity of Mexican, Central American and African Green Leafy Vegetables. *Plant Foods Hum Nutr* (2015) 70:357–364. DOI 10.1007/s11130-015-0512-7

Hiroshi Kunugi, Shinsuke Hidese, Shintaro Ogawa, Miho Ota, Zenta Yasukawa, and Makoto Ozeki. Effects of Chronic L-theanine on Stress-related Symptoms and Cognitive Function in

a Non-clinical Population: A Randomized Controlled Trial (P06-106-19). *Curr Dev Nutr* 2019 Jun; 3(Suppl 1): nzz031.P06-106-19.

Peter M. Chege, Judith O. Kimiywe and Zipporah W. Ndungu. Influence of culture on dietary practices of children under five years among Maasai pastoralists in Kajiado, Kenya. *Inter. J of Behavioral Nutr, and Phys. Act.* 2015; 12:131 DOI 10.1186/s12966-015-0284-3

César G. Fraga, Kevin D. Croft, David O. Kennedy and Francisco A. Tomás-Barberán. The effects of polyphenols and other bioactives on human health. *Food Funct.* 2019 Feb 20;10(2):514-528.

Sarika Chaturvedi, Joanna Raven, and Bhushan Patwardhan. Addressing child under nutrition: can traditional practices offer a solution? *GLOBAL HEALTH ACTION*, 2017; 10: 327255. [https:// doi.org/10.1080/16549716.2017.1327255](https://doi.org/10.1080/16549716.2017.1327255)

Jorge M. Alves-Silva, Abderrahmane Romane, Thomas Efferth and Lígja Salgueiro North African Medicinal Plants Traditionally Used in Cancer Therapy *Frontiers in Pharmacology* 2017; 8: article 383.DOI: 10.3389/fphar.2017.00383

Syed Muhammad Ali Shah, Muhammad Akram, Muhammad Riaz, Naveed Munir, and Ghulam Rasool. Cardioprotective Potential of Plant-Derived Molecules: A Scientific and Medicinal Approach. 2019 *Dose Response*. Apr-Jun; 17(2): 1559325819852243.

Abdur Rauf a, Muhammad Imran b, Tareq Abu-Izneid c, Ihtisham-UI-Haq d, Seema Patel e, Xiandao Pan f, Saima Naz g, Ana Sanches Silva h, Farhan Saeed i, Hafiz Ansar Rasul Suleria. Proanthocyanidins: A comprehensive review.2019. *Biomed Pharmacother.* Aug;116:108999. doi: 10.1016/j.biopha.2019.108999.

Martel J, Ojcius DM, Ko YF, Ke PY, Wu CY, Peng HH, Young JD. Hormetic Effects of Phytochemicals on Health and Longevity. 2019. *Trends Endocrinol Metab.* Jun;30(6):335-346. doi: 10.1016/j.tem.2019.04.001

Rômulo RN Alves and Irecê ML Rosa. Biodiversity, traditional medicine and public health: where do they meet? *Journal of Ethnobiology and Ethnomedicine.* e 2007, 3:14 doi:10.1186/1746-4269-3-14

Rozzanna Esther Cavalcanti Reis de Figueirêdo, Alexandre Vasconcellos, Iamara Silva Policarpo and Rômulo Romeu Nóbrega Alves. Edible and medicinal termites: a global overview *Journal of Ethnobiology and Ethnomedicine* (2015) 11:29 DOI 10.1186/s13002-015-0016-4

Dufour, DL, Goldman, AH and Pelto, GH, eds3ND, Eds. *Nutritional Anthropology* Chapter 7 Paleolithic Nutrition: A Consideration of Its Nature and Current Implications UNIT VII Food As Medicine pages 256-258 Chapter 29 The Pharmacology of the Exotic

Mohammad NA, Razaly NI, Rani MDM, Aris MSM, Effendy NM. An Evidence-Based Review: The Effects of Malaysian Traditional Herbs on Osteoporotic Rat Models. An Evidence-Based Review: The Effects of Malaysian Traditional Herbs on Osteoporotic Rat Models. 2018. J Med Sci. Jul;25(4):6-30. doi: 10.21315/mjms2018.25.4.2.

Sheflin AM, Melby CL, Carbonero F, Weir TL: Linking Dietary Patterns with Gut Microbial Composition and Function. Gut Microbes
<http://dx.doi.org/10.1080/19490976.2016.12708092016>

Toohey L, Harris MA, Allen KGD, Melby CL: Plasma Ascorbic Acid Concentrations are Related to Cardiovascular Risk Factors in African-Americans. Journal of Nutrition 126:121-126, 1996.

Melby CL, Toohey ML, Cebrick J: Blood Pressure and Blood Lipids Among Vegetarian, Semivegetarian, and Nonvegetarian African-Americans. American Journal of Clinical Nutrition 59:103-109, 1994.

Gentile CL, Weir TL. The gut microbiota at the intersection of diet and human health. Science. 2018 Nov 16;362(6416):776-780. doi: 10.1126/science.aau5812

San-Millán I, Brooks GA. Reexamining cancer metabolism: lactate production for carcinogenesis could be the purpose and explanation of the Warburg Effect. Carcinogenesis. 2017 Feb 1;38(2):119-133. doi: 10.1093/carcin/bgw127

Melby CL, Paris HL, Foright FM, Peth J: Attenuating the Biologic Drive for Weight Regain Following Weight Loss: Must What Goes Down Always Go Back Up? Nutrients 2017 9(5), 468: 1-22; doi:10.3390/nu9050468

Melby CL, Paris HL, Sayer RD, Bell, C, Hill JO: Increasing energy flux to maintain diet-induced weight loss. Nutrients 2019, 11(10), 2533; <https://doi.org/10.3390/nu11102533> - 21 Oct 2019

Alexander H, Lockwood L, Harris MA, Melby CL: Risk Factors for Cardiovascular Disease and Diabetes in Two Hispanic Populations with Different Dietary Patterns. Journal of the American College of Nutrition 18:127-134, 1999.