

## **ANTH 761 – Evolution of the Human Diet**

### **INSTRUCTOR:**

Office:

E-mail:

Phone:

### **COURSE DESCRIPTION:**

This course is a graduate seminar on the evolution of the human diet. We will explore notions of what our innate diet should be, based on what we are “designed” to eat in terms of our evolutionary past. By 2 million years ago, early members of the genus *Homo* had a post-cranial anatomy quite similar to ours, and much of the literature suggests that they were hunting, scavenging, and gathering plant foods. This major dietary shift characterizing human evolution consists of a change from simple sugars, complex carbohydrates, and plant proteins to a diet that includes more animal fat and protein. The transition to agriculture characterized another major shift in the evolution of the human diet. We have the genotype of our ancestors who lacked both agriculture and animal domestication, yet the current food economy in most of the world is largely based on wheat, rice, corn, and barley.

### **LEARNING OUTCOMES:**

By the end of this seminar, you will be able to:

1. Incorporate evidence from living primates, fossil primates (including hominin ancestors), contemporary human foragers, and bone chemistry to discuss large-scale dietary transitions in human evolution
2. Identify basic digestive anatomy of apes and humans and how they differ
3. Integrate theoretical paradigms (e.g. life history theory, sexual selection) with anatomical and dietary evidence to better understand the links with ecology, diet, and behaviour in evolutionary models of human behavior

### **READINGS:**

- *The Omnivore's Dilemma: A natural history of four meals* (2006) Michael Pollan
- *Catching Fire: How cooking made us human* (2010) Richard Wrangham
- Weekly articles that will be available on WebCampus

### **GRADING:**

Students are responsible for reading the assigned readings before class each week and coming to class prepared to discuss the readings with the group (20% of the grade). Each student will present an article or portion of the book to the seminar class a minimum of three times throughout the semester (30% of the grade). This presentation will cover the main points of the reading, how they integrate into the larger points of the course, and present the student's perceptions and critiques of the reading. The presentation should be a Powerpoint presentation and last approximately 15 minutes. In addition, a final 15 – 20 page paper will be due at the end of the course (50% of the grade).

**COURSE SCHEDULE:**

WEEK	DATES	TOPIC	READINGS
1	Sep 2	INTRODUCTION TO COURSE	Begin reading <i>The Omnivore's Dilemma</i>
2	Sep 9	WHY STUDY EVOLUTION OF THE HUMAN DIET?	(1) Pollan, M (2006) <i>The Omnivore's Dilemma</i>  (2) Leonard WR (2002) Food for thought: dietary change was a driving force in human evolution. <i>Scientific American</i> December:106-115.
3	Sep 16	PALEOLITHIC NUTRITION & THE PALEO DIET	(1) Leonard, WR, Robertson, ML and Snodgrass, JJ (2007) Energetic models of human nutritional evolution. In: Ungar P (ed) <i>Evolution Of The Human Diet</i> . Oxford University Press, pp. 344-359.  (2) Eaton SB (2007) Preagricultural diets and evolutionary health promotion. In: Ungar P (ed) <i>Evolution Of The Human Diet</i> . Oxford University Press, pp. 384-394.  (3) Boyd, S and Eaton, MD (1989) <i>The Paleolithic Prescription: A Program of Diet &amp; Exercise and a Design for Living</i> . Harper-Collins Publishing.  (4) Cordain et al. (2005) Origins and evolution of the Western diet: health implications for the 21st century. <i>American Journal of Clinical Nutrition</i> , 81(2): 341-354.
4	Sep 23	PRIMATE ORIGINS & OVERVIEW	(1) Gaulin SJC, and Konner M (1977) On the natural diet of primates, including humans. In RJ Wurtman and JJ Wurtman (eds.): <i>Nutrition and the Brain, Vol. I</i> . New York: Raven Press, pp. 2-86.  (2) Cartmill M (1992) New views on Primate origins. <i>Evolutionary Anthropology</i> 1:105-111.  (3) Rose, L.M. (2001) Meat and the early human diet: Insights from neotropical Primate studies. In: Stanford, C.B. and Bunn, H.T. (eds.) <i>Meat-Eating &amp; Human Evolution</i> . Oxford: Oxford University Press, pp. 141-159.  (4) Hernandez-Aguilar, RA, Moore, JJ, and Pickering, TR (2007) Savanna chimpanzees use tools to harvest the underground storage organs of plants. <i>Proceeding of the National Academy of Sciences</i> 104:19210-19213.
5	Sep 30	DIGESTION, PLANT CHEMISTRY & THE EXPENSIVE TISSUE HYPOTHESIS	(1) Chivers DJ, and Langer P (1994) Gut form and function: variations and terminology. In DJ Chivers and P Langer (eds.): <i>The Digestive System in Mammals: Food, Form and Function</i> . Cambridge: Cambridge University Press, pp. 3-8.  (2) Lambert, J (1998) Primate digestion: Interactions among anatomy, physiology, and feeding ecology. <i>Evolutionary Anthropology</i> 7:8-20.  (3) Ley et al. (2008) Worlds within worlds: Evolution of the vertebrate gut microbiota. <i>Nat Rev Microbiol</i> . 6(10): 776-788.  (4) Aiello, L and Wheeler P (1995) The Expensive Tissue Hypothesis: The Brain and the Digestive System in Human Evolution. <i>Current Anthropology</i> 36(2): 199-221.
6	Oct 7	TUBERS & UNDERGROUND STORAGE ORGANS	(1) Laden, G, and Wrangham, R. (2005) The rise of the hominids as an adaptive shift in fallback foods: Plant underground storage organs (USOs) at australopith origins. <i>Journal of Human Evolution</i> 49: 482-498.  (3) Dominy et al. (2007) Mechanical Properties of Plant Underground

			<p>Storage Organs and Implications for Dietary Models of Early Hominins. <i>Evolutionary Biology</i> 35(3): 159-175.</p> <p>(4) Perry et al. (2007) Diet and the evolution of human amylase gene copy number variation. <i>Nat Genet.</i> 39(10): 1256-1260.</p> <p>(5) Gibbons A. 2009. Of tools and tubers. <i>Science</i> 324:588-589.</p>
7	Oct 14	MEAT EATING & HUMAN EVOLUTION	<p>(1) Finch, CE, and Stanford, CB (2004) Meat-adaptive genes and the evolution of slower aging in humans. <i>Quarterly Review of Biology</i> 79:3-50.</p> <p>(2) Milton, K. (1999) A hypothesis to explain the role of meat-eating in human evolution. <i>Evolutionary Anthropology</i> 8(1): 11-21.</p> <p>(3) Stanford, C. (1996) The Hunting Ecology of Wild Chimpanzees: Implications for the Evolutionary Ecology of Pliocene Hominids. <i>American Anthropologist</i> 98(1): 96-113.</p> <p>(4) Bunn, H. (2006) Meat made us human. In <i>Evolution of the Human Diet: The Known, the Unknown, and the Unknowable</i>. Oxford University Press.</p> <p>(5) Mann, N (2000) Dietary lean red meat and human evolution. <i>European Journal of Nutrition</i> 39(2): 71-79.</p>
8	Oct 21	IMPORTANCE OF DHA: POSSIBLE LINKS TO FRESHWATER AND MARINE FOOD RESOURCES	<p>(1) Crawford, MA (2010) Long-chain polyunsaturated fatty acids in human brain evolution. In <i>Human Brain Evolution: The Influence of Freshwater and Marine Food Resources</i>. Wiley-Blackwell. Pp. 13-32</p> <p>(2) Brenna, J.T. (2010) Metabolic and molecular aspects of the critical role of docosahexaenoic acid in human brain function. . In <i>Human Brain Evolution: The Influence of Freshwater and Marine Food Resources</i>. Wiley-Blackwell. Pp. 65-76.</p> <p>(3) Helland, IB et al. (2003) Maternal supplementation with very-long-chain n-3 fatty acids during pregnancy and lactation augments children's IQ at 4 years of age. <i>Pediatrics</i> 111(1): 39-44.</p> <p>(4) Muskiet, FAJ et al. (2004) Is Docosahexaenoic Acid (DHA) Essential? Lessons from DHA Status Regulation, Our Ancient Diet, Epidemiology and Randomized Controlled Trials. <i>Journal of Nutrition</i> 134(1): 183-186.</p>
9	Oct 28	FIRE: EVOLUTION OF COOKING AND PLACENTOPHAGY	<p>(1) Wrangham, R. (2010) <i>Catching Fire</i>.</p> <p>(2) Mallol, C et al. (2007) Earth, wind, and fire: ethnoarchaeological signals of Hadza fires. <i>Journal of Archaeological Science</i> 34(12): 2035-2052.</p> <p>(3) Young, S. et al. (In Press) The conspicuous absence of placenta consumption in human postpartum females: The fire hypothesis. <i>Ecology of Food and Nutrition</i>.</p>
10	Nov 4	DIET AND MODELS OF THE EVOLUTION OF HUMAN BEHAVIOR	<p>(1) Lee, RB and DeVore, I (1968) <i>Man the Hunter</i>.</p> <p>(2) Zihlman, A (1978) Women in evolution: Subsistence and social organization among early hominids. <i>Signs</i> 4(1): 4-20.</p> <p>(3) Hawkes, K. and Bliege Bird, R (2002) Showing off, handicap signalling, and the evolution of men's work. <i>Evolutionary Anthropology</i> 11(2): 58-67.</p> <p>(4) Kaplan, H. et al. (2000) A theory of human life history evolution: diet, intelligence, and longevity. <i>Evolutionary Anthropology</i> 9(4): 156-185.</p> <p>(5) Grandmothering, menopause, and the evolution of human life histories. <i>Proceedings of the National Academy of Sciences</i> 95(3): 1336-1339.</p>

			(6) Hrdy, SB (2007) Evolutionary context of human development: The cooperative breeding model. In <i>Family Relationships: An Evolutionary Perspective</i> . Oxford University Press. Pp 39-68.
11	Nov 11	AGRICULTURE & DISEASE	<p>(1) Larsen, CS (2002) Post-Pleistocene Human Evolution: Bioarchaeology of the agricultural transition. In: <i>Human Diet – Its Origin and Evolution</i>. Eds. PS Ungar and MF Teaford. Greenwood Publishing.</p> <p>(2) Atici, L. 2009. Specialisation &amp; diversification: animal exploitation strategies in the terminal Pleistocene, Mediterranean Turkey. <i>Before Farming</i>.</p> <p>(3) Stiner, M (2001) Thirty years on the “Broad Spectrum Revolution” and paleolithic demography. <i>Proceedings of the National Academy of Sciences</i> 98(13): 6993-6996.</p> <p>(4) Steckel RH, Rose JC, Larsen CS, and Walker PL (2002) Skeletal health in the western hemisphere from 4000 B.C. to the present. <i>Evolutionary Anthropology</i> 11:142-155.</p>
12	Nov 18	CUISINES	<p>(1) Henderson, JS, et al. (2007) Chemical and archaeological evidence for the earliest cacao beverages. <i>Proceeding of the National Academy of Sciences</i>. 104:18937-18940.</p> <p>(2) Katz, SH (1990) An Evolutionary Theory of Cuisine. <i>Human Nature</i> 1(3): 233-259.</p> <p>(3) Huang HT (2002) Hypolactasia and the Chinese Diet. <i>Current Anthropology</i> 43:809-819.</p> <p>(4) McGee H (1998) In victu veritas. <i>Nature</i> 392:649-650.</p> <p>(5) Crittenden, A (In Press) The Importance of Honey Consumption in Human Evolution. <i>Food and Foodways</i>.</p>
13	Week of Nov 21	OBESITY, DIABETES, AND FAST FOOD NATION	<p>(1) Benyshek, D (2007) The developmental origins of obesity and related health disorders: prenatal and perinatal factors. <i>Collegium Antropologicum</i> 31(1):11-17.</p> <p>(2) Simpson, SJ and Raubenheimer, D. (2005) Obesity: The protein leverage hypothesis. <i>Obesity Reviews</i> 6: 133-142.</p> <p>(3) Schlosser, E. (2002) <i>Fast Food Nation: The Dark Side of the All-American Meal</i>. Harper Perennial.</p>
14	Dec 2	PROCESSING, DISEASE, POLITICS	<p>(1) Man EH, and Bada JL (1987) Dietary D-amino acids. <i>Annual Review of Nutrition</i> 7:209-225.</p> <p>(2) Jew, S et al. (2009) Evolution of the Human Diet: Linking Our Ancestral Diet to Modern Functional Foods as a Means of Chronic Disease Prevention. <i>Journal of Medicinal Food</i> 12(5): 925-934.</p> <p>(3) Tangvoranuntakul, P (2003) Human uptake and incorporation of an immunogenic nonhuman dietary sialic acid. <i>Proceedings of the National Academy of Sciences</i> 100(21): 12045-12050.</p> <p>(4) Taubes G (1998) The (political) science of salt. <i>Science</i> 281:898-907.</p> <p>(5) Taubes G (2000) A DASH of data in the salt debate. <i>Science</i> 288:1319.</p>
15	Dec 9	WE ARE WHAT WE EAT... IS IT TRUE?	<p>Conclusions from course Readings TBA</p>

## ADDITIONAL INFORMATION:

**Academic Misconduct** – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV’s function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

**Copyright** – The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

**Disability Resource Center (DRC)** – The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you.

If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

**Religious Holidays Policy**—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Transparency in Learning and Teaching**—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

**Incomplete Grades** - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring and Coaching**—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

**UNLV Writing Center** – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

**Rebelmail** – By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted

to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.

**Library statement:**

Students may consult with a librarian on research needs. For this class, the Subject Librarian is ([https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject)). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>

**Final Examinations** – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>

**Any other class specific information** - (e.g., absences, make-up exams, extra credit policies, plagiarism/cheating consequences, policy on electronic devices, specialized department or college tutoring programs, bringing children to class, policy on recording classroom lectures, etc.)