

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Zeisel, Steven H.	POSITION TITLE Professor
eRA COMMONS USER NAME (credential, e.g., agency login) stevenzeisel	

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Harvard Medical School	M.D.	1971– 975	Medicine
Yale-New Haven Hospital	Resident	1975-1977	Pediatrics
Massachusetts Institute of Technology	Ph.D.	1977-1980	Nutrition
Children’s Hospital, Boston	Fellow	1978-1981	Human Nutrition
Massachusetts Institute of Technology	Postdoc	1980-1981	Neurochemistry

**A. Personal Statement**

Dr. Zeisel is a leader in the study of choline and 1-carbon metabolism, and was the first to demonstrate that humans require this nutrient and has identified genetic and hormonal effects that modulate this requirement. He has published more than 230 peer-reviewed articles on choline metabolism, and has worked in cell culture, rodent and human models. Dr. Zeisel has been the principal investigator for this R01 since its initiation.

**B. Positions and Honors**

**Positions and Employment**

- 1982-1987 Assistant Professor, Boston University School of Medicine
- 1987-1990 Associate Professor, Boston University School of Medicine
- 1990-1990 Professor of Pathology and Pediatrics, Boston University School of Medicine
- 1990-2005 Professor and Chair, Department of Nutrition, School of Medicine and School of Public Health, University of North Carolina
- 1990-present Professor, Department of Pediatrics, University of North Carolina
- 1999-2007 Associate Dean for Research, School of Public Health, University of North Carolina
- 2005-present Kenan Distinguished University Professor, University of North Carolina
- 2006-present Director, Nutrition Research Institute, University of North Carolina

**Other Experiences and Professional Memberships**

- 1987-present American Society for Nutritional Sciences, (President 2002), Long Range Planning Chair, 2003-2005; Strategic Planning Committee 2055-present).
- 1998-present International Society for Neurochemistry
- 1996-1998 Panel on Recommended Dietary Intake of Folate and B-vitamins, National Academy of Sciences
- 2000-2009 Chairman NIH Integrative Nutrition and Metabolic Processes study section
- 2001-2005 FDA Food Advisory Committee, Center for Food Safety & Applied Nutrition, Dietary Supplements
- 2005-2008 Member, Editorial Committee, Annual Review of Nutrition
- 2005-present Member, Editorial Board, FASEB Journal
- 2010 Specialty Chief Editor, Frontiers in Nutrigenomics

**Honors**

- 1986 Future Leader Award, International Life Sciences Institute-Nutrition Foundation
- 1991 American College of Nutrition, Grace Goldsmith Award for Teaching & Research in Nutrition
- 1996-present Who's Who in America
- 2001 American Society for Clinical Nutrition - Dannon Institute Award for Excellence in Medical/Dental Nutrition Education
- 2006 Bristol-Meyers Squibb Award for Distinguished Achievement in Nutrition Research
- 2007 The American College of Nutrition, Award for Outstanding Achievements in Nutrition

2008	The American Society for Nutrition, Osborne and Mendel Award
2009	W.O. Atwater Lecturer - U.S. Department of Agriculture's Agricultural Research Service
2010	Hans Falk Memorial Lecturer, National Institute of Environmental Health Sciences
2011	Mildred A. Reeves Distinguished Visiting Professor in Nutrition, University of Tennessee

### C. Selected Peer-reviewed Publications (Selected from 236 peer-reviewed publications)

#### Most relevant to the current application

1. **Zeisel, S.H.**, da Costa, K-A., Franklin, P.D., Alexander, E.A., LaMont, T.J., Sheard, N.F., and Beiser, A. (1991) Choline is an essential nutrient for humans. *FASEB Journal* 5:2093-2098. PMID: 2010061.
2. Kohlmeier, M., da Costa, K-A., Fischer, L., and **Zeisel, S.H.** (2005) Genetic variation of folate-mediated one-carbon transfer pathway predicts susceptibility to choline deficiency in humans. *Proceedings of the National Academy of Sciences USA* 102(44):16025-16030. PMCID: PMC1276051.
3. da Costa, K-A., Gaffney, C., Fischer, L., and **Zeisel, S.H.** (2005) Choline deficiency in mice and humans is associated with increased plasma homocysteine after a methionine load. *American Journal of Clinical Nutrition* 81:440-444. PMCID: PMC2424020.
4. da Costa, K-A., Kozyrez, O.G., Song, J., Galanko, J.A., Fischer, L.M., and **Zeisel, S.H.** (2006) Common genetic polymorphisms affect the human requirement for the nutrient choline. *FASEB Journal* 20:1336-1344. PMCID: PMC1574369.
5. da Costa, K-A., Niculescu, M., Craciunescu, C.N., Fischer, L.M., and **Zeisel, S.H.** (2006) Choline deficiency increases lymphocyte apoptosis and DNA damage in humans. *American Journal of Clinical Nutrition* 84:88-94. PMCID: PMC2430662.
6. Cho, E., **Zeisel, S.H.**, Jacques, P., Selhub, J., Dougherty, L., Colditz, G.A., and Willett, W.C. (2006) Dietary choline and betaine assessed by food-frequency questionnaire in relation to plasma homocysteine concentration in the Framingham Offspring Study. *American Journal of Clinical Nutrition* 83:905-911. PMCID: PMC2430728.
7. Fischer, L., da Costa, K-A., Kwock, L., Stewart, P., Lu, T., Stabler, S., Allen, R., and **Zeisel, S.H.** (2007) Sex and menopausal status influence human dietary requirements for the nutrient choline. *American Journal of Clinical Nutrition* 85(5):1275-85. PMCID: PMC2435503.
8. Resseguie, M., Song, J., Niculescu, M., da Costa, K-A., Randall, T., and **Zeisel, S.H.** (2007) Phosphatidylethanolamine N-methyltransferase (PEMT) gene expression is induced by estrogen in human and mouse primary hepatocytes. *FASEB Journal* 10:2622-2632. PMCID: PMC1934379.
9. Cho, E., Willett, W., Colditz, G., Fuchs, C., Wu, K., Chan, A., **Zeisel, S.H.**, and Giovannucci, E. (2007) Dietary Choline and Betaine and the Risk of Distal Colorectal Adenoma in Women. *Journal of the National Cancer Institute* 99(16):1224-1231. PMCID: PMC2441932.
10. Xu, X., Gammon, M.D., **Zeisel, S.H.**, Lee, Y.L., Wetmur, J.G., Teitelbaum, S.L., Bradshaw, P., Neugut, A.I., Santella, R.M., and Chen, J. (2008) Choline Metabolism and Risk of Breast Cancer in population-based study. *FASEB Journal* 22(6):2045-52. PMCID: PMC2430758.
11. Xu, X., Gammon, M.D., **Zeisel, S.H.**, Bradshaw, P.T., Wetmur, J.G., Teitelbaum, S.L., Neugut, A.I., Santella, R.M., Chen, J. (2009) High intakes of choline and betaine reduce breast cancer mortality in a population-based study. *FASEB Journal* 23:4022-4028. PMCID: PMC2775010.
12. Sha, W., da Costa, K-A., Fischer, L.M., Milburn, M.V., Lawton, K.A., Berger, A., Jia, W., **Zeisel, S.H.** (2010) Metabolomic profiling can predict which humans will develop liver dysfunction when deprived of dietary choline. *FASEB*. 24: 2962-2975. PMCID: PMC2909293.
13. Johnson, A.R., Craciunescu, C.N., Guo, Z., Teng, Y-W., Thresher, R.J., Blusztajn, J.K., **Zeisel, S.H.** (2010) Deletion of murine choline dehydrogenase results in diminished sperm motility. *FASEB*. 24(8): 2752-61. PMCID: PMC2909292.
14. Fischer, L.M., daCosta, K-A, Galanko, J., Sha, W., Stephenson, B., Vick, J., **Zeisel, S.H.** (2010) Choline intake and genetic polymorphisms influence choline metabolite concentrations in human breast milk and plasma. *American Journal of Clinical Nutrition*. 92(2): 336-346. PMCID: PMC2904035.
15. Fischer, L.M., da Costa, K-A, Kwock, L., Galanko, J., **Zeisel, S.H.** (2010) Dietary choline requirements of women: effects of estrogen and genetic variation. *American Journal of Clinical Nutrition*. doi: 10.3945/ajcn.2010.30064. PMCID: PMC2954445.

16. Resseguie, M., da Costa, K-A, Galanko, J., Davis, I.J., **Zeisel, S.H.**, (2010) Aberrant estrogen regulation of PEMT results in choline deficiency-associated liver dysfunction. *Journal of Biological Chemistry*. 286(2): 1649-58. PMID: PMC3020773.
17. Spencer, M.D., Hamp, T.J., Reid, R.W., Fischer, L.M., **Zeisel, S.H.**, Fodor, A.A. (2010) Association between composition of the human gastrointestinal microbiome and development of fatty liver with choline deficiency. *Gastroenterology*. 140(3):976-86. PMID: PMC3049827.
18. da Costa, K-A, Sanders, L.M., Fischer, L.M., **Zeisel, S.H.**, (2011) Docosahexaenoic acid in plasma phosphatidylcholine may be a potential marker for in vivo phosphatidylethanolamine N-methyltransferase activity in humans. *American Journal of Clinical Nutrition*. 93(5): 968-74. PMC Journal - In Process.

**Additional recent publications of importance to the field (in chronological order)**

1. Craciunescu, C.N., Albright, C.D., Mar, M-H, Song, J., and **Zeisel, S.H.** (2003) Choline availability during embryonic development alters progenitor cell mitosis in developing mouse hippocampus. *Journal of Nutrition* 133(11):3614-3618. PMID: PMC1592525.
2. Niculescu, M., Craciunescu, C.N., and **Zeisel, S.H.** (2006) Dietary choline deficiency alters global and gene-specific DNA methylation in the developing hippocampus of mouse fetal brains. *FASEB Journal* 20:43-49. PMID: PMC1635129.
3. Mehedint, M.G., Craciunescu, C.N., **Zeisel, S.H.** (2010) Maternal dietary choline deficiency alters angiogenesis in fetal mouse hippocampus. *Proceedings of the National Academy of Sciences USA*. 107(29): 12834-39. PMID: PMC2919920.

**D. Research Support**  
**Ongoing Research Support**

P30 DK56350 Zeisel (PI) 09/30/99 - 03/31/16  
 NIH / NIDDK  
 UNC-Nutrition Obesity Research Center  
 The major goal of this center is to provide expertise and core services that increase and enhance conduct of human nutrition research.

R01 CA109753 Chen (PI) 06/26/06 - 04/30/12  
 NIH / NCI (No cost extension)  
 Dietary methyl content, epigenetics, and etiology of breast cancer (Gammon, PI of subcontract at UNC)  
 The major goal of this project is to investigate whether the methyl content of the diet and methyl metabolism influences pathogenesis of breast cancer through epigenetic mechanisms.  
 Role: Investigator

R01 DK55865 Zeisel (PI) 09/01/00 - 01/31/12  
 NIH / NIDDK  
 Human Requirements for the Nutrient Choline  
 The major goals of this project is to better understand the how genetic polymorphisms influence the dietary requirements for choline.

1235-52000-051-17S Zeisel (PI) 09/15/05 - 08/31/15  
 US Department of Agriculture  
 Choline Content of Commonly Eaten Foods  
 The major goal of this project is to analyze the foods used by the USDA to provide nutrient database information to investigators and consumers. The USDA will provide UNC homogenized food samples and we will perform analyses.

R25 CA134285 Zeisel (PI) 07/01/08 - 06/30/13  
 NIH / NCI  
 Nutrition Education for Practicing Physicians  
 The major aim of this study is to deliver a web-based medical nutrition training program for medical residents and other postgraduate physician learners.

**Completed Research Support**

P30 DK56350-S Zeisel (PI) 09/30/05 - 03/31/11  
NIH / NIDDK  
Obesity in Asians Supplement - UNC Nutrition Obesity Research Center Parent Grant  
The major goal of this research is to examine Asians living in China and Whites and Blacks living in the United States.

P30 DK56350-S Zeisel (PI) 10/01/09 - 09/30/10  
NIH / NIDDK  
Administrative Supplement - UNC Nutrition Obesity Research Center Parent Grant  
The major goal of this grant is to expand the current pilot & feasibility program and acquire new equipment for the Center.

P01 AG09525 Blusztajn (PI) 04/01/05 - 03/31/10  
NIH / NIA  
Parent program – Aging of Brain: Perinatal Effects of Perinatal Nutrition (Blusztajn)  
Daughter project - Biochemistry of Supplemental Choline in Neonatal Rats (Zeisel)  
The major goals of this project are to determine the metabolism of supplemental choline in the rat during the perinatal period and to determine the extent to which physiologic changes occur in the availability of choline to perinatal brain.  
Role: PI of Daughter Project

R01 DK55865-S Zeisel (PI) 09/01/09 - 08/31/10  
NIH / NIDDK  
Administrative Supplement - Human Requirements for the Nutrient Choline Parent Grant  
The main goal of this grant is to expand the scope of the current grant by exploring the link between a common genetic polymorphism and health in postmenopausal women.

R43 DK078509 Ruiz (PI) 07/01/08 - 06/31/09  
NIH / NIDDK  
Clearing Intrahepatic Lipids to Aid in Toxicity Testing  
This major aim in this project is to examine the feasibility of targeting pathways involved in fatty acid metabolism to clear intracellular lipids from isolated steatotic hepatocytes. This is a subcontract from VestaTherapeutics, Inc.  
Role: Consultant

P30 ES10126 Swenberg (PI) 04/01/01 - 03/31/09  
NIH / NIEHS  
UNC-CH Center for Environmental Health and Susceptibility  
The major goal of this award is to bring population science, medical and biomedical researchers together to examine major issues in environmental health resulting from gene-environment interactions that affect an individual's susceptibility to disease.  
Role: Core Director