

BIOGRAPHICAL SKETCH

Name Joyce C. McCann <hr/> ERA COMMONS USER NAME JOYCEMCCANN	Position Title Staff Scientist Associate Director, Ames Nutrition & Metabolism Group		
Education/Training <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Colorado, Boulder	B.A.	1966	Chemistry
University of Colorado, Boulder	Ph.D.	1972	Biology
University of California, Berkeley	Post-Doc	1973-78	Biochemistry

A. Personal Statement

The goal of the proposed project is to apply a method of inquiry based on Bruce Ames' "triage theory" in a critical review of the published literature aimed at providing an overview of evidence pertinent to a possible causal relationship between modest selenium deficiency and diseases of aging. I am well qualified to carry out this project. I have many years experience analyzing complex multi-disciplinary biological evidence relevant to possible causal linkages between environmental agents (e.g., mutagens, electromagnetic fields) and cancer, and in the past 6 years, between micronutrient deficiencies and poor brain function and other chronic diseases. Results of these analyses have been published as major review articles on which I have been the senior author. These articles have all been published in high impact peer-reviewed journals. I began my career as a postdoctoral student with Bruce Ames, where I helped in the final stages of development of the Ames mutagenesis test. During that time I was senior author on a number of research articles and reviews discussing various aspects of the Ames test and environmental mutagenesis. Subsequently, I was a private research consultant and in that capacity wrote a series of major review articles that critically assessed multi-disciplinary biological evidence concerning the possible adverse health effects of electromagnetic fields. These reviews were also published in major peer-reviewed journals. Since rejoining Bruce Ames' group in 2004, I have written a series of major reviews (and additional shorter reviews), again involving analysis of multi-disciplinary evidence, concerning possible effects of each of 4 micronutrient deficiencies during development on subsequent brain function of offspring. These reviews have been very well received. For example, our vitamin D review received the following unsolicited praise from Gerald Weissmann, editor of FASEB Journal: "This critical analysis of vitamin D function and the brain is a model of careful thinking about nutrition and behavior. One wishes that all studies of nutritional supplements or requirements were this thoughtful". Most recently, I carried out a triage-based analysis of vitamin K biology, which was recently published in American Journal of Clinical Nutrition. The proposed project will employ a similar approach to that used for the Vitamin K study. Because of years of experience analyzing complex evidence from different fields, I am well aware of the pitfalls of over-promising what a multi-disciplinary review can accomplish, and also of the need to interface with experts in the field to ensure accuracy and balance, which we have done on previous reviews and plan to do with the selenium review. In summary, I am well qualified to conduct this project because I have a demonstrated record of successful production of peer-review quality scientific reviews in complex multi-disciplinary areas, and I have specific experience using the published literature to investigate micronutrient biology and questions posed by the triage theory.

B. Positions and Honors

Professional Experience

1979 – 1980	Sr. Research Associate, Biochemistry Dept., University of California, Berkeley, CA
1980 – 1989	Lecturer. School of Public Policy, University of California, Berkeley, CA
1981 – 1987	Staff Scientist, Lawrence Berkeley Laboratory, Biomedical Division, Berkeley, CA

1987 – 1991	Director of Western Operations, Clement International, San Francisco, CA
1990 – 1995	Vice President, ICF-Kaiser Int'l., Oakland, CA
1995 – 2004	Private Research Consultant
2004 – 2006	Assistant Staff Scientist, Children's Hospital Oakland Research Institute, Oakland, CA
2007 – Present	Associate Staff Scientist, Children's Hospital Oakland Research Institute, Oakland, CA

C. Selected Peer-reviewed Publications (in chronological order, since 2005).

Micronutrient deficiencies and health

1. **McCann JC** and Ames BN (2005) Is docosahexaenoic acid, an n-3 long chain polyunsaturated fatty acid, required for the development of normal brain function? An overview of evidence from cognitive and behavioral tests in humans and animals. *Am J Clin Nutr* 82:281-95.
2. **McCann JC** and Ames BN (2006) Scientific Precision and Deciding Whether to Add LCPUFAs to Infant Formula (Response to P. Wainwright). *Am J Clin Nutr* 83:920-1.
3. **McCann JC**, Hudes M, and Ames BN (2006) An overview of evidence for a causal relationship between dietary availability of choline during development and cognitive function in offspring. *Neuro Bio Rev* 30:696-712.
4. **McCann, JC** and Ames, BN (2007) DHA and cognitive development: an update on the science. *Pediatric Basics* April 16-22.
5. **McCann JC** and Ames BN (2007) An overview of evidence for a causal relationship between iron deficiency during development and cognitive or behavioral function in children. *Am J Clin Nutr*, 85:931-45.
6. Ames BN, **McCann J**, Stampfer MJ, and Willett WC (2007) Letter: Evidence-based decision-making on micronutrients and chronic disease: Long-term randomized controlled trials (RCTs) are not enough. *Am J Clin Nutr* 86:522-3.
7. **McCann JC** and Ames BN (2008) Review Article: Is there convincing biological or behavioral evidence linking vitamin D deficiency to brain dysfunction? *FASEB J*, 22:982-1001.
8. **McCann JM** and Ames BN (2009) Foreword: Prevention of Cancer, and the Other Degenerative Diseases of Aging, Through Nutrition In: Chemoprevention of Cancer and DNA Damage by Dietary Factors (eds S. Knasmüller, D. M. DeMarini, I. Johnson and C. Gerhäuser), Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany. xxxi-xxxviii.
9. **McCann JC** and Ames BN (2009) Vitamin K, an example of triage theory: is micronutrient inadequacy linked to diseases of aging? *Am J Clin Nutr* 90:889-907.
10. **McCann JC** and **Ames BN** (2011) Adaptive dysfunction of selenoproteins from the perspective of the triage theory: why modest selenium deficiency may increase risk of diseases of aging *FASEB J*. 25(6):1793-814

Other Selected Peer-reviewed Publications (in chronological order)

1. **McCann JC** and Ames BN (2005) Is docosahexaenoic acid (DHA), an n-3 long chain polyunsaturated fatty acid, required for normal brain function? An overview of evidence from cognitive and behavioral tests in humans and animals: a review. *Am J Clin Nutr*. 82: 281-95.
2. **McCann J**, Hudes M and Ames BN (2006). An Overview of Evidence for a Causal Relationship Between Dietary Availability of Choline During Development and Cognitive Function in Offspring. *Neuroscience and Biobehavioral Reviews*, 30: 696-712.
3. **McCann J** and Ames BN (2006) Letter to the Editor (Response to P. Wainwright): Scientific Precision and Deciding Whether to Supplement Infant Formulas With LCPUFAs, *Am J Clin Nutr.*, 83: 920-1.
4. **McCann J** and Ames, BN (2007) An Overview of Evidence For a Causal Relationship Between Iron Deficiency During Development and Deficits in Cognition or Behavior, *Am J Clin Nutr*. 85:931-45
5. **McCann JC** and Ames BN (2007) DHA and Cognitive Development. *Pediatric Basics* 117: 16-22

6. Ames BN, **McCann JC**, Stampfer MJ and Willett WC (2007) Letter to the Editor: Evidence-based decision making on micronutrients and chronic disease: long-term randomized controlled trials are not enough. *Amer J Clin Nutr* 86:522-3.
7. **McCann JC** and Ames BN (2007) Lessons from DHA trials on cognition/behavior in humans and animals (in Dutch). In: *Special Fatty Acids*. Scientific publication on infant nutrition (ed. FAJ Muskiet). Elsevier Health Care, The Netherlands, pp15-17.
8. **McCann JC** and Ames BN (2008) Review Article: Is there convincing biological or behavioral evidence linking vitamin D deficiency to brain dysfunction? *FASEB J*. 22: 982-1001. April. PMID: 18056830
9. Hudes ML, **McCann JC** and Ames BN (2009) Unusual clustering of coefficients of variation in published articles from a medical biochemistry department in India. *FASEB J* 23:689-703. PMID: 18940892
10. **McCann JC**, Hudes ML and Ames BN (2009) Part 2—Unusual clustering of coefficients of variation in published articles from a medical biochemistry department in India. *FASEB J* 23:706-708. PMID: 18940890
11. **McCann JC** and Ames BN, Evidence required for causal inferences about effects of micronutrient deficiencies during development on brain health -- DHA, choline, iron, and vitamin D, In: *Micronutrients and Brain Health*, Packer, L, Sies, H., Eggersdorfer, M. & Cadenas, E., Eds, CRC Press, London, 2009, chap. 30.
12. Ames BN and **McCann JC** (2009) Foreword: Prevention of Cancer, and the Other Degenerative Diseases of Aging, Through Nutrition In: ***Chemoprevention of Cancer and DNA Damage by Dietary Factors***. S. Knasmüller, DM DeMarini, I. Johnson, and C. Gerhäuser eds. WILEY-VCH Verlag GmbH & Co.KGaA, Germany. xxxi-xxxviii
13. **McCann JC** and Ames BN (2009) Vitamin K, an example of triage theory: is micronutrient inadequacy linked to diseases of aging? *Am J Clin Nutr*. 90: 889-907. doi: 10.3945/ajcn.2009.27930. PMID: 19692494
14. **McCann JC** and Ames BN (2011) Adaptive dysfunction of selenoproteins from the perspective of the triage theory: why modest selenium deficiency may increase risk of diseases of aging *FASEB J*. 25(6):1793-814.
15. Mietus-Snyder ML, Shigenaga, MK, Suh JH, Shenvi SV, Lal A, McHugh T, Olson D, Lilienstein J, Krauss RM, Gildengoren G, **McCann JC**, and Ames BN (2012) A micronutrient-dense, high fiber, fruit-based supplement bar increases HDL, particularly large HDL, lowers homocysteine, and raises glutathione in a 2-week trial. *FASEB J*, 26(8):3515-27. doi:10.1096/fj.11-201558.
16. **McCann JC**, Hudes ML and Ames BN (2012) Unusual clustering of coefficients of variation in published articles from a medical biochemistry department in India. *Anaesthesia*. In press. Submitted May 4, 2012

ABSTRACTS

Mietus-Snyder M, Shigenaga MK, Suh JH, Shenvi SV, Lal A, McHugh T, Olson D, McCann JC, Krauss RM, Ames BN (2011) **Metabolic Effects of a Nutrient-Dense High Fiber Supplement**. AHA Epi, Nutrition, Physical Activity and Metabolism Meeting in San Diego March 2012.

Michele Mietus-Snyder, Mark Shigenaga, Jung Suh, Swapna Shenvi, Ashutosh Lal, Tara McHugh, Don Olson, Joyce McCann, Ronald Krauss, and Bruce Ames (2012) **Metabolic Effects of a Nutrient-Dense High Fiber Supplement**. American Heart Association, Epidemiology and Prevention/Nutrition, Physical Activity and Metabolism Session March 2012. (Abstract Number 667).

D. Research Support

Ongoing Research Support

Bruce and Giovanna Ames Foundation
(Private Foundation)

Completed Research Support

NA