BIOGRAPHICAL SKETCH

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NAME: Skinner, Michael K.

eRA COMMONS USER NAME (credential, e.g., agency login): skinner

POSITION TITLE: Professor

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

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Warner Pacific College, Portland, OR	A.S.	06/77	General Science
Reed College, Portland, OR	B.A.	06/79	Chemistry
Washington State University, Pullman, WA	Ph.D.	06/82	Biochemistry
University of Toronto, Toronto, Ont., Canada	Post-doc	1984	Biochem/Physiol.
Rosetta Inpharmatics/Merck, Seattle WA	Sabbatical	2008	Bioinformatics

A.

Personal Statement. The Skinner laboratory has operated for over 25 years with over 25 years of research in gonadal development and cell biology and 15 years in epigenetics research. The ability of environmental factors to promote an epigenetic transgenerational adult onset disease phenotype was first described by the Skinner laboratory. More recently many of the current state of the art epigenetic technologies have been in part developed and utilized by the Skinner laboratory. Therefore, Dr. Skinner and his laboratory are well qualified to perform the proposed research. Dr. Michael Skinner has trained over 50 students and fellows and published over 275 publications.

B.

Positions and Honors.

Positions:

2010-Present Professor, School of Biological Sciences, Washington State University, Pullman, Washington.
2002-2008 Founder and Director, Center for Integrated Biotechnology, Washington State University, Pullman, Washington.
1996-2008 Founder and Director, Center for Reproductive Biology, Washington State University, Pullman, Washington.
1996-2010 Professor, School of Molecular Biosciences, Washington State University, Pullman, Washington.
1991-1996 Member, the Reproductive Endocrinology Center and the Developmental Biology Program in Biological Sciences, University of California, San Francisco.
1991-1996 Associate Professor, Department of Obstetrics, Gynecology and Reproductive Sciences and Department of Physiology, University of California, San Francisco, CA.
1985-1991 Assistant Professor, Department of Pharmacology, Vanderbilt University, School of Medicine, Nashville, Tennessee.

Honors: (Selected Past 5 Years)

2014 Invited TEDxRainier Talk, Seattle, WA, (One of the largest worldwide) https://www.youtube.com/watch?v=f1Pf5S8Nbfk
2014 Awarded Eastlick Distinguished Professorship
2014 Invited Featured article in Scientific American, “A New Kind of Inheritance”.

2013 Awarded Smithsonian 2013 “American Ingenuity Award”, in the area of the Natural Sciences, Washington, D.C. With feature article in Smithsonian Magazine and documentary on the Smithsonian Channel.
2013 Fifth Annual Gregor Stoddard Visiting Professorship and Lecturer, Department of Pediatrics, University of Colorado, School of Medicine, Aurora, CO.
2012 Elected Fellow of the American Association for the Advancement of Science (AAAS).
2012 Brasel Basic Science Lectureship, Los Angeles, Biomedical Research Institute at Harbor-UCLA, Los Angeles, CA.
2012 The DH Ruttenberg Visiting Professorship in Endocrine Disruption and Child Health, Mt. Sinai School of Medicine. New York, NY.
2010 Newsweek Magazine, Science Feature, “Sins of the Grandfathers”, November 8, 2010.

C.
Contributions to Science.
Selected peer-reviewed publications relevant to application (Selected from over 275 publications):

http://www.ncbi.nlm.nih.gov/sites/myncbi/1PiX8IHGveyAh/bibliography/41624451/public/?sort=date&direction=ascending.

(1) Anway M, Cupp AS, Uzumcu M and MK Skinner (2005) Epigenetic transgenerational actions of endocrine disruptors and male fertility. Science 308:1466-1469. PMID: 15933200

Senior author that designed and oversaw the research. This is the first example of an environmentally induced epigenetic transgenerational inheritance of disease. The first model of non-genetic inheritance with an epigenetic mechanism documented. The most highly cited research manuscript in the reproductive sciences. The extensive press can be seen at http://skinner.wsu.edu/pressinfo.html

Jirtle RL and MK Skinner (2007) Environmental Epigenomics and Disease Susceptibility. Nature Genetics Rev. 8:253-262. PMID: 16973726

Crews D, Gore AC, Hsu TS, Dangleben NL, Spinetta M, Schallert T, Anway MD and Skinner MK (2007) Transgenerational epigenetic imprints on mate preference. Proc Natl Acad Sci 104:5942-5946. PMID: 17389367

Nilsson EE, Rogers N and MK Skinner (2007) Actions of the anti-Mullerian hormone (AMH) on the ovarian transcriptome to inhibit primordial to primary follicle transition. Reproduction 134:209-221. PMID:17660231

Skinner MK (2008) What is an epigenetic transgenerational phenotype? F3 or F2. Reproductive Toxicology. 25:2-6. PMID: 17949945

Skinner MK, Schmidt M, Savenkova M, Sadler-Riggleman I, and EE Nilsson. (2008) Regulation of granulosa and theca cell transcriptomes during ovarian antral follicle development. Molecular Reproduction and Development 75(9):1457-72. PMID: 18288646

Dole G, Nilsson EE, and MK Skinner (2008) Glial derived neurotrophic factor promotes the ovarian primordial to primary follicle transition. Reproduction 135(5):671-82. PMID: 18304989

Nilsson EE and Skinner MK (2009) Progesterone regulation of primordial follicle assembly in bovine fetal ovaries. Molecular and Cellular Endocrinology. 313 (2009) 9–16. PMID:19747959

Skinner MK, Manikkam M, Guerrero-Bosagna C. 2010 Epigenetic transgenerational actions of environmental factors in disease etiology. Trends Endocrinol Metab. 2010 Jan 12. 21(4):214-22. PMID: 20074974

Nilsson EE, Savenkova MI, Schindler R, Zhang B, Schadt EE and Skinner MK (2010) Gene bionetwork analysis of ovarian primordial follicle development. PLoS ONE 16;5(7):e11637. PMID: 20661288

Schindler R, Nilsson EE and Skinner MK (2010) Induction of ovarian primordial follicle assembly by connective tissue growth factor CTGF. PLoS ONE 24;5(9):e12979. PMID: 20886044

Nilsson EE, Schindler R, Savenkova MI and Skinner MK (2011) Inhibitory Actions of Anti-Müllerian Hormone (AMH) on Ovarian Primordial Follicle Assembly. PLoS ONE 6(5): e20087. PMID: 21637711

(2) Mohan Manikkam, Carlos Guerrero-Bosagna, Rebecca Tracey, Md. M. Haque and Michael K. Skinner (2012) Transgenerational Actions of Environmental Compounds on Reproductive Disease and Identification of Epigenetic Biomarkers of Ancestral Exposures. PLoS ONE 7(2):e31901. PMID: 22389676

> Senior author and designed the experiments. This is the first report of exposure specific epimutations in the germline suggesting epigenetics can provide diagnostic markers for exposures and later life disease. The first genome-wide analysis of transgenerational germline epimutations. One of the most highly accessed papers in the field. The extensive press can be seen at http://skinner.wsu.edu/toxnews/projectnews.html

Nilsson E, Larsen G, Manikkam M, Guerrero-Bosagna C, Savenkova MI, Skinner MK. (2012) Environmentally induced epigenetic transgenerational inheritance of ovarian disease. PLoS ONE. 7(5):e36129. PMID: 22570695

Skinner MK, Manikkam M, Haque Md., Zhang B, Savenkova M (2012) Epigenetic Transgenerational Inheritance of Somatic Transcriptomes and Epigenetic Control Regions. Genome Biology 3;13(10):R91. PMID: 23034163

Guerrero-Bosagna C, Savenkova M, Haque Md. M, Sadler-Riggleman I, and Skinner MK (2013) Environmentally Induced Epigenetic Transgenerational Inheritance of Altered Sertoli Cell Transcriptome and Epigenome: Molecular Etiology of Male Infertility. PLoS ONE 8(3): e59922. PMID: 23555832

Skinner MK, Guerrero-Bosagna C, Haque Md, Nilsson E, Bhandari R, and McCarrey J (2013) Environmentally Induced Transgenerational Epigenetic Reprogramming of Primordial Germ Cells and Subsequent Germline. PLoS ONE 15;8(7):e66318. PMID: 23869203

Nilsson E, Zhang B, and Skinner MK (2013) Gene Bionetworks that Regulate Ovarian Primordial Follicle Assembly. BMC Genomics 14:496. PMID: 23875758

(3) Skinner MK, Manikkam M, Tracey R, Nilsson E, Haque Md. M, and Guerrero-Bosagna C (2013) Ancestral DDT Exposure Promotes Epigenetic Transgenerational Inheritance of Obesity. BMC Medicine 11:228. PMID: 24228800

> This was one of the first reports of environmental toxicant promoting transgenerational obesity. The germline epimutations were also identified in this paper. One of the highly accessed papers of BMC Medicine. Press on the paper can be seen at http://skinner.wsu.edu/toxnews/projectnews.html

Feeney A, Nilsson E, and Skinner MK (2014) Cytokine (IL16) and Tyrphostin Actions on Ovarian Primordial Follicle Development. Reproduction. 148(3):321-331. PMID: 24970835

Skinner MK and Guerrero-Bosagna C (2014) Role of CpG Deserts in the Epigenetic Transgenerational Inheritance of Differential DNA Methylation Regions. BMC Genomics 15:692. PMID: 25142051

(4) Skinner MK, Guerrero-Bosagna C, Haque M, Knutie S, Koop J, and Clayton D (2014) Epigenetics and the Speciation and Evolution of Darwin's Finches. Genome Biology & Evolution 24;6(8):1972-89. PMID: 25062919

> First author and designed experiments and wrote the manuscript. Provides the first phenotypic associations between related species to suggest a potential role of epigenetics in evolutionary biology. One of the most highly accessed papers for this journal. Press can be seen at http://skinner.wsu.edu/toxnews/projectnews.html

Skinner MK (2014) A new kind of inheritance. Scientific American 311(2)44-41. PMID: 25095468

Guerrero-Bosagna C, Skinner MK. (2014) Environmentally induced epigenetic transgenerational inheritance of male infertility. Curr Opin Genet Dev. 4;26C:79-88. PMID: 25104619

(5) Skinner MK, Savenkova M, Zhang B, Gore A, and Crews D (2014) Gene Bionetworks Involved in Epigenetic Transgenerational Inheritance of Altered Mate Preference: Environmental Epigenetics and Evolutionary Biology. BMC Genomics 16;15(1):337. PMID: 24885959

> First author and designed the research and wrote the paper. The first system biology analyses of mate preference and associated epigenetic transgenerational inheritance of brain function. One of the first transcriptome links to behavioral outcome. Highly accessed paper in field. Press can be seen at http://skinner.wsu.edu/pressinfo.html

Manikkam M, Haque M, Guerrero-Bosagna C, Nilsson EE, Skinner MK (2014) Pesticide methoxychlor promotes the epigenetic transgenerational inheritance of adult onset disease and sperm epimutations through the female germline. PLoS ONE 9(7)e102091. PMID: 25057798

Crews D, Gillette R, Miller-Crews I, Gore AC, Skinner MK. (2014) Nature, nurture and epigenetics. Mol Cell Endocrinol. 398(1-2):42-52 Review. PMID: 25102229

Skinner MK (2014) Endocrine disruptor induction of epigenetic transgenerational inheritance of disease. Molecular and Cellular Endocrinology. Vol. 398, Pages 4-12. PMID: 25088466

Skinner MK (2014) Environment, Epigenetics and Reproduction. Molecular and Cellular Endocrinology. Vol. 398, Pages 1-3. PMID: 25086400

Nilsson E and Skinner MK (2015) Environmentally Induced Epigenetic Transgenerational Inheritance of Disease Susceptibility. Translational Research. 165(1):12-17. PMID: 24657180

Skinner MK (2015) Environmental Epigenetics and a Unified Theory of the Molecular Aspects of Evolution: A Neo-Lamarckian Concept that Facilitates Neo-Darwinian Evolution. Genome Biol Evol 7(5): 1296-1302. PMID: 25917417

Gillette R, Miller-Crews I, Nilsson E, Skinner MK, Crews D. (2015) Distinct actions of ancestral vinclozolin and juvenile stress on neural gene expression in the male rat. Frontiers in Genetics 2;6:56. PMID: 25784924

Sadler-Riggleman I and Skinner MK (2015) Environment and the Epigenetic Transgenerational Inheritance of Disease. In: "Epigenetics: Current Research and Emerging Trends. Editor: Brian Chadwick, Caister Academic Press. Chapter 15, pp. 297-305.

Skinner MK, Guerrero-Bosagna C, Haque M. (2015) Environmentally Induced Epigenetic Transgenerational Inheritance of Sperm Epimutations Promotes Genetic Mutations. Epigenetics 10:8, 762-771. PMID:26237076

D.
Research Support.

Active

NIH R01 ES012974-11, 4/1/2014-3/31/2019, "Epigenetic Transgenerational Endocrine Disruptor Actions" This project deals with the examination of the epigenetic actions of the endocrine disruptor vinclozolin on testis development and male fertility. This grant investigates the DNA methylation mechanisms involved in the transgenerational phenomena. Principal Investigator: Dr. Michael K. Skinner.

Pending

NIH R01 Subcontract, 2016–2021, "Ovarian Primordial Follicle Development and Disease" Principal Investigator: Michael K. Skinner.