

CURRICULUM VITAE

Katherine A. Burns, Ph.D.

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Education

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| 2000-2007 | <p>Doctor of Philosophy
Pennsylvania State University, University Park, PA
Major: Pathobiology with a concentration in Toxicology; Dissertation: Regulation of Peroxisome proliferator-activated receptor alpha activity via cross-talk with Glycogen synthase kinase 3</p> |
| 1996-2000 | <p>Bachelor of Science
Gettysburg College, Gettysburg, PA
Major: Biology; Minor: Chemistry</p> |

Academic and Professional Experience

- 4/15- present Assistant Professor, University of Cincinnati College of Medicine
- ◆ My laboratory focuses on the development and progression of endometriosis from environmental and immunological bases
- 7/07-3/2015 Postdoctoral Fellow, National Institute of Environmental Health Sciences
- ◆ Worked with Kenneth Korach, Laboratory of Reproductive and Developmental Toxicology, Receptor Biology group, Principal Investigator and Chief
 - ◆ Investigating the role of ER α and ER β in the etiology of endometriosis by developing a novel mouse model of endometriosis.
 - ◆ Investigating alterations in the uteri of mice given endometriosis and comparing these factors to alterations seen in women with endometriosis. (Collaborators: Steven Young, MD PhD and Bruce Lessey, MD, PhD)
 - ◆ Awarded a K99/R00 with Project title: Endometriosis and Environmental Endocrine Disrupting Chemical Exposure
 - ◆ Determining the key amino acids in ER α to focus research efforts on non-nuclear, non-genomic responses and nuclear genomic responses apart from tethered-mediated activation.
 - ◆ Mentored an undergraduate student with a project designed to encompass my endometriosis research interests with focus on gestational environmental toxicant exposure.
- 9/00-5/07 Graduate Research Associate, The Pennsylvania State University, Department of Veterinary and Biomedical Sciences, University Park, PA
- ◆ Worked with Jack Vanden Heuvel, Professor of Veterinary and Biomedical Sciences
 - ◆ Investigated the regulation of peroxisome proliferator-activated receptor α (PPAR α) by glycogen synthase kinase 3 (GSK3). Identified a novel GSK3 phosphorylation site of PPAR α .
 - ◆ Mentored a number of undergraduate students with projects that were designed to encompass my research, but give them their own research experience.

- 9/98-8/00 Research Assistant, Gettysburg College, Department of Biology, Gettysburg, PA
- ♦ Worked with Steven W. James, Associate Professor of Biology
 - ♦ Investigated a mutant of DNA polymerase ϵ (*nimP*) and its role in cell cycle regulation in *aspergillus nidulans*.
 - ♦ Mentored a high school student in Dr. James' lab who wanted to experience scientific research before she entered college.

Awards and Honors

- ♦ Top downloaded article in *Reproduction*, 2016
- ♦ NIEHS Science Day Best Poster Presentation, 2014
- ♦ NIEHS Paper of the Month, 2011, 2012
- ♦ Laylor Foundation Merit Award, Society for the Study of Reproduction, 2011
- ♦ Larry Ewing Memorial Trainee Travel Grant, Society for the Study of Reproduction, 2010
- ♦ Bristol-Myers Squibb Graduate Student Fellowship in Molecular Toxicology, 2005-2007
- ♦ Society of Toxicology Graduate Student Travel Award, 2005
- ♦ Paul Hand Endowment Graduate Student Award, 2005

Professional Society Memberships

- ♦ The Society for the Study of Reproduction, 2010- present
- ♦ Endocrine Society, 2010
- ♦ The Society of Toxicology, 2004-2008
- ♦ The Teratology Society, 2006-2007
- ♦ Memberships associated with endometriosis: The World Endometriosis Foundation, The Endometriosis Foundation of America, and the Endometriosis Association

External Funding:

Submissions:

1 R01 HD097597-A01

resubmitted 11/2018

Project title: The Role of the Matrisome in Endometriosis Development

Goals: Define the early initiation of endometriosis by examining the core matrisome and the interaction with the immune system

Role: PI

1R42HD098965-01

Pending Counsel Review

Project title: Novel, Non-hormonal Therapeutic for Endometriosis. Raw Score: 33

Goals: Development of a non-hormonal and disease modifying therapeutic for endometriosis

Role: PI

1 R01 for ES

new submission planned Feb 5, 2019

Project title: The environmental contaminant Bis(2-ethylhexyl) phthalate is an immunotoxicant in the development of endometriosis. Score: 41%

Goals: Define the impacts of DEHP as an immunotoxicant and endocrine disrupting chemical on the development of endometriosis

Role: PI

Funded:

New Investigator Award

4/2018-3/2019

University of Cincinnati: Center for Environmental Genetics NIH/NIEHS--P30ES00606

Project title: The role of DEHP signaling through IL6 in the initiation of endometriosis

Goals: Examine the role of IL6 and ESR1 in the initiation of endometriosis

Role: PI

Endometriosis Foundation of America

4/2017-3/2019

Project title: The Environmental Contaminant di-(2-ethylhexyl)phthalate (DEHP) Induces Endometriosis

Goals: Define the impacts of DEHP on endometrial cell function

Role: PI

A National Training Program in Reproductive Medicine

1/2017-1/2018

American Society for Reproductive Medicine 5T32HD040135-14

Project title: Curcumin suppression of di-(2-ethylhexyl) phthalate (DEHP)-induced endometriosis.

Goals: To examine the effects of curcumin on DEHP-induced endometriosis.

Role: Mentor

Next Generation Biomedical Investigator

4/2016-4/2017

University of Cincinnati: Center for Environmental Genetics NIH/NIEHS--P30ES00606

Project title: Inhibition of Endometriosis by Curcumin

Goals: Define the optimal dose of curcumin needed to inhibit the potentiation of endometriosis and determine the effect of curcumin on innate immune cell infiltration.

Role: PI

New Investigator Scholar Award

4/2016-4/2017

University of Cincinnati: Center for Environmental Genetics NIH/NIEHS--P30ES00606

Project title: Endometriosis serum biomarkers in the Fernald Medical Monitoring Program

Goals: To examine chemokines in women with and without endometriosis exposed and not exposed to uranium.

Role: Mentor

R00ES021737

4/2013-4/2018

NIH/NIEHS

Project title: Endometriosis and Environmental Endocrine Disrupting Chemical Exposure

Goals: Mentored incorporation of immunology into my knowledge basis while defining the role of ER α , E2, and Endocrine Disrupting Chemical-mediated signaling in the pathogenesis of endometriosis

Role: PI with mentor Kenneth Korach, PhD and co-mentor Steven Young, MD PhD

Human and Health Science Number: HHSN273200900005C

10/01/2011-6/30/2012

National Toxicology Program

Project title: Mice exposed developmentally to TCDD exhibit blunted uterine responses as adults

Goals: Define the early life exposure timing from TCDD necessary to alter adult uterine hormone responses.

Role: PI with sponsor Michael DeVito, PhD

Teaching Experience

Lectures on reproductive toxicology as part of the Core graduate curriculum, University of Cincinnati College of Medicine, Cincinnati, OH (2016)

Adjunct professor, lectures (7) given on Physiology, MPAP 502, Campbell University, Buies Creek, NC (2012)

Invited presenter on "Mice exposed developmentally to TCDD exhibit blunted uterine responses as adults" for the Reproductive Endocrinology group under the direction of Suzanne Fenton at NIEHS (2011)

Camp Monkey, outreach program organized by the Society for the Study of Reproduction (2011)

Ambassador for North Carolina DNA Day (2011)

Invited presenter on “Endometriosis and Animal Models” for The NIEHS Comparative Medicine Branch Technician Training Series (2010)

Biotechnology 664: Biotechnology Laws and Regulations, University of Maryland, University College, 2007- 2010 (seven semesters)

Guest Lecturer, lectures given on Insecticides and Heavy Metals, Molecular and Cellular Toxicology-VSC497A, Pennsylvania State University, University Park, PA (2005)

Scholarly Activities

- ◆ Ad hoc reviewer: The American Journal of Pathology (2017-present)
- ◆ Ad hoc reviewer: The Journal of Clinical Endocrinology and Metabolism (2017-present)
- ◆ Ad hoc reviewer: Scientific Reports, Nature (2016-present)
- ◆ Ad hoc reviewer: Molecular Metabolism (2016-present)
- ◆ Ad hoc reviewer: The Journal of Clinical Endocrinology and Metabolism (2016-present)
- ◆ Ad hoc reviewer: Molecular Metabolism (2016-present)
- ◆ Ad hoc reviewer: PLoS ONE (2016-present)
- ◆ Ad hoc reviewer: Reproductive Biology (2015-present)
- ◆ Ad hoc reviewer: International Journal of Toxicology (2015-present)
- ◆ Ad hoc reviewer: FASEB (2015-present)
- ◆ Ad hoc reviewer: Science Translational Medicine (2014-present)
- ◆ Ad hoc reviewer: Reproductive Sciences (2014-present)
- ◆ Ad hoc reviewer: Reproduction (2013-present)
- ◆ Ad hoc reviewer: Journal of Biological Research (2013-present)
- ◆ Ad hoc reviewer: Journal of Biological Chemistry (2013-present)
- ◆ Ad hoc reviewer: Journal of Endocrinology (2013-present)
- ◆ Ad hoc reviewer: Reproductive Toxicology (2012-present)
- ◆ Ad hoc reviewer: Biology of Reproduction (2011-present; 2017 Board of Reviewing Editors)
- ◆ Ad hoc reviewer: Endocrinology (2011-present)
- ◆ Ad hoc reviewer: Molecular Reproduction and Development (2010-present)
- ◆ Ad hoc reviewer: Reproductive Biology and Endocrinology (2010-present)
- ◆ Ad hoc reviewer: Environmental Health Perspectives (2008-present)
- ◆ Faculty of 1000 Medicine Reports with Dr. Steven L. Young (2009-2013)

Continuing Education

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| 2015-2016 | “Write Winning Grant Proposals”- intensive grant writing program from Grant Writers’ Seminars and Workshops |
| 2012 | The Grantsmanship Center- “Research Proposal Workshop”- 40 hr course at the NIEHS by the Office of Fellows’ Career development to prepare postdoctoral fellows for grant writing |
| 2012 | Management Boot Camp- offered at the NIEHS by the Office of Fellows’ Career Development to prepare postdoctoral fellows for management of his/her own laboratory |
| 2011 | College Teaching- offered at the NIEHS by the Office of Fellows’ Career Development- 10 week (20 hr) course designed to prepare postdoctoral fellows for teaching careers |
| 2010 | NIEHS Grant Writing Class- 2hr class offered to fellows preparing for an academic career |

2006 Vertebrate Embryology at the Teratology Society annual meeting

Complete List of Published Work in MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1BaZkg4fizz5m/bibliography/47890669/public/?sort=date&direction=ascending>

Manuscripts in preparation:

Greene, A.D., Kendzierski, J.A., Buckholz, J.M., Niu L., Xie, C., Pinney, S.M., **Burns, K.A.** Elevated serum chemokines are independently associated with both endometriosis and uranium exposure. Under revision at *Reproductive Toxicology*. Ref: RTX_2018_226.

Langevin, S.M., Kuhnell, D., Biesiada, J., Zhang, X, Medvedovic, M., Talaska, G.G., **Burns, K.A.**, Kasper, S. Comparability of the small RNA secretome across human biofluids concomitantly collected from healthy adults. Under review at PLOS ONE. PONE-D-18-33862.

Greene, AD, Lang, SA, Jones, RL, **Burns, KA.** The Environmental Contaminant Bis(2-ethylhexyl) Phthalate (DEHP) Increases the Development of Endometriosis in a Mouse Model. In preparation for *Biology of Reproduction*.

Published:

Jones, R.L., Lang, S.A., Kendzierski, J.A., Greene, A.D., **Burns, K.A.** Use of a mouse model of experimentally induced endometriosis to evaluate and compare the effects of Bisphenol A and Bisphenol AF exposure. Accepted 11/15/2018. *Environmental Health Perspectives*. Ref.: Ms. No. EHP3802R2

Burns, K.A., Thomas, S.Y., Hamilton, K.J., Young, S.L., Cook, D.N., Korach, K.S. Early Endometriosis in Females is Directed by Immune-mediated Estrogen Receptor alpha and IL6 Cross-talk. *Endocrinology*. 159(1):103-118. 2018.

Hinds, T.D. Jr, **Burns, K.A.**, Hosick, P.A., McBeth, L., Nestor-Kalinoski, A., Drummond, H.A., AlAmodi, A.A., Hankins, M.W., Vanden Heuvel, J.P., Stec, D.E. Biliverdin Reductase A Attenuates Hepatic Steatosis by Inhibition of Glycogen Synthase Kinase (GSK) 3 β Phosphorylation of Serine 73 of Peroxisome Proliferator-activated Receptor (PPAR) α . *J Biol Chem*. Nov 25;291(48):25179-25191. 2016.

Greene, A.D., Lang, S.A., Kendzierski, J.A., Sroga-Rios, J.M., Herzog, T.J., **Burns, K.A.**, Endometriosis: Where are We and Where are We Going? Invited review for *Reproduction*. Sep; 152(3):R63-78. 2016.

Burns, K.A., Li, Y., Liu, L., Korach, K.S., Selective mutations in ER alpha's D-domain alters the gene expression profile in response to estrogen. *Molecular Endocrinology*. Aug; 28(8):1352-61. 2014.

*Franasiak, J.M., ***Burns, K.A.**, Slayden, O, Yuan, L., Fritz, M.A., Korach, K.S., Lessey, B.A., Young, S.L. Endometrial CXCL13 Expression is Cycle Regulated in Humans and Aberrantly Expressed in Humans and Rhesus Macaques with Endometriosis. *Reproductive Sciences*. Apr; 22(4):442-52. 2015.

*Designates authors contributed equally.

*Jayes, F.L., ***Burns, K.A.**, Rodriguez, K.F., Korach, K.S., The naturally occurring luteinizing hormone surge is diminished in mice lacking estrogen receptor beta in the ovary. *Biology of Reproduction*. Feb; 6;90(2):24. 2014. *Designates authors contributed equally.

- Li, Y., Hamilton, J.K., Lai, A.Y., **Burns, K.A.**, Li, L., Wade, P.A., Korach, K.S. Diethylstilbestrol (DES)-stimulated hormonal toxicity is mediated by ER α alteration of target gene methylation patterns and epigenetic modifiers (*DNMT3A*, *MBD2* and *HDAC2*) in the mouse seminal vesicle. *Environmental Health Perspectives*. Mar; 122(3):262-8. 2014.
- Li, Y., **Burns, K.A.**, Korach, K.S., Estrogen receptor (ER)-mediated activation by endocrine disrupting chemicals (EDCs): A comparison between synthetic and natural compounds. Commentary for *Endocrine Disruptors*. Accepted 11/12/2013.
- Burns, K.A.**, Zorrilla, L.M., Hamilton, K.J., Reed, C.E., Birnbaum, L.S., Korach, K.S., A single gestational exposure to 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD) disrupts the adult uterine response to estradiol in mice. *Toxicological Sciences*. Dec; 136(2):514-26; 2013.
- Winuthayanon, W. Piyachaturawat, P., Suksamrarn, A. **Burns K.A.**, Arao, Y., Hewitt S.C., Pedersen L.C., Korach, K.S. The Natural Estrogenic Compound Diarylheptanoid (D3): *In Vitro* Mechanisms of Action and *in Vivo* Uterine Responses via Estrogen Receptor α . *Environmental Health Perspectives*. April, 121:433-439. 2013.
- Li, Y., Luh, C.J., **Burns, K.A.**, Arao, Y., Jiang, Z, Teng, C.T., Tice, R.R., Korach, K.S. Endocrine-Disrupting Chemicals (EDCs): *In Vitro* Mechanism of Estrogenic Activation and Differential Effects on ER Target Genes. *Environmental Health Perspectives*. April;121:459-466. 2013.
- Burns, K.A.**, Hewitt, S.C., Rodriguez, K.F., Janardhan K., Young, S.L., Korach, K.S. Establishment and proliferation of endometriosis-like lesions in estrogen receptor deficient mouse models is host and donor specific. *Endocrinology*. Aug; 153(8): 3960-71. 2012.
- Burns, K.A.** and Korach, K.S., Estrogen Receptors and Human Disease: An update. *Arch Toxicol*. Oct; 86(10): 1491-504. 2012.
- Li, Y., **Burns, K.A.**, Arao, Y., Korach, K.S. Differential estrogenic actions of endocrine-disrupting chemicals Bisphenol A, Bisphenol AF, and zearalenone through estrogen receptor alpha and beta in vitro. *Environ Health Perspect* July; 120(7): 1029-35. 2012.
- Burns, K.A.**, Li, Y, Arao, Y., Petrovich, R., Korach, K.S., Selective mutations in estrogen receptor alpha's d-domain alters nuclear translocation and non-ERE gene regulatory mechanisms: *Journal of Biological Chemistry* April; 8;286(14):12640-9. 2011.
- Rodriguez, K.F., Couse, J.F., Jayes, F.L., Hamilton, K.J., **Burns, K.A.**, Taniguchi, F., Korach, K.S., Insufficient luteinizing hormone-induced intracellular signaling disrupts ovulation in preovulatory follicles lacking estrogen receptor beta: *Endocrinology* June; 151(6):2826-34. 2010.
- Deroo, B.J., **Burns, K.A.**, Winuthayanon, W., and Korach, K.S., Potential effects for environmental xeno-oestrogens: Pollution and fertility. *The Biochemist* April; 31 (2): 22-26. 2009.
- Burns, K.A.**, Vanden Heuvel, J.P., Modulation of PPAR α activity via phosphorylation. *Biochim Biophys Acta*. Aug;1771(8):952-60. 2007.
- Gray, J.P., **Burns, K.A.**, Leas, T.L., and Vanden Heuvel, J.P., Regulation of Peroxisome Proliferator-Activated Receptor α by Protein Kinase C. *Biochemistry* 44 (30): 10313-10321. 2005.
- Vanden Heuvel, J.P., Kreder, D., Belda, B., Hannon, D.B., Nugent, C.A., **Burns, K.A.**, and Taylor, M.J. Comprehensive analysis of gene expression in rat and human hepatoma cells exposed to the

peroxisome proliferator Wy-14,643. *Toxicology and Applied Pharmacology* May 1; 188(3): 185-98. 2003.

Presentations

Oral/Invited

Invited speaker, "From Mycology to Medicine: Endocrine Disruptors and Endometriosis," Presentation given at The University of Illinois Urbana Champaign, Urbana Champaign, IL (2018)

Invited presentation, "The Early Initiation of Endometriosis is Predominately Mediated by the Innate Immune System," Presentation given at the 13th World Congress on Endometriosis, Vancouver, Canada (2017)

Invited speaker, "From Mycology to Medicine: Stepping Stones to Study Endometriosis", Presentation given as the Robert D. Barnes Lecture at Science Honors Day at Gettysburg College, Gettysburg, PA (2017)

Invited speaker, "Endometriosis and Environmental Endocrine Disrupting Chemical Exposure: Bisphenol AF potentiates the development of endometriosis in a mouse model", Presentation given as the Former NIEHS Trainee at NIEHS Science Days, NIEHS, Durham, NC (2016)

Invited speaker, "The immune system and hormones in the early initiation of endometriosis," Presentation given to The Department of Environmental Health, University of Cincinnati College of Medicine, and given to The Immunology Forum at Cincinnati Children's Hospital Medical Center, Cincinnati, OH (2015)

Invited speaker, "The role of estrogen receptor signaling in endometriosis," Presentation given to the Receptor Mechanisms Discussion Group, NIEHS, Durham, NC (2014)

Invited speaker, "The role of estrogen receptor signaling in endometriosis," Presentation given to the National Toxicology Program, Pathology Branch, Durham, NC (2013)

Invited speaker, "Mouse model of endometriosis," Presentation given to the National Toxicology Program and National Institute of Environmental Health Sciences, Reproductive Endocrinology Group, Durham, NC (2012)

Invited speaker, "Endometriosis-like lesion establishment and proliferation in estrogen receptor deficient mouse models is host and donor specific," Presentation given at East Carolina University, Brody School of Medicine, Greenville, NC (2011)

Invited presentation, Burns, K.A. "Establishment and proliferation of endometriotic-like lesions in immunocompetent estrogen receptor deficient mouse models is host and donor specific," Presentation given during NIEHS Summer Seminar Series, Durham, NC (2011)

Invited presentation, Burns, K.A., Li, Y., Petrovich, R., and Korach, S.K., "Selective mutations in the D-domain of mouse ER α alters nuclear translocation and ER α 's non-ERE gene regulatory mechanism," Presentation given at Keystone Symposia- Nuclear Receptors: Signaling, Gene Regulation and Cancer, Keystone, CO (2010)

Invited presentation, Burns, K.A., Li, Y., Petrovich, R., and Korach, S.K., "Selective mutations in the D-domain of mouse ER α alters nuclear translocation and ER α 's non-ERE gene regulatory mechanism," Fellow, NIEHS, Durham, NC (2010)

Invited speaker, "Convergence of two metabolic pathways: PPAR α is directly phosphorylated by GSK3," Bristol-Myers Squibb, NJ (2006)

Invited presentation, Burns, K.A. and Vanden Heuvel, J.P. Peroxisome Proliferator Activated Receptor α (PPAR α) is regulated and directly phosphorylated by Glycogen Synthase Kinase α/β (GSK3 α/β). Presentation given at the 44th Annual Meeting of the Society of Toxicology (2005)

Interviews/News Articles

Endofound Medical Conference, "Breast, Ovary and Endometriosis" Endometriosis Foundation of America. Lotte New York Palace Hotel. (2017)

<https://www.endofound.org/katherine-a-burns-phd-interview>

https://www.youtube.com/watch?v=lnx_LBA6QTU

<https://rucenters.com/inline/UCyLvBkPWroSFnN6dimFytJw>

"Endometriosis Foundation of America Awards \$200,000 to Research Projects," by Carolina Henriques in Endometriosis News (2017)

<https://endometriosisnews.com/2017/03/20/endometriosis-foundation-prioritizes-research-with-awards-to-leading-universities/>

<https://www.endonews.com/efa-medical-conference-2017-efa-research-grants-presentation-by-dr.-serin-seckin>

"Science Days fest showcases trainees and research across NIEHS", by Kelly Lenox in the National Institute of Environmental Health Sciences Environmental Factor (2016)

<https://factor.niehs.nih.gov/2016/12/science-highlights/sciencedays/index.htm>

"Talk explores link between endometriosis and the estrogen receptor", by Monica Frazier in the National Institute of Environmental Health Sciences Environmental Factor (2014)

<https://factor.niehs.nih.gov/2014/2/science-estrogenreceptor/index.htm>

Abstracts and Poster Presentations

Available upon request.