BIOMEDICAL ENGINEERING DEPARTMENT

Douglas A. Kniss, Ph.D.
Professor

Education

B.S., Biology and Psychology, Susquehanna University, 1980

Ph.D., Anatomy and Cell Biology, The Ohio State University, 1986

Postdoctoral Fellowship, National Institutes of Health, 1987

Work Experience

Professor, Department of Obstetrics & Gynecology, College of Medicine

Professor, Department of Biomedical Engineering, College of Engineering

Member, Integrated Biomedical Graduate Program, College of Medicine

Member, Molecular, Cellular and Developmental Biology Graduate Program

Member, Ohio State University Nutrition Graduate Program

Honors and Awards

President's Poster Award, Society for Gynecologic Investigation, 1991

Contact Information

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Professional Societies

- Society for Gynecologic Investigation
- American Society for Cell Biology
- Tissue Engineering Society International
- American Diabetes Association
- American Association for the Advancement of Science

- American Society for Microbiology
- International Federation of Placental Associations
- New York Academy of Sciences
- Perinatal Research Society

Research interests

Dr. Kniss is Director of the Laboratory of Perinatal Research within the Department of Obstetrics and Gynecology. Research interests in the lab include stem cell biology, tissue engineering, signal transduction and inflammation. Translational interests in the lab focus on understanding the role of inflammation and signaling pathways in the context of pregnancy complications and diabetes.

A second major focus of the lab involves studies into the influence of three-dimensional geometry within engineered tissue constructs on the differentiation of stem cell populations. In addition, collaborative studies are carried out with biomaterials engineers to evaluate the influence of surface nanotopography on cell adhesion, migration and differentiation. Research currently in progress in the lab focuses on understanding the molecular mechanisms that coordinate transcription factor function in the setting of inflammation.

In addition, studies are underway to examine the mechanisms by which stem cells interact with polymer surfaces for applications in tissue engineering.

Teaching

BME 694: "Fundamentals of Cell & Tissue Engineering"

Med I lecturer

Med II lecturer

Selected Publications

Ackerman WE IV, Robinson JM, Kniss DA. In situ immunolabeling allows for detailed localization of prostaglandin synthesizing enzymes in amnion epithelium, *Placenta* 2005; doi: 10.1016/j.placenta.2005.06.009

Xie Y, Kang X, Ackerman WE IV, Belury MA, Koster C, Rovin BH, Landon MB, and Kniss DA. Differentiation-dependent regulation of the cyclooxygenase cascade during adipogenesis suggests a complex role for prostaglandins, *Diabetes, Obesity, and Metabolism* 2005; 8(1): 83-90

Ackerman WE IV, Robinson JM, Kniss DA. Despite transcriptional and functional coordination, cyclooxygenase-2 and microsomal prostaglandin E synthase-1 largely reside in discrete lipid domains in WISH epithelial cells, *Journal of Histochemistry and Cytochemistry* 2005; 53(11): 1391-1401

Ackerman WE IV, Zhang XL, Rovin BH, and Kniss DA. Modulation of cytokine-induced cyclooxygenase 2 expression by PPARg ligands through NFkB signal disruption in human WISH and amnion cells, *Biology of Reproduction* 2005; 73(3): 527-35

Kang X, Xie Y, Kniss DA. Adipose tissue model using three-dimensional cultivation of preadipocytes seeded onto fibrous polymer scaffolds, *Tissue Engineering* 2005; 11: 458-468

Ackerman WE IV, Rovin BH, and Kniss DA. Epidermal growth factor and interleukin-1 utilize divergent signaling pathways to synergistically up-regulate cyclooxygenase-2 gene expression in human amnion-derived WISH cells, *Biology of Reproduction* 2004; 71:2079-86

Li Y, Kniss DA, Lasky LC, and Yang S-T. Culturing and differentiation of murine embryonic stem cells in a three-dimensional fibrous matrix. *Cytotechnology* 2003; 41: 23-35

Xie Y, Sproule T, Li Y, Powell H, Lannutti JJ, and Kniss DA. Nanoscale modifications of PET polymer surfaces via oxygen-plasma discharge yield minimal changes in attachment and growth of mammalian epithelial and mesenchymal cells in vitro. *Journal of Biomedical Materials Research* 2002; 61: 234-245

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