

The Institute of Maternal-Fetal Biology

A Research Institute of the University of Kansas
Healthy Mothers, Healthy Babies



Annual Report

April 1, 2004-March 31, 2005

OVERVIEW

Research Activities:

The Institute of Maternal-Fetal Biology (**IMFB**) consists of twelve research laboratories representing three Institutions and six different departments. The research activities of each laboratory within the IMFB are detailed in the preceding pages. To summarize, the group has been collectively responsible for approximately 65 research reports/book chapters, which were published during this past year or are in press. The Institute members currently maintain 17 NIH grants, 4 NIH supplements, and 2 private research grants and are co-investigators on an additional 17 NIH grants. Several of the publications and NIH grants represent cooperative efforts among members of the IMFB. Each member of our group is well-respected in the scientific community. As a whole, the membership presented approximately 35 invited talks outside the Kansas City area during this past year, including presentations at universities and national and international research meetings. During this past year the group has been involved in training 25 postdoctoral fellows, 22 graduate students, and 5 summer students. An additional 35 individuals comprise the research staff for the IMFB research laboratories.

IMFB Recruitment:

Over the past year, two new investigators have been added to the IMFB.

Dr. Jay L. Vivian, Assistant Professor of Pathology & Laboratory Medicine. Dr. Vivian represents the first of three recruitments for the IMFB. He started in August after completing postdoctoral training in the Department of Genetics at the University of North Carolina. Dr. Vivian utilizes chemical mutagenesis strategies in mouse model systems to investigate embryonic vascular development.

Dr. T. Rajendra Kumar, Assistant Professor of Molecular & Integrative Physiology and Pathology & Laboratory Medicine. Dr. Kumar relocated from Baylor College of Medicine in September. He utilizes mutant mouse models to investigate diseases of reproduction and development.

Ongoing recruitment effort:

A second recruitment effort has been underway since early fall of 2004. An offer letter has been sent to **Dr. Lori Raetzman**, Department of Human Genetics, University of Michigan. Dr. Raetzman investigates the genetic mechanisms controlling pituitary development. The recruitment is complicated in that her spouse is also in academic medicine. **Dr. Richard Barohn**, Chair of Neurology, has been outstanding in his efforts to create a position for Dr. Raetzman's husband, **Dr. Charles Davies**. The offer letter for Dr. Davies was sent to him on April 15th. We anticipate a decision within the next two weeks.

Based on the activities of the past two years, we also anticipate internal applications to join our group from investigators at the University of Kansas Medical Center, the University of Kansas-Lawrence, Children's Mercy Hospital, and/or Stowers Medical Research Institute.

Other IMFB Efforts:

Facilitating the preparation of multi-investigator grant applications:

The IMFB contributed to the development of three multi-investigator NIH grant applications during the past year. The first was an “*Exploratory Center Grant for Human Embryonic Stem Cells*” led by **Dr. Kenneth Peterson**, Professor and Vice Chair of the Department of Biochemistry & Molecular Biology and member of the IMFB. The effort also involved four laboratories from the IMFB and included investigators from the Kidney Institute, the Center for Reproductive Sciences, the Stowers Medical Research Institute, and the University of Kansas-Lawrence. The second was an effort led by **Dr. Joan S. Hunt**, Vice Chancellor for Research and member of the IMFB. This represented a grant application to the NCCR/NIH for renovating space for the IMFB. We assisted Dr. Hunt and her staff in the preparation of the grant application. The third was a faculty development grant in women’s health research led by **Dr. Patricia Thomas**, Chair of Pathology & Laboratory Medicine and Dr. Michael J. Soares of the Pathology & Laboratory Medicine and Director of the IMFB. The grant represented a cooperative effort of faculty within the Schools of Medicine, Pharmacy, Allied Health, and Nursing. Preparation of the application benefited from the generous advice and assistance provided by **Dr. Jasjit Ahluwalia**, Chair of the Department of Preventive Medicine.

“Cancer & Developmental Biology Seminar Series”

We have initiated a new seminar series that represents a cooperative effort of the IMFB, the Department of Pathology & Laboratory Medicine, and the Kansas Masonic Cancer Research Institute. The seminar series provides a forum for investigators associated with each of these groups to meet and listen to outstanding scientists discuss research in the fields of cancer and developmental biology. The seminars are held at 8:30 am on Thursdays and have averaged 50 attendees from across basic science and clinical departments and the Stowers Medical Research Institute.

“Annual Greenwald Symposium in Reproductive Biology”

An annual symposium in reproductive biology was established to honor **Dr. Gilbert S. Greenwald**. Dr. Greenwald was a leader in the study of reproduction and was responsible for the development of the reproductive biology group at the University of Kansas Medical Center. The IMFB worked together with the Center for Reproductive Sciences in organizing this important activity.

“Kansas City Area Stem Cell Club”

The IMFB participated in the organization of a group of scientists from the University of Kansas Medical Center, University of Kansas-Lawrence, and the Stowers Medical Research Institute pursuing stem cell research. The Stem Cell Club was an outgrowth of **Dr. Kenneth Peterson’s** activities in organizing the “*Exploratory Center Grant for Human Embryonic Stem Cells*” and was facilitated by **Dr. Roy Jensen**, Director of the Kansas Masonic Cancer Research Institute. During the past year, four meetings have been held. They included an inaugural symposium at the Stowers Medical Research Institute and evening research workshop/discussion sessions held at the University of Kansas Medical Center, Stowers Medical Research Institute, and the University of Kansas-Lawrence. The events were well attended by investigators from each of the participating institutions.

IMFB Plans and New Initiatives for Fiscal Year 2006:

We will continue our ongoing efforts with the “*Cancer & Developmental Biology Seminar Series*”, “*Annual Greenwald Symposium in Reproductive Biology*”, “*Kansas City Area Stem Cell Club*”, and facilitating multi-investigator grant applications.

“Faculty Recruitment Efforts”

Our joint recruitment efforts with the Department of Pathology & Laboratory Medicine will continue. We will actively recruit an individual that complements existing research efforts within the IMFB and the Division of Cancer & Developmental Biology within the Department of Pathology & Laboratory Medicine.

“Maternal-Fetal Biology Seminars”

The IMFB is in discussions with **Dr. Chet Johnson**, Chair of Pediatrics, regarding the development of a cooperative seminar program. Two members of the IMFB, **Dr. Margaret Petroff**, Assistant Professor of Anatomy & Cell Biology and **Dr. Michael W. Wolfe**, Associate Professor of Molecular & Integrative Physiology, will lead the effort.

“Training Grant in Developmental Biology”

The IMFB membership has expressed interest in pursuing an NIH training grant focused on developmental biology. During the next year, we will explore the feasibility of such an effort and enter in discussions with other groups interested in developmental biology, including the Center for Reproductive Sciences, the Mental Retardation Research Center, the Kidney Institute, and the Stowers Medical Research Institute.

“Monthly IMFB Research Discussion Sessions”

We will explore organizing monthly meetings of IMFB principal investigators to informally discuss research efforts. It is hoped that such efforts will improve the overall research effort of the membership and hopefully enhance interest in multi-investigator efforts.

IMFB RESEARCHERS

The current research group consists of twelve laboratories directed by faculty from the University of Kansas School of Medicine in Kansas City, Kansas, The University of Kansas School of Pharmacy in Lawrence, Kansas, and Children's Mercy Hospitals and Clinics in Kansas City, Missouri.



Glen K. Andrews, Ph.D.
Professor, Biochemistry & Molecular Biology, Univ. of Kansas School of Medicine. *Zinc homeostasis during pregnancy.*



Kenneth R. Peterson, Ph.D.
Professor and Vice Chair, Biochemistry & Molecular Biology, Univ. of Kansas School of Medicine. *Gene regulation in developing red blood cells.*



Kenneth L. Audus, Ph.D.
Dean, School of Pharmacy, Univ. of Kansas. *Drug transport across the placental barrier.*



Margaret G. Petroff, Ph.D.
Assistant Professor, Anatomy and Cell Biology, Univ. of Kansas School of Medicine. *Immunology of placental cells.*



Alan R. Godwin, Ph.D.
Assistant Professor, Molecular & Integrative Physiology, Univ. of Kansas School of Medicine. *Genetic control of morphogenesis.*



Michael J. Soares, Ph.D.
Director, Institute of Maternal-Fetal Biology, Professor, Pathology and Laboratory Medicine, Univ. of Kansas School of Medicine. *Molecular endocrinology of pregnancy.*



Leslie L. Heckert, Ph.D.
Assistant Professor Molecular & Integrative Physiology, Univ. of Kansas School of Medicine. *Gene regulation in the developing reproductive system.*



William E. Truog, M.D.
Sosland Family Endowed Chair in Neonatal Research, Children's Mercy Hospital, Univ. of Missouri-Kansas City School of Medicine. *Pulmonary developmental biology and mechanisms of lung injury.*



Joan S. Hunt, Ph.D.
Senior Associate Dean for Research and Graduate Education, University Distinguished Professor of Anatomy & Cell Biology, Univ. of Kansas School of Medicine. *Immunology of pregnancy.*



Jay L. Vivian, Ph.D.
Assistant Professor, Pathology & Laboratory Medicine, Univ. of Kansas School of Medicine. *Genetics of embryonic signaling.*



T. Rajendra Kumar, Ph.D.
Assistant Professor, Molecular & Integrative Physiology, Univ. of Kansas School of Medicine. *Developmental genetics of the pituitary-gonadal axis.*



Michael W. Wolfe, Ph.D.
Associate Professor, Molecular and Integrative Physiology, Univ. of Kansas School of Medicine. *Gene regulation in the pituitary and placenta.*

IMFB
Sponsored Seminars
(April 1, 2004 through March 31, 2005)

“Fetal heart growth: implications for adult survival”, Kent Thornburg, Ph.D., The Heart Research Center, Oregon Health & Science University, Portland, May 17, 2004

“Regulation of placental morphogenesis”, James C. Cross, Ph.D., Department of Biochemistry & Molecular Biology, Genes & Development Research Group, University of Calgary Faculty of Medicine, Calgary, Alberta, Canada, October 1, 2004 (*presented at the First Annual Gilbert Greenwald Symposium on Reproduction*)

“Pituitary gland development... kicking it up a notch”, Lori Raetzman, Ph.D., Department of Human Genetics, University of Michigan, October 4, 2004

“Mechanisms of Mammalian Zinc Homeostasis”, Glen Andrews, Ph.D., Department of Biochemistry and Molecular Biology, KUMC, January 20, 2005

“In vivo mapping of SF-1 functional domains”, Leslie Heckert, Ph.D., Department of Molecular and Integrative Physiology, KUMC, January 27, 2005

“Cellular and molecular regulation of hematopoietic and intestinal stem cells”, Linheng Li, Ph.D., Stowers Institute for Medical Research, February 3, 2005

“Epigenetic control of T-cell differentiation”, Patrick E. Fields, Ph.D., Immunobiology Section, Yale University School of Medicine, February 24, 2005

“Regulation of cell growth and cell size by the TSC-mTOR pathway”, Kun-Liang Guan, Ph.D., Department of Biological Chemistry, University of Michigan, March 3, 2005

“Stem Cells in the male germline”, Kyle Orwig, Ph.D., Department of Obstetrics and Gynecology and Reproductive Sciences, Department of Molecular Genetics and Biochemistry, Magee-Womens Research Institute, University of Pittsburgh, March 14, 2005

“Exploring the nuclear functions of the tumor suppressor APC”, Kristi Neufeld, Ph.D., Department of Molecular Biosciences, KU-Lawrence, March 31, 2005

IMFB Annual Report

(April 1, 2004 through March 31, 2005)

Glen K. Andrews, Ph.D.

Professor

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1. Research Interests

Our laboratory is interested in understanding the molecular mechanisms that regulate zinc homeostasis. Zinc is an essential metal required for the activity of hundreds of enzymes and transcription factors. A dietary deficiency of zinc causes a multitude of detrimental effects during pregnancy including malformation of the embryo, growth retardation and loss of pregnancy. Thus, understanding how zinc is taken into the embryonic environment and maintained there is of central importance. Zinc homeostasis is controlled by uptake, storage and excretion of this metal. One area of our research focuses on the transcription factor MTF-1. MTF-1 functions as a zinc-sensing transcription factor that regulates the expression of metallothionein and ZnT1 zinc transporter genes. These genes modulate the internal stores of zinc in the cell. We are interested in structure-function relationships in this essential protein. A second area of active research in our laboratory focuses on genes that encode zinc transporters in the ZIP superfamily. We are identifying and cloning mouse and human ZIP genes and then analyzing their structure, function and expression patterns in pregnant mice and embryos. We are also creating mice in which specific ZIP genes have been knocked out. These knockout mice are being examined to determine the physiological functions of these ZIP genes in zinc homeostasis during pregnancy.

2. Publications (4/1/04-3/31/05)

a. Published

Andrews, G.K., Wang, H., Dey, S.K. and Palmiter, R.D. (2004) The mouse zinc transporter 1 gene provides an essential function during early embryonic development. *Genesis*, 40: 74-81.

Dufner-Beattie, J., Kuo, Y.-M., Gitschier, J. and **Andrews, G.K.** (2004) The adaptive response to dietary zinc in mice involves the differential cellular localization and zinc-regulation of the zinc transporters ZIP4 and ZIP5. *J. Biol. Chem.* 279: 49082-49090.

Jiang, H. and **Andrews, G.K.** (2004) Gene-Specific and Cell Type-Specific Effects of Signal Transduction Cascades on Metal-Regulated Gene Transcription Appear to Be Independent of Changes in the Phosphorylation of Metal Response Element-Binding Transcription Factor-1. *Biochem J.* 382: 33-41.

b. In press

Potter, B.M., Feng, L., Matskevich, V., Knudsen, N., **Andrews, G.K.** and Laity, J.H., Letter to the editor: ^1H , ^{13}C and ^{15}N resonance assignments for the six-zinc finger domain of MTF-1 metalloregulatory protein in the free and DNA bound states. *J. Biomolecular NMR.* (In press)

Potter, B.M., Feng, L., Matskevich, V.A., Wilson, J.A., **Andrews, G.K.** and Laity, J.H., The six zinc fingers of metal-response element-binding transcription factor-1 form stable and highly ordered structures with relatively small differences in zinc affinities. *J. Biol. Chem.* (Submitted)

Dufner-Beattie, J., Huang, J.L., Geiser, J., Xu, W., and Andrews, G.K. Generation and Characterization of Mice Lacking the Zinc Uptake Transporter ZIP3. *Mol Cell Biol* (In press)

3. Grant Support (active funding 4/1/04-3/31/05)

National Institutes of Health, "Environmental Toxicology using Transgenic Models", R01 ES 05704, Principal Investigator, **Glen K. Andrews**, \$250,000 (direct costs, \$344,000 (total costs), Total duration of the award: August 8, 2002 through July 31, 2006.

National Institutes of Health, "Molecular Biology of Mammalian Zinc Homeostasis", R01 DK 050181, Principal Investigator, **Glen K. Andrews**, \$192,188 (direct costs, \$266,407 total costs), Total duration of the award: April 15, 2002 through November 30, 2007.

National Institutes of Health, "A Mouse Model of Acrodermatitis Enteropathica", R01 DK 063975, Principal Investigator, **Glen K. Andrews**, \$200,000 (direct costs, \$274,248 (total costs), Total duration of the award: April 1, 2003 through January 31, 2008.

4. Meetings attended (4/1/04-3/31/05)

FASEB Summer Research Conference: Trace Element Metabolism: Integrating Basic and Applied Research, Mechanisms of Mammalian Zinc Homeostasis, June 26, 2004, Snowmass Village, Colorado

5. Editorial Board Service, Committees, Consulting, etc. (National, Regional) (4/1/04-3/31/05)

Departmental Committees:

Graduate Committee, University of Kansas Medical Center, 1999 to date (Director)
Equipment Committee, University of Kansas Medical Center, 2003 to date (Chair)
Faculty Search Committee (Gene Regulation), University of Kansas Medical Center, 2004-2005 (Member)

School of Medicine Committees:

Advisory Board and Admission Committee for the Interdisciplinary Program in Biomedical Science, 1997 to date (Member)
Oversight Committee for Transgenic and Gene Targeting Facility, 1996 to date (Member)
Oversight Committee for Microarray Facility, 2003 (Member)

Consulting:

Swiss Science Foundation, 2002, 2003 (Ad Hoc Reviewer)
MRC Canada, 2003 (Ad Hoc Reviewer)

6. Seminars presented (4/1/04-3/31/05)

Mechanisms of Mammalian Zinc Homeostasis, June 29, 2004. FASEB Summer Research Conference; Trace Element Metabolism: Integrating Basic and Applied Research, Snowmass, CO
Molecular Biology of Mammalian Zinc Homeostasis, January 20, 2005. KUMC, Institute for Fetal Maternal Biology.

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Students:

Huimin Jiang, Ph.D. (received April 2004)
Benjamin Weaver (May 2004 to present)

Post-doctoral Fellows:

Jodi Dufner-Beattie, Ph.D. (March 2001 to present)
Jason Huang, Ph.D. (June 2003 to present)
Yong Li, Ph.D. (April 2004 to present)

Rachel Russi, Ph.D. (June 2004 to present)

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Jim Geiser, B.S., research technician (July 1994 to present)

Gary Lin, M.S., research technician (February 2002 to November 2004)

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Kenneth L. Audus, Ph.D.

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1. Research Interests

Our laboratory is interested in molecular mechanisms controlling placental transport and metabolism; specifically, drugs of abuse, disease and environmental factors and their interactions with mechanisms that regulate the distribution of drugs and drugs of abuse across the maternal-fetal interface; including peptide carriers, organic anion and cation transporters, multidrug resistance efflux mechanisms, and phase I and II enzymes in the trophoblast.

2. Publications (4/1/04-3/31/05)

a. Published

Thadani, P.V., Strauss, J.E. III, Dey, S.K., Anderson, V.M., **Audus, K.L.**, Coats, K.S., Cross, J.C., Erlebacher, A., Ganapathy, V., Linzer, D.I., Miller, R.K., Novak, D.A., Rapaka, R.S., Sadovsky, Y., Salafia, C.M., Soares, M., and Unadkat, J. (2004) National Institute on Drug Abuse Conference report on placental proteins, drug transport, and fetal development. *Am. J. Ob. Gyn.* 191, 1858-1862.

Michaelis, M.L., Ansar, S., Chen, Y., Reiff, E.R., Seyb, K.I., Himes, R.H., **Audus, K.L.**, and Georg, G.I. (2005) β -Amyloid-induced neurodegeneration and protection by structurally diverse microtubule-stabilizing drugs. *J. Pharmacol. Exp. Ther.* 312, 659-668.

Rytting, E. and **Audus, K.L.** (2005) OCTN2-Mediated carnitine uptake in placental choriocarcinoma (BeWo) cells. *J. Pharmacol. Exp. Ther.* 312, 192-198.

Karunaratne, D.N., Silverstein, P.S., Vasandani, V., Young, A.M., Rytting, E., Yops, B., and **Audus, K.L.** (2005) Cell culture models for drug transport studies, in *Drug Delivery: Principles and Applications* (Wang, B., Siahaan, T.J., and Soltero, R.A, Eds.), pp. 103-125, John Wiley & Sons, Inc., New York.

Rice, A., Liu, Y., Michaelis, M.L., Himes, R.H., Georg, G., and **Audus, K.L.** (2005) Chemical modification of paclitaxel (taxol) reduces P-glycoprotein interactions and increases permeation across the blood-brain barrier *in vitro* and *in vivo*. *J. Med. Chem.* 48, 832-838.

b. In press

Jin, H. and **Audus, K.L.** (2005) Effect of bisphenol A on drug efflux in BeWo, a human trophoblast-like cell line. *Placenta*, in press.

Bode, C., Jin, H., Rytting, E., Silverstein, P., Young, A.M., and **Audus, K.L.** (2005) *In vitro* models for studying trophoblast transcellular transport, in *Placenta and Trophoblast: Protocols and Methods*, Volume II (Soares, M.J. and Hunt, J.S., Eds.), in press, Humana Press, New York.

Audus, K.L., Hidalgo, I.J., and Borchardt, R.T. (2004) Intestinal epithelial and vascular endothelial barriers to peptide and protein delivery, in *Peptide and Protein Drug Delivery* (V. Lee, Ed.), in press, Marcel Dekker, New York.

c. Abstracts

Audus, K.L., Rice, A., Liu, Y., Michaelis, M.L., Himes, R.H., and Georg, G. (August 22, 2004) Chemical approaches to overcoming multidrug resistance at the blood-brain barrier, Medicinal Chemistry Division Symposium on Transporters in Drug Delivery, American Chemical Society National Meeting, Philadelphia, Pennsylvania

Audus, K.L. (September 27, 2004) Xenobiotic regulation of nutrient and multidrug resistance transporters at the maternal:fetal interface, Placenta Association of Americas Conference (PAA2004), Asilomar, California

Chappa, A.K., Audus, K.L., and Lunte, S.M. (2004) Characterization of uptake and transport of Substance P across blood-brain barrier. *Pharm. Sci.*, in press.

Rytting, E., Bryan, J., Southard, M., and Audus, K.L. (2004) Uptake of fluorescent substrate 4-Di-1-ASP in BeWo cells is not mediated by an identified organic cation transporter. *Pharm. Sci.*, in press.

Jin, H. and Audus, K.L. (2004) Influence of estrogen on drug efflux in BeWo human trophoblast cell lines. *Pharm. Sci.*, in press.

3. Grant Support (active funding 4/1/04-3/31/05)

National Institutes of Health, "Trophoblast MDR Efflux System and Fetal Protection", 1 P01 HD39878-01A1, Principal Investigator (Subproject II), **Kenneth L. Audus**, \$141,000 (direct costs/year), Total duration of the award: May 1, 2002 through April 30, 2007.

National Institutes of Health, “Trophoblast MDR Efflux System and Fetal Protection”, 1 P01 HD39878-03S1, Principal Investigator (Subproject II supplement), **Kenneth L. Audus**, \$65,000 (direct costs/year), Total duration of the award: February 4, 2004 through March 31, 2007.

National Institutes of Health, “Modulation of the intercellular junction cadherins”, 5 RO1-eb00226-04, Principal Investigator, T. J. Siahaan, \$159,376 (direct costs/year), Total duration of the award: July 1, 2002 through June 30, 2005.

National Institutes of Health, “Analytical Methods for Investigating Peptide Transport”, 1 R01 NS42929-01, Principal Investigator, S. Lunte, \$94,589, Total duration of the award: March 18, 2002 through January 31, 2007.

4. Meetings attended (4/1/04-3/31/05)

Globalization of Pharmaceuticals Education Network Meeting, May 28, 2004, Kyoto, Japan

Medicinal Chemistry Division Symposium on Transporters in Drug Delivery, American Chemical Society National Meeting, August 22, 2004, Philadelphia, Pennsylvania

Placenta Association of Americas Conference (PAA2004), September 2004, Asilomar, California

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

Service:

The Kansas Pharmacists Association, 2004-present (Member Board of Trustees)

National or International Committees:

Globalization of Pharmaceuticals Education Network Inc., 1996-present (Board of Directors)

Globalization of Pharmaceuticals Education Network Inc., 1996-present (Executive Committee)

American Association for the Advancement of Science, 2002-2005 (Council Delegate for the Section on Pharmaceutical Sciences)

International Scientific Committee, Placenta Association of the Americas and International Federation Placenta Association Meeting, 2004-present (Member)

Pharmaceutical Chemistry Conferences Inc., 2002-present (Board of Directors)

Dissertation Committees:

Committee Member, Nathan Lacher, Ph.D., Pharmaceutical Chemistry, 2004

Committee Member, Stephanie Pasas, Ph.D., Pharmaceutical Chemistry, 2004

Committee Member, Cindy Yang, Ph.D., Pharmaceutical Chemistry, 2004

Committee Member, Bianca Liederer, Ph.D., Pharmaceutical Chemistry, 2005

Departmental Committees:

Center for Research, Inc., The University of Kansas, 2005-present (Member Board of Trustees)

Kansas Economic Growth Act Committee at the University of Kansas, 2004-present (Member)

Consulting:

Scientific Advisory Board, Genzyme Pharmaceuticals, Cambridge, Massachusetts, 2001-present (Member)

Editorial Advisory Boards Service:

Current Pharmaceutical Design, 2003-present (Member)

International Journal of Pharmaceutics, 1999-present (Member)

Journal of Pharmaceutical Sciences, 1997-present (Member)

6. Seminars presented (4/1/04-3/31/05)

“Drug Transport at the Blood-Brain Barrier,” Wyeth Pharmaceuticals Division, Princeton, New Jersey, April 22, 2004

“Issues in Controlling Delivery across the Placenta,” Globalization of Pharmaceutics Education Network Meeting, Kyoto, Japan, May 28, 2004

“Chemical Approaches to Overcoming Multidrug Resistance at the Blood-Brain Barrier,” Medicinal Chemistry Division Symposium on Transporters in Drug Delivery, American Chemical Society National Meeting, Philadelphia, Pennsylvania, August 22, 2004

“In Vitro Studies Using Cell Cultures,” Workshop on Methods to Study Placental Transport of Xenobiotics, Placenta Association of Americas Conference (PAA2004), Asilomar, California, September 26, 2004

“Xenobiotic Regulation of Nutrient and Multidrug Resistance Transporters at the Maternal:Fetal Interface,” Placenta Association of Americas Conference (PAA2004), Asilomar, California, September 27, 2004

“Xenobiotic Regulation of Nutrient and Multidrug Resistance Transporters at the Maternal:Fetal Interface,” School of Pharmacy, Virginia Commonwealth University, Richmond, VA, March 22, 2005

7. Honors (4/1/04-3/31/05)

2004 Inducted into the National Pharmacy Leadership Society, Phi Lambda Sigma

8. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Students:

Kelly Desino (2004-present)
Pallabi Mitra (2004-present)
Erik Rytting (2001-present)
Amber Young (1999-present)

Postdoctoral Fellows:

Claudia Bode (2003-2004)
Hong Jin (2003-2004)
Peter Silverstein (2000-2004)
Veena Vasandani (2002-2004)

Visiting Scientists:

Rasmus Engelbrecht (2004)

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Alan R. Godwin, Ph.D.

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1. Research Interests

Hox genes are evolutionarily conserved transcription factors that are important in determining changes along the major anterior-posterior axis in animals as diverse as nematodes, fruit flies, and man. Little is understood about how these genes carry out this process, especially which genes are regulated by these transcription factors. We are carrying out a detailed examination of one of these genes to determine the genes it regulates, the amino acid residues important for cofactor interaction and changes of the use of these genes in mice and zebrafish. In addition, we are examining the roles of these genes in tissue regeneration in zebrafish.

2. Publications (4/1/04-3/31/05)

R. Thummel, Li, L., Tanase, C., Sarras, Jr., M. P., and **Godwin, A. R.** (2004) Differences in Expression Pattern and Function between Zebrafish *hoxc13* Orthologs: Recruitment of Hoxc13b into an Early Embryonic Role. *Developmental Biology* 274 (2): 318-333.

3. Grant Support (active funding 4/1/04-3/31/05)

NIH/NIAMS, "Hoxc13 and Hair Follicle Morphogenesis", Principal Investigator, **Alan R. Godwin**, \$188,000 (direct costs) and \$94,000 (indirect costs), Total duration of the award: August 1, 2000 through July 31, 2005.

NIH/NHLB, "Locus-linked Regulator Motifs of Globin Gene Switching", Co-investigator (5% effort), **Alan R. Godwin**, \$337,500 (direct and indirect costs), Total duration of the award: June 15, 2001 through May 30, 2005.

NIH/NICHD, "Biology at the Maternal-Fetal Interface", Co-Investigator (5% effort), **Alan R. Godwin**, \$1,108,000 (direct and indirect costs), Total duration of the award: April 1, 2002 through March 31, 2006.

NIH/NIDDK, “Receptor/Ligand Signals for Kidney Vascular Development”, Co-Investigator (5% effort), **Alan R. Godwin**, \$317,250 (direct and indirect costs), Total duration of the award: January 1, 2004 through January 31, 2009.

4. Meetings attended (4/1/04-3/31/05)

The Evolution of Developmental Diversity, Cold Spring Harbor Laboratory, March 31- April 4, 2004, Cold Spring Harbor, New York.

44th Annual Midwest Developmental Biology Meeting and The Singer Symposium, Stowers Institute for Medical Research, June 5-8, 2004, Kansas City, Missouri. (Organizing Committee Member)

6th International Conference on Zebrafish Development and Genetics, July 29-August 2, 2004, University of Madison-Wisconsin, Wisconsin.

5. Editorial Board Service, Committees, Consulting, etc (dates)

Dissertation Committees:

Graduate Committee for Ryan Thummel, June 2004, Graduated with Honors, (Mentor)

Graduate Committee for Susanna Harju, Biochemistry Ph.D. candidate (Member)

Departmental Committees:

Graduate Student Advisory Committee, (Member)

Departmental Website Committee, (Chair)

Graduate Committee - Brian Hermann, (Member)

Graduate Committee - Ning Lei (Member)

Medical School Committees:

Transgenic Facility Steering Committee (Member)

Biotechnology Support Facility Steering Committee (Member)

LAR Advisory Committee (Member)

School of Medicine Research Committee (Member)

Graduate Committee for Daniel Kirilly, Anatomy Ph.D. candidate (Member)

Graduate Committee for Shuyi Chen, Anatomy Ph.D. candidate (Member)

Consulting:

Developmental Biology (Ad hoc reviewer)

Editorial Board, *Developmental Dynamics*, 2003-2005, (Member)

Genesis (Ad hoc reviewer)

Journal of Investigative Dermatology (Ad hoc reviewer)

6. Seminars presented (4/1/04-3/31/05)

“One fish, two fish, red fish, green fish: Adventures in *Hox* gene function and reverse genetics in zebrafish”, Department of Pharmacology, Toxicology, and Therapeutics, University of Kansas Medical Center, Kansas, March 16, 2004

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Students:

Ryan Thummel (1999-2004)

Peizhen Song (January-July 2004)

Summer Students:

William Chatfield-Taylor (Summer 2004) (High School)

Nelson Stauffer (Summer 2004) (High School)

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Jeffrey Brewer, Technician

Jeff McDermott, Technician

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Leslie L. Heckert, Ph.D.

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1. Research Interests

One of the most exciting and intriguing problems in biology is the mystery of how and why cells differentiate. All cells start out with the same genetic information, but during embryonic development they "differentiate" into brain cells, muscle cells, cells of different organs, and all of the eventual tissues of the human body. Each of these types of cells has distinguishing characteristics that are determined by the composite of active genes in that cell. The Heckert laboratory is studying the molecular and cellular mechanisms that regulate the differentiation and development of cells involved in sexual development and reproduction. Currently we are investigating the molecular events involved in activating and regulating genes important for the development and function of the reproductive organs. Of particular interest are the genes responsible for the production of doublesex and mab-3 related transcription factor 1, an evolutionarily conserved protein that is required for testis differentiation, and steroidogenic factor 1, a protein that is required for the formation of adrenal glands and gonads. These proteins, and consequently the genes that are responsible for their production, are critical for proper fetal development and gonad function.

Research in the Heckert laboratory is designed to help solve the mystery surrounding the events important to the production of these proteins and their roles in sex determination. In humans, sex is determined by the presence or absence of the Y chromosome. Individuals with a Y chromosome develop testes, while individuals that lack a Y chromosome develop ovaries. Occasionally the chromosomal makeup of an individual does not correspond to their sex, revealing that a mutation has occurred in a gene critical to either testis or ovarian development. The genes we are studying are implicated in XY sex reversal. Their studies seek to understand how these genes are responsible for this abnormality and will provide a greater understanding of the processes directing cell-specific gene expression, gonad development, and sex determination.

2. Publications (4/1/04-3/31/05)

a. Published

Heckert L. and Hermann B. (2004) “Transcriptional regulation of the FSH receptor in testes” in *Proceedings of the 12th International Congress of Endocrinology*. pp 161-167

Lei N and **Heckert, L.L.** (2004) “GATA4 regulates testis expression of the doublesex and mab-3 related transcription factor Dmrt1” *Molecular and Cellular Biology* 24: 377-388. This journal has an impact factor of 8.84.

b. In press

Hermann, B.P. and **Heckert, L.L.** (2004) Silencing of *Fshr* occurs through a conserved, hypersensitive site in the first intron. In revision for acceptance to *Molecular Endocrinology*

Karpova, T., Presley, J., Scherrer, S.P., Tajeda, L., Peterson, K.R., and **Heckert, L.L.** “A 500 kb *Ftz-F1*-containing yeast artificial chromosome recapitulates expression of steroidogenic factor 1 *in vivo*” In revision for acceptance to *Molecular Endocrinology*.

c. Books, book chapters, reports

Heckert, L.L. (2004) “Structure & Regulation of the FSH Receptor Gene” In: *The Sertoli Cell* (M.D Griswold and M.K. Skinner eds.) Elsevier Academic Press, San Diego pp. 281-299

3. Grant Support (active funding 4/1/04-3/31/05)

National Institutes of Health/ NICHD, “Regulation of SF-1 expression in the gonads”, U54 HD33994, Principal Investigator of Project 1, Leslie L. Heckert, \$160,255/year (direct costs), Total duration of the award: April 2001 through March 2006.

NASA, “Long-term Simulated Microgravity Inhibits Spermatogenesis in Adult Male Rats”, NNA04CC17G, Principal Investigator, Joseph Tash, \$144,904/year (direct costs), Total duration of the award: July 1, 2001 through June 30, 2004.

National Institutes of Health/ NICHD, “Hormonal and cell-specific regulation of Dmrt1”, R01 HD41056, Principal Investigator, Leslie L. Heckert, \$202,500/year (direct costs), Total duration of the award: August 1, 2002 through July 31, 2007.

KUMC Research Institute, “Transcriptional regulation of the FSH receptor” G1810240, Principal Investigator, Leslie L. Heckert, \$25,000/year (direct costs), Total duration of the award: May 25, 2004 through May 24, 2005.

NASA, “Negative Impacts of Altered Gravity on Male Mammalian Reproductive Capacity”, NNA04CC54A, Principle Investigator, **Joseph Tash**, \$223,586/year (direct costs), Total duration of the award: March 1, 2004 through February 28, 2007.

4. Meetings attended (4/1/04-3/31/05)

The 29th Annual Meeting of the American Society of Andrology, April 17-20, 2004, Baltimore, Maryland

NIH SCCPRR Male Focus Group, April 17, 2004, Baltimore, Maryland

The 37th Annual meeting of the Society for the Study of Reproduction, August 1-4, 2004, Vancouver, British Columbia

86th Annual Meeting of the Endocrine Society, June 16-19, 2004, New Orleans, Louisiana

The 37th Annual meeting of the Society for the Study of Reproduction, August 1-4, 2004 Vancouver, British Columbia

XVIII North American Testis Workshop, March 30-April 2, 2005, Seattle, Washington

5. Editorial Board Service, Committees, Consulting, etc. (National, Regional) (4/1/04-3/31/05)

Extramural:

Molecular Endocrinology (Member)

J. of Andrology (Member)

Biology of Reproduction (Ad Hoc Reviewer)

Endocrinology (Ad Hoc Reviewer)

Developmental Biology (Ad Hoc Reviewer)

NIH F06 Fellowship Study Section, 2004 (Member)

The Society for the Study of Reproduction Organization Committee, 2004 (Member)

NIH SCCPRR Male Focus Group Annual Meeting, 2004 and 2005 (Co-Leader)

Intramural:

DNA sequencing core, Center for Reproductive Sciences, September 2000-present (Director)

Student Travel Committee, School of Graduate Studies January 2004-present (Member)

Transgenic Advisory Committee, July 2004-present (Chair)

Anatomy Chair Review Committee, April 2004-December 2004 (Member)

6. Seminars presented (4/1/04-3/31/05)

“Incomplete rescue of SF-1-null mice reveals gender differences in transcriptional control of the Ftz-f1 locus”, Department of Cell Biology and Physiology, University of Pittsburg, Pittsburg, Pennsylvania, January 14, 2004

“Regulatory regions of the *Ftz-F1* locus revealed by YAC transgenesis” Northwestern University, Evanston, Illinois, February 2, 2004

"Transcriptional regulation of the Fsh receptor; insights from comparative genomics" CIIT Centers for Health Research, Research Triangle Park, North Carolina, August 20, 2004

"Transcriptional regulation of the FSH receptor in testes" 12th International Congress of Endocrinology, Lisbon, Portugal, September 4, 2004

7. Honors (4/1/04-3/31/05)

- 2004 Invited speaker for the 12th International Congress of Endocrinology, Lisbon, Portugal (August 31-September 4)
- 2005 Invited speaker for the XVIII North American Testis Workshop (March 30-April 2)
- 2005 Invited speaker for the International Conference on Gonadotropins and Receptors (April 13-April 17)
- 2005 Invited Lecturer/Instructor for the Frontiers in Reproduction Course, Woods Hole Maryland (May 23-May 27)

8. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Students:

Brian Hermann, B.S. (2000-present)

Ning Lei, B.S. (2000-present)

Postdoctoral Fellows:

Tatiana Karpova, Ph.D. (2003-present)

Rengasamy R. ManiMaran, Ph.D. (2002-present)

Kumarasamy ravichandiran, Ph.D. (2004-present)

9. Research Associates, Assistants, Technicians and Aides (4/1/04-3/31/05)

Daren Rice, Research Associate (1998-present)

Kaori Iha-Hornbaker, Research Assistant (2002-present)

IMFB Annual Report

(April 1, 2004 through March 31, 2005)

Joan S. Hunt, Ph.D., D.Sc. (HON)
President, KUMC Research Institute
University Distinguished Professor
Department of Anatomy and Cell Biology
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1. Research Interests

Our focus is on immunological aspects of pregnancy. In order to understand how semiallogeneic embryos are protected against maternal immune cells and their products, we study macrophages in the uterus and placenta and the expression, regulation and functions of placental transplantation antigens (HLA). The results of these experiments on the natural situation of pregnancy might be applicable to other conditions such as artificial transplants where protection against immune cell activity would be desirable.

Limited recognition of the semiallogeneic fetus by the maternal immune system has a beneficial effect on fertility and maintenance of pregnancy. We are studying one product of activated immune cells, the multifunctional polypeptide growth factor, tumor necrosis factor, and other members of this supergene family that might be among the "recognition signals" that contribute to successful pregnancy.

2. Publications (4/1/05-3/31/06)

a. Published

Langat, D.K., Morales, P.J., Fazleabas, A.T., Mwenda, J.M. and **Hunt, J.S.** (2004) The olive baboon (*Papio anubis*): a potential animal model to study the function of human leukocyte antigen-G (HLA-G). *Gynecol. Obstet. Invest.* 57:33-36.

Gill, R.M., and **Hunt, J.S.** (2004) Soluble receptor (DcR3) and cellular inhibitor of apoptosis-2 (cIAP-2) protect human cytotrophoblast cells against LIGHT-mediated apoptosis. *Amer. J. Pathol.* 165:309-317.

McIntire, R.H., Morales, P.J., Petroff, M.G. and **Hunt, J.S.** (2004) Soluble isoforms of HLA-G drive differential expression of anti-inflammatory cytokines by the U937 human macrophage cell line. *J. Leukocyte Biol.* 76:1220-1228.

b. In Press

Hunt, J.S., Petroff, M.G., McIntire, R., Ober, C. HLA-G and Immune Tolerance in Pregnancy. *FASEB J.*, In Press.

Langat, D.K., Morales, P.J., Fazleabas, A.T., Mwenda, J.M. and **Hunt, J.S.** (2005) Potential regulatory sequences in the untranslated regions of the baboon MHC class Ib gene, *Paan-AG*, more closely resemble those in the human MHC class Ia genes than those in the class Ib gene, *HLA-G*. *Immunogenet.* 56:657-666. In press, 2004.

Hunt, J.S., Petroff M.G., McIntire R., Ober, C. (2005) Invited review. HLA-G and immune tolerance in pregnancy. *FASEB J.*, In press.

Nicolae, D., Cox, N.J., Lester, L.A., Schneider, D., Tan, Z., Billstrand, C., Kuldaneck, S., Donfack, J., Kogut, P., Patel, N.M., Goodenbour, J., Howard, T., Wolf, R., Koppelman, G.H., White, S.R., Parry, R., Postma, D.S., Meyers, D., Bleeker, E.R., **Hunt, J.S.**, Solway, J., and Ober, C. (2005) Fine mapping and positional candidate studies identify HLA-G as an asthma susceptibility gene on chromosome 6p21. *Am. J. Human Genet.*, 76:349-357. In press, 2004.

McIntire, R.H., and **Hunt, J.S.** Antigen presenting cells and HLA-G – A review. *Trophoblast Res.*, in press.

c. Books, book chapters, reports

Hunt, J.S., Petroff, M.G. (2004) Placental immunology. In: Encyclopedia of Hormones. H.L. H and A. W. Norman, Eds. Academic Press, NY. Vol. 3:224-231.

Petroff, M.G., Phillips, T.A., Ka, H., Pace, J.L. and **Hunt, J.S.** (2005) Isolation and culture of term human trophoblast cells. In: *Placental and Trophoblast Methods and Protocols*, M. J. Soares and J. S. Hunt, Eds. Humana Press, Totowa, NJ, in press.

Langat, D.K., Fazleabas, A.T. and **Hunt, J.S.** (2005) Methods for evaluating histocompatibility antigen gene expression in the baboon. In: *Placental and Trophoblast Methods and Protocols*, M. J. Soares and J. S. Hunt, Eds. Humana Press, Totowa, NJ, in press.

McIntire, R.H., Petroff, M.G. and **Hunt, J.S.** (2005) In vitro models for studying human uterine and placental macrophages. In: *Placental and Trophoblast Methods and Protocols*, M. J. Soares and J. S. Hunt, Eds. Humana Press, Totowa, NJ, in press.

Pace, J.L., Morales, P.J., Phillips, T.A. and **Hunt, J.S.** (2005) Analysis of the soluble isoforms of HLA-G: mRNAs and proteins. In: *Placental and Trophoblast Methods and Protocols*, M. J. Soares and J. S. Hunt, Eds. Humana Press, Totowa, NJ, in press.

Hunt, J.S., McIntire, R.A. and Petroff, M.G. (2005) Immunobiology of human pregnancy. In: *Knobil and Neill: The Physiology of Reproduction*. Elsevier Inc., San Diego, CA. In press.

Hunt, J.S. Inflammatory cells and cytokine production. In: *Inflammation and Pregnancy*, L. Myatt and D. Peebles, Eds. Parthenon Publishing. In preparation.

Hunt, J.S. Major histocompatibility antigens in reproduction. In: *The Endometrium*, Second Edition. A. Fazleabas, S. Glasser, J. Aplin, L. Giudice and S. Tabibzadeh, Eds. Taylor & Francis, London and New York. In preparation.

3. Grant Support (active funding 4/1/04-3/31/05)

National Institutes of Health, Project IV “TRAIL and the Human Implantation Site”, 2U54 HD33994-06, Principal Investigator, **Joan S. Hunt**, \$845,008 (direct + indirect costs), Total duration of the award: April 23, 2003 through March 31, 2006.

National Institutes of Health, Core B, Cell and Tissue Culture, 2U54 HD33994-06, Principal Investigator/Core Director, **Joan S. Hunt**, \$73,734 (direct costs current year), Total duration of the award: April 23, 2003 through March 31, 2006.

National Institutes of Health, “Biology at the Maternal-Fetal Interface”, PO1 HD39878, Principal Investigator: Michael J. Soares (**Hunt, Associate Director**), \$890,441/\$1,335,661 (directs/total costs); Project III, “Class I MHC Gene Expression by Human Trophoblast Cells”; Principal Investigator: **Joan S. Hunt**, Total duration of the award: May 1, 2004 through April 30, 2007.

National Institutes of Health, “Biology at the Maternal-Fetal Interface”, PO1 HD39878, Principal Investigator: Michael J. Soares (**Hunt, Associate Director**), \$890,441/\$1,335,661 (directs/total costs); Core B, Cell Culture Core, Principal Investigator/Core Director: **Joan S. Hunt**, \$301,922/\$452,884 (directs/total costs), Total duration of the award: May 1, 2004 through April 30, 2007.

National Institutes of Health, “Kansas IDeA Network of Biomedical Research Excellence”, 1 P20 RR01647-04, Principal Investigator, **Joan S. Hunt**, \$18,098,195 (total costs), Total duration of the award: July 1, 2004 through June 30, 2009.

National Institutes of Health, “Decidual Cell/Placental Interactions”, 1 RO1 HD24212-14, Principal Investigator, **Joan S. Hunt**, \$893,025 (total costs), Total duration of the award: December 1, 2004 through November 30, 2007.

KUMC Research Institute, “HLA-G at the maternal-fetal interface”, Program grant preparation, Principal Investigator, **Joan S. Hunt**, \$24,009 (total cost), Total Duration of the award: March 1, 2004 through February 28, 2004.

4. Meetings attended (4/1/04-3/31/05)

Reproductive Immunology Platform Session, Society for Gynecological Investigation, Houston,

TX, March 27, 2004 (Chairperson)
Kansas City Area Life Sciences Initiative Research Day, Kansas City, MO, June 3-4, 2004 (Co-Chair with R. Krumlauf, and opening session chair)
Satellite Symposium on Reproductive Immunology, Montreal, Canada, July 2004 (Chairperson)
Placenta Association of the Americas and International Federation of Placenta Associations, Plenary Session on Reproductive Immunology, Alvamar, CA, September 2004 (Chairperson and member of organizing committee)
Greenwald Symposium, Kansas City, MO, 2004 (Immunology Section Chairperson)

5. Editorial Board Service, Committees, Consulting, etc. (National, Regional) (4/1/04-3/31/05)

Editorial Board Service:

Editor-in Chief, *Journal of Reproductive Immunology*, 1997-present
Editorial Board, *Biology of Reproduction*, 1999-present

Committees:

Chairperson, Reproductive Immunology Platform Session, Society for Gynecological Investigation, Houston, TX, March 27, 2004.
Co-Chair (with R. Krumlauf), and opening session chair, Kansas City Area Life Sciences Initiative Research Day, June 3-4, 2004
Chairperson, Satellite Symposium on Reproductive Immunology, Montreal, Canada, July, 2004
Chairperson, Plenary Session on Reproductive Immunology, Placenta Association of the Americas and International Federation of Placenta Associations, Asilomar, CA, September, 2004
Organizing Committee, Placenta Association of the Americas and International Federation of Placenta Associations, Asilomar, CA, September, 2004
Immunology Section Chairperson, Greenwald Symposium, Kansas City, MO, 2004
International Organizing Committee, International Federation of Placenta Associations, Glasgow, Scotland, September, 2005
International Organizing Committee, International Federation of Placenta Associations, Kobe, Japan, September, 2006

Dissertation Committee:

In Progress: Ramsey McIntire, Ph.D. candidate, Anatomy and Cell Biology, J. Hunt, Advisor

6. Seminars presented (4/1/04-3/31/05)

“HLA-G in maternal-fetal immunology”, *NIAID, HLA Genetics Meeting*, Washington, D.C., March 2004

“K-BRIN Report”, Kansas Technology Enterprise, March 2004

“Immunology of the Maternal-Fetal Interface”, Susceptibility to Preterm Birth: What is the Science, Communicable Disease Center, Decatur, GA, March 2004

“Immunology of Pregnancy”, Frontiers in Reproduction training course, Woods Hole, MA, June 2004

“HLA-G-Dependent Maternal Placental Interactions”, Queens University, Kingston, ON, Canada, July 2004

“Setting the Stage: Antigen-Presenting Uterine Cells”, Reproductive Immunology Satellite Symposium, International Association of Immunology, Montreal, QC, Canada, July 2004

“The Immune System May Alter Placental Development”, *FASEB Conference on Molecular and Cellular Signaling in the Perinatal Cardiovascular System*, Tucson, AZ, August 2004

“K-BRIN Report”, Board of Regents, October 2004

“HLA-G and Immune Tolerance” and “Research Directions in the Pathophysiology of Reproductive Loss”, Postgraduate Program, American Society for Reproductive Medicine, Philadelphia 2004

“Immunobiology of the Maternal-Fetal Interface”, Perinatal Section Symposium of the Society of Pediatric Pathology, Little Rock, AR, October 2004

7. Honors (4/1/04-3/31/05)

Nominated for the Executive Council of the Society for Gynecological Investigation (and elected in 2005)

Accepted Section Editor, Reproductive Immunology, *Frontiers*1000 (L. Guidice and L. Regan, Editors)

8. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Student:

Ramsey McIntire, Ph.D. candidate, Dept. of Anat. & Cell Biol. (KUMC Biomedical Training Grant Scholar (2000-present))

Ryan Gill, Ph.D., and candidate for M.D., finished his requirements for his doctorate in June, 2005, and was awarded his degree. He will be hooded in May, 2005. (2000-present)

Post-doctoral Fellows:

Daudi Langat, PhD; Present: Post-doctoral fellow, Dept. of Anat. & Cell Biol., KUMC (2002-present)

9. Research Associates, Assistants, Technicians and Aides (4/1/04-3/31/05)

Daudi Langat, Ph.D. – Research Assistant Professor

David Wheaton – Research Assistant

Pedro Morales – Research Associate

Teresa Phillips – Senior Research Associate

Sue Platt - Research Associate

Judy Pace - Senior Research Associate

Ramsey McIntire - Graduate Student

Ryan Gill – M.D./Ph.D. Student

Karen Rodriguez, Administrative Assistant

Heiata Chapman, Administrative Officer

Martha Miller, Administrative Assistant

Annie Zhu, Administrative Specialist

IMFB Annual Report

(April 1, 2004 through March 31, 2005)

T. Rajendra Kumar, Ph.D.

Assistant Professor
Department of Molecular & Integrative Physiology
Division of Cancer & Developmental Biology in the
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1. Research Interests

Regulation of the hypothalamus-pituitary-gonadal (hpg) axis is a complex process. It involves a network of autocrine, paracrine and endocrine interactions among multiple factors. Alterations within this network can lead to abnormalities of reproductive tract development and may result in infertility and formation of gonadal cancers. Over the past several years, research in the Kumar lab has been directed towards elucidating these interactions at all three levels of the hpg axis using both gain-of-function (transgenic) and loss-of-function (gene knockout) approaches. Currently, research efforts in Kumar lab are focused using these unique mouse models that phenocopy human reproductive diseases. Specific projects include unraveling signaling pathways in the medial preoptic area that contribute to male sexual behavior, understanding human pituitary null cell adenoma, mechanisms of secretion of pituitary gonadotropins, and delineating mechanisms of gonadotropin regulation of testis and ovarian development and function. These studies are clinically relevant and will have significant impact in understanding the physiology and pathology of the mammalian reproductive axis.

2. Publications (4/1/04-3/31/05)

Mayerhoefer A, Fritz, Mani S, **Kumar TR**, Talhammer A, Ingressia P, Fienberg A and Greengard P. (2004) Ovarian function and morphology after deletion of the DARPP-32 gene in mice. *Exp Clin Endocrinol Diabetes* 112(8):451-457.

Combelles CC, Carabatsos MJ, **Kumar TR**, Matzuk MM and Albertini DF. (2004) Hormonal control of somatic cell oocyte interactions during ovarian follicle development. *Molecular Reproduction and Development* 69: 347-355.

Hirst RC, Abel MH, Wilkins V, Simpson C, Knight PG, Zhang FP, Huhtaniemi I, **Kumar TR**, and Charlton HM (2004). Influence of mutations affecting gonadotropin

production or responsiveness on expression of inhibin subunit mRNA and protein in the mouse ovary *Reproduction* 128:53-62.

Kumar TR (2004) Divide and differentiate: ghrelin instructs the Leydig cells. News & Views Editorial. *Endocrinology* 145:4822-4824.

Ma X, Dong YL, Matzuk MM and **Kumar TR**. (2004) Targeted mutagenesis of LH β leads to hypogonadism, defects in steroidogenesis and infertility. *PNAS (USA)* 101: 17294-17299.

Garcia-Campayo V, Boime I, Xiaoping Ma, Iken DD and **Kumar TR** (2005) A tetradomain single chain glycoprotein hormone analog elicits multiple hormone activities *in vivo*. *Biol Reprod* 72: 301-308.

3. Grant Support (active funding 4/1/04-3/31/05)

NIH/NICHD, "FSH- Responsive Genes in The Mouse Testis", RO3, Principal Investigator, **T. Rajendra Kumar**, \$100,000 (direct costs), Total duration of the award: 2004 through 2005.

Diagnostic Systems Laboratories, Inc., "Validation of hormone assay kits", Research Contract - Diagnostic Systems Laboratories, Inc, Principal Investigator, **T. Rajendra Kumar**, \$12,500 (direct costs), Total duration of the award: January 2004 through December 2006.

NIH/NIDDK, "Carbohydrates in the Sorting of Lutropin and Follitropin", RO1, Principal Investigator, **T. Rajendra Kumar**, \$ 25,000 per year (direct costs), Total duration of the award: 2005 through 2006.

4. Meetings attended (4/1/04-3/31/05)

SSR Annual Meeting, July 2004, Vancouver, British Columbia, Canada

Member, Education Committee – International Committee

XXVIII North American Testis Workshop, March 2005, Seattle (participant).

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

Consulting:

Ad hoc Reviewer of the following journals:

Endocrinology (Ad hoc Reviewer)

Journal of Clinical Endocrinology & Metabolism (Ad hoc Reviewer)

Biology of Reproduction (Ad hoc Reviewer)

Journal of Andrology (Ad hoc Reviewer)

Endocrine (Ad hoc Reviewer)

Journal of Physiology (Ad hoc Reviewer)

Clinical Endocrinology (UK) (Ad hoc Reviewer)
Molecular and Cellular Endocrinology (The Netherlands) (Ad hoc Reviewer)
Molecular and Human Reproduction (UK) (Ad hoc Reviewer)
Journal of Cell Science (UK) (Ad hoc Reviewer)
Trends in Endocrinology and Metabolism (The Netherlands) (Ad hoc Reviewer)
Oncogene (Nature Publishing group, UK) (Ad hoc Reviewer)
Asia Journal of Endocrinology (PR China) (Ad hoc Reviewer)

6. Seminars presented (4/1/04-3/31/05)

“Genetic analysis of the mouse reproductive axis”, Department of Biomedical Sciences, Colorado State University, Fort Collins, January 2004

“Genetic approaches to study the physiology of the mouse reproductive axis”, Department of Molecular and Integrative Physiology, Kansas University Medical Center, Kansas City, March 2004

“Engineering the mouse reproductive axis”, Department of Obstetrics & Gynecology, UT Medical Branch, Galveston, TX, March 2004

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Student:

Sara Turk, M.S., IGPBS rotation student (10 weeks beginning 03/28/05)

Post-doctoral Fellows:

Aparna Zama, Ph.D., (September 2004-Present)

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Joshua Eklund, Research Technician, November 2004-Present

IMFB Annual Report

(April 1, 2004 through March 31, 2005)

Kenneth R. Peterson, Ph.D.

Department of Biochemistry and Molecular Biology
MSN 3030
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University of Kansas Medical Center
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1. Research Interests

Red blood cells ferry oxygen and carbon dioxide throughout the body. Sickle cell disease, which impacts one of 500 African Americans born each year, affects their shape and renders them ineffective, resulting in anemia. Sickle cell disease is a genetic disease; it is caused by a single point mutation in the coding sequence of the β -globin gene. A second disease of these cells, β -thalassemia, also causes anemia. β -thalassemias result from an array of mutations in the β -globin locus that affect β -globin gene function. Gene therapy could aid in the replacement of the mutant globin gene and help cure these disorders. The β -globin locus consists of five functional β -like globin genes. The ϵ -globin gene is expressed in the primitive yolk sac during the first six weeks of gestation; the $^G\gamma$ - and $^A\gamma$ -globin genes are transcribed in the fetal liver from the sixth week to shortly after birth; and the β -globin gene (and to a much lesser extent the δ -globin gene) is expressed in bone marrow soon after birth for the duration of life. The ϵ -globin and γ -globins are largely silenced in the adult. Introducing an active fetal γ -globin gene in the adult by bone marrow transplantation or transactivation of γ -globin gene expression are goals of current gene therapy efforts towards curing sickle cell disease and β -thalassemias.

Realizing these goals requires understanding the molecular mechanisms controlling globin gene switching and the Peterson laboratory seeks to unravel the regulatory motifs involved, particularly as they pertain to transactivation or pharmacologic induction of fetal γ -globin synthesis. In addition, Dr. Peterson's laboratory is focused on the *cis*-control of human β -like globin gene expression during development; that is, the identification and characterization of DNA elements regulating globin synthesis via interaction of these sequences with trans-acting proteins. One of the most challenging questions in developmental biology concerns the mechanisms by which *cis*-regulatory elements/regions within a gene locus confer distinct developmental-specific expression patterns during ontogeny. The *cis* motifs under study include, but are not limited to, individual gene associated sequences involved in activation, silencing and competition

for interaction with the locus control region (LCR), gene order, distance from the LCR, intergenic sequences such as domain boundaries or barriers, and chromatin architecture. Acquisition of knowledge about these processes may aid in the development of targeted therapies or therapeutics.

2. Publications (4/1/04-3/31/05)

a. Published

Peterson, K.R., Fedosyuk, H., Zelenchuk, L., Nakamoto, B., Yannaki, E., Stamatoyannopoulos, G., Ciciotte, S., Peters, L. L., Scott, L. M., and Papayannopoulou, T. (2004) Transgenic Cre expression mice for generation of erythroid-specific gene alterations. *Genesis* 39:1-9.

Harju, S. J., Fedosyuk, H., and **Peterson, K.R.** (2004) Rapid isolation of yeast genomic DNA: Bust n' Grab. *MCB Biotechnol.* 4:8-13.

b. In press

Harju, S. and **Peterson, K.R.** (2005) *In vivo* and *in vitro* analysis of an γ -globin gene silencer in human β -YAC transgenic mice. *Blood Cells, Molecules & Diseases* (In press). Fourteenth Conference on Hemoglobin Switching, Orcas Island, WA.

Peterson, K.R., Yan, J., Navas, P.A., Barbas C.F. III, and Blau, C.A. (2005) γ -globin gene expression in CID-dependent multipotential cells established from β -YAC transgenic mice. *Blood Cells, Molecules & Diseases* (In press). Fourteenth Conference on Hemoglobin Switching, Orcas Island, WA.

Harju, S.J., Navas, P.A., Stamatoyannopoulos, G., and **Peterson, K.R.** (2005) Proximity of the human β -globin genes to the locus control region, a determinant of the temporal order of developmental expression, is an inherent property of spatial gene order. *Mol. Cell. Biol.* (Accepted with revision)

Karpova, T., Presley, J., Scherrer, S.P., Tajeda, L., **Peterson, K.R.**, and Heckert, L.L. (2005) A 500 kb *Ftz-F1*-containing yeast artificial chromosome recapitulates expression of steroidogenic factor 1 *in vivo*. *Molec. Endocrinol.* (Accepted with revision).

Navas, P.A., **Peterson, K.R.**, and Stamatoyannopoulos, G. (2005) Investigations of a human embryonic globin gene silencing element using YAC transgenic mice. *Dev. Biol.* (submitted).

Blau, C.A., Barbas, C.F. III, Bomhoff, A., Neades, R., Yan, J., Navas, P.A., and **Peterson, K.R.** (2005) γ -globin gene expression in CID-dependent multi-potential cells established from β -YAC transgenic mice. *Blood* (submitted).

Harju, S.J., Navas, P.A., Stamatoyannopoulos, G., and **Peterson, K. R.** (2005) Proximity of the human β -globin genes to the locus control region, a determinant of the temporal order of developmental expression, is an inherent property of spatial gene order. *Mol. Cell. Biol.* (Accepted with revision).

Karpova, T., Presley, J., Scherrer, S.P., Tajeda, L., **Peterson, K.R.**, and Heckert, L.L. (2005) A 500 kb *Ftz-F1*-containing yeast artificial chromosome recapitulates expression of steroidogenic factor 1 *in vivo*. *Molec. Endocrinol.* (Accepted with revision).

Navas, P.A., **Peterson, K.R.**, and Stamatoyannopoulos, G. (2005) Investigations of a human embryonic globin gene silencing element using YAC transgenic mice. *Dev. Biol.* (submitted).

Blau, C.A., Barbas, C.F. III, Bomhoff, A., Neades, R., Yan, J., Navas, P.A., and **Peterson, K.R.** (2005) γ -globin gene expression in CID-dependent multi-potential cells established from β -YAC transgenic mice. *Blood* (submitted).

c. Abstracts

Harju, S., Fedosyuk, H., and **Peterson, K.R.** (2004) Effect of LCR 5'HS4 and 5'HS1 deletions on β -like globin gene expression in β -YAC transgenic mice. *Blood* 104:342a. Annual Meeting of the American Society of Hematology, San Diego, CA.

Peterson, K.R., Fedosyuk, H., and Harju, S. (2004) LCR 5'HS3 displays specificity for ϵ -globin gene activation during primitive erythropoiesis and γ -globin gene activation during fetal definitive erythropoiesis. *Blood* 104:343a. Annual Meeting of the American Society of Hematology, San Diego, CA.

Harju, S. and **Peterson, K.R.** (2004) *In vivo* and *in vitro* analysis of an γ -globin gene silencer in human β -YAC transgenic mice. *Blood* 104:345a. Annual Meeting of the American Society of Hematology, San Diego, CA.

3. Grant Support (active funding 4/1/04-3/31/05)

NIH, "Locus-linked Regulatory Motifs of Globin Gene Switching", 5 R01 HL67336, Principal Investigator, **Kenneth Peterson**, \$225,000 (annual direct costs), \$900,000 (total direct costs), Total duration of the award: June 15, 2001 through May 31, 2005.

NIH, "Molecular Control of Fetal γ -globin Gene Expression", 5 R01 DK61804, Principal Investigator, **Kenneth Peterson**, \$200,000 (annual direct costs), \$800,000 (total direct costs), Total duration of the award: September 30 2001 through May 31, 2005.

NIH, "Studies of β -like Globin Gene Switching", Self Faculty Scholar Award, Principal Investigator, **Kenneth Peterson**, (no cost extension to 06/30/05) \$50,000 (annual direct

costs), \$150,000 (total direct costs), Total duration of the award: July 1, 2001 through June 30, 2004.

NIH, "Regulation of Globin Gene Switching in Human ES Cells", 3 R01 HL67336-03S1 supplement, Principal Investigator, **Kenneth Peterson**, \$50,000 (annual direct costs), \$100,000 (total direct costs), Total duration of the award: September 22, 2003 through May 31, 2005.

NIH, "Kansas Interdisciplinary Center for PKD Research", Project 3, Polycystin G-protein signal transduction, P50 DK57301, Co-investigator, **Kenneth Peterson**, \$144,567 (annual direct costs), \$675,356 (total direct costs), Total duration of the award: September 30, 1999 through August 31, 2005.

NIH, "*Hoxc13* and Hair Follicle Morphogenesis", R01 AR47233, Co-investigator, **Kenneth Peterson**, \$188,000 (annual direct costs), \$940,000 (total direct costs), Total duration of the award: August 1, 2000 through July 31, 2005.

NIH, "Center for Reproductive Sciences," Project 1, Regulation of SF1 in the Gonads, 2 U54 HD33994, Co-investigator, **Kenneth Peterson**, \$114,398 (Annual direct costs), \$607,355 (Total direct costs), Total duration of the award: April 1, 2001 through March 31, 2006.

NIH, "A Mouse Model of Acrodermatitis Enteropathica,"¹ R01 DK63975, Co-investigator, **Kenneth Peterson**, \$250,000 (Annual direct costs), \$1,250,000 (Total direct costs), Total duration of the award: April 1, 2003 through January 31, 2008.

NIH, "Biology at the Maternal-Fetal Interface", 3 P01 HD039878-03S1 supplement, Co-investigator, **Kenneth Peterson**, \$75,000 (annual direct costs), \$150,000 (total direct costs), Total duration of the award: April 1, 2004 through March 31, 2005.

4. Meetings attended (4/1/04-3/31/05)

Fourteenth Conference on Hemoglobin Switching, Orcas Island, WA.
Annual Meeting of the American Society of Hematology, San Diego, CA.

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

Service:

Kansas Junior Academy of Science District 3 and Shawnee Mission School District
Research and Development Forum, 1999-2000, 2002-2004 (Judge)
Science Pioneers Greater Kansas City Science & Engineering Fair, 2000, 2002-2004
(Judge)
Stem Cell Symposium, University of Kansas Medical Center and Stowers Institute for
Medical Research, 2004 (Co-Chairman)

Program Committee, Stem Cells and Developmental Biology mini-symposium, Life Sciences Research Day, Kansas City Area Life Sciences Institute, 2004-2005 (Member)

National or International Committees:

Ad hoc member, NIH Erythrocyte and Leukocyte Biology (ELB) Study Section, 2004.
Ad hoc member, NIDDK Grant Review Board ZDK1 GRB-B (M1) and ZDK1 GRB-B (M2), 2004.
Ad hoc reviewer, BBSRC grant, 2004.

Dissertation Committees:

Huimin Jiang, Biochem./Mol. Biol., 02/19/01-04/02/04
Huaijin Zhou, Micro./Mol. Genet./Immun., 04/22/02-12/08/04
Anna Nunn, Biochem./Mol. Biol., 06/01/02-present
Ryan Thummel, Molec./Integr. Physiol., 06/24/02-06/25/04
Brian P. Hermann, Molec./Integr. Physiol., 02/24/03-present
Jing Liu, Stowers Institute/ Micro./Mol. Genet./Immun., 05/16/03-present
Raymond Camahort, Stowers Institute/Biochem./Mo. Biol. (M.S.), 01/17/05-present
Alex Dajkovic, Micro./Mol. Genet./Immun., 02/17/05-present

Departmental Committees:

Graduate Committee, Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 1998-present (Member)
Search Committee for Fluorescence Biochemist, Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 2003 (Member)
Search Committee for Regulatory Biochemist, Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 2003 (Member)
Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 2003-present (Vice-Chairman)
Search Committee for Nucleic Acids Biochemist, Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 2003-2005 (Member)
Graduate Committee, Department of Biochemistry and Molecular Biology, University of Kansas Medical Center, 2003-2004 (Chairman)

Institution Committees:

Advisory Board for Transgenic and Genetic Technologies Support Facility, University of Kansas Medical Center, 1998-2004 (Member)
Harry R. Wahl Academic Society, University of Kansas Medical Center, 1999-present (Member)
Student Research Forum, University of Kansas Medical Center, 1999, 2002-2004 (Judge)
Graduate Travel Committee, University of Kansas Medical Center, 2000-present (Member)
Faculty Council, University of Kansas Medical Center, 2000-2003, 2004-2005 (Member)
Microarray Core Advisory Committee, University of Kansas Medical Center, 2001-present (Member)

Internal Advisory/Planning Committee, KUMC Center for Molecular Informatics, University of Kansas Medical Center, 2002-present (Member)
Medical Genetics Subcommittee of the Education Council, University of Kansas Medical Center, 2002-2004 (Member)
Executive Committee of the Medical Faculty, University of Kansas Medical Center, 2002-2003, 2004-2005 (Member)
Internal Advisory Committee, Institute of Maternal Fetal Biology, University of Kansas Medical Center, 2002-present (Member)
Self Graduate Fellowship Selection Committee, University of Kansas, 2002-2004 (Member)
Interdepartmental Graduate Program in Biological Sciences Advisory Board, University of Kansas Medical Center, 2003-2004 (Member)
Medical Center Hearings Committee, University of Kansas Medical Center, 2004 (Member)
Advisory Committee for the Molecular Resource Facility, University of Kansas Medical Center, 2004-present (Member)
School of Medicine Space Committee, University of Kansas Medical Center, 2004-present (Member)

Consulting:

NIH Erythrocyte and Leukocyte Biology (ELB) Study Section, 2004 (Ad hoc member)
NIDDK Grant Review Board ZDK1 GRB-B (M1) and ZDK1 GRB-B (M2), 2004 (Ad hoc member)
BBSRC grant, 2004 (Ad hoc member)

6. Seminars presented (4/1/04-3/31/05)

“LCR HS Specificity for globin gene activation”, *Fourteenth Conference on Hemoglobin Switching*, Orcas Island, Washington, 2004

“Cis-acting determinants of γ -globin gene activation.”, Institute of Biomedical Sciences and Technology, University of Texas, Dallas, Richardson, Texas, 2004

“Science and ethics: The intertwined debate on stem cells using technology to enhance quality of life”, *Greater Kansas City Association of Family & Consumer Sciences and Business Professionals in Family & Consumer Sciences*, Kansas City, Missouri, 2005

“Molecular control of fetal globin gene expression”, Division of Genetic Medicine, Vanderbilt University, Nashville, Tennessee, 2005

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Postdoctoral Fellows:

Susanna Harju, Ph.D. (2003-2004)

Masters Graduate Students:

Anna Nunn (2002-present); Department of Biochemistry and Molecular Biology,
University of Kansas Medical Center

Rotation Students:

Raymond Camahort (2004); IGPBS, University of Kansas Medical Center, 2nd rotation
Andrew Ralya (2004); IGPBS, University of Kansas Medical Center, 1st rotation

High School Students:

Taras Zelenchuk (2003-2004); Volunteer and Employee, Shawnee Mission East High
School, Prairie Village, Kansas

Patrick Sturdivant (2004); Volunteer and Employee, Olathe East High School, Olathe,
Kansas

Ali Heitmann (2004-2005); Employee, Liberty High School, Liberty, Missouri

Visiting Scholars:

Tiago de Andrade (2004); Graduate Student, Molecular Biology and Gene Therapy
Laboratory, HEMOCENTRO (UNICAMP), Cidade Universitária Zeferino Vaz,
Campinas, Brazil

Luciana Sarmento Moreira (2004); Graduate Student, Molecular Biology and Gene
Therapy Laboratory, HEMOCENTRO (UNICAMP), Cidade Universitária
Zeferino Vaz, Campinas, Brazil

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Research Associates:

Renee Neades

Lesya Zelenchuk

Halyna Fedosyuk

Adrian Zelenchuk

Annual Report

(April 1, 2004 through March 31, 2005)

Margaret G. Petroff, Ph.D.

Assistant Professor

Department of Anatomy and Cell Biology

University of Kansas Medical Center

Kansas City, KS 66160

Phone: 913 588-2781

Fax: 913 588-2710

Email: mpetroff@kumc.edu

1. Research Interests

A breakdown in the immunotolerogenic function of the placenta during gestation may result in inadequate protection of the fetus against possible harmful effects of the maternal immune system. This could in turn contribute to certain pathologies of the pregnancy such as intrauterine growth retardation and preeclampsia. These complications not only endanger the well-being of the mother and child, but also may have long-term effects on the health of the child.

Placental trophoblast cells, which are derived from the trophoblast of the pre-implantation embryo, form an epithelial barrier between potentially immunogenic fetal mesenchyme and potentially immunoreactive maternal immune cells. Trophoblast cells are armed with a host of cell-surface associated macromolecules that function to divert the maternal immune system away from a harmful immune response towards a favorable one. In addition to suppressing the immune system, trophoblast cells are believed to induce a state of immunological tolerance. The mechanisms by which they do so, however, are ill-understood.

Recent studies have unveiled the existence of multiple cell surface-associated proteins belonging to the B7 and CD28 families that are of fundamental importance in immune evasion and tolerance. In ongoing studies, our laboratory has been mapping the locations of the B7 family molecules at the human maternal-fetal interface, and have found that trophoblast cells uniquely express a number of these proteins, including B7-H1, B7-DC, B7-H2, and B7-H3. Expression of the B7 proteins on the epithelial surface of the placenta is highly unique, since many other cell types, including other epithelial layers, do not express these proteins. Furthermore, because these proteins are on trophoblast cells that are directly juxtaposed to maternal blood and tissue, they have the opportunity to interact with and alter the function of maternal immune cells. The overall goal of our laboratory is to determine the role of B7 family proteins in the immunological function of the placenta.

2. Publications (4/1/04-3/31/05)

a. in press

McIntire RH, **Petroff MG**, Phillips TA, Hunt JS. In vitro models for studying human uterine and placental macrophages. In: Placental and Trophoblast Methods and Protocols, Molecular Medicine Series. MJ Soares and JS Hunt, Eds. Humana Press, Totawa, NJ. In Press.

Petroff M.G., Ka H., Phillips T.A., Pace J.L., Hunt J.S. Purification and culture of human trophoblast cells. In: Placental and Trophoblast Methods and Protocols, Molecular Medicine Series. MJ Soares and JS Hunt, Eds. Humana Press, Totawa, NJ. In Press.

Hunt J.S., **Petroff M.G.**, McIntire R., Ober C. HLA-G and Immune Tolerance in Pregnancy. FASEB J., In Press.

Hunt J.S., McIntire R.H., **Petroff M.G.** Immunobiology of Human Pregnancy. In: Encyclopedia of Reproduction, E. Knobil, J.D. Neill, Eds. In Press.
Petroff M.G. B7 family molecules in the placenta. In: Immunology of Implantation, G Mor, Ed. In Press.

Choi J., Holtz R., **Petroff M.G.**, Alfaidy N., Challis J.R., Murphy S.P. IRF-1 expression is dampened in human trophoblasts by a proteasome-dependent mechanism. Submitted.

Petroff M.G., Kharatyan, E., Torry D.S., Holets L. Novel Members of the Extended B7 Family are Differentially Expressed Across Gestation in the Human Placenta. Submitted.

b. abstracts

E. Taglauer, S. Svojanovsky, **M.G. Petroff**. (2005, March) Oxygen-Mediated Gene Regulation in Placental Cytotrophoblast Cells. Kansas City Area Life Sciences Institute.

M. G. Petroff, J. Ittner, D.S. Torry, L. Holets. (2005, March) Novel Members of the Extended B7 Family are Differentially Expressed Across Gestation in the Human Placenta. Kansas City Area Life Sciences Institute.

c. Books, book reviews, etc.

Hunt J.S., **Petroff M.G.** Placental immunology. In: Encyclopedia of Hormones. H.L. H and A. W. Norman, Eds. Academic Press, NY. 2004; Vol. 3:224-231.

Petroff M.G., Hunt J.S. Immunity at the maternal-fetal interface. In: Mucosal Immunology. J. Mestecky, J. Bienenstock, M.E. Lamm, L. Mayer, J.R. McGhee, W. Strober, Eds. Elsevier, San Diego, CA. Ch. 101.

3. Grant Support (active funding 4/1/04-3/31/05)

NIH, "Immunomodulatory B7 Family Proteins in the Placenta", R01 (HD045611), Principal Investigator, **Margaret G. Petroff**, \$1,373,830 (total cost), \$202,500 (direct costs), Total duration of the award: January 1, 2004 through December 31, 2008.

NIH, "HLA-G at the Maternal-Fetal Interface", P01, Principal Investigator Project II, **Margaret G. Petroff**, \$5,991,000 (total costs), \$4,875,177 (direct costs), Total duration of the award: pending, 2005-2010.

NIH, "Immunomodulatory B7 Family Proteins in the Placenta", Faculty Development award, KSU Cobre grant on epithelial function, Principal Investigator, **Margaret G. Petroff**, \$25,000 (total costs), \$23,000 (direct costs), Total duration of the award: pending March 2005 through June 2005.

4. Meetings attended (4/1/04-3/31/05)

24th Annual meeting of the American Society for Reproductive Immunology, June 2004, St. Louis, Missouri

37th Annual meeting of the Society for the Study of Reproduction, July 2004, Vancouver, British Columbia

Placenta Association of the Americas Conference 2004, September 2004, Asilomar, California

38th Annual meeting of the Society for the Study of Reproduction, July 2005, Quebec City, Quebec

Gilbert S. Greenwald Symposium on Reproduction, October 2004, Kansas City, Missouri

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

Service:

Gilbert S. Greenwald Symposium on Reproduction, (Member Organizing Committee)

National or International Committees:

Biology of Reproduction, 2002-present (Reviewer)

Molecular Human Reproduction, 2003-present (Reviewer)

Placenta, 2003-present (Reviewer)

Journal of Reproductive Immunology, 2002-present (Reviewer)

Society for the Study of Reproduction, 2004-2005 (Member Program Committee)

Minisymposium on Maternal-Fetal Interactions, 38th Meeting of the Society for the Study of Reproduction (Organizer)

Dissertation Committee:
Ramsey H. McIntire

Departmental Committees:
Graduate Studies Committee

Consulting:
Cellular and Molecular Immunology - B Study Section, National Institutes of Health;
June 2004 (Ad Hoc Reviewer)
Pregnancy and Neonatology, National Institutes of Health; October 2004 (Ad Hoc
Reviewer)

6. Seminars presented (4/1/04-3/31/05)

“Expression and Regulation of B7 Family Proteins in the Placenta”, *Donald Johnson Seminar in Reproductive Physiology*, Kansas City, KS, April, 2004

“B7 Family Molecules and Oxygen: Novel Regulation of Immunomodulatory Molecules in the Placenta,” *Society for the Study of Reproduction*, Vancouver, British Columbia, July 2004

“Oxygen and EGF Regulate Trophoblast B7 Family Molecule Expression”, *Placenta Association of the Americas Conference 2004*, Asilomar, California, September 2004

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Medical Graduate Students:
Elizabeth Taglauer (June 2004-present)

Graduate Student:
Jessica Ittner (Rotation October-December 2004)

Postdoctoral Fellows:
Lesya Holets, Ph.D. (January 2005-present)

Summer Students:
Gayana Grigoran, K-INBRE Summer Scholar (June-August 2005)

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Elza Kharatyan, Research Assistant (January 2004-present)

IMFB Annual Report
(April 1, 2004 through March 31, 2005)

Michael J. Soares, Ph.D.

Professor and Director
Department of Pathology and Laboratory Medicine
Division of Cancer and Developmental Biology
Institute of Maternal-Fetal Biology
University of Kansas Medical Center
Kansas City, KS 66160
Phone: 913 588-5691
Fax: 913 588-8287
Email: msoares@kumc.edu

1. Research Interests

Our laboratory is interested in molecular mechanisms and signaling events involved in the establishment and maintenance of pregnancy; including investigations on the prolactin gene family, intrauterine inflammatory and immune cells, uterine vasculature, and signaling pathways controlling the growth and differentiation of decidual and trophoblast cells.

2. Publications (4/1/04-3/31/05)

a. Published

Ain, R., Dai, G., Dunmore, J.H., Godwin, A.R., and **Soares, M.J.** (2004) A prolactin family paralog regulates reproductive adaptations to a physiological stressor. *Proceedings of the National Academy of Sciences U.S.A.* **101**, 16543-16548.

Ain, R. and **Soares, M.J.** (2004) Is the metrial gland really a gland? *Journal of Reproductive Immunology*, **61**, 129-131.

Ain, R., Trinh, M.-L., and **Soares, M.J.** (2004) Interleukin-11 signaling is required for the differentiation of natural killer cells at the maternal-fetal interface. *Developmental Dynamics* **231**, 700-708.

Arroyo, J.A., Konno, T., Khalili, D., and **Soares, M.J.** (2005) A simple in vivo approach to investigate invasive trophoblast cells. Submitted. February 2005.

Asano, N., Kondoh, M., Ebiara, C., Fujii, M., **Soares, M.J.**, Nakashima, E., Sato, M., and Watanabe, Y. (2004) Expression profiles of zinc transporters in rodent placental models. *Toxicology Letters* **154**, 45-53.

Berghorn, K.A., Clark, P.A., Encarnacion, B., DeRegis, C.J., Folger, J., Morasso, M.I., **Soares, M.J.**, Wolfe, M.W., and Roberson, M.S. (2005) Developmental expression of the homeobox protein Distal-less 3 and its relationship to progesterone production in mouse placenta. Submitted. December 2004.

Rider, V., Potapova, T, Dai, G., and **Soares, M.J.** (2005) Stimulation of a rat uterine stromal cell line in culture reveals a molecular switch for endocrine-dependent differentiation. *Journal of Endocrinology* **184**, 119-127.

Soares, M.J. and Wolfe, M.W. (2004) Human embryonic stem cells ‘assemble’ and fulfill their developmental ‘destiny’. *Endocrinology* **145**, 1514-1516.

Soares, M.J. (2004) The prolactin and growth hormone families: pregnancy-specific hormones/cytokines at the maternal-fetal interface. *Reproductive Biology & Endocrinology* **2**, 51 (<http://www.rbej.com/content/2/1/51>).

Thadani, P.V., Strauss, J.F., Dey, S.K., Anderson, V.M., Audus, K.L., Coats, K.S., Cross, J.C., Erlebacher, A., Ganapathy, V., Linzer, D.I., Miller, R.K., Novak, D.A., Rapaka, R.S., Sadovsky, Y., Salafia, C.M., **Soares, M.J.**, and Unadkat, J. (2004) NIDA conference report on placental proteins, drug transport, and fetal development. *American Journal of Obstetrics and Gynecology* **191**, 1858-1862.

b. In press

Ain, R., Canham, L.N., and **Soares, M.J.** (2005) Dexamethasone-induced intrauterine growth restriction impacts the placental prolactin family and the insulin-like growth factor-II/Akt signaling pathway. *Journal of Endocrinology*, in press.

Ain, R., Konno, T., Canham, L.N., and **Soares, M.J.** (2005) Phenotypic analysis of the placenta in the rat. In: *Placenta and Trophoblast: Methods and Protocols, Vol. I.* **M.J. Soares** and J.S. Hunt (eds), Humana Press, New Jersey (in press)

Ho-Chen, J.K., Ain, R., Alt, A., Wood, J.G., Gonzalez-N.C., and **Soares, M.J.** (2005) Hypobaric-hypoxia as a tool to study pregnancy-dependent responses at the maternal-fetal interface. In: *Placenta and Trophoblast: Methods and Protocols, Vol. II.* **M.J. Soares** and J.S. Hunt (eds), Humana Press, New Jersey (in press)

Müller, H. and **Soares, M.J.** (2005) Alkaline phosphatase fusion proteins as tags for identifying targets for placental ligands. In: *Placenta and Trophoblast: Methods and Protocols, Vol II.* **M.J. Soares** and J.S. Hunt (eds), Humana Press, New Jersey (in press)

Sahgal, N., Canham, L.N., and **Soares, M.J.** (2005) Rcho-1 trophoblast cells: a model for studying trophoblast differentiation. In: *Placenta and Trophoblast: Methods and Protocols, Vol. I.* **M.J. Soares** and J.S. Hunt (eds), Humana Press, New Jersey (in press)

c. Abstracts

Alam, S.M.K., Konno, T., Sahgal, N., Li, C., Lu, L., Canham, L.N., and **Soares, M.J.** (2004) Decidual cells produce a heparin-binding cytokine, prolactin-like protein-J: expression and biological targets. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Arroyo, J.A., Ain, R., and **Soares, M.J.** (2004) A simple in vivo approach to investigate the regulation of trophoblast cell invasion. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Bustamante, J.J., Takahashi, T., Dai, G., and **Soares, M.J.** (2004) Prolactin-like protein-C binds to hepatocytes via a mechanism independent of the prolactin receptor. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Casillan, A.J., Gonzalez, N.C., Ain, R., **Soares, M.J.**, and Wood, J.G. (2004) Upregulation of heme oxygenase-1 and inducible nitric oxide synthase mediates microvascular acclimatization to systemic hypoxia. Annual FASEB Meeting, Washington, D.C.

Ho-Chen, J.K., Bustamante, J.J., and **Soares, M.J.** (2004) Trophoblast cell responses to restricted oxygen. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Konno, T., Alam, S.M.K., Dai, G., Lu, L., Wang, D., Dunmore, J., Godwin, A.R., and **Soares, M.J.** (2004) Decidual prolactin-related protein gene targeting: insights into expression and biological actions. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Ohboshi, S. and **Soares, M.J.** (2004) Phosphatidylinositol 3-kinase/Akt signaling pathway and 14-3-3 ligand interactions modulate the endocrine phenotype of trophoblast cells. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

Sahgal, N. and **Soares, M.J.** (2004) Gestationally dependent invasion of trophoblast into the maternal uterine mesometrial compartment is regulated by fetal signals. 37th Annual Meeting of the Society for the Study of Reproduction, Vancouver, British Columbia, Canada

3. Grant Support (active funding 4/1/04-3/31/05)

National Institutes of Health, "Biology at the Maternal-Fetal Interface", HD39878, Principal Investigator, **Michael J. Soares**, \$862,347 (total costs), Total duration of the award: April 1, 2002 through March 31, 2007.

National Institutes of Health, “Trophoblast Differentiation”, HD20676, Principal Investigator, **Michael J. Soares**, \$303,750 (total costs), Total duration of the award: May 1, 2002 through April 30, 2007.

National Institutes of Health, “Trophoblast Differentiation-Minority Supplement for Dr. Juan Bustamante”, HD20676-S, Principal Investigator, **Michael J. Soares**, \$49,680 (total costs), Total duration of the award: May 1, 2002 through April 30, 2007.

National Institutes of Health, “Trophoblast Differentiation-Human Embryonic Stem Cells”, HD20676-S2, Principal Investigator, **Michael J. Soares**, \$110,250 (total costs), Total duration of the award: September 1, 2003 through August 31, 2005.

Hall Family Foundation, “Hypoxia and Vascular Programming”, None, Principal Investigator, **Michael J. Soares**, \$82,500 (total costs), Total duration of the award: September 1, 2003 through August 31, 2005.

National Institutes of Health, “Biology at the Maternal-Fetal Interface-Human Embryonic Stem Cell Suppl”, HD39878-S, Principal Investigator, **Michael J. Soares**, \$110,250 (total costs), Total duration of the award: September 1, 2004 through August 31, 2006.

4. Meetings attended (4/1/04-3/31/05)

International Conference on the Female Reproductive Tract, “The prolactin family and pregnancy”, June 2003, Frauenchiemsee, Germany

American Physiological Society Symposium on the Maternal-Fetal Dialogue, “Prolactin family expansion and the maternal-fetal interface”, April 2004, Washington D.C.

Presidential Symposium, American Society Reproductive Immunology, “Invasive trophoblast cells: what we can learn from rodents?”, June 2004, St. Louis, Missouri, June 2004

Mini-Symposium on Reproductive Immunology, Annual Meeting for the Society for the Study of Reproduction, “Gestation stage dependent interactions between trophoblast cells and natural killer cells”, August 2004, Vancouver, British Columbia, Canada

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

Service:

National Institutes of Health, NICHD, Special Study Section, October 2004 (Committee Member)

National or International Committees:

American Physiological Society Sponsored Symposium, June 2003-May 2004 (Organizer)

International Scientific Committee for the Placenta Association of Americas Meeting,
October 2003-September 2004 (Member)

Dissertation Committees:

Dissertation Committee, Molecular & Integrative Physiology, December 2004, University
of Kansas Medical Center (Committee Member)

Dissertation Committee, Pharmaceutical Chemistry, In progress, University of Kansas
Medical Center (Committee Member)

Departmental Committees:

Promotion and Tenure-Physiology, 2004-present (Member)

Faculty Search Committee, 2004-present (Chair)

Department of Pathology & Laboratory Graduate Advisory Committee, 2004-present
(Member)

Medical School Committees:

Research Advisory Committee, 2002-present (Member)

University of Kansas Medical Center Transgenic Core Laboratory Oversight Committee,
2004-present (Member)

Consulting:

Perinatal Research Center, Department of Pediatrics, University of Colorado Health
Sciences Center, Aurora, CO, on a research project entitled: "Fetoplacental
amino acid metabolism in IUGR pregnancies", July 2002-June 2007 (Consultant)

Center for Environmental Exposure and Health, Medical College of Georgia/Georgia
Tech University, 2004-present (Member of the External Advisory Board)

6. Seminars presented (4/1/04-3/31/05)

"Prolactin family expansion and the maternal-fetal interface", Southern Illinois
University School of Medicine, Carbondale, Illinois, April 2004

"Prolactin family expansion and the maternal-fetal interface", *American Physiological
Society Symposium on the Maternal-Fetal Dialogue*, Washington D.C., April 2004

"Invasive trophoblast cells: what we can learn from rodents?", *Presidential Symposium*,
American Society Reproductive Immunology, St. Louis, Missouri, June 2004

"Gestation stage dependent interactions between trophoblast cells and natural killer
cells", *Mini-Symposium on Reproductive Immunology*, Annual Meeting for the Society
for the Study of Reproduction, Vancouver, British Columbia, Canada, August 2004

"Prolactin family and pregnancy-dependent adaptations", Morehouse School of
Medicine, Atlanta, Georgia, October 2004

7. Honors (4/1/04-3/31/05)

2004 Dolph C. Simons, Sr. Research Award in the Biomedical Sciences
Higuchi Research Achievement Award, University of Kansas

8. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Graduate Students:

Jennifer Ho-Chen (2002-present); NIH NRSA Predoctoral Fellowship
Lindsey N. Canham (2004-present)

Postdoctoral Fellows:

Dr. Rupasri Ain (1999-2003); Recipient of a University of Kansas Medical Center
Training Program in Biomedical Sciences Fellowship and a Postdoctoral
Fellowship from the American Heart Association, Promoted to Research
Assistant Professor (August 2004)

Dr. Juan A. Arroyo (2003-present)

Dr. Juan J. Bustamante (2002-present)

Dr. S.M. Khorshed Alam (2003-present)

Dr. Toshohoro Konno (2003-present)

Dr. Shigeki Ohboshi (2002-2004)

Summer Students:

Darya Khalili (Summer 2004)

My-Linh Trinh (Summer 2001-Summer 2003)

9. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Adam Alt, Research Assistant (2001-present)

Lindsey N. Canham, Research Assistant (2001-present)

Bithika Ray, Research Assistant (2004-present)

Sara Turk, Research Assistant (April 2004-August 2004)

Stacy McClure, Administrative Assistant (2002-present)

IMFB Annual Report
(April 1, 2004 through March 31, 2005)

William E. Truog, MD

Sosland Family Endowed Chair in Neonatal Research
Section of Neonatal-Perinatal Medicine
Children's Mercy Hospitals and Clinics
Professor of Pediatrics
University of Missouri - Kansas City School of Medicine
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1. Research Interests

The long-term goal of Dr. Truog and other investigators in the Pulmonary Developmental Biology Research Laboratories of Children's Mercy Hospitals and Clinics at the University of Missouri - Kansas City School of Medicine is to improve understanding of how the lungs of newborn infants are injured, and to investigate new therapies for pulmonary disorders. One specific goal of the laboratory is to assess both beneficial and toxic effects of the potent therapeutic agent, inhaled nitric oxide, both at the bedside and in the laboratory. Our group has focused on studying potential toxicity of combined exposure to oxygen and to nitric oxide in neonatal piglets. We seek to learn about alterations in structural elements of the lung, as well as altered molecular expression and protein production of growth factors in the lung. Our parallel studies in humans have examined the impact of profoundly preterm delivery and its consequences. We have studied pulmonary microvascular development, assessing quantitatively by light and electron microscopy the state of the pulmonary microvasculature following exposure to oxygen and assisted ventilation.

Other studies undertaken in our laboratory include assessment, both in humans and in animals, of lipid and peptide mediators of pulmonary vascular reactivity and the effects of various pulmonary disorders on the metabolism of these vasoactive substances in the developing lung. Investigations in our laboratory also include the assessment of different patterns of lung inflation as provided by assisted breathing devices and their relative contributions to lung injury in immature lungs.

Participation in the Institute of Maternal-Fetal Biology at the University of Kansas School of Medicine will enhance our own research activities, encouraging sharing of our work with the complementary work of many other investigators interested in basic and translational aspects of developmental biology.

2. Publications (4/1/04-3/31/05)

a. published

Ekekezie, II, Norberg, M., Rezaiekhaligh, M.H., Mabry, S., Zhang, X., Thibeault, D.W., **Truog, W.E.** (2004) Low levels of tissue inhibitors of metalloproteinases with a high MMP-9/TIMP-1 ratio are present in the tracheal aspirate fluids of infants developing CLD. *Pediatrics* **113**:1709-1714.

Thibeault, D.W., Mabry, S.M., Norberg, M., **Truog, W.E.**, Ekekezie, II. (2004) Lung microvascular adaptation in infants with chronic lung disease. *Biol Neonate* **85**:273-282.

Merrill, J.D., Ballard, R.A., Godinez, R.I., Godinez, M.H., Cnaan, A., **Truog, W.E.**, Ballard, P.L. (2004) Dysfunction of pulmonary surfactant in chronically ventilated premature infants. *Pediatr Res*, 56:918-926.

Zhang, X., Reinsvold, P., Thibeault, D.W., Ekekezie, II, Rezaiekhaligh, M., Mabry, S.M., Buch, S., **Truog, W.E.** (2005) Responses of pulmonary platelet-derived growth factor peptides and receptors to hyperoxia and nitric oxide in piglet lungs. *Pediatr Res* **57**:523-529.

b. abstracts

Truog, W.E., Xu, D., Rezaiekhaligh, M., Castor, C.A., Mayock, D.E. (2004) Gene expression and risk for chronic lung disease: Directed microarray analysis. *Pediatr Res* **55**(4):495A (Poster).

Sheffield, M.J., Thibeault, D.W., Ekekezie, II, Mabry, S., **Truog, W.E.** (2004) Human pulmonary nitric oxide synthases and nitrotyrosine: mediators of nitric oxide production and a marker of activity in the developing neonate and in chronic lung disease. *Pediatr Res* **55**(4):497A, (Poster).

Ford, S., Leeder, S., Gaedigk, A., **Truog, W.E.** (2004) Pharmacogenomics of inhaled nitric oxide response in persistent pulmonary hypertension of the newborn. *Pediatr Res* **55**(4):471A, (Platform presentation).

Minderman, D.W., Xu, D., Rezaiekhaligh, M., **Truog, W.E.** (2004) Hyperoxia, inflammation and immunity in the lung: directed microarray analysis. *Pediatr Res* **55**(4):452A, (Poster).

Xu, D., Guthrie, J.R., Kilbride, H.W., Rezaiekhaligh, M., Ekekezie, II, Sack T.M., **Truog, W.E.** (2004) Proteomic analysis of differential protein expression in normoxic and hyperoxic neonatal rat lungs. *Pediatr Res* **55**(4):495A, (Poster).

Gow, A.J., Ballard, P.L., Norberg, M., **Truog, W.E.**, Ballard, R.A. (2004) Relationship between markers of nitric oxide metabolism and pulmonary function in infants at risk of BPD. *Pediatr Res* **55**(4):497A, (Poster).

c. books, book reviews, etc.

Truog, W.E. and Golombek, S.G. (2004) Principles of Respiratory Care and Strategies for Management. In: Avery, Fletcher, MacDonald, eds. *Neonatology Pathophysiology and Management of the Newborn*. 6th ed. Philadelphia, PA. Lippincott Williams and Wilkins.

3. Grant Support (active funding 4/1/04-3/31/05)

NIH, “TLRs, Nitric Oxide and Chronic Lung Disease: Any Connections?”, R-01 HL70560, Principal Investigator, **William E. Truog**, \$915,000 (total cost), Total duration of the award: 2002-2006.

Hall Family Foundation, “Hypoxia and Pulmonary Vasculogenesis” joint award to Children’s Mercy Hospitals and Clinics and the University of Kansas School of Medicine, Co-Principal Investigator, **William E. Truog**, \$75,000 (direct costs per year) costs, Total duration of the award: July 1, 2003 through June 30, 2005.

Clinical Scholars Award, “Proteomic Analysis of TAF from Infants with BPD”, Co-Investigator, **William E. Truog**, \$70,000 (total cost), Total duration of the award: 2004-2006.

Katherine B. Richardson, MD Award, “Inflammation and Lung Development: Gene Expression Analysis”, Co-Investigator, **William E. Truog**, \$9,999 (total cost), Total duration of the award: 2004-2005.

4. Meetings attended (4/1/04-3/31/05)

The NO-CLD Study Group Meeting, “Part I – Status of Study, Part II – Potential New Trials,” and “Report to Investigators’ Meeting, NO-CLD Study,” May 2004, San Francisco

Midwest Society for Pediatric Research, “Expression of Epidermal Growth Factor-Like Domain 7 in Neonatal Rat Lungs During Normoxia and Hyperoxia,” October 2004, St. Louis, MO

Organization of Neonatal-Perinatal Training Program Directors, October 2004, San Francisco, CA

University of Miami-Division of Neonatology's 28th Annual International Conference: Neonatology 2004, "Genomics and Predicting the Risk of CLD of Prematurity" and "Current Status of the Uses of Inhaled Nitric Oxide in Preterm Infants", November 2004, Key Biscayne, Florida

Federation of Pediatric Organization Forum of Pediatric Subspecialties for Program Directors, "How Training Programs can Address the New American Board of Pediatrics Subspecialty Certification Requirements," November 2004, Palo Alto, CA

5. Editorial Board Service, Committees, Consulting, etc. (4/1/04-3/31/05)

National or International Committees:

Neonatal Pulmonology for PAS Annual Meeting, 2004 (Reviewer)

Dissertation Committees:

Teresa Orth, Ph.D. candidate, Department of Molecular and Integrative Physiology, University of Kansas School of Medicine

Departmental Committees:

Medical Staff Research Committee, Children's Mercy Hospital, 2004 (Chairman)

Consulting:

1998-present: Scientific Advisory Board – for a biotechnology corporation

2000-present: Member, National Scientific Advisory Board – for a nationally operating health management corporation

6. Seminars presented (4/1/04-3/31/05)

"Chronic Lung Disease of Prematurity: What Does the Evidence Say About Treatments?" Pediatric Grand Rounds, University of Kansas School of Medicine, October 2004

"Genomics and Predicting the Risk of CLD of Prematurity" and "Current Status of the Uses of Inhaled Nitric Oxide in Preterm Infants," University of Miami-Division of Neonatology's 28th Annual International Conference: Neonatology 2004, Key Biscayne, Florida, November 11-12, 2004

"Part I – Status of Study, Part II – Potential New Trials," and "Report to Investigators' Meeting, NO-CLD Study," The NO-CLD Study Group Meeting, May 2004, San Francisco, CA

7. Graduate, Medical, Postdoctoral and Summer Students (4/1/04-3/31/05)

Postdoctoral Fellows:

David Minderman, M.D., Neonatal-Perinatal Fellow (2002-present)

Emily McNellis, M.D., Neonatal-Perinatal Fellow (2003-present)

Kerri Fitzgerald, M.D., Neonatal-Perinatal Fellow (2004-present)

Chris Stapley, D.O., Neonatal-Perinatal Fellow (2004-present)

8. Research Associate, Assistants, Technicians and Aides (4/1/04-3/31/05)

Mo Rezaiekhalthigh, M.S., Research Assistant (1988-present)

Sherry Mabry, M.S., Research Assistant (1988-present)

Michael Norberg, B.S., MDiv, Research Assistant (1993-present)