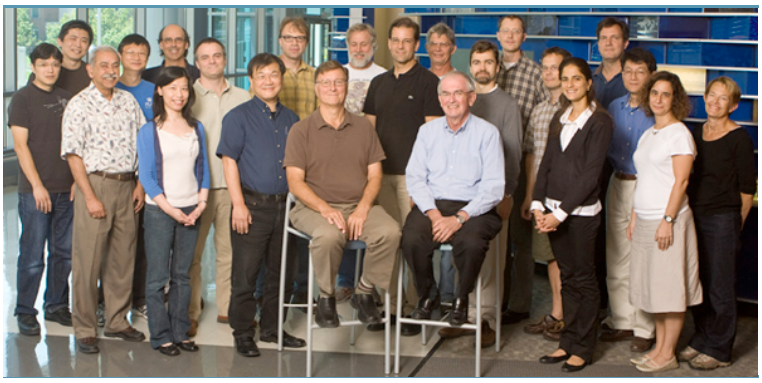
Developmental Biology

Division Photo



First Row: SK Dey, Chiou-Fen Chuang, Alex Kuan, Christopher Wylie, James Lessard, Geraldine Guasch, Tiffany Cook, Janet Heasman.

Second Row: Yutaka Yoshida, Jun Ma, Kenneth Campbell, Thomas Bartman, Saulius Sumanas, James Wells, Masato Nakafuku.

Third Row: Chieh Chang, Jay Degen, Brian Gebelein, Steven Potter, Vaughn Cleghon, Aaron Zorn, Matthew Kofron.

Division Data Summary

Research and Training Details	
Number of Faculty	24
Number of Joint Appointment Faculty	11
Number of Research Fellows	50
Number of Research Students	28
Number of Support Personnel	38
Direct Annual Grant Support	$5,567,373
Peer Reviewed Publications	101
Clinical Activities and Training	
Number of Clinical Fellows	5
Number of Other Students	24

Significant Publications

Cha, S., Tadjuidje, E.,Tao, Q, Wylie, C., and Heasman, J. (2009) "Wnt5a and Wnt11 interact in amaternal in a maternal Dkk1-regulated fashion to activate both canonical andnon-canonical signaling in Xenopus axis formation". Development 135: 3719-29

Brunskill, E., Aronow, B.,Georgas, K., Rumballe, B., Valerius, M., Aronow, J., Kaimal, V., Jegga, A.,Grimmond, S., McMahon, A., Patterson, L., Little, M., and Potter, S. (2008) Dev.Cell 15: 781-91 (+ front cover)

Nagao M,Campbell K, Burns K, Kuan CY, Trumpp A, Nakafuku M (2008).Coordinated controlof self renewal and differentiation of neural stem cells by Myc and thep19ARF-p53 pathway. J Cell Biol 183,1243-5

Li-Kroeger, D., Witt, L.,Grimes, H.L., Cook, T., and Gebelein (2008) Hox and senseless antagonismfunctions

as a molecular switch to regulate EGF secretion in the DrosophilaPNS. Dev Cell 15: 298-308

Li, Y., Rankin, S., Sinner,D., Kenny, A., Krieg, P., and Zorn, A. (2008) Srrp5 coordinates foregutspecification and morphogenesis by antagonizing both canonical and noncanonicalWnt11 signaling. Genes and Development22, 3050-63

Division Collaboration

Collaboration with Gastroenterology, Hepatology, and Nutrition

Collaborating Faculty: Jorge Bezerra

Plasminogen activation and hepatic repair with Jay Degen

Collaboration with Hematology/Oncology

Collaborating Faculty: Joseph Palumbo

Mechanisms linking procoagulants to tumor cell metastasis with Jay Degen

Collaboration with Rheumatology

Collaborating Faculty: Sherry Thornton

Arthritic disease and the hemostatic system with Jay Degen

Collaboration with Immunobiology

Collaborating Faculty: Lee Grimes

Integration of Hox and Sens inputs in blood cells with Brian Gebelein

New tumor suppression pathways in leukemia with Brian Gebelein

Collaboration with Pediatric Ophthalmology

Collaborating Faculty: Tiffany Cook

Understanding Sens/Gfi-1 function in Drosophila with Brian Gebelein

Collaboration with Pediatric and Thoracic Surgery

Collaborating Faculty: Alberto Pena; Marc Levitt

Characterizing anorectal transitional zones in humans with Geraldine Guasch

Collaboration with Experimental Hematology

Collaborating Faculty: Shyra Miller

Defining tumorigenesis role of eyes absent homolog 4 with Rashmi Hegde

Collaboration with Human Genetics

Collaborating Faculty: Gregory Grabowski

Crystallographic studies of acid-beta-glucosidase with Rashmi Hegde

Collaboration with Immunobiology

Collaborating Faculty: Lee Grimes

LSD1 inhibitor design with Rashmi Hegde

Collaboration with Infectious Diseases

Collaborating Faculty: Jason Jiang

Structure of Norwalk virus capsid proteins with Rashmi Hegde

Collaboration with Molecular Immunology

Collaborating Faculty: Christopher Karp

Structure-function studies of MD-2 with Rashmi Hegde

Collaboration with Pediatric Ophthalmology

Collaborating Faculty: Richard Lang

Structure of protein complexes involved in eye development with Rashmi Hegde

Collaboration with Experimental Hematology

Collaborating Faculty: Yi Zheng

Rac and Cdc42 in mammalian brain development with Alex Kuan, Kenny Campbell, and Masato Nakafuku

Collaboration with Nephrology and Hypertension
Collaborating Faculty: Prasad Devarajan
Implications of the ASK1/JNK pathway in ARF with Alex Kuan

Collaboration with Pulmonary Biology and Neonatology; Pediatric Neurology
Collaborating Faculty: Beth Haberman; Tonya Phillip
tPA neurotoxicity in hypoxia-ischemic encephalopathy with Alex Kuan

Collaboration with Pediatric Neurology
Collaborating Faculty: Tracy Glauser
Association study of neuronal migration genes in pediatric epilepsy with Alex Kuan

Collaboration with Radiology
Collaborating Faculty: Scott Holland
Thrombosis and plasminogen activators in cerebral ischemia-hypoxia with Alex Kuan and Jay Degen

Collaboration with Biomedical Informatics
Collaborating Faculty: Bruce Aronow
Genomic analysis in altered muscle with Jim Lessard

Collaboration with Gastroenterology, Hepatology, and Nutrition
Collaborating Faculty: Ajay Kaul
Altered myofilaments in chronic pseudo-obstruction with Jim Lessard

Collaboration with Pathology
Collaborating Faculty: Kevin Bove
Mouse models of actin-based myopathy with Jim Lessard

Collaboration with Pulmonary Biology and Neonatology
Collaborating Faculty: James Greenberg; Anne Akeson; Jeffrey Whitsett
Epithelial mesenchymal interactions in lung development with Jim Lessard

Collaboration with Pulmonary Biology and Neonatology
Collaborating Faculty: John Shannon
Regulation of pulmonary smooth muscle development with Jim Lessard

Collaboration with Pediatric Ophthalmology
Collaborating Faculty: Richard Lang
Role of Pygopus in Wnt signaling during mouse development with Xinhua Lin

Collaboration with Anesthesiology
Collaborating Faculty: Steve Danzer
Neurogenesis in the adult hippocampus of epileptic brains with Masato Nakafuku

Collaboration with Experimental Hematology
Collaborating Faculty: Yi Zheng
Role of Rac1 in brain development with Masato Nakafuku and Alex Kuan

Role of Cdc42 in neural stem cells during development with Masato Nakafuku and Alex Kuan

Collaboration with Biomedical Informatics
Collaborating Faculty: Bruce Aronow
Global gene expression atlas of the developing kidney with Steve Potter and Jim Lessard

Collaboration with Biomedical Informatics
Collaborating Faculty: Jun Ma
PPitx2 homedomain with Steve Potter

Collaboration with Nephrology and Hypertension
Collaborating Faculty: Prasad Devarajan

Altered gene expression using microarrays in FSGS with Steve Potter

Collaboration with Experimental Hematology
Collaborating Faculty: Yi Zheng
Analysis of RhoA mutant embryos with Jim Wells

Collaboration with Experimental Hematology; Hematology/Oncology
Collaborating Faculty: Susanne Wells; Punam Malik; Jose Canelas
Induced pluripotent stem cells from human tissues with Jim Wells

Collaboration with Gastroenterology, Hepatology, and Nutrition
Collaborating Faculty: Noah Shroyer
Role of Sox17 in intestinal neoplasia with Jim Wells

Collaboration with Pulmonary Biology and Neonatology
Collaborating Faculty: Jeffrey Whitsett
Differentiation of pluripotent stem cells into lung with Jim Wells

Collaboration with Biomedical Informatics
Collaborating Faculty: Bruce Aronow
Role of Onecut 2 in intestinal gene regulation with Dan Wiginton

Collaboration with Orthopedic Surgery
Collaborating Faculty: Roger Cornwall
Role of muscle satellite cells in postnatal muscle denervation injuries with Chris Wylie

Collaboration with Orthopedic Surgery
Collaborating Faculty: Eric Wall
Growth and differentiation of the postnatal vertebra and intervertebral disk with Chris Wylie

Collaboration with Plastic Surgery
Collaborating Faculty: Jesse Taylor
Growth of mandibles from stem cells with Chris Wylie

Collaboration with Pulmonary Biology and Neonatology
Collaborating Faculty: Jeffrey Whitsett
Sox17 in lung development and repair with Aaron Zorn

Faculty Members

Christopher C. Wylie, PhD, Professor ; *Director; Associate Chair for Basic Science*
Research Interests: Early Vertebrate Development, Xenopus, Mammal

Nadean Brown, PhD, Associate Professor
Research Interests: Eye Development, Mouse And Drosophila

Kenneth Campbell, PhD, Associate Professor ; *Director, Molecular and Developmental Biology Graduate Program*
Research Interests: CNS Patterning, Mammal

Chieh Chang, PhD, Assistant Professor
Research Interests: Nervous System, C. Elegans

Chiou-Fen Chuang, PhD, Assistant Professor
Research Interests: Nervous System, C. Elegans, Laterality

Vaughn Cleghon, PhD, Associate Professor
Research Interests: Kinase Function In Development, Signaling

Jay L. Degen, PhD, Professor
Research Interests: Hemostatic Factor Function, Mammal

Brian Gebelein, PhD, Assistant Professor
Research Interests: Transcriptional Regulation, Drosophila, Body Patterning, Nervous System

Geraldine Guasch, PhD, Assistant Professor

Janet Heasman, PhD, Professor

Research Interests: Early Vertebrate Development, Xenopus

Rashmi S. Hegde, PhD, Professor
Research Interests: Protein Structure/Function

J. Matthew Kofron, PhD, Research Assistant Professor
Research Interests: Imaging Manager, Ectodermal Organ Development In Vertebrates, Xenopus

Chia-Yi Kuan, MD, PhD, Associate Professor
Research Interests: Nervous System Patterning, Stroke, Cell Death, Mammal

James L. Lessard, PhD, Professor ; *Associate Director*
Research Interests: Muscle Development, Mammal

Hung-Chi Liang, PhD, Research Instructor
Research Interests: Affymetrix Core Manager

Xinhua Lin, PhD, Associate Professor
Research Interests: Cell Signaling, Drosophila

Christopher Mayhew, PhD, Research Assistant Professor ; *Co-Director, Stem Cell Core*
Research Interests: Human ES Biology and Differentiation

Masato Nakafuku, MD, PhD, Professor
Research Interests: Nervous System Patterning And Stem Cells, Mammal

S. Steven Potter, PhD, Professor ; *Director, Affymetrix Core*
Research Interests: Transcription Regulation And Kidney Development, Mammal

Saulius Sumanas, PhD, Assistant Professor
Research Interests: Vascular Development, Zebrafish

James M. Wells, PhD, Associate Professor ; *Co-Director, Stem Cell Core*
Research Interests: Vertebrate Gut Development, Stem Cells, Mammal

Dan A. Wiginton, PhD, Associate Professor
Research Interests: Gut Differentiation, Mammal

Yutaka Yoshida, PhD, Assistant Professor
Research Interests: Nervous System, Cell Migration, Mammal, Chicken

Aaron Zorn, PhD, Associate Professor
Research Interests: Vertebrate Gut Development, Xenopus, Mammal

Joint Appointment Faculty Members

Bruce Aronow, PhD, Professor
Pediatric Bioinformatics
Bioinformatics

Thomas Bartman, MD PhD, Assistant Professor
Pulmonary Biology and Neonatology
Cardiovascular Development, Zebrafish

Tiffany Cook, PhD, Assistant Professor
Pediatric Ophthalmology
Eye Development, Drosophila

Sandra Degen, PhD, Professor
Research Administration
Director, Career Development

Sudhansu Dey, PhD, Professor
Director, Reproductive Sciences
Reproductive Biology

Prasad Devarajan, MD, Professor
Director, Nephrology and Hypertension
Urinary Tract Differentiation, Mammal

Vladimir Kalinichenko, MD PhD, Associate Professor
Pulmonary Biology and Neonatology
Transcriptional Regulation of Lung Embryonic Development

Richard A. Lang, PhD, Professor

Director, Transgenic Core Facility, Pedatric Opthalmology
Visual System Development, Mammal

Jun Ma, PhD, Professor
Pediatric Bioinformatics
Transcriptional Regulation, Drosophila

Noah F. Shroyer, PhD, Assistant Professor
Gastroenterology, Hepatology, and Nutrition
Vertebrate Gut Development, Mammal

Jeffrey A. Whitsett, MD, Professor
Chief, Section of Neonatology, Perinatal, and Pulmonary Biology
Respiratory System, Mammal

Trainees

- **Matthew Flick, PhD,** Facult, Purdue University, Instructor, Rheumatology
- **Larry Patterson, MD,** Facult, College of Medicine of Pennsylvania State University, Assoc. Prof., Nephrology
- **Joseph Palumbo, MD,** Facult, Penn State University College of Medicine, Asst. Prof., Hematology
- **Pramod Reddy, MBBS,** Facult, Guntur Medical College and Siddhartha, Assoc. Prof., Urology
- **Tatyana Belenkaya, PhD,** Res. A, Russian Academy of Science
- **Eric Brunskill, PhD,** Res. A, University of Maryland
- **Weiming Bu, PhD,** Res. A, Jilin University, China
- **Bharesh Chauhan*, PhD,** Res. A, Oxford University, United Kingdom
- **Chitra Dahia*, PhD,** Res. A, Indian Institute of Science
- **Lisa Ehrman, PhD,** Res. A, University of Cincinnati
- **Tomoko Fujita*, PhD,** Res. A, University of Tsukuba, Japan
- **Alfor Lewis, PhD,** Res. A, University of Manchester, UK
- **Guoqing Lin, PhD,** Res. A, University of Luebeck, Germany
- **Motoshi Nagao, PhD,** Res. A, Tokyo Institute of Technology
- **Reena Rani, PhD,** Res. A, Chatrapati Shahu Ji University, India
- **Michael Spencer, PhD,** Res. A, University of Kentucky (end 8/22/08)
- **Qinghua Tao, PhD,** Res. A, Chinese Academy of Sciences (end 5/29/09)
- **Jody White, PhD,** Res. A, California Institute of Technology (end 1/30/09)
- **Huirong Xie*, PhD,** Res. A, Vanderbilt University
- **Dianer Yang, PhD,** Res. A, Chinese Academy of Sciences
- **Kevin Burns, PhD,** Res. F, University of Cincinnati
- **Sang-Wook Cha, PhD,** Res. F, Kyungpook National University, Korea
- **Hidetoshi Fujita*, PhD,** Res. F, University of Tsukuba, Japan
- **Amy Gresser, PhD,** Res. F, Harvard University
- **Jing-Fen Han, PhD,** Res. F, University of Medicine and Dentistry of New Jersey
- **Yasushi Hirota*, MD PhD,** Res. F, University of Tokyo, Japan
- **Yi-Wen Hsieh, PhD,** Res. F, University of California, Los Angeles
- **Maximiliano Jimenez-Dalmaroni, PhD,** Res. F, University of Oxford, UK
- **Avedis Kazanjian*, PhD,** Res. F, University of Louisville
- **Jay Kormish, PhD,** Res. F, University of Calgary
- **Suh-Chin Lin, PhD,** Res. F, University of Texas Health Sciences, San Antonio
- **Yi-Ling Lin, PhD,** Res. F, National Yang-Ming University, Taiwan
- **Junbo Liu*, PhD,** Res. F, Fudan University
- **Mayur Madhavan, PhD,** Res. F, Miami University
- **Aygun Mamedova, PhD,** Res. F, Moscow State University (end 10/31/08)
- **Athanasia Nikolaou, PhD,** Res. F, University of Melbourne, Australia (end 2/6/09)
- **Taeko Noah*, PhD,** Res. F, University of Nevada
- **Jennifer Ondr*, PhD,** Res. F, Washington University

- **Timothy Plageman*, PhD,** Res. F, University of Cincinnati
- **Virgilio Ponferrada*, PhD,** Res. F, Wright State University
- **Sujata Rao*, PhD,** Res. F, Cornell University
- **Latasha Redmond, PhD,** Res. F, Virginia Commonwealth University
- **Debora Sinner, PhD,** Res. F, University of Buenos Aires, Argentina
- **Jason Spence, PhD,** Res. F, Miami University, Ohio
- **Yalikun Suofu, PhD,** Res. F, University of Greifswald, Germany (end 8/29/09)
- **Emmanuel Tadjuidje, PhD,** Res. F, University of Goettengen, Germany
- **Kaori Takeshima, PhD,** Res. F, Miyazaki University, Japan
- **Ilya Vilinksy, PhD,** Res. F, Cornell University (end 8/29/08)
- **Ronald Waclaw, PhD,** Res. F, University of Cincinnati
- **Yihui Wu, PhD,** Res. F, Peking University, China
- **Baotang Xie*, PhD,** Res. F, Chinese Academy of Sciences
- **Dong Yan, PhD,** Res. F, University of Cincinnati
- **Eun-Jin Yeo*, PhD,** Res. F, Seoul National University, South Korea
- **Yan Zou, PhD,** Res. F, Chinese Academy of Sciences
- **Andrew Grande, MD,** Clin. , University of Cincinnati
- **Jonathan Howell, MD PhD,** Clin. , Indiana University
- **Alan Kenny, MD PhD,** Clin. , University of Rochester, School of Medicine and Dentistry
- **Eric Mullins, MD,** Clin. , University of Missouri - Columbia
- **Bella Zeisler*, MD,** Clin. , New York University
- **Nuray Acar*, ,** Grad., Akdeniz University, Antalya, Turkey
- **Douglas Brown*, ,** Grad., University of Cincinnati - College of Medicine
- **Alessandro Cancelliere, ,** Grad. , University of Cincinnati - Neuroscience (end 8/31/08)
- **Peng Cheng, ,** Grad., Xiamen University School of Life Sciences, China
- **Hui Chiu, ,** Grad., National Taiwan University, Taiwan
- **Xiaolan Fan, ,** Grad., Wenzhou Medical College, China
- **Ying Feng, ,** Grad. , Xiamen University, China
- **Qinzhu Huang, ,** Grad., Wenzhou Medical College, China
- **Robert Hufnagel, ,** Grad. , University of Cincinnati - PSTP and Neuroscience
- **Xiaofei Sun*, ,** Grad., Vanderbilt University
- **Yongfei Yang, ,** Grad. , Peking University, China
- **Russel Alt, ,** Underg, Yale University
- **Julie Bonn, ,** Underg, University of Cincinnati
- **Felicia Ciamacco, ,** Underg, University of Cincinnati
- **Dustin Dumont, ,** Underg, University of Cincinnati (end 5/28/09)
- **Elizabeth Eichhold, ,** Underg, Xavier University
- **Megan Feng, ,** Underg, Ohio State University
- **Lauren Head, ,** Underg, Xavier University
- **Wynn Hunter, ,** Underg, Duke University
- **Tasneem Kaleem, ,** Underg, Xavier University
- **Howard Kim, ,** Underg, Tufts University
- **Ryan Lauf, ,** Underg, Xavier University
- **Veronica Massey, ,** Underg, Xavier University
- **Meredith McAdams, ,** Underg, Xavier University
- **Nikhil Menon, ,** Underg, Ohio State University
- **Susan Mittenzwei, ,** Underg, Xavier University
- **Karan Munshani, ,** Underg, Case Western University
- **Ashley Riesenberg, ,** Underg, University of Cincinnati (end 8/29/08)
- **Eric Smith, ,** Underg, Rose-Hulman Institute of Technology

- **Jasmine Suggs, ,** Underg, Oakwood University
- **Katelyn Walzer, ,** Underg, University of Pittsburgh
- **Blair Wissel, ,** Underg, Xavier University
- **Chris Wolfe, ,** Underg, Xavier University
- **Anna Jackson, ,** High S, Mt. Healthy High School
- **Briona McCoy, ,** High S, Mt. Healthy High School

Significant Accomplishments

Mentorship

Mentorship plays an important role in the division, and trainees had an exceptional year. **Jason Spence** (Wells lab) gained a postdoctoral fellowship from the Juvenile Diabetes Research Foundation. **Rob Hufnagel** (Brown lab) won the first prize for his presentation at the Midwest meeting of the Society for Developmental Biology (SDB), and was awarded a free trip to the annual national society meeting in San Francisco. **Sumeda Nandadasa** (Wylie lab) won first prize for his presentation at the Molecular and Developmental Biology Graduate Program Annual Retreat, and gained a University of Cincinnati Dissertation Fellowship, only five of which are awarded in the university. He also had a front cover and a News and Views article for his first-author paper in *Development.* **Ying Gu** (Wylie lab) gained a Ryan Fellowship, the university's most prestigious award for graduate students, and was invited to give a very rare "graduate student platform presentation" at the SDB national meeting. This means that two of our graduate students will be presenting at the national meeting of the SDB, and bringing important kudos to CCHMC.

Research

The mechanisms by which tissues differentiate into specific lineages, and the way in which they become patterned, are central issues in development, addressed in two major papers from the division, both in *Developmental Cell*. In the first, Brian Gebelein's group describe how the Hox genes control tissue patterning by forming a molecular switch with the transcription factor Senseless in the Drosophila embryo. In the second, Jim Wells' group defines the role played by the transcription factor Sox17 in the formation of different organs in the mammalian foregut. One of the basic tenets of stem cell biology is that the properties of pluripotency and proliferation of stem cells are controlled by cells that surround them, their so called "niches." However, some stem cell populations migrate during embryogenesis, which raises the question of how these properties are controlled. Ying Gu (Wylie lab), showed in a first-author paper in *Development*, that essential signals are released progressively by tissues along the migratory route of primordial germ cells in the mouse embryo, thus providing a "traveling niche" for these essential pluripotent cells. During development of the spinal cord, sensory neuron processes that enter the cord dorsally migrate ventrally and form synapses on their target motor neurons in the ventral spinal cord. In a paper in *Nature,* Yutaka Yoshida showed that recognition of the target neurons by the sensory neuron processes requires the semaphorin/plexin family of ligands and receptors. An interesting thing about signaling ligands is that their concentration and localization must be tightly controlled. Excess Wnt signaling, for example, causes cancer. In a paper in *Development,* Janet Heasman's group show that the amount of Wnt signaling is controlled in the early embryo both by the specific inhibitor Dkk, and by dimerization of two different Wnts. This finding offers novel translational opportunities to control Wnt signaling in disease.

External Funding

In a very tough financial climate, there was also some good news with respect to **external funding**. Yutaka Yoshida and Saulius Sumanas, two new faculty members in the division, both gained highly competitive Basil O'Connor Starter Scholar awards from the March of Dimes. Yutaka Yoshida also gained his first NIH RO1 grant at the first attempt, to study the way sensory nerve terminals growing into the developing spinal cord find their complementary motor neuron cell bodies in order to initiate reflex arcs. A Biotechnology Research Partnership Award, the first such grant awarded by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), was awarded to David Butler (Dept of Biomedical Engineering) and Chris Wylie (Division of Developmental Biology, CCHMC). This major award is to identify the developmental mechanisms underlying tendon differentiation, and use these to generate new tendon from stem cells in vitro. Jim Wells, Aaron Zorn, Chris Wylie, Steve Potter, Jay Degen, Kenny Campbell, Xinhua Lin, and Rashmi Hegde all gained NIH RO1's. At a time of sub-10% funding levels at the NIH, all these faculty should be congratulated.

Division Publications

1. Chen J, Aronow BJ, Jegga AG. Disease candidate gene identification and prioritization using protein interaction networks. *BMC Bioinformatics.* 2009; 10: 73.
2. Lange AW, Keiser AR, Wells JM, Zorn AM, Whitsett JA. Sox17 promotes cell cycle progression and inhibits TGF-beta/Smad3 signaling to initiate progenitor cell behavior in the respiratory epithelium. *PLoS One.* 2009; 4:

e5711.

3. Qu XA, Gudivada RC, Jegga AG, Neumann EK, Aronow BJ. Inferring novel disease indications for known drugs by semantically linking drug action and disease mechanism relationships. *BMC Bioinformatics.* 2009; 10 Suppl 5: S4.
4. Tan M, Xia M, Chen Y, Bu W, Hegde RS, Meller J, Li X, Jiang X. Conservation of carbohydrate binding interfaces: evidence of human HBGA selection in norovirus evolution. *PLoS One.* 2009; 4: e5058.
5. Wang B, Waclaw RR, Allen ZJ, 2nd, Guillemot F, Campbell K. Ascl1 is a required downstream effector of Gsx gene function in the embryonic mouse telencephalon. *Neural Dev.* 2009; 4: 5.
6. Gu Y, Runyan C, Shoemaker A, Surani A, Wylie C. Steel factor controls primordial germ cell survival and motility from the time of their specification in the allantois, and provides a continuous niche throughout their migration. *Development.* 2009; 136: 1295-303.
7. Kothiyal P, Cox S, Ebert J, Aronow BJ, Greinwald JH, Rehm HL. An overview of custom array sequencing. *Curr Protoc Hum Genet.* 2009; Chapter 7: Unit 7 17.
8. Lewis CC, Aronow B, Hutton J, Santeliz J, Dienger K, Herman N, Finkelman FD, Wills-Karp M. Unique and overlapping gene expression patterns driven by IL-4 and IL-13 in the mouse lung. *J Allergy Clin Immunol.* 2009; 123: 795-804 e8.
9. Nandadasa S, Tao Q, Menon NR, Heasman J, Wylie C. N- and E-cadherins in Xenopus are specifically required in the neural and non-neural ectoderm, respectively, for F-actin assembly and morphogenetic movements. *Development.* 2009; 136: 1327-38.
10. Le TT, Conley KW, Brown NL. Jagged 1 is necessary for normal mouse lens formation. *Dev Biol.* 2009; 328: 118-26.
11. Nishijo K, Chen QR, Zhang L, McCleish AT, Rodriguez A, Cho MJ, Prajapati SI, Gelfond JA, Chisholm GB, Michalek JE, Aronow BJ, Barr FG, Randall RL, Ladanyi M, Qualman SJ, Rubin BP, LeGallo RD, Wang C, Khan J, Keller C. Credentialing a preclinical mouse model of alveolar rhabdomyosarcoma. *Cancer Res.* 2009; 69: 2902-11.
12. Lian L, Wang Y, Flick M, Choi J, Scott EW, Degen J, Lemmon MA, Abrams CS. Loss of pleckstrin defines a novel pathway for PKC-mediated exocytosis. *Blood.* 2009; 113: 3577-84.
13. Gu Y, Harley IT, Henderson LB, Aronow BJ, Vietor I, Huber LA, Harley JB, Kilpatrick JR, Langefeld CD, Williams AH, Jegga AG, Chen J, Wills-Karp M, Arshad SH, Ewart SL, Thio CL, Flick LM, Filippi MD, Grimes HL, Drumm ML, Cutting GR, Knowles MR, Karp CL. Identification of IFRD1 as a modifier gene for cystic fibrosis lung disease. *Nature.* 2009; 458: 1039-42.
14. Haase-Fielitz A, Bellomo R, Devarajan P, Story D, Matalanis G, Dragun D, Haase M. Novel and conventional serum biomarkers predicting acute kidney injury in adult cardiac surgery--a prospective cohort study. *Crit Care Med.* 2009; 37: 553-60.
15. Sun X, Wang H, Okabe M, Mackie K, Kingsley PJ, Marnett LJ, Cravatt BF, Dey SK. Genetic loss of Faah compromises male fertility in mice. *Biol Reprod.* 2009; 80: 235-42.
16. Sun H, Wang X, Degen JL, Ginsburg D. Reduced thrombin generation increases host susceptibility to group A streptococcal infection. *Blood.* 2009; 113: 1358-64.
17. Besnard V, Wert SE, Stahlman MT, Postle AD, Xu Y, Ikegami M, Whitsett JA. Deletion of Scap in alveolar type II cells influences lung lipid homeostasis and identifies a compensatory role for pulmonary lipofibroblasts. *J Biol Chem.* 2009; 284: 4018-30.
18. Lim HJ, Dey SK. HB-EGF: a unique mediator of embryo-uterine interactions during implantation. *Exp Cell Res.* 2009; 315: 619-26.
19. Pontoriero GF, Smith AN, Miller LA, Radice GL, West-Mays JA, Lang RA. Co-operative roles for E-cadherin and N-cadherin during lens vesicle separation and lens epithelial cell survival. *Dev Biol.* 2009; 326: 403-17.
20. Willardsen MI, Suli A, Pan Y, Marsh-Armstrong N, Chien CB, El-Hodiri H, Brown NL, Moore KB, Vetter ML. Temporal regulation of Ath5 gene expression during eye development. *Dev Biol.* 2009; 326: 471-81.
21. Abman S, Jobe A, Chernick V, Blaisdell C, Castro M, Ramirez MI, Gern JE, Cutting G, Redding G, Hagood JS, Whitsett J, Raj JU, Barst R, Kato GJ, Gozal D, Haddad GG, Prabhakar NR, Gauda E, Martinez FD, Tepper R, Wood RE, Accurso F, Teague WG, Venegas J, Cole FS, Wright RJ, Gail D, Hamvas A, Kercsmar C, Kiley J, Weinmann G. Strategic plan for pediatric respiratory diseases research: an NHLBI working group report. *Pediatr Pulmonol.* 2009; 44: 2-13.
22. Fuhrmann S, Riesenberg AN, Mathiesen AM, Brown EC, Vetter ML, Brown NL. Characterization of a transient TCF/LEF-responsive progenitor population in the embryonic mouse retina. *Invest Ophthalmol Vis Sci.* 2009; 50: 432-40.
23. Haase M, Haase-Fielitz A, Bellomo R, Devarajan P, Story D, Matalanis G, Reade MC, Bagshaw SM, Seevanayagam

N, Seevanayagam S, Doolan L, Buxton B, Dragun D. Sodium bicarbonate to prevent increases in serum creatinine after cardiac surgery: a pilot double-blind, randomized controlled trial. *Crit Care Med.* 2009; 37: 39-47.

24. Perl AK, Zhang L, Whitsett JA. Conditional expression of genes in the respiratory epithelium in transgenic mice: cautionary notes and toward building a better mouse trap. *Am J Respir Cell Mol Biol.* 2009; 40: 1-3.
25. Phng LK, Potente M, Leslie JD, Babbage J, Nyqvist D, Lobov I, Ondr JK, Rao S, Lang RA, Thurston G, Gerhardt H. Nrarp coordinates endothelial Notch and Wnt signaling to control vessel density in angiogenesis. *Dev Cell.* 2009; 16: 70-82.
26. Sise ME, Barasch J, Devarajan P, Nickolas TL. Elevated urine neutrophil gelatinase-associated lipocalin can diagnose acute kidney injury in patients with chronic kidney diseases. *Kidney Int.* 2009; 75: 115-6; author reply 116.
27. Zhuge Y, Lagman JA, Ansenberger K, Mahon CJ, Daikoku T, Dey SK, Bahr JM, Hales DB. CYP1B1 expression in ovarian cancer in the laying hen Gallusdomesticus. *Gynecol Oncol.* 2009; 112: 171-8.
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Grants, Contracts, and Industry Agreements

Grant and Contract Awards — Annual Direct / Project Period Direct

ALLEN, Z

The Role of FoxP2 in Olfactory Bulb Interneuron Neurogenesis
National Institutes of Health
F30 DC 008928 — 01/01/07 - 06/30/09 — $46,176 / $92,826

BROWN, N.

Cell-cell Signaling during Mammalian Early Eye Formation
National Institutes of Health
R01 EY 018097 — 04/01/08 - 03/31/12 — $250,000 / $1,000,000

CAMPBELL, K

Regional Control of Telencephalic Neuronal Diversity
National Institutes of Health
R01 MH 069643 — 01/01/05 - 12/31/09 — $213,341 / $1,125,000

The Roles GSH1 and GSH2 Genes in Telencephalic Neurogenesis
National Institutes of Health
R01 NS 044080 — 07/01/08 - 06/30/13 — $218,750 / $1,093,750

CHUANG, C

Molecular Mechanisms of Gap Junction-Mediated Olfactory Signaling
Whitehall Foundation, Inc.
02008-05-21 — 07/01/08 - 06/30/11 — $70,468 / $207,851

DEGEN, J.

Hemostatic Factors as Determinants of Bacterial Virulence and Host Defense
National Institutes of Health
R01 HL 085357 — 07/01/06 - 06/30/11 — $242,750 / $1,250,000

Cincinnati Rheumatic Diseases Center (Core 2)
National Institutes of Health
P30 AR 047363 — 07/01/08 - 06/30/09 — $67,299 / $67,299

GEBELEIN, B

A New Tumor Suppression Pathway in Leukemia
Ohio Cancer Research Association
5308 07/01/08 - 06/30/10 $22,727 / $45,454

Hox Regulation of Sensory Organ Development in Drosophila
National Institutes of Health
R01 GM 079428 04/01/08 - 02/28/13 $190,000 / $950,000

HEGDE, R

Mechanism of Action of Retinal Determination Proteins
National Institutes of Health
R01 EY 014648 09/01/04 - 08/31/09 $214,113 / $1,125,000

KUAN, C

Apoptosis and Renewal of Neural Progenitor Cells
National Institutes of Health (Yale University School of Medicine)
R01 NS 038296 02/01/06 - 01/31/11 $41,199 / $255,353

Vascular Effects of Amyloid Peptide via Rac GTPase in Ischemia-hypoxia
Alzheimer's Association
08/01/07 - 07/31/09 $45,450 / $90,900

Rac GTPases in the Mammalian Brain Development
National Institutes of Health
R01 NS 056435 07/01/08 - 06/30/12 $200,000 / $800,000

tPA Neurotoxicity in Hypoxic-Ischemic Encephalopathy
National Institutes of Health
R21 NS 059668 04/01/08 - 03/31/10 $109,375 / $240,625

LESSARD, J

Murine Atlas of Genitourinary Smooth Muscle Development
National Institutes of Health
U01 DK 070219 04/01/05 - 03/31/10 $930,460 / $1,715,972

LIN, X

Regulation of Hedgehog Distribution and Signaling
American Cancer Society - National
RSG0705101DDC 01/01/07 - 12/31/10 $150,000 / $600,000

Regulation of Wingless (Wg) Signaling and Morphogen Gradient Formation
National Institutes of Health
R01 GM 063891 07/01/07 - 06/30/11 $190,000 / $760,000

POTTER, S

Development of Metanephric Mesenchyme
National Institutes of Health
R01 DK 061916 04/01/06 - 03/31/10 $195,073 / $820,000

Global Gene Expression Atlas of the Developing Kidney
National Institutes of Health
U01 DK 070251 09/30/04 - 07/31/09 $231,549 / $1,256,457

Global Gene Expression Atlas of the Developing Kidney
National Institutes of Health
U01 DK 070251 (supplement) 08/01/08 - 07/31/09 $10,000 / $10,000

Global Gene Expression Atlas of the Developing Kidney
National Institutes of Health
U01 DK 070251 (supplement) 08/01/08 - 07/31/09 $215,545 / $215,545

Global Gene Expression Atlas of the Developing Kidney
National Institutes of Health
U01 DK 070251 (supplement) 08/01/08 - 07/31/09 $79,398 / $79,398

Digestive Health Center: Bench to Bedside Research in Pediatric Digestive Disease (Gene Expression Core)
National Institutes of Health
P30 DK 078392 06/01/09 - 05/31/10 $53,741 / $53,741

SPENCE, J

Using Development Paradigms to Direct Human Endoderm into Beta Cells
Juvenile Diabetes Research Foundation
09/01/08 - 08/31/10 $47,296 / $96,224

SUMANAS, S

Estrp Role in the Zebrafish Heart Formation
March of Dimes - National
5-FY09-78 02/01/09 - 01/31/11 $68,182 / $136,364

Etsrp Role in the Zebrafish Heart Formation
University of Cincinnati Research Council
01/01/09 - 12/31/09 $6,500 / $6,500

WELLS, J.

Mechanisms of Endoderm Specification along the A-P Axis
National Institutes of Health
R01 GM 072915 05/01/06 - 04/30/11 $184,490 / $950,000

The Role of Sox17 in Beta Cell Homeostasis and Regeneration
Juvenile Diabetes Research Foundation
26-2008-894 09/01/08 - 08/31/09 $100,000 / $100,000

WYLIE, C

Cadherin-Based Actin Assembly in the Xenopus Embryo
National Institutes of Health
R01 HD 044764 03/12/09 - 01/31/14 $207,500 / $1,037,500

Training Program in Organogenesis
National Institutes of Health
T32 HD 046387 05/01/06 - 04/30/11 $215,201 / $1,007,071

YOSHIDA, Y

Regulation of Sensory-Motor Connectivity by Semaphorin-Plexin Signaling
National Institutes of Health
R01 NS 065048 04/01/09 - 03/31/14 $218,750 / $1,093,750

Role of Sema3E-PlexinD1 Signaling in Synaptic Specifically of Sensory Motor Connections in the Developing Mouse Spinal Cord
March of Dimes - National
5-FY09-106 02/01/09 - 01/31/11 $68,182 / $136,364

ZORN, A

Molecular Basis of Liver Development
National Institutes of Health
R01 DK 070858 04/01/07 - 03/31/12 $200,900 / $1,025,000

Mammalian Foregut Liver Development
National Institutes of Health
R01 DK 080823 01/01/09 - 12/31/12 $262,958 / $996,988

Current Year Direct $5,567,373

Total $5,567,373

Molecular and Developmental Biology Graduate Program

The Graduate Program in Molecular and Developmental Biology is an interdepartmental program within the University of Cincinnati that offers the Ph.D. degree. It has been based in the Department of Pediatrics for over 35 years. Drs. Kenneth

Campbell and Katherine Yutzey served as Directors of the Program with co-directors Drs. Jeffrey Whitsett - finance, Richard Lang - academics, Tim Le Cras - admissions, Tiffany Cook – recruitment, Jeff Robbins – faculty membership, and Tim Weaver– graduate studies.

There are 74 faculty members in the program. During the past year, there were 58 predoctoral students in the program, 6 of whom are pursuing M.D./Ph.D. degrees. Students and faculty continue to be productive as measured by their numbers of publications, presentations at meetings, honors and awards received. Grant support to faculty remains high.

During the past year, the University of Cincinnati continued to support the program by providing University Graduate Assistantships and funds appropriated from the Dean's office to support 9 first year students. The remaining students are supported through a variety of sources including Yates Fellowship (1), Ryan Fellowships (2), American Heart Fellowships (1), NIH NRSA (2), NIH training grants (11), external grants to their advisors (20), CHRF Special Purpose Funds to their advisors (14), and funds from the Children's Hospital Research Foundation to the Graduate Program (1).

The MDB Program provides an excellent research educational experience for students and has an excellent record in the placement of its graduates in scientific careers.

Molecular and Developmental Biology Graduate Program Students, 2008-2009

Student	Faculty Mentor	Admission
Shailaja Akunuru	Yi Zheng	2006
Zegary Allen**	Kenneth Campbell	2004
David Balli	Rotation	2008
William Baird**	Timothy Cripe	2006
Abigail Bower	Rotation	2008
Seth Brown*	Rotation	2008
Ashley Cast	Stephanie Ware	2007
Heather Chapman	Kenneth Campbell	2007
Gang Chen	Jeffrey Whitsett	2004
Michelle Combs	Katherine Yutzey	2004
Sharina Desai	Rotation	2008
Jieqing Fan	Richard Lang	2007
Derek Garrison	Jeffrey Whitsett	2006
Nicole Glenn	Thomas Bartman	2006
Curtis Grace	Charles Vorhees	2003
Ying Gu	Christopher Wylie	2006
Yuanyuan Gu	Christopher Karp	2005
Zirong Gu	Rotation	2008
David Hahn	Timothy Weaver	2006
Anna Hake	James Wells	2007
Jamie Havrilak	Rotation	2008
Mary Horn	Katherine Yutzey	2007
Shawna (Blaney) Hottinger	Jeffrey Robbins	2004
Amer Jameel	Timothy Weaver	2006
Diva Jonatan	James Wells	2006
Elizabeth (Haque) Kramer**	Timothy Le Cras	2005
David Li-Kroeger	Rotation	2008
Kristen Lipscomb	Woodrow Benson	2004
Wei Liu	Yi Zheng	2005
Thomas Lu**	Marc Rothenberg	2007
Rajat Madan	Christopher Karp	2001
Arturo Maldonado	Timothy Crombleholme	2004
Karunyakanth Mandapaka	Timothy Weaver	2005
Caitlin Maynard	Katherine Yutzey	2006
Elizabeth McDonald	Tiffany Cook	2004

Timothy Mead	Katherine Yutzey	2006
Monique Morrison	Susanne Wells	2005
Elizabeth Mushaben	Tim LeCras	2007
Sumeda Nandadasa	Christopher Wylie	2005
Zhenglei Pei	Kenneth Campbell	2004
Jennifer Peters	Randy Sallee	2002
Megan Rost	Rotation	2008
Tori Schaefer	Michael Williams	2004
Kathy (Shair) Schroer	Gurjit Hershey	2004
Emily Sites	Nancy Ratner	2005
Tony Stefater**	Richard Lang	2008
Mardi Sutherland	Rotation	2008
Xiaofang Tang	Xinhua Lin	2006
David Terrell**	Jeffrey Robbins	2008
Julie Uhl	Rotation	2008
Shiv Kumar Viswanathan	Woodrow Benson	2003
Mikah Wilson	Jaye Hove	2007
Dong Yan	Xinhua Lin	2002
Jia You	Xinhua Lin	2007
Zhang Zheng	Rotation	2008
Bo Zhou	Xinhua Lin	2006
Xuan Zhou	Yi Zheng	2007
Hongyan Zhu	Marc Rothenberg	2004
*On Leave from Program **MD/PhD Students		

Students completing their Masters work

Derek Garrison – “Role of Lung Lipofibroblasts in Surfactant Synthesis”, September 23, 2008
Shawna Hottinger – “MimickingαB Crystallin Phosphorylation at Serine 45 and 59 in Vivo”, June 19, 2009.
Emily Sites – “ProposedRoles for Sox Transcription Factors and Growth Factor Receptors in NF1”, August20, 2008.

Students completing their PhD work

Zegary Allen – “TranscriptionFactor Regulation of Olfactory Bulb Interneuron Heterogeneity,” June 24, 2009.
Yuanyuan Gu –“Immunobiology of IFRD1, a Novel Genetic Modifier of Cystic Fibrosis LungDisease,” June 17, 2009.
Elizabeth Kramer – “Role ofthe EGFR Pathway in Lung Remodeling and Disease,” June 3, 2009.
Rajat Madan – “Into theVortex: The In Vivo Biology of Interleukin-10 Production,” February 24, 2009.
Tori Schaefer – “The Roleof Serotonin in Brain Development and 3,4-methylenedioxymethamphetamine-inducedCognitive Deficits,” May 22, 2009.
Shiv Kumar Viswanathan –“Developmental and Genetic Origins of the Sinoatrial Node,” October 1, 2008.
Dong Yan – “Functions ofGlypicans in Cell Signaling during Drosophila Development,” March 24, 2009.

Student Publications

During the past year, students from the Program authored or co-authored 17 articles.
Wang B, WaclawRR, **Allen ZJ** 2nd, GuillemotF, Campbell K. Ascl1 is a required downstream effector of Gsx gene function inthe embryonic mouse telencephalon. Neural Dev. 2009 Feb 10;4:5.
Mahller YY,Sakthivel B, **Baird WH**, Aronow BJ, Hsu YH, Cripe TP, Mehrian-Shai R. Molecular analysis ofhuman cancer cells infected by an oncolytic HSV-1 reveals multiple upregulatedcellular genes and a role for SOCS1 in virus replication. Cancer Gene Ther.2008 Nov;15(11):733-41.
Mahller YY,Williams JP, **Baird WH**, Mitton B, Grossheim J, Saeki Y, Cancelas JA, Ratner N, Cripe TP. Neuroblastomacell lines contain pluripotent tumor initiating cells that are susceptible to atargeted oncolytic virus. PLoS One. 2009;4(1):e4235.
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Vorhees CV,Skelton MR, **Grace CE**, **Schaefer TL**, Graham DL, Braun AA, Williams MT. Effects of (+)-methamphetamine onpath integration and spatial learning, but not locomotor activity or acousticstartle, align with the stress hyporesponsive period in rats. Int J DevNeurosci. 2009 May;27(3):289-98.
Skelton MR, **SchaeferTL**, Herring NR,**Grace CE**, Vorhees CV,Williams MT. Comparison of the developmental effects of 5-

methoxy-N,N-diisopropyltryptamine(Foxy) to (+/-)-3,4-methylenedioxymethamphetamine (ecstasy) in rats. Psychopharmacology(Berl). 2009 Jun;204(2):287-97.
Vorhees CV, **SchaeferTL**, Skelton MR, **GraceCE**, Herring NR,Williams MT. (+/-)3,4-Methylenedioxymethamphetamine (MDMA) dose-dependentlyimpairs spatial learning in the morris water maze after exposure of rats todifferent five-day intervals from birth to postnatal day twenty. Dev Neurosci.2009;31(1-2):107-20.
Gu Y, Runyan C, Shoemaker A, Surani A, Wylie C. Steelfactor controls primordial germ cell survival and motility from the time oftheir specification in the allantois, and provides a continuous nichethroughout their migration. Development. 2009 Apr;136(8):1295-303.
Gu Y, Harley IT, Henderson LB, Aronow BJ, VietorI, Huber LA, Harley JB, Kilpatrick JR, Langefeld CD, Williams AH, Jegga AG,Chen J, Wills-Karp M, Arshad SH, Ewart SL, Thio CL, Flick LM, Filippi MD,Grimes HL, Drumm ML, Cutting GR, Knowles MR, Karp CL. Identification of IFRD1as a modifier gene for cystic fibrosis lung disease. Nature. 2009 Apr23;458(7241):1039-42.
Kramer EL, **Mushaben EM**, Pastura PA, Acciani TH, Deutsch GH, KhuranaHershey GK, Korfhagen TR, Hardie WD, Whitsett JA, Le Cras TD. Egr-1 SuppressesEGFR-Mediated Airway Hyperresponsiveness and Lung Remodeling in Mice. Am JRespir Cell Mol Biol. 2009 Feb 2.
Li-Kroeger D, Witt LM, Grimes HL, Cook TA, Gebelein B. . Hox and senseless antagonism functions as a molecular switch toregulate EGF secretion in the Drosophila. PNS. Dev Cell 2008 Aug;15(2):298-308.
Sund KL, Roelker S, Ramachandran V, Durbin L, Benson DW. Analysis of Ellis van Creveld syndrome gene products: implications forcardiovascular development and disease. HumMol Genet. 2009 May15;18(10):1813-24.
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Nandadasa S, Tao Q, Menon NR, Heasman J, Wylie C. N- andE-cadherins in Xenopus are specifically required in the neural and non-neuralectoderm, respectively, for F-actin assembly and morphogenetic movements. Development.2009 Apr;136(8):1327-38.
Yan D, Lin X. Opposing roles for glypicans inHedgehog signalling. Nat Cell Biol. 2008 Jul;10(7):761-3.

Student Honors

Akunuru, S Suported by NIH Training Grant (Hematologic and Oncologic Diseases)
Allen, Z Supported by Individual NRSA Fellowship
Baird, W Supported by NIH Training Grant (UC-Stambrook)
Balli, D Supported by Yates Fellowship
Chapman, H Supported by NIH Training Grant (Organogenesis)
Combs, M Supported by American Heart Fellowship
Grace, C Supported by NIH Training Grant (Teratology)
Hottinger, S Supported by NIH Training Grant (UC-Schwartz)
Kramer, E Supported by NIH Training Grant (Pulmonary and Cardiovascular Biology) and Ryan Fellowship
Li-Kroeger, D Supported by NIH Training Grant (Organogenesis)
Lu, T Supported by NIH Training Grant (Organogenesis)
Maldonado, A Supported by Individual NRSA Fellowship
Maynard, C Supported by NIH Training Grant (Pulmonary and Cardiovascular Biology)
Mead, T Supported by NIH Training Grant (Teratology)
Nandadasa, S Supported by Ryan Fellowship
Schaefer, T Supported by NIH Training Grant (Teratology) and Ryan Fellowship

Richard A. Akeson Fellowship Fund

The Richard A. Akeson Fellowship and Memorial Lectureship Fund continues to support the Annual Richard Akeson Memorial Lectureship and travel by students in our graduate program to relevant courses and meetings in which they are presenting results of their research. Dr. Barry Gumbiner presented the Fourteenth Annual Richard Akeson Memorial Lectureship in conjunction with the annual Molecular and Developmental Biology Graduate Student Symposium in 2008. The following students received funding from the Richard A. Akeson Fellowship and Memorial Fund for travel in 2008 - 2009:

Student	Meeting	Presentation	Date
Gang Cheng	FASEB-Lung Epithelial Cells in Developmental and Diseases, Saxton Rivers, VT	Poster	August 3 - 8, 2008
Zhenglei Pei	Mouse Genetics and Genomics, Cold Spring Harbor Laboratory, New York	Poster	October 29 - November 2, 2008
Jennifer McGuire	Stress, Coping, and Disease Society for Neuroscience Annual Meeting, Washington, D.C.	Poster	November 13 - 19, 2008
Wei Lu	American Society of Hematology (ASH), San Francisco, CA	Oral	December 5 - 10, 2008
Xiaofang Tang	50th Annual Drosophila Meeting, Chicago, IL	Poster	March 4 - 8, 2009

Dong Yan	50th Annual Drosophila Meeting, Chicago, IL	Poster	March 4 - 8, 2009
Jia You	50th Annual Drosophila Meeting, Chicago, IL	Poster	March 4 - 8 2009
Bo Zhou	50th Annual Drosophila Meeting, Chicago, IL	Poster	March 4 - 8, 2009
Ying Gu	Northwest Developmental Biology Conference, Friday Harbor, WA	Poster	March 18 - 21, 2009
Sumeda Nandadasa	Northwest Developmental Biology Conference, Friday Harbor, WA	Oral	March 18 - 21, 2009
Elizabeth McDonald	ARVO Meeting, Fort Lauderdale, FL	Poster	May 3 - 7, 2009
Caitlin Braitsch	Weinstein Cardiovascular Development Conference, San Francisco, CA	Poster	May 7 - 9, 2009
Nikki Glenn	Weinstein Cardiovascular Development Conference, San Francisco, CA	Poster	May 7 - 9, 2009
Tim Mead	Weinstein Cardiovascular Development Conference, San Francisco, CA	Poster	May 7 - 9, 2009
Sharina Desai	48th Midwest Developmental Biology Meeting, Iowa City, IA	Oral	May 29 - 31, 2009
Megan Rost	48th Midwest Developmental Biology Meeting, Iowa City, IA	Poster	May 29 - 31, 2009
Diva Jonatan	American Diabetes Association - 69th Scientific Sessions, New Orleans, LA	Poster	June 5 - 9, 2009