

2013 Research Annual Report

Developmental Biology



Division Details

Division Data Summary

RESEARCH AND TRAINING DETAILS

Number of Faculty	24
Number of Joint Appointment Faculty	22
Number of Research Fellows	61
Number of Research Students	43
Number of Support Personnel	48
Direct Annual Grant Support	\$5,409,866
Direct Annual Industry Support	\$115,500
Peer Reviewed Publications	41

CLINICAL ACTIVITIES AND TRAINING

Number of Clinical Fellows	3
Number of Other Students	24

Division Photo



Row 1: R Hegde, J Park, K Campbell, R Kopan, Y Ogawa
Row 2: Y Lan, Y Yoshida, R Jiang, G Guasch, T DeFalco, C Yin, S Brugmann
Row 3: S Sumanas, T Nakamura, M Nakafuku, J Wells, S Namekawa, R Waclaw, S Huppert
Row 4: C Mayhew, S Crone, S Cha
Row 5: V Cleghon, B Gebelein, V Kalinichenko, R Stottmann, A Zorn, J Lessard, S. Potter, D Wiginton, J Ma

Significant Accomplishments

Long-Time Director Retires

On March 31, 2013, Christopher Wylie, PhD, retired as Director of our Division. His role in expanding the Division from 11 faculty members in 2000, when he first joined Cincinnati Children's, to 22 primary faculty and 22 secondary appointments is an outstanding accomplishment. Combined, this is now one of the largest groupings of developmental biologists in the world. Wylie understood the value of establishing a major center for model organism developmental biology at world-class children's hospital, staffed with clinicians diagnosing and treating childhood diseases. Indeed, our Division has established close ties with as many as 17 clinical divisions at the hospital. These interactions will provide better diagnoses, treatments and ultimately cures for childhood disorders. Thus in his 13 years here, Wylie has built a remarkable developmental biology research enterprise and positioned it well to play a major role in changing the outcome for children locally, nationally and internationally.

Kopan Named New Division Director

Following Dr. Wylie's retirement, we were able to recruit a world-renowned developmental biologist, Raphael Kopan, PhD, to take over division leadership starting in August 2013. Kopan had been the Wolff Distinguished Professor of Developmental Biology at the Washington University School of Medicine in St. Louis. His research focuses on the role of Notch signaling in development and disease. His strong international reputation in

developmental biology will help to maintain the visibility of our division both on a national and international level, which is essential for continued growth and success of the division. Moreover, Kopan's collaborative instincts will dovetail nicely with the traditions at Cincinnati Children's as he plans to move the division forward. By all the early accounts, the transition in leadership will be smooth and effective.

Developmental Biology Retreat Hosts 175 Participants

Our two-day retreat, held in Spring 2013, was the largest and most diverse to date. We had 175 participants, including clinicians, basic scientists and students, with 62 posters from 16 different divisions at Cincinnati Children's. This is roughly on par with regional meetings of the Society of Developmental Biology and reflects the impressive size and depth of the developmental biology community here.

Significant Publications

Kenny AP, Rankin SA, Allbee AW, Prewitt AR, Zhang Z, Tabangin ME, Shifley ET, Louza MP, **Zorn AM. Sizzled-tolloid interactions maintain foregut progenitors by regulating fibronectin-dependent BMP signaling.**

Developmental Cell. 2012. 23: 292-304.

This paper describes a new mechanism by which the matrix of extracellular proteins, laying between tissues in the embryo, regulate the growth factor signals required for the development of early liver and lung cells. This work has implications for the directed differentiation of stem cells and informs our understanding of how growth factors are involved in many developmental and disease contexts.

Jia S, Zhou J, Gao Y, Baek JA, Martin JF, Lan Y, **Jiang R. Roles of Bmp4 during tooth morphogenesis and sequential tooth formation.** *Development.* 2013. 140: 423-432.

This paper demonstrates that the Bmp4 signaling molecule and the Msx1 transcription factor function in a positive feedback loop to propagate tooth inductive signals across the developing jaw mesenchyme while the Osr2 transcription factor and Wnt signaling antagonists act to block the propagation of the Msx1-Bmp4 pathway to restrict the field of tooth induction. As Bmp and Wnt signaling pathways are repeatedly deployed in embryonic development and organogenesis, this paper provides new insights into the cross-regulation of these pathways in organogenesis and developmental disorders.

Lopez-Juárez A., Howard J., Ullom, K., Howard L., Grande A., Pardo A., Waclaw R.R., Sun Y-Y., Yang D., **Kuan C-Y., Campbell K, Nakafuku M. Gsx2 controls region-specific activation of neural stem cells and injury-induced neurogenesis in the adult subventricular zone.** *Genes and Development.* 2013. 27: 1272-1287.

This paper describes new control mechanisms of stem cells in the adult brain. In particular, it demonstrates that the transcription factor Gsx2 controls the first and crucial step of the recruitment of a specific subset of stem cells toward the production of new neurons in the adult brain, and moreover, plays an important role in neuronal replacement after brain damage.

Kohli V, Schumacher JA, Desai SP, Rehn K, **Sumanas S. Arterial and venous progenitors of the major axial vessels originate at distinct locations.** *Developmental Cell.* 2013. 25: 196-206.

Arterial and venous differentiation is critical for functionality of blood vessels, however, it has not been well understood how vascular endothelial progenitors choose between arterial and venous fates. Using the zebrafish embryonic model, this paper demonstrates that arterial and venous progenitors originate at distinct time points and spatial locations. As a result, arterial progenitors are exposed to higher concentrations of Hedgehog and VEGF factors, which promote arterial differentiation. Our results explain how progenitors of the major axial vessels choose between arterial and venous fates and will be important in understanding the ontogeny of the

related human disorders such as arterial-venous malformations.

Zou Y, Chiu H, Zinovyeva A, Ambros V, **Chuang CF, Chang C. Developmental decline in neuronal regeneration by the progressive change of two intrinsic timers.** *Science*. 2013. 340: 372-376.

Neurons lose regeneration ability as they age, but it is not known why. This paper has important implications for the treatment of brain and spinal cord injury or neurodegenerative diseases as it suggests that it may be possible to turn back the clock on regeneration in old neurons through therapeutic inhibition of the *let-7* microRNA, and thereby restoring regenerative capacity.

Division Publications

1. Brunskill EW, Potter AS, Potter SS. **Defining Genetic Blueprints – Kidney and Craniofacial Development.** In: JJ Hutton, ed. *Pediatric Biomedical Informatics: Computer Applications in Pediatric Research*. Dordrecht ; New York: Springer; 2012:335-358.
2. Brunskill EW, Potter SS. **RNA-Seq defines novel genes, RNA processing patterns and enhancer maps for the early stages of nephrogenesis: Hox supergenes.** *Dev Biol*. 2012; 368:4-17.
3. Brunskill EW, Potter SS. **Changes in the gene expression programs of renal mesangial cells during diabetic nephropathy.** *BMC Nephrol*. 2012; 13:70.
4. Butler DL, Dymant NA, Shearn JT, Kinneberg KR, Breidenbach AP, Lalley AL, Gilday SD, Gooch C, Rao MB, Liu CF, Wylie C. **Evolving strategies in mechanobiology to more effectively treat damaged musculoskeletal tissues.** *J Biomech Eng*. 2013; 135:020301.
5. Cha SW, McAdams M, Kormish J, Wylie C, Kofron M. **Foxi2 is an animally localized maternal mRNA in Xenopus, and an activator of the zygotic ectoderm activator Foxi1e.** *PLoS One*. 2012; 7:e41782.
6. Chapman H, Waclaw RR, Pei Z, Nakafuku M, Campbell K. **The homeobox gene Gsx2 controls the timing of oligodendroglial fate specification in mouse lateral ganglionic eminence progenitors.** *Development*. 2013; 140:2289-98.
7. Deck M, Lokmane L, Chauvet S, Mailhes C, Keita M, Niquille M, Yoshida M, Yoshida Y, Lebrand C, Mann F, Grove EA, Garel S. **Pathfinding of corticothalamic axons relies on a rendezvous with thalamic projections.** *Neuron*. 2013; 77:472-84.
8. Dymant NA, Liu CF, Kazemi N, Aschbacher-Smith LE, Kenter K, Breidenbach AP, Shearn JT, Wylie C, Rowe DW, Butler DL. **The paratenon contributes to scleraxis-expressing cells during patellar tendon healing.** *PLoS One*. 2013; 8:e59944.
9. Fukuda T, Takeda S, Xu R, Ochi H, Sunamura S, Sato T, Shibata S, Yoshida Y, Gu Z, Kimura A, Ma C, Xu C, Bando W, Fujita K, Shinomiya K, Hirai T, Asou Y, Enomoto M, Okano H, Okawa A, Itoh H. **Sema3A regulates bone-mass accrual through sensory innervations.** *Nature*. 2013; 497:490-3.
10. Glenn NO, McKane M, Kohli V, Wen KK, Rubenstein PA, Bartman T, Sumanas S. **The W-loop of alpha-cardiac actin is critical for heart function and endocardial cushion morphogenesis in zebrafish.** *Mol Cell Biol*. 2012; 32:3527-40.
11. Godin JD, Thomas N, Laguesse S, Malinouskaya L, Close P, Malaise O, Purnelle A, Raineteau O, Campbell K, Fero M, Moonen G, Malgrange B, Chariot A, Metin C, Besson A, Nguyen L. **p27(Kip1) is a microtubule-associated protein that promotes microtubule polymerization during neuron migration.** *Dev Cell*. 2012; 23:729-44.
12. Haas M, Qu Z, Kim TH, Vargas E, Campbell K, Petrou S, Tan SS, Reid CA, Heng J. **Perturbations in cortical development and neuronal network excitability arising from prenatal exposure to benzodiazepines in mice.** *Eur J Neurosci*. 2013; 37:1584-93.
13. Hsieh YW, Chang C, Chuang CF. **The microRNA mir-71 inhibits calcium signaling by targeting the**

- TIR-1/Sarm1 adaptor protein to control stochastic L/R neuronal asymmetry in *C. elegans*.** *PLoS Genet.* 2012; 8:e1002864.
14. Hufnagel RB, Riesenberg AN, Quinn M, Brzezinski JA 4th, Glaser T, Brown NL. **Heterochronic misexpression of *Ascl1* in the *Atoh7* retinal cell lineage blocks cell cycle exit.** *Mol Cell Neurosci.* 2013; 54:108-20.
 15. James-Zorn C, Ponferrada VG, Jarabek CJ, Burns KA, Segerdell EJ, Lee J, Snyder K, Bhattacharyya B, Karpinka JB, Fortriede J, Bowes JB, Zorn AM, Vize PD. **Xenbase: expansion and updates of the *Xenopus* model organism database.** *Nucleic Acids Res.* 2013; 41:D865-70.
 16. Jia S, Zhou J, Gao Y, Baek JA, Martin JF, Lan Y, Jiang R. **Roles of *Bmp4* during tooth morphogenesis and sequential tooth formation.** *Development.* 2013; 140:423-32.
 17. Katayama K, Leslie JR, Lang RA, Zheng Y, Yoshida Y. **Left-right locomotor circuitry depends on *RhoA*-driven organization of the neuroepithelium in the developing spinal cord.** *J Neurosci.* 2012; 32:10396-407.
 18. Kattamuri C, Luedeke DM, Nolan K, Rankin SA, Greis KD, Zorn AM, Thompson TB. **Members of the *DAN* family are *BMP* antagonists that form highly stable noncovalent dimers.** *J Mol Biol.* 2012; 424:313-27.
 19. Kenny AP, Rankin SA, Allbee AW, Prewitt AR, Zhang Z, Tabangin ME, Shifley ET, Louza MP, Zorn AM. **Sizzled-tolloid interactions maintain foregut progenitors by regulating fibronectin-dependent *BMP* signaling.** *Dev Cell.* 2012; 23:292-304.
 20. Kim TH, Bae CH, Lee JC, Ko SO, Yang X, Jiang R, Cho ES. **beta-catenin is required in odontoblasts for tooth root formation.** *J Dent Res.* 2013; 92:215-21.
 21. Kohli V, Schumacher JA, Desai SP, Rehn K, Sumanas S. **Arterial and venous progenitors of the major axial vessels originate at distinct locations.** *Dev Cell.* 2013; 25:196-206.
 22. Korfhagen TR, Kitzmiller J, Chen G, Sridharan A, Haitchi HM, Hegde RS, Divanovic S, Karp CL, Whitsett JA. **SAM-pointed domain *ETS* factor mediates epithelial cell-intrinsic innate immune signaling during airway mucous metaplasia.** *Proc Natl Acad Sci U S A.* 2012; 109:16630-5.
 23. Lee N, Batt MK, Cronier BA, Jackson MC, Bruno Garza JL, Trinh DS, Mason CO, Spearry RP, Bhattacharya S, Robitz R, Nakafuku M, MacLennan AJ. **Ciliary neurotrophic factor receptor regulation of adult forebrain neurogenesis.** *J Neurosci.* 2013; 33:1241-58.
 24. Liu CF, Breidenbach A, Aschbacher-Smith L, Butler D, Wylie C. **A role for hedgehog signaling in the differentiation of the insertion site of the patellar tendon in the mouse.** *PLoS One.* 2013; 8:e65411.
 25. Lopez-Juarez A, Howard J, Ullom K, Howard L, Grande A, Pardo A, Waclaw R, Sun YY, Yang D, Kuan CY, Campbell K, Nakafuku M. ***Gsx2* controls region-specific activation of neural stem cells and injury-induced neurogenesis in the adult subventricular zone.** *Genes Dev.* 2013; 27:1272-87.
 26. Martin-Ibanez R, Crespo E, Esgleas M, Urban N, Wang B, Waclaw R, Georgopoulos K, Martinez S, Campbell K, Vicario-Abejón C, Alberch J, Chan S, Kastner P, Rubenstein JL, Canals JM. **Helios transcription factor expression depends on *Gsx2* and *Dlx1&2* function in developing striatal matrix neurons.** *Stem Cells Dev.* 2012; 21:2239-51.
 27. Matsuoka RL, Sun LO, Katayama K, Yoshida Y, Kolodkin AL. **Sema6B, Sema6C, and Sema6D expression and function during mammalian retinal development.** *PLoS One.* 2013; 8:e63207.
 28. McCracken KW, Wells JM. **Molecular pathways controlling pancreas induction.** *Semin Cell Dev Biol.* 2012; 23:656-62.
 29. McNaim AJ, Doucet Y, Demaude J, Brusadelli M, Gordon CB, Uribe-Rivera A, Lambert PF, Bouez C, Breton L, Guasch G. **TGFbeta signaling regulates lipogenesis in human sebaceous glands cells.** *BMC Dermatol.* 2013; 13:2.

30. Rankin SA, Gallas AL, Neto A, Gómez-Skarmeta JL, Zorn AM. **Suppression of Bmp4 signaling by the zinc-finger repressors Osr1 and Osr2 is required for Wnt/beta-catenin-mediated lung specification in Xenopus.** *Development.* 2012; 139:3010-20.
31. Rao S, Chun C, Fan J, Kofron JM, Yang MB, Hegde RS, Ferrara N, Copenhagen DR, Lang RA. **A direct and melanopsin-dependent fetal light response regulates mouse eye development.** *Nature.* 2013; 494:243-6.
32. Riazuddin S, Belyantseva IA, Giese AP, Lee K, Indzhukulian AA, Nandamuri SP, Yousaf R, Sinha GP, Lee S, Terrell D, Hegde RS, Ali RA, Anwar S, Andrade-Elizondo PB, Sirmaci A, Parise LV, Basit S, Wali A, Ayub M, Ansar M, Ahmad W, Khan SN, Akram J, Tekin M, Riazuddin S, Cook T, Buschbeck EK, Frolenkov GI, Leal SM, Friedman TB, Ahmed ZM. **Alterations of the CIB2 calcium- and integrin-binding protein cause Usher syndrome type 1J and nonsyndromic deafness DFNB48.** *Nat Genet.* 2012; 44:1265-71.
33. Schumacher JA, Hsieh YW, Chen S, Pirri JK, Alkema MJ, Li WH, Chang C, Chuang CF. **Intercellular calcium signaling in a gap junction-coupled cell network establishes asymmetric neuronal fates in C. elegans.** *Development.* 2012; 139:4191-201.
34. Suetsugu-Maki R, Maki N, Nakamura K, Sumanas S, Zhu J, Del Rio-Tsonis K, Tsonis PA. **Lens regeneration in axolotl: new evidence of developmental plasticity.** *BMC Biol.* 2012; 10:103.
35. Tadjuidje E, Hegde RS. **The Eyes Absent proteins in development and disease.** *Cell Mol Life Sci.* 2013; 70:1897-913.
36. Wang B, Long JE, Flandin P, Pla R, Waclaw RR, Campbell K, Rubenstein JL. **Loss of Gsx1 and Gsx2 function rescues distinct phenotypes in Dlx1/2 mutants.** *J Comp Neurol.* 2013; 521:1561-84.
37. Wang D, El-Amouri SS, Dai M, Kuan CY, Hui DY, Brady RO, Pan D. **Engineering a lysosomal enzyme with a derivative of receptor-binding domain of apoE enables delivery across the blood-brain barrier.** *Proc Natl Acad Sci U S A.* 2013; 110:2999-3004.
38. Yang D, Sun YY, Nemkul N, Baumann JM, Shereen A, Dunn RS, Wills-Karp M, Lawrence DA, Lindquist DM, Kuan CY. **Plasminogen activator inhibitor-1 mitigates brain injury in a rat model of infection-sensitized neonatal hypoxia-ischemia.** *Cereb Cortex.* 2013; 23:1218-29.
39. Zhang Z, Rankin SA, Zorn AM. **Different thresholds of Wnt-Frizzled 7 signaling coordinate proliferation, morphogenesis and fate of endoderm progenitor cells.** *Dev Biol.* 2013; 378:1-12.
40. Zhu S, Chen K, Lan Y, Zhang N, Jiang R, Hu J. **Alendronate protects against articular cartilage erosion by inhibiting subchondral bone loss in ovariectomized rats.** *Bone.* 2013; 53:340-9.
41. Zou Y, Chiu H, Zinovyeva A, Ambros V, Chuang CF, Chang C. **Developmental decline in neuronal regeneration by the progressive change of two intrinsic timers.** *Science.* 2013; 340:372-6.

Faculty, Staff, and Trainees

Faculty Members

Christopher C. Wylie, PhD (Retired 3/31/13), Professor Emeritus

Leadership Director; Associate Chair for Basic Science

Research Interests Early Vertebrate Development, Xenopus, Mammal

Nadean Brown, PhD, Adjunct

Research Interests Eye Development, Mouse and Drosophila

Kenneth Campbell, PhD, Professor

Leadership Associate/Interim Director; Director, Transgenic Core Facility; Director, Basic Science Research

in Surgical Services

Research Interests CNS Patterning, Mammal

Sang-Wook Cha, PhD, Assistant Professor

Research Interests Early Vertebrate Development

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

Brian Gebelein, PhD, Assistant Professor

Research Interests Transcriptional Regulation, Drosophila, Body Patterning, Nervous System

Geraldine Guasch, PhD, Assistant Professor

Research Interests Stem Cells in Epithelial Tissues and Their Role in Tumorigenesis, Transitional Epithelium and Anorectal Malformations

Rashmi S. Hegde, PhD, Professor

Leadership Director, Molecular and Developmental Biology Graduate Program

Research Interests Protein Structure/Function

Rulang Jiang, PhD, Professor

Research Interests Genetic Basis and Developmental Mechanisms of Structural Birth Defects; Mammalian Organogenesis

J. Matthew Kofron, PhD, Assistant Professor

Leadership Imaging Core Director

Research Interests Ectodermal Organ Development In Vertebrates, Xenopus

Chia-Yi Kuan, MD, PhD (End 9/9/12), Associate Professor

Research Interests Nervous System Patterning, Stroke, Cell Death, Mammal

James L. Lessard, PhD (Retired 6/29/12), Professor Emeritus

Research Interests Muscle Development, Mammal

Hung-Chi Liang, PhD, Instructor

Research Interests Affymetrix Core Manager

Xinhua Lin, PhD, Professor

Research Interests Cell Signaling, Drosophila

Christopher Mayhew, PhD, Assistant Professor

Leadership 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

Leadership 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

Leadership 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)

Research Interests Bioinformatics

Samantha Brugmann, PhD, Assistant Professor (Plastic Surgery)

Research Interests Molecular Basis for Craniofacial Development and Disease

Tiffany Cook, PhD, Assistant Professor (Pediatric Ophthalmology)

Research Interests Eye Development, Drosophila

Steven Crone, PhD, Assistant Professor (Neurosurgery)

Research Interests Spinal Circuit Development and Repair

Tony DeFalco, PhD, Assistant Professor (Reproductive sciences)

Research Interests Gonad Development, Mammal

Sudhansu Dey, PhD, Professor (Director, Reproductive Sciences)

Research Interests Reproductive Biology

Prasad Devarajan, MD, Professor (Director, Nephrology and Hypertension)

Research Interests Urinary Tract Differentiation, Mammal

Stacey Huppert, PhD, Associate Professor (Gastroenterology, Hepatology, and Nutrition)

Research Interests Hepatic Development and Regeneration

Vladimir Kalinichenko, MD PhD, Associate Professor (Pulmonary Biology and Neonatology)

Research Interests Transcriptional Regulation of Lung Embryonic Development

Yu Lan, PhD, Associate Professor (Plastic Surgery)

Research Interests Genetic Control of Craniofacial Development, Mutant Mouse Models

Richard A. Lang, PhD, Professor (Pediatric Ophthalmology)

Research Interests Visual System Development, Mammal

Jun Ma, PhD, Professor (Pediatric Bioinformatics)

Research Interests Transcriptional Regulation, Drosophila

Takahisa Nakamura, PhD, Assistant Professor (Endocrinology)

Research Interests Obesity-induced Metabolic Diseases

Satoshi Namekawa, PhD, Assistant Professor (Reproductive Sciences)

Research Interests Germ Cells, Epigenetics, Reproduction, Mouse

Yuya Ogawa, PhD, Assistant Professor (Reproductive Sciences)

Research Interests Long Noncoding RNA-mediated Transcriptional Regulation in Mammals

Joo-Seop Park, PhD, Assistant Professor (Urology)

Research Interests Molecular Biology, Genetics

Noah F. Shroyer, PhD, Associate Professor (Gastroenterology, Hepatology, and Nutrition)

Research Interests Vertebrate Gut Development, Mammal

Rolf Stottmann, PhD, Assistant Professor

Research Interests Genetic Approaches to Understanding Human Congenital Defects Affecting the Face and Forebrain.

Ronald Waclaw, PhD, Assistant Professor (Experimental Hematology)

Research Interests Forebrain Progenitor Cell Differentiation

Joshua Waxman, PhD, Assistant Professor (Molecular Cardiovascular Biology)

Research Interests Molecular Genetics of Cardiovascular Development

Jeffrey A. Whitsett, MD, Professor (Chief, Section of Neonatology, Perinatal, and Pulmonary Biology)

Research Interests Respiratory System, Mammal

Chunyue Yin, PhD, Assistant Professor (Gastroenterology, Hepatology, and Nutrition)

Research Interests Liver Development and Diseases

Trainees

Chitra Dahia*, PhD, Facult, Indian Institute of Science (end 4/19/13)

Kei-Ichi Katayama, PhD, DVM, Vis Re, University of Tokyo (end 2/8/13)

Eui Kyun Park, PhD, Vis Re, Kyunpook National University (end 12/21/12)

Masaki Ueno, PhD, Vis Ob, Osaka University

Baoyan Bai, PhD, Res. A, Johns Hopkins University

Tatyana Belenkaya, PhD, Res. A, Russian Academy of Science

Eric Brunskill, PhD, Res. A, University of Maryland

Kevin Burns, PhD, Res. A, University of Cincinnati

Bharesh Chauhan*, PhD, Res. A, Oxford University, United Kingdom

Eunah Chung*, PhD, Res. A, Cornell University

Lisa Ehrman*, PhD, Res. A, University of Cincinnati

Christina James-Zorn, PhD, Res. A, University of Queensland, Australia

Matthew Hass, PhD, Res. A, Harvard University Medical School

Yasuko Kato*, PhD, Res. A, Kyoto Institute of Technology, Japan

Junbo Lui*, PhD, Res. A, Fudan University, China

Athanasia Nikolaou*, PhD, Res. A, University of Melbourne, Australia

Taeko Noah*, PhD, Res. A, University of Nevada

Timothy Plageman*, PhD, Res. A, University of Cincinnati

Virgilio Ponferrada, PhD, Res. A, Wright State University

Sujata Rao*, PhD, Res. A, Cornell University

Jennifer Schumacher, PhD, Res. A, University of Pennsylvania
Ho-Su Sin*, PhD, Res. A, Kanazawa University, Japan
Emmanuel Tadjuidje, PhD, Res. A, University of Goettingen, Germany
Huirong Xie*, PhD, Res. A, Vanderbilt University
Dianer Yang, PhD, Res. A, Chinese Academy of Sciences (end 9/9/12)
Sivan Bezalel*, PhD, Res. F, University Medical School, Isreal
Sarah Beckman*, PhD, Res. F, University of Pittsburgh
Ching-Fang Chang, PhD, Res. F, University of Alabama
Enrico D'Aniello*, PhD, Res. F, Stazione Zoologica Anton Dohrn, Italy
Ashley Driver*, PhD, Res. F, University of Wisconsin-Madison
Tarsis Ferreira, PhD, Res. F, Universidade Federal de Sao Paulo, Brazil
Amy Gresser, PhD, Res. F, Harvard University
Yi-Wen Hsieh, PhD, Res. F, University of California, Los Angeles
Fumiyasu Imai, PhD, Res. F, Yokohama City University of Medicine, Japan
Shihai Jia, PhD, Res. F, Shanghai Institute for Biological Sciences, China
Maximiliano Jimenez-Dalmaroni, PhD, Res. F, University of Oxford, UK (end 4/13/13)
Donatien Kamdem Toukam, PhD, Res. F, Ruhr University Bochum, Germany
Avedis Kazanjian*, PhD, Res. F, University of Louisville
Vikram Kohli*, PhD, Res. F, University of Alberta, Canada
Hyuk-Jae Kwon, PhD, Res. F, Yonsei University, Korea
Cheng-Hao Li, PhD, Res. F, Sichuan University, China (end 3/29/13)
Chia-Feng Liu, PhD, Res. F, University of Chicago at Urbana (end 3/29/13)
Han Liu, PhD, Res. F, University of Rochester
Alejandro Lopez Juarez, PhD, Res. F, University of Mexico
Mayur Madhavan, PhD, Res. F, Miami University
Paloma Merchan Sala, PhD, Res. F, University of Murcia, Spain
Jorge Munera, PhD, Res. F, University of California, San Diego
Craig Park*, PhD, Res. F, McGill University, Canada
Anna Raines, PhD, Res. F, University of Wisconsin
Latasha Redmond, PhD, Res. F, Virginia Commonwealth University (end 8/10/12)
Kaushik Roychoudhury, PhD, Res. F, Jadaypur University, India
Jacqueline Schiesser, PhD, Res. F, Monash University, Australia
Emily Shifley, PhD, Res. F, Ohio State University
Xiaofei Sun*, PhD, Res. F, Vanderbilt University
Yu-Yo Sun, PhD, Res. F, Taipei Medial University, Taiwan (end 9/9/12)
Xiaofang Tang, PhD, Res. F, Univeristy of Cincinnati
Jumpei Terakawa*, PhD, Res. F, Yamaguchi University, Japan
Marcin Wlizia, PhD, Res. F, University of Chicago
Baotang Xie*, PhD, Res. F, Chinese Academy of Sciences
Jingyue Xu, PhD, Res. F, Nanjing University, China
Norishige Yamada*, PhD, Res. F, Kagoshima University, Japan
Eun-Jin Yeo*, PhD, Res. F, Seoul National University, South Korea
Celvie Yuan, PhD, Res. F, Case Western Reserve University
Jing Zhou, PhD, Res. F, Shanghai Institute for Biological Sciences, China
Yan Zou, PhD, Res. F, Chinese Academy of Sciences

Jonathan Howell, MD PhD, Clin., Indiana University
Alan Kenny, MD PhD, Clin., University of Rochester, School of Medicine and Dentistry
Andrea Pardo, MD, Clin., Johns Hopkins University (end 8/31/12)
Douglas Brown*, , Grad., University of Cincinnati - College of Medicine
Marion Brusadelli, , Grad. , Luminy University, France
Michael Craig, , Grad. , University of Cincinnati
Pauline Fritsch, , Grad., Luminy University, France (end 8/17/12)
Christine Marques, , Grad., ESIL, France (end 8/24/12)
Milesa Simic, , Grad. , Luminy University, France
Jurate Skerniskyte, , Grad., Vilnius Univ, Lithuania
Mustafa Turkoz, , Grad., Washington University
Mathieu Viereria, , Grad., University of Paris
Hanane Yahia, , Grad., University of Paris Diderot, France (end 8/31/12)
Brittany Bayne, , Underg, University of Cincinnati
Emily Blatz, , Underg, University of Cincinnati
Claudia Carrelli, , Underg, University of Cincinnati
Matthew Carter, , Underg, Miami University, Oxford, OH
Emily Cata, , Underg, Xavier University
Calyn Crawford, , Underg, Xavier University
Mahima Devarajan, , Underg, Case Western Reserve
Andrew DiStasio, , Underg, University of Cincinnati
Allison Estep, , Underg, University of Cincinnati
Abigail Evans, , Underg, Ohio State University
Arif Ghasletwala, , Underg, University of Cincinnati
Matthew Grazyk, , Underg, Xavier University (end 5/10/13)
Tiffany Hoang, , Underg, California State University - Fullerton (PSTP Summer Student)
Sarah Kastner, , Underg, Cincinnati State
Osama Kasem, , Underg, University of Cincinnati
Mishi Liang, , Underg, University of Cincinnati
Kelsey Lin, , Underg, Ohio State University
Madhulika Mamidi, , Underg, University of Cincinnati
Mhadhumithan Naresh, , Underg, University of Cincinnati
Jesse Niehaus, , Underg, University of Cincinnati
Mosep Okonny, , Underg, University of Cincinnati (end 8/3/12)
Thanh Phan, , Underg, University of Cincinnati
Alyna Williams, , Underg, University of Cincinnati (end 8/24/12)
Blair Wissel, , Underg, Xavier University (end 3/5/13)

Division Collaboration

Human Genetics » Rolf Stottmann

A translational approach towards the identification of causative genetic elements for ciliopathies with Samantha Brugmann

Neurosurgery » Francesco Mangano

Animals models of hydrocephalus with Kenny Campbell

Ophthalmology » Zubair Ahmed

Conservation of photoreceptor development - from flies to humans with Tiffany Cook

Biomedical Informatics » Anil Jegga

Development with Respect to Endocannabinoid Signaling with SK Dey

Endocrinology » Stuart Handwerger

Role of Endocannabinoid in Uterine Decidualization with SK Dey

Molecular Immunology » Senad Divanovic

Role of Endocannabinoid in Preterm Birth with SK Dey

Pulmonary Biology » Jeff Whitsett

Role of KLF5 in Uterine Biology and Implantation with SK Dey

Ophthalmology » Tiffany Cook

Determining the molecular interactions underlying cell-specific gene expression in the peripheral nervous system with Brian Gebelein

Immunobiology » H. Leighton Grimes

Assessing the role of Hox and Gfi-1 antagonism in regulating microRNA expression and blood cell proliferation during hematopoiesis and leukemia progression with Brian Gebelein

Ophthalmology » Tiffany Cook

Transcriptional control of cell type specification during Drosophila neurogenesis with Brian Gebelein

Colorectal Center; Urology » Marc Levitt, Alberto Pena, and Shumyle Alam

Using the Shh knock out mouse model to investigate the mechanism of persistent cloaca in human with Geraldine Guasch

Ophthalmology » Richard Lang

Molecular mechanisms in retinal angiogenesis with Rashmi Hegde

Molecular Immunology » Christopher Karp

SAM Pointed Domain Ets Factor mediates epithelial cell-intrinsic innate immune signaling during airway mucous metaplasia with Rashmi Hegde

Ophthalmology; Otolaryngology » Zubair Ahmed and Saima Riazuddin

Mutations of CIB2, a calcium and integrin binding protein, cause Usher syndrome type 1J and nonsyndromic deafness DFNB48 with Rashmi Hegde

Pulmonary Biology » Jeff Whitsett

SAM Pointed Domain Ets Factor mediates epithelial cell-intrinsic innate immune signaling during airway mucous metaplasia; FOXA3 Regulates Goblet Cell Metaplasia and Innate Immunity in the Airway with Rashmi Hegde.

Molecular Immunology » Senad Divanovic

Studies on the role of adult neurogenesis in obesity with Masato Nakfuku

Human Genetics » Rolf Stottmann

Molecular basis of congenital brain anomaly with Masato Nakfuku

Experimental Hematology » Ronald Waclaw

Development of oligodendrocytes and astrocytes in early postnatal brains with Masato Nakafuku

Experimental Hematology and Cancer Biology » Paul Andreassen

DNA damage response pathways in epigenetic programming with Satoshi Namekawa

Allergy and Immunology » Artem Barski

Epigenomic landscape of the sex chromosomes in germ cells with Satoshi Namekawa

Reproductive Sciences » SK Dey

To characterize reproductive defects in Hox mutant mice with Steve Potter

Pediatric General and Thoracic Surgery; Hemangioma and Vascular Malformation Center » Belinda Dickie and Peter Dickie

Identifying genetic causes of vascular and lymphatic malformations with Saulius Sumanas

Plastic Surgery; Biomedical Informatics » Christopher Gordon and Bruce Aronow

Functional role of miRNAs in craniofacial development with Saulius Sumanas

Critical Care Medicine » Brian Varisco

Role of elastase like proteins in vertebrates with Saulius Sumanas

Plastic Surgery » Samantha Brugmann

Generating Human Intestinal Organoids with an ENS with Jim Wells

Ophthalmology; Experimental Hematology » Richard Lang and Yi Zheng

Role of Rho GTPases molecules in mammalian nervous system with Yutaka Yoshida

Urology » Joo-Seop Park

Transcriptome analysis of wnt signaling in liver development with Aaron Zorn

Grants, Contracts, and Industry Agreements

Grant and Contract Awards Annual Direct

CAMPBELL, K

Molecular Mechanisms Controlling Formation of Basal Ganglia Circuitry

National Institutes of Health

R01 MH 090740 04/01/10-01/31/15 \$237,600

Roles of Gsh1 & Gsh2 in Telencephalic Neurogenesis

National Institutes of Health

R01 NS 044080 07/01/08-06/30/13 \$428,750

CHANG, C

Understanding MicroRNA Mechanisms for Developmental Decline in Axon Growth Activity

March of Dimes

06/01/10-05/31/13 \$58,993

CHUANG, C

Specification of Stochastic Left-Right Asymmetric Neuronal Fates in C. Elegans

National Institutes of Health

R01 GM 098026-01 08/31/12-07/31/17 \$190,000

CLEGHON, V

Fundamental Mechanisms of Protein Kinase Activation Loop Autophosphorylation

National Institutes of Health

R01 GM 087374 04/15/10-02/28/14 \$186,293

GUASCH, G**Defining the Transcriptional and Signaling Networks Involved in Epithelial Cancers of Transitional Epithelia**

The Sidney Kimmel Foundation for Cancer Research

SKF-11-036 07/01/11-06/30/13 \$86,957

Using a Novel Mouse Model of Transitional Epithelial Tumor to Investigate Cancer Initiation and Progression

V Foundation for Cancer Research

11/01/11-10/31/13 \$100,000

JIANG, R**Molecular Genetic Analysis of Craniofacial Development**

National Institutes of Health

R01 DE 13681 07/01/11-06/30/15 \$439,824

KOFRON, M.**Ectoderm Formation in the Early Xenopus Embryo**

National Institutes of Health

R01 HD 045737 04/01/10-03/31/15 \$189,041

KOHLI, V**Lineage Tracing of Endothelial Progenitor Cells: Patterning the Vascular Cord**

American Heart Association

12POST12040123 07/01/12-10/31/12 \$15,232

LIN, X**Regulation of Wingless (Wg) Signaling and Morphogen Gradient Formation**

National Institutes of Health

R01 GM 063891 04/01/12-03/31/16 \$193,000

Roles of Retromer Complex in Development

National Institutes of Health

R01 GM 087517 03/01/10-02/28/14 \$181,517

MAYHEW, C**Digestive Health Center: Stem Cell Core**

National Institutes of Health

U01 DK 062497 09/10/09-05/31/14 \$28,261

NAKAFUKU, M**Endogenous CNTF Receptors and Adult, In Vivo Neurogenesis**

National Institutes of Health(University of Cincinnati)		
R01 NS 066051	07/01/09-06/30/14	\$10,392
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NAKAFUKU, M / CAMPBELL, K (MPI)		
Molecular Control of Neurogenesis in the Adult Subventricular Zone		
National Institutes of Health		
R01 NS 069893	04/01/10-03/31/15	\$291,422
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POTTER, S		
Generating Molecular Markers that Selectively Label Urothelial Sub-Populations		
National Institutes of Health(Columbia University Medical Center)		
U01 DK 094530	09/30/11-08/31/16	\$31,311
Global Gene Expression Atlas of Craniofacial Development		
National Institutes of Health		
U01 DE 020049	09/21/09-04/30/14	\$175,411
Digestive Health Center - Gene Expression Core		
National Institutes of Health		
U01 DK 062497	09/10/09-05/31/14	\$40,695
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SCHUMACHER, J		
Training in Cardiovascular Biology		
National Institutes of Health(University of Cincinnati)		
T32 HL 007382	01/01/13-08/31/13	\$33,256
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SHROYER, N		
bHLH factor Regulation of Mammalian Retinal Neuron Development		
University of California-Davis		
	01/01/12-12/31/14	\$57,000
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SUMANAS, S		
Molecular Mechanisms of Arterial-Venous Differentiation in Zebrafish		
National Institutes of Health		
R01 HL 107369	04/01/11-03/31/16	\$238,000
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WELLS, J		
Directing Differentiation of Human Pluripotent Stem Cells to Generate 3-Dimensional Lung Tissue In Vitro		
National Institutes of Health(University of Michigan)		
R21 HL 115322	08/10/12-06/30/14	\$41,250
Generating Human Intestinal Organoids with an ENS		
National Institutes of Health		
U18 TR 000546	07/24/12-06/30/14	\$225,000
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WELLS, J / SHROYER N**Human Endocrine Cell Development**

National Institutes of Health

04/07/12-02/28/17

\$287,003

WYLIE, C**A Developmentally-Based Tissue Engineering Approach to Improve Tendon Repair**

National Institutes of Health(University of Cincinnati)

R01 AR 056943

07/10/09-06/30/14

\$178,001

YOSHIDA, Y**Properties of Interneurons Before and After SCI**

University of Cincinnati

01/01/13-06/30/13

\$15,000

Regulation of Sensory-Motor Connectivity by Semaphorin-Plexin Signaling

National Institutes of Health

R01 NS 065048

04/01/09-03/31/14

\$206,872

ZORN, A**Cadherin-based Actin Assembly in the Xenopus Embryo**

National Institutes of Health

R01 HD 044764

03/12/09-01/31/14

\$187,150

Cell Cycle Proteomics in Xenopus

National Institutes of Health(Harvard Medical School)

R01 GM 103785

09/01/12-06/30/14

\$10,873

Collaborative Research: Ontology-Enabled Reasoning across Phenotypers from Evolution and Model Organisms

National Science Foundation(University of South Dakota)

DBI-1062542

07/01/11-06/30/15

\$16,021

Osr Transcription Factors Regulate Embryonic Lung Development

National Institutes of Health

R01 HL 114898-01

08/10/12-06/30/17

\$250,000

Production, Validation and Distribution of the Xenopus ORFeome

National Institutes of Health(University of Virginia)

R01 HD 069352

08/01/11-05/31/16

\$108,702

Xenbase: a Xenopus Model Organism Database

National Institutes of Health

P41 HD 064556

06/01/10-05/31/15

\$671,039

Current Year Direct**\$5,409,866**

Industry Contracts

WELLS

Eli Lilly and Company

\$115,500

Current Year Direct Receipts

\$115,500

Total

\$5,525,366

Additional Information

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 PhD degree. It has been based in the Department of Pediatrics for over 35 years. Drs. Timothy Weaver and Rashmi Hegde served as Directors of the Program with Associate Directors Drs. Jeffrey Whitsett - finance, Aaron Zorn - curriculum, Tim Le Cras - admissions, Edith Markoff – recruitment, Yi Zheng – faculty membership, and John Shannon– graduate studies.

There are 87 faculty members in the program. During the past year, there were 70 pre-doctoral students in the program, 8 of whom are pursuing MD/PhD 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 6 first year students. The remaining students are supported through a variety of sources including Ryan Fellowships (2), NIH training grants (5), external grants to their advisors (50), CHRF Special Purpose Funds to their advisors (5) and funds from the Children's Hospital Research Foundation to the Graduate Program (5).

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, 2012-2013

Student	Faculty Mentor	Admission
Thomas Acciani	Timothy Le Cras	2009
Amel Alqadah	Chiou-Fen Chuang	2010
Robyn Amos-Kroohs	Michael Williams	2009
Aria Attia	Jeffrey Whitsett	2010
David Balli	Tanya Kalin	2008
Kristin Bell	Noah Shroyer	2010
Katie Bezold	Louis Muglia	2011
Gregory Bick	Paul Andreassen	2010
Markaisa Black	Rotating	2012
Caitlin (Maynard) Braitsch	Katherine Yutzey	2006
Adam Burr**	Jeffery Molkentin	2009
Jeeyeon Cha**	Sudhansu K. Dey	2009
Heather Chapman	Kenneth Campbell	2007
Mark Charlton-Perkins	Tiffany Cook	2010
Jason Cowan	Stephanie Ware	2009
Angela (Matthews) Damen	Katherine Yutzey	2011

Sharina Desai	Saulius Sumanas	2008
Tracy Dohn	Joshua Waxman	2009
Jieqing Fan	Richard Lang	2007
Ming Fang	Katherine Yutzey	2010
Alyssa Gallas	Geraldine Guasch	2011
Chen Gao	Tanya Kalin	2011
Margaret Gardner	Kathryn Wikenheiser-Brokamp	2010
Nicole Glenn	Saulius Sumanas	2006
Vicky Gomez	Katherine Yutzey	2011
Zirong Gu	Yutaka Yoshida	2008
David Hahn	Timothy Weaver	2006
Lu Han	Aaron Zorn	2011
Jamie Havrilak	John Shannon	2008
Michael Hester	Steve Danzer	2009
Benjamin Hogan	Rotating	2012
Jillian Hufgard	Rotating	2012
Diva Jonatan	James Wells	2006
Abigail (Bower) Kasberg	Steve Potter	2008
Jed Kendall**	Nancy Ratner	2011
Andrew Koenig	Rotating	2012
Jeff Kuerbitz**	Kenneth Campbell	2012
Julie Lander**	Stephanie Ware	2011
Mary (Horn) Lee	Katherine Yutzey	2007
Shan Lin	James Mulloy	2009
Mariana Louza	Aaron Zorn	2010
Bliss Magella	Steve Potter	2011
Amrita Mandal	Joshua Waxman	2011
Kate Maurer	Nadean Brown	2009
Heather McCauley	Geraldine Guasch	2009
Kyle McCracken**	James Wells	2010
Patrick "Sean" McGrath	James Wells	2012
Anna (Hake) Method	James Wells	2007
Edward "David" Muench	Rotating	2012
Elizabeth Mushaben	Timothy Le Cras	2007
Shenyue Qin	Kenneth Campbell	2011
Megan Rost	Saulius Sumanas	2008
Ariel Rydeen	Joshua Waxman	2011
Betsy Schock	Rotating	2012
Moen Sen	Kathryn Wikenheiser-Brokamp	2011
Katie Sinagoga	Rotating	2012
Shatrunjai Singh	Steve Danzer	2010
Mardi Sutherland	Stephanie Ware	2008
Xiaofang Tang	Xinhua Lin	2006
David Terrell**	Tiffany Cook	2008
Chelsea Tolentino	Timothy Le Cras	2010
Juli Uhl	Brian Gebelein	2008
Sha Wang	Christopher Wylie/Aaron Zorn	2009
Michael Workman	Rotating	2012
Jiadi Xu	John Harley	2010
Jia You	Xinhua Lin	2007
Inuk Zandvakili**	Yi Zheng	2009
Xuzhe Zhang	Rotating	2012
Zheng Zhang	Aaron Zorn	2008

Students completing their PhD work

- David Terrell – “A Comparative Analysis of Otd/OTX Factor Function in the Drosophila eye: Examining Mechanisms of Evolutionarily Conserved Function,” August 9, 2012.
- Elizabeth Mushaben – “MTOR and BMP2 Signaling Pathways in Inflammatory Lung Disease,” August 20, 2012.
- Diva Jonatan – “The Role of Sox17 in Normal and Pathological Beta Cells,” August 30, 2012.
- Xiaofang Tang – “Regulation of Wingless (Wg) secretion distribution and signaling,” October 30, 2012.
- Nikki Glenn – “Roles of alpha-cardiac actin during zebrafish heart development and the role of etsrp/etv2 during zebrafish primitive neutropoiesis,” December 7, 2012.
- Caitlin Braitsch – “The role of Pod1/Tcf21 in epicardium-derived cells in cardiac development and disease,” March 1, 2013.
- Xuan Zhou – “RhoA GTPase Controls Cytokinesis and Programmed Necrosis of Hematopoietic Progenitors,” May 20, 2013.
- Sharina Palencia Desai – “Transcriptional Regulation of Early Endocardial Development,” June 6, 2013.
- David Balli – “Foxm1 is a novel regulator of EMT in fibrosis and cancer,” June 17, 2013.
- Jeeyeon Cha – “The role of muscle segment homeobox genes in early pregnancy events,” June 20, 2013.

Students completing their MS work

- Chen Gao – “Role of SPDEF in prostate cancer,” June 21, 2012.
- Jiadi Xu – “DNA repair defects as a mechanism contributing to the development of lupus,” March 7, 2013.
- Chelsea Tolentino – “Identifying Genetic Modifiers Contributing to Pulmonary Arterial Hypertension,” June 4, 2013.

Student Publications

During the past year, students from the Program authored or co-authored 33 articles.

Amos-Kroohs RM, Williams MT, Braun AA, Graham DL, Webb CL, Birtles TS, Greene RM, Vorhees CV, Pisano MM. **Neurobehavioral phenotype of C57BL/6J mice prenatally and neonatally exposed to cigarette smoke.** *Neurotoxicol Teratol.* 2013 Jan-Feb;35:34-45. doi: 10.1016/j.ntt.2013.01.001. Epub 2013 Jan 11. PubMed [citation] PMID: 23314114, PMCID: PMC3593942

Balli D, Ren X, Chou FS, Cross E, Zhang Y, Kalinichenko VV, Kalin TV. **Foxm1 transcription factor is required for macrophage migration during lung inflammation and tumor formation.** *Oncogene.* 2012 Aug 23;31(34):3875-88. doi: 10.1038/onc.2011.549. Epub 2011 Dec 5. PubMed [citation] PMID: 22139074, PMCID: PMC3297705

Balli D, Ustiyanyan V, Zhang Y, Wang IC, Masino AJ, Ren X, Whitsett JA, Kalinichenko VV, Kalin TV. **Foxm1 transcription factor is required for lung fibrosis and epithelial-to-mesenchymal transition.** *EMBO J.* 2013 Jan 23;32(2):231-44. doi: 10.1038/emboj.2012.336. Epub 2013 Jan 4. PubMed [citation] PMID: 23288041, PMCID: PMC3553386

Bezold KY, Karjalainen MK, Hallman M, Teramo K, Muglia LJ. **The genomics of preterm birth: from animal models to human studies.** *Genome Med.* 2013 Apr 29;5(4):34. [Epub ahead of print] PubMed PMID: 23673148; PubMed Central PMCID: PMC3707062.

Braitsch CM, Combs MD, Quaggin SE, Yutzey KE. **Pod1/Tcf21 is regulated by retinoic acid signaling and**

inhibits differentiation of epicardium-derived cells into smooth muscle in the developing heart. *Dev Biol.* 2012 Aug 15;368(2):345-57. doi: 10.1016/j.ydbio.2012.06.002. Epub 2012 Jun 9. PubMed [citation] PMID: 22687751, PMCID: PMC3414197

Bryantsev AL, Duong S, Brunetti TM, Chechenova MB, Lovato TL, Nelson C, Shaw E, Uhl JD, Gebelein B, Cripps RM. **Extradenticle and homothorax control adult muscle fiber identity in Drosophila.** *Dev Cell.* 2012 Sep 11;23(3):664-73. doi: 10.1016/j.devcel.2012.08.004. PubMed [citation] PMID: 22975331, PMCID: PMC3575643

Cai Y, Balli D, Ustiyani V, Fulford LA, Hiller A, Misetich V, Zhang Y, Paluch AM, Waltz SE, Kasper S, Kalin TV. **Foxm1 Expression in Prostate Epithelial Cells is Essential for Prostate Carcinogenesis.** *J Biol Chem.* 2013 Jun 17. [Epub ahead of print] PubMed PMID: 23775078.

Cha J, Sun X, Bartos A, Fenelon J, Lefèvre P, Daikoku T, Shaw G, Maxson R, Murphy BD, Renfree MB, Dey SK. **A new role for muscle segment homeobox genes in mammalian embryonic diapause.** *Open Biol.* 2013 Apr 24;3(4):130035. doi: 10.1098/rsob.130035. PubMed PMID: 23615030.

Cha J, Sun X, Dey SK. **Mechanisms of implantation: strategies for successful pregnancy.** *Nat Med.* 2012 Dec;18(12):1754-67. doi: 10.1038/nm.3012. Review. PubMed [citation] PMID: 23223073

Chapman H, Waclaw RR, Pei Z, Nakafuku M, Campbell K. **The homeobox gene Gsx2 controls the timing of oligodendroglial fate specification in mouse lateral ganglionic eminence progenitors.** *Development.* 2013 Jun;140(11):2289-98. doi: 10.1242/dev.091090. Epub 2013 May 1. PubMed PMID: 23637331; PubMed Central PMCID: PMC3653554.

Chen L, Acciani T, Le Cras T, Lutzko C, Perl AK. **Dynamic regulation of platelet-derived growth factor receptor $\alpha\pm$ expression in alveolar fibroblasts during realveolarization.** *Am J Respir Cell Mol Biol.* 2012 Oct;47(4):517-27. doi: 10.1165/rcmb.2012-0030OC. Epub 2012 May 31. PubMed [citation] PMID: 22652199, PMCID: PMC3488620

Daikoku T, Yoshie M, Xie H, Sun X, Cha J, Ellenson LH, Dey SK. **Conditional deletion of Tsc1 impedes normal oviductal and uterine function by enhancing mTORC1 signaling in mice.** *Mol Hum Reprod.* 2013 Mar 7. [Epub ahead of print] PubMed [citation] PMID: 23475984

Davis J, Burr AR, Davis GF, Birnbaumer L, Molkenstin JD. **A TRPC6-dependent pathway for myofibroblast transdifferentiation and wound healing in vivo.** *Dev Cell.* 2012 Oct 16;23(4):705-15. doi: 10.1016/j.devcel.2012.08.017. Epub 2012 Sep 27. PubMed [citation] PMID: 23022034, PMCID: PMC3505601

Glenn NO, McKane M, Kohli V, Wen KK, Rubenstein PA, Bartman T, Sumanas S. **The W-loop of alpha-cardiac actin is critical for heart function and endocardial cushion morphogenesis in zebrafish.** *Mol Cell Biol.* 2012 Sep;32(17):3527-40. doi: 10.1128/MCB.00486-12. Epub 2012 Jul 2. PubMed [citation] PMID: 22751927, PMCID: PMC3422001

Graham DL, Amos-Kroohs RM, Braun AA, Grace CE, Schaefer TL, Skelton MR, Williams MT, Vorhees CV. **Neonatal +-methamphetamine exposure in rats alters adult locomotor responses to dopamine D1 and D2 agonists and to a glutamate NMDA receptor antagonist, but not to serotonin agonists.** *Int J Neuropsychopharmacol.* 2013 Mar;16(2):377-91. doi: 10.1017/S1461145712000144. Epub 2012 Mar 6. PubMed [citation] PMID: 22391043

Hester MS, Danzer SC. **Accumulation of abnormal adult-generated hippocampal granule cells predicts seizure frequency and severity.** *J Neurosci.* 2013 May 22;33(21):8926-36. doi: 10.1523/JNEUROSCI.5161-

12.2013. PubMed PMID: 23699504.

Kenny AP, Rankin SA, Allbee AW, Prewitt AR, Zhang Z, Tabangin ME, Shifley ET, Louza MP, Zorn AM. **Sizzled-tolloid interactions maintain foregut progenitors by regulating fibronectin-dependent BMP signaling.** *Dev Cell.* 2012 Aug 14;23(2):292-304. doi: 10.1016/j.devcel.2012.07.002. Epub 2012 Aug 2. PubMed [citation] PMID: 22863744

Krishnan K, Feng X, Powers-Fletcher MV, Bick G, Richie DL, Woollett LA, Askew DS. **Effects of a defective endoplasmic reticulum-associated degradation (ERAD) pathway on the stress response, virulence and antifungal drug susceptibility of the mold pathogen *Aspergillus fumigatus*.** *Eukaryot Cell.* 2013 Jan 25. [Epub ahead of print] PubMed [citation] PMID: 23355008

Liu M, Bi F, Zhou X, Zheng Y. **Rho GTPase regulation by miRNAs and covalent modifications.** *Trends Cell Biol.* 2012 Jul;22(7):365-73. doi: 10.1016/j.tcb.2012.04.004. Epub 2012 May 7. Review. PubMed [citation] PMID: 22572609, PMCID: PMC3383930

McCracken KW, Wells JM. **Molecular pathways controlling pancreas induction.** *Semin Cell Dev Biol.* 2012 Aug;23(6):656-62. doi: 10.1016/j.semcdb.2012.06.009. Epub 2012 Jun 26. Review. PubMed [citation] PMID: 22743233, PMCID: PMC3423525

Mushaben EM, Brandt EB, Hershey GK, Le Cras TD. **Differential effects of rapamycin and dexamethasone in mouse models of established allergic asthma.** *PLoS One.* 2013;8(1):e54426. doi: 10.1371/journal.pone.0054426. Epub 2013 Jan 17. PubMed [citation] PMID: 23349887, PMCID: PMC3547928

Pun RY, Rolle IJ, Lasarge CL, Hosford BE, Rosen JM, Uhl JD, Schmeltzer SN, Faulkner C, Bronson SL, Murphy BL, Richards DA, Holland KD, Danzer SC. **Excessive activation of mTOR in postnatally generated granule cells is sufficient to cause epilepsy.** *Neuron.* 2012 Sep 20;75(6):1022-34. doi: 10.1016/j.neuron.2012.08.002. PubMed [citation] PMID: 22998871, PMCID: PMC3474536

Rankin SA, Gallas AL, Neto A, Gomez-Skarmeta JL, Zorn AM. **Suppression of Bmp4 signaling by the zinc-finger repressors *Osr1* and *Osr2* is required for Wnt/ β -catenin-mediated lung specification in *Xenopus*.** *Development.* 2012 Aug;139(16):3010-20. doi: 10.1242/dev.078220. Epub 2012 Jul 12. PubMed [citation] PMID: 22791896, PMCID: PMC3403107

Rao S, Chun C, Fan J, Kofron JM, Yang MB, Hegde RS, Ferrara N, Copenhagen DR, Lang RA. **A direct and melanopsin-dependent fetal light response regulates mouse eye development.** *Nature.* 2013 Feb 14;494(7436):243-6. doi: 10.1038/nature11823. Epub 2013 Jan 16. PubMed [citation] PMID: 23334418

Riazuddin S, Belyantseva IA, Giese AP, Lee K, Indzhykulian AA, Nandamuri SP, Yousaf R, Sinha GP, Lee S, Terrell D, Hegde RS, Ali RA, Anwar S, Andrade-Elizondo PB, Sirmaci A, Parise LV, Basit S, Wali A, Ayub M, Ansar M, Ahmad W, Khan SN, et al. **Alterations of the CIB2 calcium- and integrin-binding protein cause Usher syndrome type 1J and nonsyndromic deafness DFNB48.** *Nat Genet.* 2012 Nov;44(11):1265-71. doi: 10.1038/ng.2426. Epub 2012 Sep 30. PubMed [citation] PMID: 23023331, PMCID: PMC3501259

Schaefer TL, Braun AA, Amos-Kroohs RM, Williams MT, Ostertag E, Vorhees CV. **A new model of Pde4d deficiency: genetic knock-down of PDE4D enzyme in rats produces an antidepressant phenotype without spatial cognitive effects.** *Genes Brain Behav.* 2012 Jul;11(5):614-22. doi: 10.1111/j.1601-183X.2012.00796.x. Epub 2012 May 8. PubMed [citation] PMID: 22487514

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Int J Neuropsychopharmacol. 2013 Jan 11:1-12. [Epub ahead of print]PubMed [citation] PMID: 23308402

Shang X, Marchioni F, Evelyn CR, Sipes N, Zhou X, Seibel W, Wortman M, Zheng Y. **Small-molecule inhibitors targeting G-protein-coupled Rho guanine nucleotide exchange factors**. *Proc Natl Acad Sci U S A*. 2013 Feb 19;110(8):3155-60. doi: 10.1073/pnas.1212324110. Epub 2013 Feb 4.PubMed [citation] PMID: 23382194, PMCID: PMC3581902

Skelton MR, Graham DL, Schaefer TL, Grace CE, Braun AA, Burns LN, Amos-Kroohs RM, Williams MT, Vorhees CV. **Distinct periods of developmental sensitivity to the effects of 3,4-(\pm)-methylenedioxymethamphetamine (MDMA) on behaviour and monoamines in rats**. *Int J Neuropsychopharmacol*. 2012 Jul;15(6):811-24. doi: 10.1017/S1461145711000952. Epub 2011 Jun 28.PubMed [citation] PMID: 21733225

Stefater JA 3rd, Rao S, Bezold K, Aplin AC, Nicosia RF, Pollard J, Ferrara N, Lang RA. **Macrophage Wnt-Calcineurin-Flt1 signaling regulates mouse wound angiogenesis and repair**. *Blood*. 2013 Jan 9. [Epub ahead of print]PubMed [citation] PMID: 23303818

Sutherland MJ, Wang S, Quinn ME, Haaning A, Ware SM. **Zic3 is required in the migrating primitive streak for node morphogenesis and left-right patterning**. *Hum Mol Genet*. 2013 Feb 28. [Epub ahead of print]PubMed [citation] PMID: 23303524

Zhang F, Bick G, Park JY, Andreassen PR. **MDC1 and RNF8 function in a pathway that directs BRCA1-dependent localization of PALB2 required for homologous recombination**. *J Cell Sci*. 2012 Dec 15;125(Pt 24):6049-57. doi: 10.1242/jcs.111872. Epub 2012 Oct 4.PubMed [citation] PMID: 23038782

Zhang Y, You J, Ren W, Lin X. **Drosophila glypicans Dally and Dally-like are essential regulators for JAK/STAT signaling and Unpaired distribution in eye development**. *Dev Biol*. 2013 Mar 1;375(1):23-32. doi: 10.1016/j.ydbio.2012.12.019. Epub 2013 Jan 8.PubMed [citation] PMID: 23313126

Student Honors

- Amos-Kroohs, R. – Supported by NIH Training Grant (Teratology)
- Balli, D. – Supported by the Dissertation Completion Fellowship, University of Cincinnati
- Cha, J. – Supported by NHLBI Ruth L. Kirchenstein National Research Service Award for Individual Pre-doctoral MD/PhD Fellows
- Chapman, H. – Supported by NIH Training Grant (Teratology)
- Charlton-Perkins, M. – Supported by an Albert J. Ryan Foundation Fellowship
- Gardner, M. – Supported by NIH Training Grant (Pulmonary & Cardiovascular Biology)
- Kasberg, A. – Supported by NIH Training Grant (Teratology)
- McCracken, K. – Supported by an Albert J. Ryan Foundation Fellowship
- Rost, M. – Outstanding Poster by a Graduate Student, North American Vascular Biology Organization Workshop
- Singh, S. – 3rd Prize, Graduate Student Poster Forum, University of Cincinnati; Supported by a University Research Council Summer Fellowship, University of Cincinnati
- Uhl, J. – Supported by a University Research Council Summer Fellowship, University of Cincinnati

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. David M. Ornitz presented the Seventeenth Annual Richard Akeson Memorial Lectureship in conjunction with the annual Molecular and Developmental Biology Graduate Student Symposium in 2012.

In addition to the travel stipends, the program also instituted two new student achievement awards in 2011. The Akeson Award for Outstanding Contributions to the Graduate Program is awarded to a first or second year student with outstanding participation in student recruitment, hosting visiting seminar speakers, volunteering for University of Cincinnati events and other contributions. The Akeson Award for Academic Excellence is awarded to a student in the third year or beyond with a strong publication record, pre-doctoral fellowships, grants (both submitted and awarded) and presentations at national and international meetings. Nominations are accepted for both awards from MDB program faculty and students and awards are made in the spring. For 2013, the Akeson Award for Outstanding Contributions was awarded to Moen Sen and the Akeson Award for Academic Excellence was awarded to Juli Uhl.

The following students received funding from the Richard A. Akeson Fellowship and Memorial Fund for travel in 2012 - 2013:

Student	Meeting	Location	Presentation Date	
Heather Chapman	8 th Federation of European Neurosciences Forum of Neuroscience	Barcelona, Spain	Poster	July 2012
Abigail Kasberg	Society for Developmental Biology 71 st Annual Meeting	Montreal, Canada	Poster	July 2012
Jamie Havrilak	Federation of American Societies for Experimental Biology Science Research Conference	Saxtons River, Vermont	Poster	July 2012
Mark Charlton-Perkins	Gordon Research Conference Visual System Development Meeting	New London, New Hampshire	Poster	August 2012
Thomas Acciani	European Respiratory Society Annual Congress	Vienna, Austria	Poster	September 2012
Zirong Gu	Axon Guidance, Synapse Formation and Regeneration Meeting	Cold Spring Harbor, New York	Poster	September 2012
Mariana Louza	14 th International Xenopus Conference	Giens Peninsula, France	Poster	September 2012
Robyn Amos-Kroohs	Society for Neuroscience Annual Meeting	New Orleans, Louisiana	Poster	October 2012
Megan Rost	North American Vascular Biology Organization Workshops in Vascular Biology	Asilomar, California	Poster	October 2012
Shatrunjai Singh	66 th American Epilepsy Society Annual Meeting	San Diego, California	Poster	December 2012
Sha Wang	The American Society for Cell Biology Annual Meeting	San Francisco, California	Poster	December 2012
Kyle McCracken	American Physician Scientists Association 9 th Annual Meeting	Chicago, Illinois	Poster	April 2013
Jia You	Genetics Society of American 54 th Annual Drosophila Research Conference	Washington, DC	Poster	April 2013
Juli Uhl	Genetics Society of American 54 th Annual Drosophila Research Conference	Washington, DC	Oral Presentation	April 2013
Ariel Rydeen	Weinstein Cardiovascular Conference	Tucson, Arizona	Moderated Poster	May 2013
Tracy Dohn	Weinstein Cardiovascular Conference	Tucson, Arizona	Poster	May 2013
Julie Lander	Weinstein Cardiovascular Conference	Tucson, Arizona	Poster	May 2013
Mardi	Weinstein Cardiovascular Conference	Tucson, Arizona	Poster	May 2013

Sutherland				
Jason Cowan	Weinstein Cardiovascular Conference	Tucson, Arizona	Poster	May 2013
Sharina Desai	Weinstein Cardiovascular Conference	Tucson, Arizona	Poster	May 2013
Betsy Schock	Marine Biological Laboratory Embryology Course	Woods Hole, Massachusetts	Poster	June 2013
Grethel Millington	19 th International C. elegans Meeting	Los Angeles, California	Poster	June 2013
Amel Alqadah	19 th International C. elegans Meeting	Los Angeles, California	Poster	June 2013
Lu Han	Cold Spring Harbor Laboratory Mouse Development, Stem Cells and Cancer Course	Cold Spring Harbor, New York	Poster	June 2013