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**


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.


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.


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.


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**


13. Hsieh YW, Chang C, Chuang CF. *The microRNA mir-71 inhibits calcium signaling by targeting the*


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
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, Hanard 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, University of Cincinnati
Jumpei Terakawa*, PhD, Res. F, Yamaguchi University, Japan
Marcin Wlizla, 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 Nakafuku

Human Genetics » Rolf Stottmann
  Molecular basis of congenital brain anomaly with Masato Nakafuku

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 mammalin nervous system with Yutaka Yoshida

**Urology**  » Joo-Seop Park
   Transcriptome analysis of wnt signaling in liver development with Aaron Zom

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**Grants, Contracts, and Industry Agreements**

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<td>Molecular Mechanisms Controlling Formation of Basal Ganglia Circuitry</td>
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<td>R01 MH 090740</td>
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<td>Roles of Gsh1 &amp; Gsh2 in Telencephalic Neurogenesis</td>
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<td>Understanding MicroRNA Mechanisms for Developmental Decline in Axon Growth Activity</td>
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<td>Specification of Stochastic Left-Right Asymmetric Neuronal Fates in C. Elegans</td>
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<td>R01 GM 098026-01</td>
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<td>Fundamental Mechanisms of Protein Kinase Activation Loop Autophosphorylation</td>
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<td>Defining the Transcriptional and Signaling Networks Involved in Epithelial Cancers of Transitional Epithelia</td>
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<td>Using a Novel Mouse Model of Transitional Epithelial Tumor to Investigate Cancer Initiation and Progression</td>
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<td>Molecular Genetic Analysis of Craniofacial Development</td>
<td>JIANG, R</td>
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<td>Ectoderm Formation in the Early Xenopus Embryo</td>
<td>KOFRON, M.</td>
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<td>Lineage Tracing of Endothelial Progenitor Cells: Patterning the Vascular Cord</td>
<td>KOHLI, V</td>
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<td>Regulation of Wingless (Wg) Signaling and Morphogen Gradient Formation</td>
<td>LIN, X</td>
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<td>Roles of Retromer Complex in Development</td>
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<td>Digestive Health Center: Stem Cell Core</td>
<td>MAYHEW, C</td>
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<td>Endogenous CNTF Receptors and Adult, In Vivo Neurogenesis</td>
<td>NAKAFUKU, M</td>
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<tr>
<td>Molecular Control of Neurogenesis in the Adult Subventricular Zone</td>
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<td>Generating Molecular Markers that Selectively Label Urothelial Sub-Populations</td>
<td>POTTER, S</td>
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<td>Global Gene Expression Atlas of Craniofacial Development</td>
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<td>Digestive Health Center - Gene Expression Core</td>
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<td>Training in Cardiovascular Biology</td>
<td>SCHUMACHER, J</td>
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<td>bHLH factor Regulation of Mammalian Retinal Neuron Development</td>
<td>SHROYER, N</td>
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<td>Molecular Mechanisms of Arterial-Venous Differentiation in Zebrafish</td>
<td>SUMANAS, S</td>
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<td>Directing Differentiation of Human Pluripotent Stem Cells to Generate 3-Dimensional Lung Tissue In Vitro</td>
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<td><strong>Wells, J / Shroyer N</strong></td>
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<td>Human Endocrine Cell Development</td>
<td>National Institutes of Health</td>
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<td><strong>Wylie, C</strong></td>
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<tr>
<td>A Developmentally-Based Tissue Engineering Approach to Improve Tendon Repair</td>
<td>National Institutes of Health(University of Cincinnati)</td>
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<td><strong>Yoshida, Y</strong></td>
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<td>Properties of Interneurons Before and After SCI</td>
<td>University of Cincinnati</td>
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<td>Regulation of Sensory-Motor Connectivity by Semaphorin-Plexin Signaling</td>
<td>National Institutes of Health</td>
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<td>Cadherin-based Actin Assembly in the Xenopus Embryo</td>
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<td>Cell Cycle Proteomics in Xenopus</td>
<td>National Institutes of Health(Harvard Medical School)</td>
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<td>Collaborative Research: Ontology-Enabled Reasoning across Phenotypers from Evolution and Model Organisms</td>
<td>National Science Foundation(University of South Dakota)</td>
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<td>Osr Transcription Factors Regulate Embryonic Lung Development</td>
<td>National Institutes of Health</td>
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<td>Production, Validation and Distribution of the Xenopus ORFeome</td>
<td>National Institutes of Health(University of Virginia)</td>
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<td>Xenbase: a Xenopus Model Organism Database</td>
<td>National Institutes of Health</td>
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<td><strong>Current Year Direct</strong></td>
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Industry Contracts
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

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

- Caitlin Braitsch – “The role of Pod1/Tcf21 in epicardium-derived cells in cardiac development and disease,” March 1, 2013.
- David Balli – “Foxm1 is a novel regulator of EMT in fibrosis and cancer,” June 17, 2013.

Students completing their MS work


Student Publications

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


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


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-


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 Predoctoral 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:

<table>
<thead>
<tr>
<th>Student</th>
<th>Meeting</th>
<th>Location</th>
<th>Presentation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heather Chapman</td>
<td>8th Federation of European Neurosciences Forum of Neuroscience</td>
<td>Barcelona, Spain</td>
<td>July 2012</td>
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<tr>
<td>Abigail Kasberg</td>
<td>Society for Developmental Biology 71st Annual Meeting</td>
<td>Montreal, Canada</td>
<td>July 2012</td>
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<tr>
<td>Jamie Havrilak</td>
<td>Federation of American Societies for Experimental Biology Science Research Conference</td>
<td>Saxtons River, Vermont</td>
<td>July 2012</td>
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<td>Thomas Acciani</td>
<td>European Respiratory Society Annual Congress</td>
<td>Vienna, Austria</td>
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<tr>
<td>Zirong Gu</td>
<td>Axon Guidance, Synapse Formation and Regeneration Meeting</td>
<td>Cold Spring Harbor, New York</td>
<td>September 2012</td>
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<tr>
<td>Mariana Louza</td>
<td>14th International Xenopus Conference</td>
<td>Gien Peninsula, France</td>
<td>September 2012</td>
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<tr>
<td>Robyn Amos-Krohs</td>
<td>Society for Neuroscience Annual Meeting</td>
<td>New Orleans, Louisiana</td>
<td>October 2012</td>
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<tr>
<td>Megan Rost</td>
<td>North American Vascular Biology Organization Workshops in Vascular Biology</td>
<td>Asilomar, California</td>
<td>October 2012</td>
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<tr>
<td>Shatrunjai Singh</td>
<td>66th American Epilepsy Society Annual Meeting</td>
<td>San Diego, California</td>
<td>December 2012</td>
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<tr>
<td>Sha Wang</td>
<td>The American Society for Cell Biology Annual Meeting</td>
<td>San Francisco, California</td>
<td>December 2012</td>
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<td>Kyle McCracken</td>
<td>American Physician Scientists Association 9th Annual Meeting</td>
<td>Chicago, Illinois</td>
<td>April 2013</td>
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<td>Ariel Rydeen</td>
<td>Weinstein Cardiovascular Conference</td>
<td>Tucson, Arizona</td>
<td>May 2013</td>
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<tr>
<td>Tracy Dohn</td>
<td>Weinstein Cardiovascular Conference</td>
<td>Tucson, Arizona</td>
<td>May 2013</td>
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<td>Julie Lander</td>
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<td>Mardi</td>
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<td>May 2013</td>
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<td>Name</td>
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<td>Sutherland</td>
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<td>Poster</td>
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<tr>
<td>Jason Cowan</td>
<td>Weinstein Cardiovascular Conference</td>
<td>Tucson, Arizona</td>
<td>Poster</td>
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<tr>
<td>Sharina Desai</td>
<td>Marine Biological Laboratory Embryology Course</td>
<td>Woods Hole, Massachusetts</td>
<td>Poster</td>
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<tr>
<td>Betsy Schock</td>
<td>Marine Biological Laboratory Embryology Course</td>
<td>Woods Hole, Massachusetts</td>
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<tr>
<td>Grethel Millington</td>
<td>19th International C. elegans Meeting</td>
<td>Los Angeles, California</td>
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<tr>
<td>Amel Alqadah</td>
<td>19th International C. elegans Meeting</td>
<td>Los Angeles, California</td>
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<tr>
<td>Lu Han</td>
<td>Cold Spring Harbor Laboratory Mouse Development, Stem Cells and Cancer Course</td>
<td>Cold Spring Harbor, New York</td>
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