Division of Developmental Biology

DIVISION PROFILE	
Number of Faculty	22
Number of Joint Appointment Faculty	8
Number of Fellows	
Clinical Fellows	3
Research Fellows	42
Number of Graduate Students	20
Number of Other Students (full and part-time)	18
Number of Support Personnel	44
Annual Total Grant Support (direct)	$4,247,132
Number of Peer Reviewed Publications	61

FACULTY LISTING

Christopher C. Wylie, PhD, Professor of Pediatrics, Associate Chair for Basic Science; Director of the Molecular and Developmental Biology Graduate Program
Nadean L. Brown, PhD, Assistant Professor of Pediatrics
Kenneth J. Campbell, PhD, Associate Professor of Pediatrics, Director of Graduate Studies, Molecular and Developmental Biology Graduate Program
Chiou-Fen Chuang, PhD, Assistant Professor of Pediatrics
Jay L. Degen, PhD, Professor of Pediatrics
Sandra J.F. Degen, PhD, Professor of Pediatrics, Associate Chair for Academic Affairs
Brian Gebelein, PhD, Assistant Professor of Pediatrics
Janet Heasman, PhD, Professor of Pediatrics
Rashmi Hegde, PhD, Associate Professor of Pediatrics
Harold Kalter, PhD, Professor of Pediatrics Emeritus
J. Matthew Kofron, PhD, Research Assistant Professor of Pediatrics
Chia-Yi Kuan, MD, PhD, Assistant Professor of Pediatrics
James L. Lessard, PhD, Professor of Pediatrics, Associate Director
Hung-Chi Liang, PhD, Research Instructor of Pediatrics
Xinhua Lin, PhD, Associate Professor of Pediatrics
Jun Ma, PhD, Associate Professor of Pediatrics
Masato Nakafuku, MD, PhD, Professor of Pediatrics
S. Steven Potter, PhD, Professor of Pediatrics, Director of the Affymetrix Core Facility
William J. Scott, PhD, DVM, Professor of Pediatrics Emeritus
James M. Wells, PhD, Assistant Professor of Pediatrics
Dan A. Wiginton, PhD, Associate Professor of Pediatrics
Aaron M. Zorn, PhD, Assistant Professor of Pediatrics

FACULTY JOINT APPOINTMENT LISTING

Bruce Aronow, PhD, Professor of Pediatrics, Pediatrics Bioinformatics
Thomas Bartman, MD, PhD, Assistant Professor of Pediatrics, Pulmonary Biology
Michael D. Bates, MD, PhD, Assistant Professor of Pediatrics, Gastroenterology, Hepatology, and Nutrition
Tiffany Cook, PhD, Assistant Professor of Pediatrics, Pediatric Ophthalmology
Prasad Devarajan, MD, Professor of Pediatrics, Director, Div. of Nephrology and Hypertension
Richard A. Lang, PhD, Professor of Pediatrics, Director, Transgenic Core Facility, Pediatric Ophthalmology
Noah F. Shroyer, PhD, Assistant Professor of Pediatrics, Gastroenterology, Hepatology, and Nutrition
Jeffrey A. Whitsett, MD, Professor of Pediatrics, Chief, Section of Neonatology, Perinatal, and Pulmonary Biology

OVERVIEW

The development of the fertilized egg into a child requires the expression of some 30,000 genes, in complex temporal and spatial combinations of expression, which together generate both form and function as the organ systems of the embryo develop. This highly complex process combines many cellular processes, including growth, division, movement, differential cell adhesion, cell death, and cell differentiation, to generate a functional organism. Congenital disorders result from mistakes in this intricate process. 3-4% of babies born in this country have major organ system defects caused by mistakes in embryonic development.

Left to Right: 1st Row: S.Potter, A. Kuan, N. Shroyer, J. Heasman, N. Brown, C.F. Chuang; 2nd Row: J. Ma, J. Wells, S. Sumanas, T. Cook, M. Nakafuku; 3rd Row: J. Lessard, C. Wylie, K. Campbell, R. Hegde, B. Gebelein; 4th Row: V. Cleghon, T. Bartman, R. Lang, D. Wiginton, A. Zorn

The Division of Developmental Biology is the center for basic research into this process. Its scientists study the cellular and molecular processes that control development, with the aim of uncovering the causes of human birth defects. Different model organisms are used, including mice, fish, frogs, chickens, nematodes, and fruit flies. Many different technologies are also used, including genetics, genomics, molecular structure analysis, experimental embryology, cell culture, high resolution cellular and molecular imaging, and biochemistry. A major part of the division's activities involves establishing research groups who will use novel insights into developmental mechanisms to identify the basis of congenital disorders. This is being done in three ways. First, the DB Division is becoming more of an interdivisional "matrix" structure. Several physician/scientists from six clinical divisions, including two clinical division directors, hold joint appointments in the division. This allows cross-fertilization of ideas and technologies between clinicians and basic scientists. It also allows training in basic science for young physician/scientists recruited into clinical divisions. Second, several focus groups of faculty have been established, each of which focuses on a major organ system. The Visual Systems Group (Organizer: Richard Lang), the Endoderm Club (Organizers: Jim Wells, Mike Bates and Aaron Zorn), and the Developmental Neurobiology Center (Organizers: Masato Nakafuku and Kenny Campbell), are good examples in which faculty from DB and from the clinical divisions meet regularly to plan collaborative projects and grant applications. Skeletal Biology and Stem Cell Biology groups are planned for the future. Third, individual projects are being started, in which specific birth defects are targeted by basic scientist and clinician collaborators.

The division is also a major center for training in basic science. Trainees last year included 4 clinical faculty learning basic science, 4 clinical fellows, 42 postdoctoral scientists, 20 graduate and 18 undergraduate students. It is the home of the University of Cincinnati Molecular and Developmental Biology Graduate Program (see separate entry). Our faculty play key roles in this program. Chris Wylie is currently Co-Director of the program. Janet Heasman is Curriculum Director. Kenny Campbell is Director for Student Affairs. Steve Potter and Masato Nakafuku direct the Introduction to Development course, whilst Richard Lang and Jim Wells direct the Advanced Developmental Biology course. Many faculty members give lectures in these courses. In addition, they teach in the MD/PhD, Neuroscience, and Cell Biology graduate programs.

HIGHLIGHTS

Last year the division appointed three new faculty members. Vaughn Cleghon (from the Beatson Institute, Glasgow UK) studies the functioning of protein kinases, Yutaka Yoshida (from Columbia Univ) studies directed cell migration of sensory neurons, and Saulius Sumanas (from UCLA) studies the differentiation of blood vessels. Congratulations go to Chia Yi (Alex) Kuan, who was promoted to Associate Professor with tenure.

Three students successfully completed their PhD's in the division last year. Adnan Mir studied ectoderm differentiation in Xenopus laevis, Kristopher Schwab studied gene expression in normal and abnormal kidney development, and Ni Song studied early lens development in the mouse eye. Our students gained several awards for research presentations. Chris Runyan (Wylie/Heasman lab) gained the first prize at the Annual Graduate Research Forum at the University of Cincinnati, Sarah Goodwin (Cook lab) was awarded the best poster prize at the Capstone Summer Research Program Symposium. Rob Hufnagal (Brown lab) was awarded the first graduate student Crawley Scholarship Award in Vision Research.

Both senior and junior faculty made significant contributions to their research fields last year. Amongst the seniors; Chris Wylie is on the Advisory Councils of the RIKEN Institute in Japan, and of Princeton University, and gave several pleniary lectures at international conferences last year. Jay Degen gave the *Sol Sherry Distinguished Lecture in Thrombosis* at the International Society on Hemostasis, and gained the Sol Sherry Award for the Advancement of the understanding and treatment of thrombosis, presented at the XXI Congress of the International Society on Thrombosis and Hemostasis, in Geneva. Janet Heasman gave the *Arthur H. Whiteley Pleniary Lecture* at the Society of Developmental Biology Meeting in Seattle. Amongst our younger faculty members, Jim Wells was invited by the graduate students at SUNY Stonybrook to give the keynote address at their Annual Symposium. Tiffany Cook gave a platform presentation at the International Congress of Eye Research in Buenos Aires. Xinhua Lin gave an invited presentation at the prestigious Santa Cruz Developmental Biology Meeting. Nadean Brown, Janet Heasman, and Brian Gebelein all gained front cover articles in major developmental journals last year. Altogether, divisional faculty published 61 research publications last year, and gave 49 platform presentations or invited seminars.

TRAINING

Faculty

Gail Deutsch, MD	Brown University, Asst. Professor, Pathology
Larry Patterson, MD	College of Medicine of Pennsylvania State University, Res. Asst. Professor, Nephrology
Joseph Palumbo, MD	Penn State University College of Medicine, Res. Asst. Professor, Hematology/Oncology
Pramod Reddy, MBBS	Guntur Medical College and Siddhartha Medical College, University of Health Sciences, Vijayawada, India, Asst. Professor, Urology

Research Associates

Tatyana Belenkaya, PhD	Russian Academy of Science
Eric Brunskill, PhD	University of Maryland
Weiming Bu, PhD	Jilin University, China
Bharesh Chauhan, PhD*	Oxford University, United Kingdom
Lisa Ehrman, PhD	University of Cincinnati
Matthew Flick, PhD	Purdue University
Reena Rani, PhD	Chhatrapati Shahu Ji University, India
Michael Spencer, PhD	University of Kentucky
John Szucsik, PhD	University of Cincinnati
Qinghua Tao, PhD	Chinese Academy of Sciences
Bei Wang, MD	Yuzhou University (end 8/31/06)
Jody White, PhD	California Inst of Technology

Research Fellows

Michael Bennett, PhD	University of Cincinnati (end 10/27/06)
Sang-Wook Cha, PhD	Kyungpook National University, Korea
Korie Counts, PhD	University of Kentucky (end 4/13/07)
Chitra Dahia, PhD*	Indian Institute of Science
Ying Fang, PhD	University of Cincinnati
Avedis Kazanjian, PhD*	University of Louisville
Savita Kurup, PhD*	University of Pune, India
Yan Li, PhD	Shandong University, China (end 4/2/07)
Suh-Chin Lin, PhD	University of Texas Health Sciences, San Antonio
Junbo Liu, PhD	Fudan University
Mayur Madhavan, PhD	Miami University
Aygun Mamedova, PhD	Moscow State University
Leigh-Anne Miller, PhD*	University of Cincinnati
Billie Moore-Scott, PhD	Medical College of Georgia (end 12/29/06)
Motoshi Nagao, PhD	Tokyo Institute of Technology
Jennifer Ondr, PhD*	Washington University
Xiufang Pan, MD*	Beijing Medical University
Timothy Plageman, PhD	University of Cincinnati

Virgilio Ponferrada, PhD*	Wright State University
Sujata Rao, PhD*	Cornell University
Debora Sinner, PhD	University of Buenos Aires, Argentina
Jason Spence, PhD	Miami University, Ohio
Yalikun Suofu, PhD	University of Greifswald, Germany
Emmanuel Tadjuidje, PhD	University of Goettengen
Ilya Vilinsky, PhD	Cornell University
Ronald Waclaw, PhD	University of Cincinnati
Stephanie Whitaker, PhD*	SUNY Upstate Medical University
Baotong Xie, PhD*	Chinese Academy of Sciences
Yukiyo Yamamoto, PhD	Hokkaido University, Japan
Eun-Jin Yeo, PhD	Seoul National University, Seoul, South Korea

Clinical Fellows

Alan Kenny, MD, PhD	University of Rochester, School of Medicine and Dentistry
David Kitchens, MD	University of Cincinnati
Eric Mullins, MD	University of Missouri - Columbia
Bang Bao Scholar:	
Danielle Yu	West China Second University Hospital (end 12/31/06)

Graduate Students from other programs

(see separate listing for students in the Molecular and Developmental Biology Program)

Alessandro Cancelliere	Neuroscience – Univ of Cincinnati
Longqui Cheng	Jinan University (end 12/29/06)
Feng He	Institute of Biophysics, Chinese Academy of Sciences
Robert Hufnagel	PSTP and Neuroscience, Univ. of Cincinnati
Ken Somekawa	Dept of Neurosurgery -Univ of Tokyo (end 9/15/06)
Michiya Sugimori	Dept of Neuropathology-Univ of Tokyo (end 6/30/07)
Gengqiang Xie	Institute of Biophysics, Chinese Academy of Sciences
Shunyan Weng	Shanghai Jiatong University

Undergraduate Students

Jarred Burkart	Vanderbilt University
Jeeyeon Cha	University of Cincinnati
Kylie Chew	Baldwin College
I-Yuan Chang	University of Cincinnati
Dustin Dumont	University of Cincinnati
Joshua Feuerstein	State University of New York
Michael Fusakio	DePauw University
Mansour Haque	University of Cincinnati
Kimberly Hermann	Xavier University
Robert Holtgraves	Xavier University
John Kleimeyer	Cornell University
Kyle McCracken	Xavier University
Evan Pflum	Xavier University
Andrew Potter	University of Cincinnati
Lorraine Ray	University of Cincinnati
Ashley Riesenberg	University of Cincinnati
Yizhi Shan	Ohio State University
Bo Yang	University of Cincinnati

** Trainees of Faculty with Joint Appointment*

Grant and Contract Awards		Annual Direct/Project Period Direct
Allen, Z		
The Role of FoxP2 in Olfactory Bulb Interneuron Neurogenesis		
National Institutes of Health		
F30 DC 008928	01/01/07 – 10/19/10	$32,234/$164,089
Brown, N		
Investigation of Mammalian Retinal Neuron Development		
National Institutes of Health		
R01 EY 013612	08/01/04 – 7/31/08	$219,713/$925,000
In Vivo Investigation of Optic Nerve Formation and Connectivity within the Mouse Brain		
The Glaucoma Foundation		
	01/01/07 – 12/31/07	$35,000
Burns, K		
Regeneration by White-matter Progenitors after Stroke		
National Institutes of Health		
F31 NS 054496	01/01/06– 12/31/08	$31,946/$95,846
Campbell, K		
Regional Control of Telencephalic Neuronal Diversity		
National Institutes of Health		
R01 MH 069643	01/01/05 – 12/31/09	$213,341/$1,125,000
Degen, J		
Hemostatic Factors as Determinants of Bacterial Virulence and Host Defense		
National Institutes of Health		
R01 HL 085357	07/01/06 – 06/30/11	$250,000/$1,250,000
Arthritic Disease and the Hemostatic System		
National Institutes of Health		
R01 AR 049822	02/01/04 – 01/31/09	$215,711/$1,137,500
Gebelein, B		
Role of Hox Transcription Factor Complexes in Anterior-Posterior Patterning of the Embryo		
March of Dimes - National		
5-FY05-1220	02/01/06 – 01/31/08	$68,182/$136,364
Heasman, J		
Maternal Control of Tissue Formation in Xenopus		
National Institutes of Health		
R01 HD 038272	04/01/04 – 03/31/09	$213,341/$1,125,000
Hegde, R		
Mechanism of Action of Retinal Determination Proteins		
National Institutes of Health		
R01 EY 014648	09/01/04 – 08/31/09	$219,713/$1,125,000
Kuan, C		
Apoptosis and Renewal of Neural Progenitor Cells		
National Institutes of Health (Yale University subcontract)		
R01 NS 038296	02/01/06 – 01/31/11	$41,200/$255,353
Lessard, J		
Murine Atlas of Genitourinary Smooth Muscle Development		
National Institutes of Health		
U01 DK 070219	04/01/05 – 03/31/10	$448,009/$1,715,972
Lin, X		
Regulation of Hedgehog Distribution and Signaling		
American Cancer Society - National		
RSG0705101DDC	01/01/07 – 12/31/10	$150,000/$600,000
Regulation of DPP Morphogen Gradient Formation in Drosophilia		
March of Dimes – National		
	06/01/05 – 05/31/08	$75,691/$219,456
Molecular Mechanisms of Beta-Catenin Signaling		
American Heart Association – Ohio Valley		
0655393B	07/01/06 – 06/30/08	$55,000/$110,000

Ma, J

Activities of the Bicoid Gradient in Drosophila Embryos
National Institutes of Health
R01 GM 072812 — 07/01/05-06/30/09 — $185,535/$760,000

Moore-Scott, B

Patterning of Pancreatic Endoderm Through FGF4 and Fgfpb
Juvenile Diabetes Research Foundation
09/01/06 – 12/31/06 — $12,214

Potter, S

Development of Metanephric Mesenchyme
National Institutes of Health
R01 DK 061916 — 04/01/06 – 03/31/10 — $199,055/$820,000

Global Gene Expression Atlas of the Developing Kidney
National Institutes of Health
U01 DK 070251 — 09/30/04 – 07/31/09 — $142,848/$1,256,457

Wells, J

Promoting Endodermal and Pancreatic Differentiation of Embryonic Stem Cells
Juvenile Diabetes Research Foundation
11/01/03 – 10/31/08 — $100,000/$500,000

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

Wylie, C

Maternal Control of Actin Assembly in Xenopus Embryos
National Institutes of Health
R01 HD 044764 — 02/01/04 - 1/31/09 — $197,007/$1,012,500

Ectoderm Formation in the Early Xenopus Embryo
National Institutes of Health
R01 HD 045737 — 02/12/04 - 12/31/08 — $253,497/$1,298,955

Training Program in Organogenesis
National Institutes of Health
T32 HD 046387 — 05/01/06 – 04/30/11 — $205,985/$1,007,071

Yan, D

Regulation of Hh Distribution by Proteoglycan Dally-Like
American Heart Association – Ohio
07/01/05 – 06/30/07 — $19,000/$38,000

Zorn, A

Molecular Basis of Endoderm Development
National Institutes of Health
R01 HD 042572 — 07/01/02 – 06/30/07 — $273,420/$922,500

Molecular Basis of Liver Development
National Institutes of Health
R01 HD 070858 — 04/01/07 – 03/31/12 — $205,000/$1,025,000

Current Year Direct — **$4,247,132**

Industry Contracts

Current Year Direct Receipts — **$0**

TOTAL — **$4,247,132**

Funded Collaborative Efforts

Hegde, R

Norway-like Viruses and Their Receptors
National Institutes of Health
PI: Jiang, J — 01/01/05 – 01/31/10 — 10%

Kuan, A

Implications of the ASK1/JNK Pathway in ARF
National Institutes of Health
PI: Devarajan, P 04/01/05 – 03/31/10 5%

Potter, S

Cincinnati DDRDC: Center for Growth and Development
National Institutes of Health
PI: Cohen, M 04/01/03-03/31/08 10%

Wells, J

Molecular Basis of Endoderm Development – Supplement
National Institutes of Health
PI: Zorn, A 12/01/04-06/30/07 10%

Zorn, A

Ectoderm Formation in Early Xenopus Embryos
National Institutes of Health
PI: Wylie, C 02/12/04-12/31/08 5%

Mechanisms of Endoderm Specification along the A-P Axis
National Institutes of Health
PI: Wells, J 05/01/06 – 04/31/11 10%

PUBLICATIONS

Bosco EE, Wang Y, Xu H, Zilfou JT, Knudsen KE, **Aronow BJ**, Lowe SW, Knudsen ES. The retinoblastoma tumor suppressor modifies the therapeutic response of breast cancer. J Clin Invest 2007 Jan;117(1):218-28.

Deane NG, Manning HC, Foutch AC, Washington MK, **Aronow BJ**, Bornhop DJ, Coffey RJ. Targeted imaging of colonic tumors in smad3-/- mice discriminates cancer and inflammation. Mol Cancer Res 2007 Apr;5(4):341-9.

Diwan A, Koesters AG, Odley AM, Pushkaran S, Baines CP, Spike BT, Daria D, Jegga AG, Geiger H, **Aronow BJ**, Molkentin JD, Macleod KF, Kalfa TA, Dorn GW, 2nd. Unrestrained erythroblast development in Nix-/- mice reveals a mechanism for apoptotic modulation of erythropoiesis. Proc Natl Acad Sci U S A 2007 Apr 17;104(16):6794-9.

Fink D, Fazli L, **Aronow B**, Gleave ME, Ong CJ. Clusterin is not essential for androgen-regulated involution and regeneration of the normal mouse prostate. Prostate 2006 Sep 15;66(13):1445-54.

Gerber LK, **Aronow BJ**, Matlib MA. Activation of a novel long-chain free fatty acid generation and export system in mitochondria of diabetic rat hearts. Am J Physiol Cell Physiol 2006 Dec;291(6):C1198-207.

Jegga AG, Chen J, Gowrisankar S, Deshmukh MA, Gudivada R, Kong S, Kaimal V, **Aronow BJ**. GenomeTrafac: a whole genome resource for the detection of transcription factor binding site clusters associated with conventional and microRNA encoding genes conserved between mouse and human gene orthologs. Nucleic Acids Res 2007 Jan;35(Database issue):D116-21.

Jegga AG, Gowrisankar S, Chen J, **Aronow BJ**. PolyDoms: a whole genome database for the identification of non-synonymous coding SNPs with the potential to impact disease. Nucleic Acids Res 2007 Jan;35(Database issue):D700-6.

Liang Y, Jansen M, **Aronow B**, Geiger H, Van Zant G. The quantitative trait gene latexin influences the size of the hematopoietic stem cell population in mice. Nat Genet 2007 Feb;39(2):178-88.

Liu C, **Aronow BJ**, Jegga AG, Wang N, Miethke A, Mourya R, Bezerra JA. Novel resequencing chip customized to diagnose mutations in patients with inherited syndromes of intrahepatic cholestasis. Gastroenterology 2007 Jan;132(1):119-26.

McGraw DW, Fogel KM, Kong S, Litonjua AA, Kranias EG, **Aronow BJ**, Liggett SB. Transcriptional response to persistent beta2-adrenergic receptor signaling reveals regulation of phospholamban, which alters airway contractility. Physiol Genomics 2006 Oct 11;27(2):171-7.

Rajan S, Williams SS, Jagatheesan G, Ahmed RP, Fuller-Bicer G, Schwartz A, **Aronow BJ**, Wieczorek DF. Microarray analysis of gene expression during early stages of mild and severe cardiac hypertrophy. Physiol Genomics 2006 Nov 27;27(3):309-17.

Schleiss MR, **Aronow BJ**, Handwerger S. Cytomegalovirus infection of human syncytiotrophoblast cells strongly interferes with expression of genes involved in placental differentiation and tissue integrity. Pediatr Res 2007 May;61(5 Pt 1):565-71.

Bates MD, Dunagan DT, Welch LC, Kaul A, Harvey RP. The Hlx homeobox transcription factor is required early in enteric nervous system development. BMC Dev Biol 2006;6:33.

Becknell B, Hughes TL, Freud AG, Blaser BW, Yu J, Trotta R, Mao HC, Caligiuri de Jesus ML, Alghothani M, Benson DM, Jr., Lehman A, Jarjoura D, Perrotti D, **Bates MD**, Caligiuri MA. Hlx homeobox transcription factor negatively regulates interferon-gamma production in monokine-activated natural killer cells. Blood 2007 Mar 15;109(6):2481-7.

Falcone RA, Jr., Levitt MA, Pena A, **Bates M**. Increased heritability of certain types of anorectal malformations. J Pediatr Surg 2007 Jan;42(1):124-7; discussion 7-8.

Harzsch S, Vilpoux K, Blackburn DC, Platchetzki D, **Brown NL**, Melzer R, Kempler KE, Battelle BA. Evolution of arthropod visual systems: development of the eyes and central visual pathways in the horseshoe crab Limulus polyphemus Linnaeus, 1758 (Chelicerata, Xiphosura). Dev Dyn 2006 Oct;235(10):2641-55.

Le TT, Wroblewski E, Patel S, Riesenberg AN, **Brown NL**. Math5 is required for both early retinal neuron differentiation and cell cycle progression. Dev Biol 2006 Jul 15;295(2):764-78.

Chen L, Liao G, Waclaw RR, Burns KA, Linquist D, **Campbell K**, Zheng Y, **Kuan CY**. Rac1 controls the formation of midline commissures and the competency of tangential migration in ventral telencephalic neurons. J Neurosci 2007 Apr 4;27(14):3884-93.

Chen L, Liao G, Yang L, **Campbell K**, **Nakafuku M**, **Kuan CY**, Zheng Y. Cdc42 deficiency causes Sonic hedgehog-independent holoprosencephaly. Proc Natl Acad Sci U S A 2006 Oct 31;103(44):16520-5.

Chuang CF, Vanhoven MK, Fetter RD, Verselis VK, Bargmann CI. An innexin-dependent cell network establishes left-right neuronal asymmetry in C. elegans. Cell 2007 May 18;129(4):787-99.

Adams RA, Bauer J, Flick MJ, Sikorski SL, Nuriel T, Lassmann H, **Degen JL**, Akassoglou K. The fibrin-derived gamma377-395 peptide inhibits microglia activation and suppresses relapsing paralysis in central nervous system autoimmune disease. J Exp Med 2007 Mar 19;204(3):571-82.

Adhami F, Liao G, Morozov YM, Schloemer A, Schmithorst VJ, Lorenz JN, Dunn RS, Vorhees CV, Wills-Karp M, **Degen JL**, Davis RJ, Mizushima N, Rakic P, Dardzinski BJ, Holland SK, Sharp FR, **Kuan CY**. Cerebral ischemia-hypoxia induces intravascular coagulation and autophagy. Am J Pathol 2006 Aug;169(2):566-83.

Shanmukhappa K, Sabla GE, **Degen JL**, Bezerra JA. Urokinase-type plasminogen activator supports liver repair independent of its cellular receptor. BMC Gastroenterol 2006;6:40.

Wetzel CC, Leonis MA, Dent A, Olson MA, Longmeier AM, Ney PA, Boivin GP, Kader SA, Caldwell CC, **Degen SJ**, Waltz SE. Short-form Ron receptor is required for normal IFN-gamma production in concanavalin A-induced acute liver injury. Am J Physiol Gastrointest Liver Physiol 2007 Jan;292(1):G253-61.

Zhang G, Kernan KA, Collins SJ, Cai X, Lopez-Guisa JM, **Degen JL**, Shvil Y, Eddy AA. Plasmin(ogen) promotes renal interstitial fibrosis by promoting epithelial-to-mesenchymal transition: role of plasmin-activated signals. J Am Soc Nephrol 2007 Mar;18(3):846-59.

Brunner HI, Mueller M, Rutherford C, Passo MH, Witte D, Grom A, Mishra J, **Devarajan P**. Urinary neutrophil gelatinase-associated lipocalin as a biomarker of nephritis in childhood-onset systemic lupus erythematosus. Arthritis Rheum 2006 Aug;54(8):2577-84.

Devarajan P. Emerging biomarkers of acute kidney injury. Contrib Nephrol 2007;156:203-12.

Erkan E, **Devarajan P**, Schwartz GJ. Mitochondria are the major targets in albumin-induced apoptosis in proximal tubule cells. J Am Soc Nephrol 2007 Apr;18(4):1199-208.

Mitsnefes M, Kimbal T, Kartal J, Kathman T, Mishra J, **Devarajan P**. Serum cystatin C and left ventricular diastolic dysfunction in children with chronic kidney disease. Pediatr Nephrol 2006 Sep;21(9):1293-8.

Mitsnefes MM, Kathman TS, Mishra J, Kartal J, Khoury PR, Nickolas TL, Barasch J, **Devarajan P**. Serum neutrophil gelatinase-associated lipocalin as a marker of renal function in children with chronic kidney disease. Pediatr Nephrol 2007 Jan;22(1):101-8.

Park MS, Kim BS, **Devarajan P**. Hypoxia/re-oxygenation injury induces apoptosis of LLC-PK1 cells by activation of caspase-2. Pediatr Nephrol 2007 Feb;22(2):202-8.

Schmidt-Ott KM, Mori K, Kalandadze A, Li JY, Paragas N, Nicholas T, **Devarajan P**, Barasch J. Neutrophil gelatinase-associated lipocalin-mediated iron traffic in kidney epithelia. Curr Opin Nephrol Hypertens 2006 Jul;15(4):442-9.

Schmidt-Ott KM, Mori K, Li JY, Kalandadze A, Cohen DJ, **Devarajan P**, Barasch J. Dual action of neutrophil gelatinase-associated lipocalin. J Am Soc Nephrol 2007 Feb;18(2):407-13.

Rayapureddi JP, **Hegde RS**. Branchio-oto-renal syndrome associated mutations in Eyes Absent 1 result in loss of phosphatase activity. FEBS Lett 2006 Jul 10;580(16):3853-9.

Kofron M, Birsoy B, Houston D, Tao Q, **Wylie C**, **Heasman J**. Wnt11/beta-catenin signaling in both oocytes and early embryos acts through LRP6-mediated regulation of axin. Development 2007 Feb;134(3):503-13.

Liao G, Tao Q, **Kofron M**, Chen JS, Schloemer A, Davis RJ, Hsieh JC, **Wylie C**, **Heasman J**, **Kuan CY**. Jun NH2-terminal kinase (JNK) prevents nuclear beta-catenin accumulation and regulates axis formation in Xenopus embryos. Proc Natl Acad Sci U S A 2006 Oct 31;103(44):16313-8.

Mir A, **Kofron M**, **Zorn AM**, Bajzer M, Haque M, **Heasman J**, **Wylie CC**. FoxI1e activates ectoderm formation and controls cell position in the Xenopus blastula. Development 2007 Feb;134(4):779-88.

Adhami F, Schloemer A, **Kuan CY**. The roles of autophagy in cerebral ischemia. Autophagy 2007 Jan-Feb;3(1):42-4.

Schwab KR, Patterson LT, Hartman HA, Song N, **Lang RA**, **Lin X**, **Potter SS**. Pygo1 and Pygo2 roles in Wnt signaling in mammalian kidney development. BMC Biol 2007;5:15.

Stoneman V, Braganza D, Figg N, Mercer J, **Lang R**, Goddard M, Bennett M. Monocyte/macrophage suppression in CD11b diphtheria toxin receptor transgenic mice differentially affects atherogenesis and established plaques. Circ Res 2007 Mar 30;100(6):884-93.

Song N, Schwab KR, Patterson LT, Yamaguchi T, **Lin X**, **Potter SS**, **Lang RA**. pygopus 2 has a crucial, Wnt pathway-independent function in lens induction. Development 2007 May;134(10):1873-85.

Kim HJ, Sugimori M, **Nakafuku M**, Svendsen CN. Control of neurogenesis and tyrosine hydroxylase expression in neural progenitor cells through bHLH proteins and Nurr1. Exp Neurol 2007 Feb;203(2):394-405.

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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 30 years. Drs. Christopher Wylie and Katherine Yutzey served as Directors of the Program with co-directors Drs. David Williams - marketing, Jeffrey Whitsett - finance, Janet Heasman - academics, Tim Le Cras and Tim Weaver - recruitment and admissions, Jeff Robbins – faculty membership, and Kenneth Campbell – graduate studies.

There are 66 faculty members in the program. During the past year, there were 52 predoctoral 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 10 first year students. The remaining students are supported through a variety of sources including Ryan Fellowships (2), American Heart Fellowships (4), NIH training grants (12), external grants to their advisors (11), CHRF Special Purpose Funds to their advisors (7) and funds from the Children's Hospital Research Foundation to the Graduate Program (1).

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

Molecular and Developmental Biology Graduate Program Students, 2006–2007

Student	Faculty Mentor	Admission
Faisal Adhami**	Chia-Yi Kuan	2003
Shailaja Akunuru	Rotation	2006
Zegary Allen**	Kenneth Campbell	2004
William Baird**	Timothy Cripe	2006
Kevin Burns	Chia-Yi Kuan	2002
Gang Chen	Jeffrey Whitsett	2004
Lei Chen	Yi Zheng	2001
Michelle Combs	Katherine Yutzey	2004
Katherine (Russell) Eaton	Randy Sallee	2002
Derek Garrison	Rotation	2006
Gabriel Ghiaur	David Williams	2001
Nicole Glenn	Rotation	2006
Curtis Grace	Charles Vorhees	2003
Ying Gu	Rotation	2006
Yuanyuan Gu	Christopher Karp	2005
David Hahn	Rotation	2006
Shawna (Blaney) Hottinger	Jeffrey Robbins	2004
Amer Jameel	Rotation	2006

Diva Jonatan	Rotation	2006
Elizabeth (Haque) Kramer**	Timothy Le Cras	2005
Manish Kumar	Robert Colbert	2005
Wei Liu	Yi Zheng	2005
Kristen Lipscomb	Woodrow Benson	2004
Rajat Madan	Christopher Karp	2001
Yoni Mahller**	Timothy Cripe	2002
Arturo Maldonado	Timothy Crombleholme	2004
Karunyakanth Mandapaka	Timothy Weaver	2005
Caitlin Maynard	Rotation	2006
Elizabeth McDonald	Tiffany Cook	2004
Timothy Mead	Rotation	2006
David Metzger	John Shannon	2002
Adnan Mir**	Christopher Wylie	2003
Monique Morrison	Susanne Wells	2005
Sumeda Nandadasa	Christopher Wylie	2005
Wenjun Ni	Yi Zheng	2003
Zhenglei Pei	Kenneth Campbell	2004
Jennifer Peters	Randy Sallee	2002
Om Prakash*	Thomas Bartman	2005
Christopher Runyan**	Christopher Wylie	2003
Tori Schaefer	Michael Williams	2004
Kris Schwab	Steve Potter	2001
Kathy (Shair) Schroer	Gurjit Hershey	2004
Elaine (Howells) Shelton	Katherine Yutzey	2003
Emily Sites	Nancy Ratner	2005
Ni Song	Richard Lang	2001
Xiaofang Tang	Rotation	2006
Matthew Turner**	Robert Colbert	2001
Shiv Kumar Viswanathan	Woodrow Benson	2003
Dong Yan	Xinhua Lin	2002
Li Yang	Yi Zheng	2002
Bo Zhou	Rotation	2006
Hongyan Zhu	Marc Rothenberg	2004

**Left Program* ***MD/PhD Students*

Students completing their Masters work

Wenjun Ni "Involvement of Rac GTPase in p53-deficiency mediated lymphomagenesis," August 14, 2006.

Students completing their PhD work

Lei Chen "The role of Cdc42 and Rac1 in mouse forebrain development," November 7, 2006.
Adnan Mir "The role and regulation of FoxI1e in Xenopus ectoderm formation," June 11, 2007.
Kristopher Schwab "Expression microarray analysis of renal development and human renal disease," August 14, 2006.
Ni Song "Genetic analysis of early lens development in mouse," June 4, 2007.
Li Yang "Studying the function of Rho family GTPase Cdc42 by gene targeting in mice," February 27, 2007.

Student publications

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

Adhami F, Liao G, Morozov YM, Schloemer A, Schmithorst VJ, Lorenz JN, Dunn RS, Vorhees CV, Wills-Karp M, Degen JL, Davis RJ, Mizushima N, Rakic P, Dardzinski BJ, Holland SK, Sharp FR, Kuan CY. Cerebral ischemia-hypoxia induces intravascular coagulation and autophagy. Am J Pathol. 2006 Aug;169(2):566-83.

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Burns KA, Ayoub AE, Breunig JJ, Adhami F, Weng WL, Colbert MC, Rakic P, Kuan CY. Nestin-CreER Mice Reveal DNA Synthesis by Nonapoptotic Neurons following Cerebral Ischemia-Hypoxia. Cereb Cortex. 2007 Jan 27.

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Viswanathan S, Burch JB, Fishman GI, Moskowitz IP, Benson DW. Characterization of sinoatrial node in four conduction system marker mice. J Mol Cell Cardiol. 2007 Feb 22.

Vorhees CV, Schaefer TL, Williams MT. Developmental effects of +/-3,4-methylenedioxymethamphetamine on spatial versus path integration learning: Effects of dose distribution. Synapse. 2007 Apr 5;61(7):488-99.

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Student Honors

Adhami F Supported by State of Ohio Doctoral Investment Award
Allen Z Supported by NIH Training Grant (Teratology) and Individual NRSA Fellowship
Burns K Supported by Individual NRSA Fellowship
Combs M Supported by NIH Training Grant (Pulmonary and Cardiovascular Biology)
Grace C Supported by NIH Training Grant (Teratology)
Hottinger S Supported by NIH Training Grant (UC – Schwartz)
Kramer E Supported by University Distinguished Graduate Fellowship and NIH Training Grant (Pulmonary and Cardiovascular Biology)
Lipscomb K Supported by American Heart Association Fellowship
McDonald E Supported by NIH Training Grant (Organogenesis)
Metzger D Supported by NIH Training Grant (Pulmonary and Cardiovascular Biology)
Mir A Supported by NIH Training Grant (Organogenesis)
Runyan C Supported by NIH Training Grant (Organogenesis)
Schaefer T Supported by NIH Training Grant (Teratology) and Ryan Fellowship
Schwab K Supported by NIH Training Grant (Teratology)
Shelton E Supported by American Heart Association Fellowship
Sites E Supported by NIH Training Grant (UC – Khan)
Viswanathan S Supported by American Heart Association Fellowship
Yan D Supported by American Heart Association Fellowship and Ryan Fellowship

Richard A. Akeson Fellowship Fund

The Richard A. Akeson Fellowship and Memorial Lectureship Fund continues to support the Annual Richard Akeson Memorial Lectureship and travel by students in our graduate program to relevant courses and meetings in which they are

presenting results of their research. Dr. Eric Olsen presented the Thirteenth Annual Richard Akeson Memorial Lectureship in conjunction with the annual Molecular and Developmental Biology Graduate Student Symposium in 2006.

The following students received funding from the Richard A. Akeson Fellowship and Memorial Fund for travel in 2006–07:

Student	Meeting	Presentation	Date
Adhami, Faisal	Society for Neuroscience Atlanta, GA	Poster	October 14 – 18, 2006
Allen, Zegary	Society for Neuroscience Atlanta, GA	Poster	October 14 –18, 2006
Baird, William	American Society of Gene Therapy Seattle, WA	Poster	May 29 – June 3, 2007
Burns, Kevin	Society for Neuroscience Atlanta, GA	Poster	October 14 –18, 2006
Chen, Lei	Society for Neuroscience Atlanta, GA	Poster	October 14 –18, 2006
Combs, Michelle	Weistein Cardiovascular Development Indianapolis, IN	Poster	May 10 – 12, 2007
Mahller, Yoni	American Society of Gene Therapy Seattle, WA	Oral	May 29 – June 3, 2007
Metzger, David	Society for Developmental Biology Cancun, Mexico	Poster	June 16 – 20, 2007
Mir, Adnan	International Xenopus Meeting Kisarazu City, Japan	Poster	September 12 – 16, 2006
Nandadasa, Sumeda	Conference on Developmental Biology Santa Cruz, CA	Poster	August 3 –7, 2006
Runyan, Chris	Workshop on Carcinoma in situ Testis & Germ Cell Cancer Copenhagen, Denmark	Poster	October 26 – 29, 2006
Schaefer, Tori	Neurobehavioral Teratology Society Pittsburgh, PA	Poster	June 23 – 27, 2007
Schroer, Kathy	Pediatric Academic Societies Toronto, Canada	Poster	May 5 – 8, 2007
Shelton, Elaine	Weistein Cardiovascular Development Indianapolis, IN	Oral	May 10 – 12, 2007
Song, Ni	SDB Mid-Atlantic Regional Meeting Princeton, NJ	Poster	March 30 – 31, 2007
Tang, Xiaofang	Wnt Meeting San Diego, CA	Poster	June 21 – 23, 2007
Yang, Li	American Society of Hematology Orlando, FL	Oral	December 9 – 12, 2007
Zhou, Bo	Wnt Meeting San Diego, CA	Poster	June 21 – 23, 2007