# Anesthesiology

## Research and Training Details

<table>
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## Clinical Activities and Training

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Research Highlights

Anesthesiology Emphasizes Research
Research in the Department of Anesthesiology ranges from basic science investigations of anesthetic neurotoxicity, to examination of psychosocial factors that contribute to surgery cancellation. The Department of Anesthesiology continues to place a major emphasis on supporting research by providing our faculty with both time and resources to find ways to better treat epilepsy, to relieve pain, and to more safely and effectively anesthetize children. A total of 36 of our 60 faculty have published during FY15.

Growth in Research on Pain Mechanisms
To foster research within the department, we have hired a new director of research, Robert C. Coghill, PhD, as well as a new translational researcher, Christopher D. King, PhD. This new team will amplify existing research into pain mechanisms by adding expertise in quantitative sensory testing and neuroimaging. Their addition into an already outstanding multi-disciplinary pain research environment solidifies Cincinnati Children's position as a leader in developing better ways to treat pain in children.

National and International Leadership in Research
Our faculty serve at both national and international levels where they help shape the future of research. They guide the selection of papers for publications in scientific journals: Andreas Loepke, MD, PhD, serves on the editorial boards of Pediatric Anesthesia and the Journal of Perioperative Science; Steve Danzer, PhD, serves as a contributing editor to Epilepsy Currents; and Robert Coghill, PhD, is section editor for the International Association for the Study of Pain (PAIN).

They lead their peers in advocacy for research and safety: Michael Jankowski, PhD, is co-chair of the Basic Science Shared Interest Group of the American Pain Society; and Dr. Danzer is chair of the Basic Science Committee of the American Epilepsy Society; John McAuliffe, MD, is president of The American Society of Neurophysiological Monitoring; and C. Dean Kurth, MD, is president of Wake Up Safe.

Finally, they help agencies decide how to fund research: Dr. Danzer serves as a standing member of the National Institutes of Health (NIH) Study Section for Clinical Neuroplasticity and Neurotransmitters; while Robert Coghill, PhD, serves as an ad hoc reviewer for several NIH study sections and on the Research Grants Committee of the American Pain Society.

Trainees Excel in Research
Anesthesiology faculty contribute to the future of research by mentoring the development of outstanding young scientists and clinical researchers. Our trainees have garnered many awards. Kathryn Green, a Summer Undergraduate Research Fellowship (SURF) student mentored by Dr. Michael Jankowski, received first place in the Capstone Poster session for all SURF programs; while Dr. Jankowski's graduate student, Jessica Ross, and post-doctoral fellow, Luis Queme, received Young Investigator awards to attend the American Pain Society meeting. Dr. Steve Danzer's graduate student, Shatrunjai Singh, was awarded a fellowship at The Data Incubator, in Washington, DC, while one of Dr. Danzer's other graduate students, Bethany Hosford, received a University Research Council (URC) Graduate Student Research Fellowship.

Significant Publications

Epilepsy is a major child health problem and can range from a life threatening event to a very subtle disorder. Even in
mild forms, epilepsy can have a deleterious effect on learning and intellectual development. One brain region, the hippocampus, is critically involved in learning and memory. A sub-region of the hippocampus, the dentate gyrus, is thought to serve as a gate that regulates the flow of information into the hippocampus. Breakdown of this gating mechanism might be an important factor in temporal lobe epilepsy. Work by post-doctoral fellow Candi LaSarge and colleagues in Steve Danzer's laboratory explored the role of the PTEN gene on connectivity of granule cells in a mouse model of temporal lobe epilepsy. They found that when the PTEN gene was knocked out, a complex set of morphologic changes occurred that would disrupt gating, such that information coming into the hippocampus would undergo less filtering. As such, these altered connections between neurons could play an important role in temporal lobe epilepsy.


Chronic pain is far more prevalent in children than one would ever hope. In particular, some forms of chronic pain that strike children, such as pain during Ehlers–Danlos syndrome and fibromyalgia, are associated with a great deal of pain in the muscle. Other forms of pain, such as that arising from sickle cell anemia, are related to reduced blood flow to certain body regions. However, very little is known about how muscle damage is signaled and what types of changes occur in signaling when blood flow to the muscle is blocked. Work by graduate student Jessica Ross and colleagues in Michael Jankowski's laboratory found that, after blockade of blood flow to a muscle, more nociceptive primary afferents (peripheral nerve cells that respond to information about potential damage to the body) responded to the types of chemicals that are given off during muscle activity. During a brief blockade of blood flow, these primary afferents also became more sensitive to light pressure. However, when blood flow was blocked for longer periods of time, the neurons became more sensitive to heat. Thus, different neural mechanisms are engaged during different durations of reduced blood flow. These findings provide an explanation for how different types of injuries to muscles are associated with different types of pain and sensitization, and underscore the need to develop multiple drug therapies for muscle pain.


Children undergo surgeries for many reasons, but nearly all of the surgeries are associated with some form of post-operative pain. Opioid drugs such as morphine are key tools for the treatment of post-operative pain. These drugs are effective at relieving pain, but can also slow or even stop breathing if too much is given. Different individuals respond to these drugs very differently, such that an individual whose body processes the drug in one way may get respiratory depression, while other individuals getting the same dose do not experience this dangerous side effect. Senthil Sadhasivam and colleagues examined the genetic make up of 263 children undergoing tonsillectomy to see if differences in a gene called ABCB1 were related to respiratory depression. This gene encodes a molecule called P-glycoprotein that helps transport opioid drugs like morphine out of the brain and into the blood. They found that children with certain types of the ABCB1 gene were at far greater risk of prolonged hospital stays from respiratory depression. These findings provide an important foundation for the individualization of treatment in that they can permit the identification of individuals at risk of respiratory depression before any opioids are given. This is an important step towards ensuring that every child can have safe and effective pain relief after surgery.


Time in the operating room is a precious and expensive resource. The operating room is filled with highly specialized equipment and requires a large team of highly trained individuals to perform surgery. Many patients wait weeks, or even months, for surgeries. If appointments for surgery are cancelled at the last minute, this important resource is
wasted, and the expenses are passed on to everyone’s health care costs. Reducing day of surgery cancellations is thus very important to ensure that children get the care that they require and to keep health care costs under control. Nick Pratap and colleagues developed and tested interventions to help parents keep their child’s appointment for surgery. These interventions included providing clear and focused instructions in a colorful and personalized format, text message reminders, and changes in the check-in process to identify patient illness near the day of surgery. Implementation of these interventions reduced OR time lost to day of surgery cancellations by 17%. This means that more children received the care that they required in a timely fashion, while simultaneously keeping costs under control.

**Division Publications**


27. Lin EP, Spaeth J, Cooper D. Sedative Hypnotics and Anesthetic Agents. In: R Munoz, EMd Cruz, CG Vetterly, DS


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**Faculty, Staff, and Trainees**

**Faculty Members**

**C. Dean Kurth, MD**, Professor  
Leadership Anesthesiologist-in-Chief and Chair, Department of Anesthesiology

**Elena Adler, MD**, Associate Professor  
Leadership Medical Director, Anesthesia Supply Chain, Department of Anesthesiology

**Lori Aronson, MD**, Associate Professor

**Anne Boat, MD**, Associate Professor  
Leadership Director, Fetal Surgery Team, Department of Anesthesiology, Patient Family Experience Officer

**David Buck, MD**, Assistant Professor

**Veronica Busso, MD**, Assistant Professor  
Leadership Clinical Director, Department of Anesthesiology

**Vidya Chidambaran, MD**, Associate Professor

**Smokey Clay, MD**, Assistant Professor  
Leadership Co-Director, Core Fellowship Program; Department of Anesthesiology

**Robert Coghill, PhD**, Associate Professor  
Leadership Director of Research, Department of Anesthesiology

**Andrew Costandi, MD**, Assistant Professor

**Steve Danzer, PhD**, Associate Professor

**Bobby Das, MD**, Assistant Professor

**Hilary Flint, DO**, Assistant Professor
Lisa Francis, DO, Assistant Professor

Kenneth Goldschneider, MD, Associate Professor
Leadership Director, Medical Pain Service and Chronic Pain Clinic, Division of Pain Management

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Joel Gunter, MD, Professor

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Leadership Co-Medical Director, Same Day Surgery and Pre-Anesthesia Consultation Clinic, Department of Anesthesiology

Elizabeth Hein, MD, Associate Professor

Michael Jankowski, PhD, Assistant Professor

Thomas Kabalin, MD, Associate Professor

Michael "Jack" Kibelbek, MD, Associate Professor

Christopher King, PhD, Assistant Professor

Rachael Koll, MD, Assistant Professor

Renee Kreeger, MD, Assistant Professor

Jennifer Lam, DO, Assistant Professor

Christopher Lee, MD, Assistant Professor

Erica Lin, MD, Assistant Professor

Andreas Loepke, MD, PhD, Associate Professor

Mohamed Mahmoud, MD, Associate Professor
Leadership Director, Division Anesthesia Imaging

Jagroop Mavi, MD, Assistant Professor

John McAuliffe, MD, MBA, Professor
Leadership Clinical Director, Interim Research Director, Division of Neurobiology

Marc Mecoli, MD, Assistant Professor

Mark Meyer, MD, Associate Professor
Leadership Director, Procedure Management, Division of Pain Management

Jeffrey Miller, MD, Associate Professor

David Moore, MD, Associate Professor
Leadership Clinical Coordinator, Anesthesia Fellow Pain Management Education, Division of Pain Management

Jacquelyn Morillo-Delerme, MD, Associate Professor
Leadership Co-Director of Anesthesia - Liberty Campus, Department of Anesthesiology

Pornswan Ngamprasertwong, MD, Assistant Professor
Leadership Clinical Director, Co-Director of Anesthesia - Liberty Campus, Department of Anesthesiology

Vanessa Olbrecht, MD, Assistant Professor
Mario Patino, MD, Assistant Professor
Jayant "Nick" Pratap, MD, Assistant Professor
Joseph Previte, MD, FAAP, Associate Professor
  Leadership Director, Information Technology Services, Department of Anesthesiology; Clinical Director, Division of Anesthesiology
David Richards, PhD, Associate Professor
John Rose, MD, Professor
Joanna Rosing, MD, Assistant Professor
Senthilkumar Sadhasivam, MD, MPH, Associate Professor
  Leadership Director, Perioperative Pain Management, Division of Pain Management
Nancy Samol, MD, Assistant Professor
  Leadership Director of Anesthesia - Liberty Campus, Department of Anesthesiology
Paul Samuels, MD, Associate Professor
  Leadership Director, Education, Department of Anesthesiology
Michael Sikora, MD, Assistant Professor
Matthew Sjoblom, MD, Assistant Professor
  Leadership Co-Director of Anesthesia - Liberty Campus, Department of Anesthesiology
Ximena Soler, MD, Assistant Professor
  Leadership Director, Liver Transplant Surgery Team, Department of Anesthesiology
James Spaeth, MD, Associate Professor
  Leadership Associate Director, Department of Anesthesiology; Director, Cardiac Anesthesia Team, Department of Anesthesiology
Theodore Striker, MD, Professor
Rajeev Subramanyam, MD, Assistant Professor
Alexandra Szabova, MD, Associate Professor
Rachel Thienprayoon, MD, Assistant Professor
Anna Varughese, MD, MPH, Associate Professor
  Leadership Associate Director, Department of Anesthesiology; Director, Quality, Department of Anesthesiology; Co-Medical Director, Same Day Surgery and Pre-Anesthesia Consultation Clinic; Department of Anesthesiology; Associate Director, Perioperative Services
Norbert Weidner, MD, Associate Professor
  Leadership Director, Palliative Care and Comfort Team, Division of Pain Management
Eric Wittkugel, MD, Associate Professor
Junzheng Wu, MD, Associate Professor

Joint Appointment Faculty Members
Susmita Kashikar-Zuck, PhD, Associate Professor (Behavioral Medicine & Clinical Psychology)
Anne Lynch-Jordan, PhD, Assistant Professor (Behavioral Medicine & Clinical Psychology)
Clinical Staff Members

- Nancy Andersen, MD, Staff Anesthesiologist
- Clifford Hoffmann, MD, Staff Anesthesiologist
- Normidaris Jimenez, MD, Staff Anesthesiologist
- William Worden, MD, Staff Anesthesiologist

Trainees

- Niekoo Abbasian, MD, PGY-V, University of Illinois
- Donna Maria Cortezzo, MD, PGY-X, University of Connecticut
- Ajay D'Mello, MD, PGY-V, Cleveland Clinic
- Natalie Hadaway, MD, PGY-V, Saint Barnabas Medical Center
- Ali Kandil, MD, PGY-V, Saint Barnabas Medical Center
- Megah Kanjia, MD, PGY-X, University of Arkansas
- Christina Kettelle, MD, PGY-V, University of Arizona
- Eugene Kim, MD, PGY-X, Stony Brook Medicine
- Elizabeth Leweling, MD, PGY-V, Michigan State
- Eapen Mathew, MD, PGY-X, University of Connecticut
- Sarah Norris, MD, PGY-X, Medical College of Georgia
- Suzanne Numan, MD, PGY-V, University of New Mexico
- Neil Patel, MD, PGY-V, Thomas Jefferson University
- Deepika Rao, MD, PGY-V, University of Pennsylvania
- Deborah Romeo, MD, PGY-X, Virginia Commonwealth University
- Diane Ruehlmann, MD, PGY-V, University of Illinois
- Ashley Smith, MD, PGY-V, Beth Israel Deaconess Medical Center
- Anurag Tewari, MD, PGY-X, Dayanand Medical College & Hospital
- Charlotte Walters, MD, PGY-V, Texas Tech University

Grants, Contracts, and Industry Agreements

**Grant and Contract Awards**

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Morphine Pharmacogenomics to Predict Risk of Respiratory Depression in Children
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<td>Molecular Mechanisms Of Musculoskeletal Pain After Ischemic Tissue Injury</td>
<td>American Pain Society</td>
<td>R01 AR065020</td>
<td>5/1/2014–4/30/2019</td>
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<td>Singh, S</td>
<td>Ontogenetic Silencing of Dentate Granule Cells as an Approach to Block Seizure Progression</td>
<td>American Heart Association</td>
<td>R03 HD077483</td>
<td>8/1/2013–7/31/2015</td>
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**Current Year Direct** $936,373

**Industry Contracts**

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Better genetic-based predictors of morphine-induced respiratory depression could lead to more personalized pain-relief dosage for children recovering from surgery.

The key was found in μ1 opioid receptor genetic variant A118G, which decreases the binding potential of the μ-receptor in the brain, and therefore increases morphine requirement.

Postoperative respiratory depression is the most serious adverse effect of opioids. Researchers believe genetics account for up to 30 percent of the variability in respiratory depression.

The study, published online Sept. 30, 2014, in The Pharmacogenomics Journal, was led by Senthilkumar Sadhasivam, MD, MPH, and Vidya Chidambaran, MD, both of the Division of Anesthesia, and also involved researchers from the Division of Human Genetics. It was the first clinical study to show significant association of a functionally relevant polymorphism — A118G — of the opioid receptor gene in predicting MIRD susceptibility.

The team analyzed 88 cases of adolescents who had undergone spine fusion for scoliosis, and found that in the first 48 hours after surgery, MIRD in patients with AA genotype was significantly higher. The findings could have wide implications because the variant is present in an estimated 11-17 percent of the Caucasian population.

“This translates to immediate clinical relevance for a large part of the population,” Chidambaran says, “as identifying genotype predicted risk of MIRD will facilitate safer individualized opioid dosing.”

The team also has recently reported additional associations of respiratory depression in children with novel variants of the gene FAAH, published in January 2015, and with ABCB1, published in April 2015.

“These findings show that multiple genes play a role in opioids’ clinical responses,” Sadhasivam says. “As we identify more of these associations, the future of preoperative genetic risk signature stratification and personalizing postoperative pain management in children is promising.”
This chart compares morphine-induced respiratory depression (MIRD) in the two genotype groups (AA and AG+GG) for the A118G polymorphism of the OPRM1 gene. Incidence was significantly higher in the AA subgroup (25/67 or 37 percent) compared with AG or GG subgroup (2/21 or 9 percent).

When looking across time, pain was highest two hours after surgery, and was consistently higher in individuals carrying a G allele (white bars). Differences in morphine consumption by genotype (blue and red lines) were greatest between two and 16 hours after surgery.