

Division Photo



Division Data Summary

Research and Training Details

Number of Faculty	41
Number of Joint Appointment Faculty	3
Number of Research Fellows	0
Number of Research Students	2
Number of Support Personnel	14
Direct Annual Grant Support	\$683,600
Peer Reviewed Publications	17

Clinical Activities and Training

Number of Clinical Staff	100
Number of Clinical Fellows	8
Number of Clinical Students	143
Number of Other Students	11
Inpatient Encounters	16,114
Outpatient Encounters	30,499

Significant Publications

Loepke AW, Istaphanous GK, McAuliffe JJ, Miles L, Hughes EA, McCann JC, Harlow KE, Kurth CD, Williams MT, Vorhees CV, Danzer SC: The Effects of Neonatal Isoflurane Exposure in Mice on Brain Cell Viability, Adult Behavior, Learning, and Memory. *Anesthesia & Analgesia* 2009; 108(1): 90-104.

Recent studies have raised concerns about anesthesia inducing neuronal apoptosis in the developing brain. This study describes anesthesia exposure in an infant animal model and its effect on neuronal viability and developmental outcome. It suggests that although anesthesia induces neuronal apoptosis, the effect is less than previous reports and has no long term effect on behavior, learning, or memory.

Gunter JB, Ball J, Than-Win S: Preparation of the Drager Fabius anesthesia machine for the malignant-hyperthermia susceptible patient. *Anesthesia & Analgesia* 2008;107:1936-1945.

Malignant hyperthermia is a lethal condition induced by exposure to anesthesia in susceptible individuals. Prevention

of malignant hyperthermia requires an involved and lengthy process of removing the anesthesia gases from the anesthesia machine. This report describes a simple, rapid method of removing the anesthesia gases from the machine.

Danzer SC Neuronal plasticity in the young and aged epileptic brain. *The Neuroscientist*, 2008 14:446-458.

This study in an animal model describes how cells in a region of the brain, the hippocampus, develop abnormal circuits to produce epilepsy, a common disease in children. In addition to demonstrating a potential mechanism of epilepsy, it also points to possible treatments and prevention of the disorder.

Kurth CD, McCann J, Wu J, Miles LL, Loepke AW. Cerebral oxygen saturation-time thresholds for cerebral hypoxia-ischemia injury in piglets. *Anesthesia & Analgesia*, 2009 108(4):1268-77.

Infants with congenital heart disease not infrequently experience hypoxia-ischemic brain injury. Near infrared spectroscopy is a non-invasive, bedside technology that can monitor for hypoxic-ischemia to the brain. This study identifies the critical values of brain oxygenation in an infant animal model to diagnose brain hypoxia-ischemia. Such critical values will help design clinical trials of prevention and treatment of brain hypoxia-ischemia in infants with congenital heart disease.

Sadhasivam S, Cohen LL, Szabova A, Varughese A, Kurth CD, Willging P, Wang Y, Nick TG, Gunter J: Real-time assessment of perioperative behaviors and prediction of perioperative outcomes. *Anesthesia & Analgesia* 2009;108:822-826.

Children often experience anesthetic and surgical complications and side-effects at home that were not seen in the recovery room or predicted in the operating room or recovery room. In this study, the relationship between behavior of the child and family in the recovery room and at home afterwards was investigated to determine if an assessment tool and predictive model could be constructed. This study describes the assessment tool and validates it against postoperative outcomes in children after outpatient surgical procedures.

Division Highlights

Steve Danzer, PhD

Dr. Danzer was awarded two RO-1 grants from the NIH to investigate the mechanisms of abnormal cell connectivity in the hippocampus to autism and to epilepsy.

Senthil Sadhasivam, MD

Dr. Sadhasivam led the Department in presentations of research at the national meeting of the American Society of Anesthesiologists. His research investigates the pharmacology of opioids in children and its relationship to postoperative outcomes.

David Richards, PhD

Dr. Richards was recruited to the Department of Anesthesiology with an RO-1 grant to investigate the mechanisms of synaptic transmission, which underlies the basis of anesthesia as well as learning, memory, and neuronal apoptosis.

John McAuliffe, MD

Dr. McAuliffe was awarded a Trustee Research Initiative grant to develop a neural network to prevent the unwanted breathing depression side-effects of pain medications in children.

Andreas Loepke, MD, PhD

Dr. Loepke was noted by the International Anesthesia Research Society for the best basic science research abstract of 2009. His research investigates the mechanisms of anesthesia induced neuronal apoptosis in the developing brain.

Division Collaboration

Collaboration with Neurology

Collaborating Faculty: [Dr. Vorhees](#) and [Dr. Williams](#)

Dr. Andreas Loepke collaborates with Drs. Vorhees and Williams to evaluate the effect of anesthesia exposure in infants on learning and memory as an adult. The collaboration is with the use of animal models of learning and memory.

Collaboration with Pathology

Collaborating Faculty: [Dr. Miles](#)

Dr. C. Dean Kurth collaborates with Dr. Miles to evaluate the hypoxic ischemic brain injury in an infant animal model.

Collaboration with Pharmacology

Collaborating Faculty: Dr. Vinks

Dr. Senthil Sadhasivam collaborates with Dr. Vinks to investigate the pharmacokinetics, pharmacodynamics, and pharmacogenetics of opioids and hypnotics in children.

Faculty Members

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

Elena Adler, MD, Adjunct Associate Professor ; *Medical Director, Anesthesia Supply Chain, Division of Anesthesia*

Nancy Andersen, MD, Adjunct Associate Professor

Lori Aronson, MD, Adjunct Associate Professor

Anne Boat, MD, Assistant Professor ; *Director, Fetal Surgery Team, Division of Anesthesia*

Vidya Chidambaran, MD, Assistant Professor

Steve Danzer, PhD, Assistant Professor

Kenneth Goldschneider, MD, Associate Professor ; *Director, Division of Pain Management*

Joel Gunter, MD, Professor

Nancy Hagerman, MD, Adjunct Assistant Professor ; *Co-Medical Director, Same Day Surgery and Pre-Anesthesia Consultation Clinic, Division of Anesthesia*

Elizabeth Hein, MD, Adjunct Assistant Professor

Liana Hosu, MD, Assistant Professor

George Istaphanous, MD, Assistant Professor

Fay Jou, MD, Assistant Professor

Thomas Kabalin, MD, Associate Professor

Michael "Jack" Kibelbek, MD, Associate Professor

Matthias Konig, MD, Assistant Professor

Ik Lee, MD, Associate Professor ; *Director, Division of Anesthesia*

Andreas Loepke, MD, PhD, Associate Professor

Mohamed Mahmoud, MD, Assistant Professor

John McAuliffe, MD, MBA, Associate Professor ; *Director, Research, Division of Neurobiology; Interim Director, Division of Neurobiology*

Mark Meyer, MD, Assistant Professor ; *Director, Procedure Management, Division of Pain Management*

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

Jacquelyn Morillo-Delerme, MD, Associate Professor ; *Director of Anesthesia, Liberty Campus, Division of Anesthesia*

Mario Patino, MD, Assistant Professor

Joseph Previte, MD, FAAP, Associate Professor ; *Director, Information Technology Services, Division of Anesthesia*

David Richards, PhD, Assistant Professor

Senthilkumar Sadhasivam, MD, Associate Professor

Nancy Samol, MD, Adjunct Assistant Professor

Paul Samuels, MD, Associate Professor ; *Director, Education, Department of Anesthesia*

Thomas "Mike" Shackelford, DO, Assistant Professor

Ximena Soler, MD, Assistant Professor

James Spaeth, MD, Associate Professor ; *Associate Chief, Division of Anesthesia; Director, Cardiac Anesthesia Team, Division of Anesthesia*

Theodore Striker, MD, Adjunct Professor

Alexandra Szabova, MD, Assistant Professor

Jon Tomasson, MD, Assistant Professor ; *Medical Director, Post Anesthesia Care Unit, Division of Anesthesia*

Anna Varughese, MD, MPH, Associate Professor ; *Associate Chief, Division of Anesthesia; Director, Quality, Division of Anesthesia; Medical Director, Same Day Surgery and Pre-Anesthesia Consultation Clinic, Division of Anesthesia*

Deborah Vermaire, MD, Adjunct Associate Professor ; *Director, Quality, Division of Pain Management*

Norbert Weidner, MD, Associate Professor ; *Director, Palliative Care, Division of Pain Management; Medical Director, Starshine Hospice*

Eric Wittkugel, MD, Associate Professor

Junzheng Wu, MD, Assistant 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

Todd Nick, PhD, Professor
Epidemiology & Biostatistics

Clinical Staff Members

- **Jasleen Goel, MD**
- **Clifford Hoffmann, MD**

Trainees

- **Rahul Baijal, MD**, PGY-IV, Johns Hopkins School of Medicine
- **Chandra Beals, MD**, PGY-IV, University of Iowa
- **Charles Eastwood, MD**, PGY-IV, University of Vermont
- **Lisa Francis, DO**, PGY-IV, West Virginia University
- **Erica Lin, MD**, PGY-IV, University of North Carolina
- **David Morse, MD**, PGY-IV, University of Alabama at Birmingham
- **Kristen Ogg, DO**, PGY-IV, University Hospitals Case Medical Center
- **Wade Smith, MD**, PGY-IV, University of Arizona

Significant Accomplishments

Department of Anesthesia: Division of Pain Management

Book published: *Pain in Children: a Practical Guide for Primary Care* - This is the first book about pediatric pain management aimed specifically towards primary care providers. Pediatricians and Family practitioners see the majority of painful conditions, and full-service pediatric pain programs are scarce nationally. This book is intended to help the greatest number of children across the board, by giving primary care practitioners both information and practical approaches to pain in general, as well as a variety of specific pain problems.

Opioid-related adverse drug events became an even higher focus, and sedation assessment became part of routine pain assessment for patients on PCAs and epidurals. This was part of a movement throughout CCHMC, initiated by the Division, to balance the expectations for control of pain with the need to maintain the highest level of safety and with the potential for post-surgical and medical recovery. A pilot education program targeting pre-operative spinal fusion patients was initiated with the objective of providing education regarding the whole process of surgery, including recovery and pain care, so patients and families had realistic expectations prior to surgery. The success of this program is being tested, and will likely see expansion in the next year.

The Division's Quality Scorecard was presented to a national meeting of pediatric pain practitioners, in preparation for expansion of our QI efforts into a nation-wide, collaborative process. As part of this process, two articles are presently being submitted for publication.

Department of Anesthesia: Division of Neurobiology

Research in neurobiology focuses on the impact of neurological insults on the developing brain and on pharmacogenetic studies to improve patient care. This year, Steve Danzer, PhD, was awarded a five year NIH R01 grant to study the impact of PTEN deletion on the development of epilepsy and autism, a second NIH R01 grant to examine the role of adult-generated hippocampal granule cells in epilepsy, and an NIH R03 grant to examine the impact of neonatal seizures on hippocampal development.

Andreas Loepke, MD, PhD and George Istaphanous, MD continue to explore the role of anesthesia in inducing neuroapoptosis in the developing brain, publishing several articles and presenting numerous invited seminars this year on the topic. This work is funded by the Foundation for Anesthesia Education and Research (FAER).

The basic research strength of the Neurobiology program continues to grow with the recruitment of David Richards, PhD. His NIH-funded research focuses on synaptic mechanisms - the way in which neurons communicate with one another. Developing collaborations with the Danzer and Loepke laboratories will help us to understand how synaptic mechanisms are modified in epilepsy and following exposure to anesthesia.

Senthilkumar Sadhasivam, MD, received a 2 year Outcome Research Award this year to study responses of children to morphine in an effort to personalize perioperative pain management based on genotype. Dr. Sadhasivam is in his second year of a FAER grant correlating perioperative child and parental behavioral interactions with post-discharge maladaptive behaviors. In collaboration with Dr. Vinks, Clinical Pharmacology, Dr. Sadhasivam and Dr. Vidya Chidambaran received a Translational Research Initiative (TRI) grant this year to study a pharmacokinetic-pharmacodynamic model based on the dosing of propofol to individualize and optimize anesthetic management in morbidly obese adolescents.

Department of Anesthesia

Significant reduction in the number of adverse events relating to perioperative soft tissue injuries with the institution of a clinical protocol for prevention of these injuries.

Improving the coordination of the care of complex patients using the pre-anesthesia consultation clinic, by effective communication with the surgeons. The new electronic (EPIC) surgical scheduling system now allows us to identify patients with certain complex medical conditions for anesthesia screening prior to the day of surgery.

Improvement in first case starts, as well as on time starts for subsequent cases, both resulting from timely anesthesia assessment and pre-medication order entry.

Division Publications

1. Kurth CD, McCann JC, Wu J, Miles L, Loepke AW. [Cerebral oxygen saturation-time threshold for hypoxic-ischemic injury in piglets](#). *Anesth Analg*. 2009; 108: 1268-77.
2. Ryckman FC, Schoettker PJ, Hays KR, Connelly BL, Blackledge RL, Bedinghaus CA, Sorter ML, Friend LC, Kotagal UR. [Reducing surgical site infections at a pediatric academic medical center](#). *Jt Comm J Qual Patient Saf*. 2009; 35: 192-8.
3. Wootten CT, Rutter MJ, Dickson JM, Samuels PJ. [Anesthetic management of patients with tracheal T-tubes](#). *Paediatr Anaesth*. 2009; 19: 349-57.
4. Rubin K, Sullivan D, Sadhasivam S. [Are peripheral and neuraxial blocks with ultrasound guidance more effective and safe in children?](#). *Paediatr Anaesth*. 2009; 19: 92-6.
5. Loepke AW, Istaphanous GK, McAuliffe JJ, 3rd, Miles L, Hughes EA, McCann JC, Harlow KE, Kurth CD, Williams MT, Vorhees CV, Danzer SC. [The effects of neonatal isoflurane exposure in mice on brain cell viability, adult behavior, learning, and memory](#). *Anesth Analg*. 2009; 108: 90-104.
6. Istaphanous GK, Loepke AW. [General anesthetics and the developing brain](#). *Curr Opin Anaesthesiol*. 2009; 22: 368-73.
7. Sadhasivam S, Cohen LL, Szabova A, Varughese A, Kurth CD, Willging P, Wang Y, Nick TG, Gunter J. [Real-time assessment of perioperative behaviors and prediction of perioperative outcomes](#). *Anesth Analg*. 2009; 108: 822-6.
8. Konig MW, Mahmoud MA, Fujiwara H, Hemasilpin N, Lee KH, Rose DF. [Influence of anesthetic management on quality of magnetoencephalography scan data in pediatric patients: a case series](#). *Paediatr Anaesth*. 2009; 19: 507-12.
9. Gunter JB, Willging JP, Myer CM, 3rd. [Dexamethasone and postoperative bleeding after tonsillectomy in children](#). *JAMA*. 2009; 301: 1764-5; author reply 1765-6.

10. Arndt GA, Cambray AJ, Tomasson J. [Intubation bougie dissection of tracheal mucosa and intratracheal airway obstruction](#). *Anesth Analg*. 2008; 107: 603-4.
11. Varughese AM, Nick TG, Gunter J, Wang Y, Kurth CD. [Factors predictive of poor behavioral compliance during inhaled induction in children](#). *Anesth Analg*. 2008; 107: 413-21.
12. Gunter JB, Ball J, Than-Win S. [Preparation of the Drager Fabius anesthesia machine for the malignant-hyperthermia susceptible patient](#). *Anesth Analg*. 2008; 107: 1936-45.
13. Robinson MB, Crombleholme TM, Kurth CD. [Maternal pulmonary edema during fetoscopic surgery](#). *Anesth Analg*. 2008; 107: 1978-80.
14. Danzer SC, Kotloski RJ, Walter C, Hughes M, McNamara JO. [Altered morphology of hippocampal dentate granule cell presynaptic and postsynaptic terminals following conditional deletion of TrkB](#). *Hippocampus*. 2008; 18: 668-78.
15. Meyer MJ, Goldschneider KR, Bielefeldt K, Zeltzer L, Lackner J, Keefer L. [Functional abdominal pain in adolescence: a biopsychosocial phenomenon](#). *J Pain*. 2008; 9: 984-90.
16. Mahmoud M, Tyler T, Sadhasivam S. [Dexmedetomidine and ketamine for large anterior mediastinal mass biopsy](#). *Paediatr Anaesth*. 2008; 18: 1011-3.
17. Mahmoud M, Spaeth J, Sadhasivam S. [Protection of tongue from injuries during transcranial motor-evoked potential monitoring](#). *Paediatr Anaesth*. 2008; 18: 902-3.

Grants, Contracts, and Industry Agreements

Grant and Contract Awards

Annual Direct / Project Period Direct

DANZER, S

Selective Disruption of Hippocampal Dentate Granule Cell in Autism: Impact of PTEN Deletion

National Institutes of Health

R01 NS 065020

05/01/09 - 04/30/14

\$250,000 / \$1,250,000

Short and Long-Term Impact of Neonatal Seizures on Hippocampal Granule Cell Integration

National Institutes of Health

R03 NS 064378

06/01/09 - 05/31/11

\$50,000 / \$100,000

ISTAPHANOUS, G

Anesthesia-Induced Neuronal Cell Death in the Developing Brain

Foundation for Anesthesia Education and Research

07/01/07 - 06/30/09

\$50,000 / \$85,000

RICHARDS, D

Regulation and Mechanisms of Synaptic Vesicle Exocytosis

National Institutes of Health

R01 NS 054750

11/9/08 - 06/30/12

\$193,600 / \$849,850

SADHASIVAM, S

Perioperative Child and Adult Behavioral Interactions

Foundation for Anesthesia Education and Research

01/01/08 - 12/31/09

\$140,000 / \$215,000

Current Year Direct

\$ 683,600

Total \$ 683,600