

# Anesthesiology

## Division Details

### RESEARCH AND TRAINING DETAILS

Faculty	58
Joint Appointment Faculty	2
Research Fellows and Post Docs	9
Research Graduate Students	6
Total Annual Grant Award Dollars	\$2,700,084
Total Annual Industry Award Dollars	\$151,890
Total Publications	65

### CLINICAL ACTIVITIES AND TRAINING

Staff Physicians	5
Staff Psychologists	2
Clinical Fellows	18
Inpatient Encounters	24,635
Outpatient Encounters	38,444



Row 1: R Thienprayoon, V Chidambaran, R Kreeger, E Lin, V Olbrecht, P Ngamprasertwong, E Adler, J Pratap

Row 2: E Wittkugel, C Lee, T Striker, A Loepke, B Das, P Samuels, A Szabova, J Morillo-Delerme, A Kandil, A Varughese

Row 3: K Goldschneider, C King, R Coghill, M Jankowski, M Sikora, N Weidner, J Spaeth, S Sadhasivam, C Walter, S Clay, M Mecoli, R Subramanyam

## Research Highlights

### Anesthesiology Emphasizes Research

Research in the [Department of Anesthesiology](#) ranges from molecular level studies of mechanisms contributing to pain to outcomes research focused on optimizing hospice care for children at the end of life. 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 33 of our 58 faculty published during FY16.

### 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*. [Robert Coghill, PhD](#), serves as a section editor for *PAIN*. [Michael Jankowski, PhD](#), and affiliate faculty member [Susmita Kashikar-Zuck, PhD](#), just became members of the editorial board of *PAIN*. Having three faculty members on the editorial board of *PAIN* is quite exceptional and underscores the fact that Cincinnati Children's Hospital Medical Center is an international leader in pain research.

They lead their peers in advocacy and guidance for research: Michael Jankowski, is co-chair of the [Basic Science Shared Interest Group](#) of the [American Pain Society](#), and Steve Danzer is chair of the Basic Science Committee of the [American Epilepsy Society](#). Robert

Coghill, is shaping the [Federal Pain Research Strategy](#) through his involvement with the Acute Pain Work Group of the [Interagency Pain Research Coordinating Committee](#).

Finally, they help agencies decide how to fund research: Steve Danzer serves as a standing member of the [National Institutes of Health \(NIH\) Study Section for Clinical Neuroplasticity and Neurotransmitters](#), and serves on the scientific review panel of the [CURE foundation](#), while Robert Coghill just chaired his first NIH study section and also serves on the Research Grants Committee of the American Pain Society. Our newest faculty member, [Christopher King, PhD](#), just served on his first NIH study section.

## Trainees and Faculty 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 and won highly competitive fellowships. From [Steve Danzer's laboratory](#), Aynara Wulsin received an NIH F30 predoctoral fellowship, while Bethany Hosford received an NIH F31 predoctoral fellowship, as well as a travel award from the [CURE Foundation](#). From [Michael Jankowski's laboratory](#), Luis Queme, received a scholarship to attend the North American Pain School Scholarship, and Jessica Ross received a travel award to attend the [American Pain Society](#). [Vanessa Olbrecht, MD, MBA](#), received the Young Investigator award from the [Society for Pediatric Anesthesia](#).

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## Significant Publications

**Queme LF, Ross JL, Lu P, Hudgins RC, Jankowski MP. Dual Modulation of Nociception and Cardiovascular Reflexes during Peripheral Ischemia through P2Y1 Receptor-Dependent Sensitization of Muscle Afferents.** *J Neurosci.* 2016 Jan 6;36(1):19-30.

Many chronic pain conditions that affect children have a musculoskeletal component. Such conditions include complex regional pain syndrome, sickle cell anemia, juvenile fibromyalgia, and Ehlers-Danlos Syndrome. Children with these conditions often have significant impairment of blood flow to muscles in affected regions. However, the link between musculoskeletal pain and altered cardiovascular responses has remained elusive. In this study, Michael Jankowski, PhD, and colleagues examine receptors on nerve fibers that innervate muscles, and find that one type of purinergic receptor, the P2Y1 receptor, may regulate both cardiovascular reflexes as well as the transduction of chemical signals related to muscle pain. This finding indicates that this receptor mechanism represents a new therapeutic target for the treatment of concurrent muscle pain and ischemia.

**Osterop SF, Virtanen MA, Loepke JR, Joseph B, Loepke AW, Vutskits L. Developmental stage-dependent impact of midazolam on calbindin, calretinin and parvalbumin expression in the immature rat medial prefrontal cortex during the brain growth spurt.** *Int J Dev Neurosci.* 2015 Oct;45:19-28.

Exposure of newborn infants to anesthetics during surgery is a source of major concern as such exposures may cause lasting neurocognitive alterations. Anesthetics have the potential to kill neurons in the brain or change their development. However, tracking down these effects has been difficult, potentially because neurons at different developmental stages may be differentially affected. For example, the GABAergic transmitter system undergoes dramatic changes through the course of development. Early in development, this system is excitatory, while later in development it becomes inhibitory. Here Andreas Loepke, MD, PhD, and colleagues show that one compound - midazolam - can have profound effects on the development of inhibitory interneurons depending on which stage of development when administered. Early exposure of rat pups to midazolam caused increased levels of markers associated with neuron shrinkage and death, as well as increased numbers of cells expressing proteins such as parvalbumin. Later exposure produced increases in cells expressing both parvalbumin and calretinin. Both of these proteins are important in the regulation of calcium signaling, and as such, could provide a substrate for altered action of inhibitory neurons, which in turn may contribute to anesthetic-induced neurocognitive changes.

**Singh SP, LaSarge CL, An A, McAuliffe JJ, Danzer SC. Clonal Analysis of Newborn Hippocampal Dentate Granule Cell Proliferation and Development in Temporal Lobe Epilepsy.** *eNeuro.* 2016 Jan 9;2(6).

A portion of our brain, the hippocampus, continues to grow new neurons throughout our life. However, during epilepsy, newborn cells in this region become abnormal with altered shapes or changes in the way that they move from one region of the hippocampus to the other. The origin of these abnormal cells has remained poorly characterized. Steve Danzer, PhD, and colleagues have determined

that a small subset of progenitor cells produce the majority of granule cells that migrate to abnormal locations, while cells with abnormal shapes arise throughout the pool of progenitor cells. These findings indicate that distinct mechanisms associated with the different abnormalities underscore the need for multiple therapeutic targets.

Vaughn LM, DeJonckheere M, Pratap JN. **Putting a face and context on pediatric surgery cancellations: The development of parent personas to guide equitable surgical care.** *J Child Health Care.* 2016 Jun 9. pii: 1367493516645858.

Last minute cancellation of a child's surgery can represent a major barrier to health care and represents a substantial loss of expensive health care resources. Finding ways of preventing such cancellations relies heavily on the preemptive identification of families at risk for cancellation. However, these families are not at all homogenous. As such, different strategies need developed for families in different situations. Nick Pratap, MB BChir, MRCPCH, FRCA, and colleagues surveyed 21 parents of children at risk for last minute cancellation in order to define different categories (a.k.a. personas) of families that would require distinct interventions to minimize the risk of late cancellation. They defined 5 different personas ranging from parents with substantial hospital experience to those with limited hospital experience, family support, and transportation challenges. These personas guide contextualized development of interventions tailored to prototypical families as they prepare and attend for surgery.

Thienprayoon R, Marks E, Funes M, Martinez-Puente LM, Winick N, Lee SC. **Perceptions of the Pediatric Hospice Experience among English- and Spanish-Speaking Families.** *J Palliat Med.* 2016 Jan;19(1):30-41.

The death of a child from disease or developmental abnormality is always a tragedy, and, sadly, remains a reality despite tremendous advances in medicine. Pediatric hospice care provides a means for guiding the child and their family through the end-of-life. However, pediatric hospice care is vastly different from adult hospice care due to distinct needs of patients and their families. Unfortunately, little remains known about the parental perspectives of the benefits and disappointments of the hospice experience, and accordingly, how pediatric hospice care can be better optimized. Moreover, culturo-linguistic differences in the hospice experience remain unknown. To address these gaps in knowledge, Dr. Thienprayoon, MD, MSCS, and colleagues surveyed both English and Spanish speaking parents of children who had received hospice care. Parents in both groups described caregiver strain. English-speaking families were more likely to highlight concerns about finances and insurance loss, while Spanish-speaking families described the difficulty of bedside caregiving and geographic hardship. Uncontrolled pain and symptom management remains a significant challenge.

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## Division Publications

1. Ahmed Z, Samuels PJ, Mai CL, Rodriguez S, Iftikhar AR, Yaster M. **The Development of Pediatric Anesthesiology and Critical Care Medicine at the Cincinnati Children's Hospital: An Interview with Dr. Theodore Striker.** *Paediatr Anaesth.* 2015; 25:764-9.
2. Aronson LA. **Child with Junctional Epidermolysis Bullosa, Hoarseness, and Nasal Obstruction Demonstrating Severe Laryngeal Stenosis.** *Anesthesiology.* 2016.
3. Ayala A, Szabova A. **Management of Chronic Pain Patient on the Pediatric Floor** In: R Rosenquist, D SouzdaInitski, R Urman, eds. *Chronic Pain Management for the Hospitalized Patient.* New York, NY: Oxford University Press; 2016:124-43.
4. Backeljauw B, Holland SK, Altaye M, Loepeke AW. **Cognition and Brain Structure Following Early Childhood Surgery with Anesthesia.** *Pediatrics.* 2015; 136:e1-12.
5. Bartley EJ, King CD, Sibille KT, Cruz-Almeida Y, Riley JL, 3rd, Glover TL, Goodin BR, Sotolongo AS, Herbert MS, Bulls HW, Staud R, Fessler BJ, Redden DT, Bradley LA, Fillingim RB. **Enhanced Pain Sensitivity among Individuals with Symptomatic Knee Osteoarthritis: Potential Sex Differences in Central Sensitization.** *Arthritis Care Res (Hoboken).* 2016; 68:472-80.
6. Bastero P, DiNardo J, Pratap J, Schwartz J, Sivarajan V. **Early Perioperative Management after Pediatric Cardiac Surgery: Review at Pcics 2014.** *World J Pediatr Congenit Heart Surg.* 2015; 6:565-74.

7. Buck D, Subramanyam R, Varughese A. **A Quality Improvement Project to Reduce the Intraoperative Use of Single-Dose Fentanyl Vials across Multiple Patients in a Pediatric Institution.** *Paediatr Anaesth.* 2016; 26:92-101.
8. Chidambaran V, Costandi A, D'Mello A. **Propofol: A Review of Its Role in Pediatric Anesthesia and Sedation.** *CNS Drugs.* 2015; 29:543-63.
9. Chidambaran V, Venkatasubramanian R, Sadhasivam S, Esslinger H, Cox S, Diepstraten J, Fukuda T, Inge T, Knibbe CA, Vinks AA. **Population Pharmacokinetic-Pharmacodynamic Modeling and Dosing Simulation of Propofol Maintenance Anesthesia in Severely Obese Adolescents.** *Paediatr Anaesth.* 2015; 25:911-23.
10. Chidambaran V, Venkatasubramanian R, Zhang X, Martin LJ, Niu J, Mizuno T, Fukuda T, Meller J, Vinks AA, Sadhasivam S. **Abcc3 Genetic Variants Are Associated with Postoperative Morphine-Induced Respiratory Depression and Morphine Pharmacokinetics in Children.** *Pharmacogenomics J.* 2016.
11. Coghill RC, Yarnitsky D. **Healthy and Normal? The Need for Clear Reporting and Flexible Criteria for Defining Control Participants in Quantitative Sensory Testing Studies.** *Pain.* 2015; 156:2117-8.
12. Costandi A, Chidambaran V. **Anesthesia.** In: J Abzug, S Kozin, D Zlotolow, eds. *The Pediatric Upper Extremity.* New York: Springer; 2015:117-38.
13. Cudilo EM, Varughese AM, Mahmoud M, Carey PM, Subramanyam R. **Case Report of Transfusion-Related Acute Lung Injury in a Pediatric Spine Surgery Patient Transfused Leukoreduced Red Blood Cells.** *Paediatr Anaesth.* 2015; 25:1294-7.
14. Cunningham NR, Jagpal A, Tran ST, Kashikar-Zuck S, Goldschneider KR, Coghill RC, Lynch-Jordan AM. **Anxiety Adversely Impacts Response to Cognitive Behavioral Therapy in Children with Chronic Pain.** *J Pediatr.* 2016; 171:227-33.
15. Danzer SC. **Adult Neurogenesis: Opening the Gates of Troy from the Inside.** *Epilepsy Curr.* 2015; 15:263-4.
16. Du T, Mahmoud M. **Variability of Fasting Outcomes Observed in a Single Patient.** *Br J Anaesth.* 2016; 116:560-1.
17. Ehsan Z, Mahmoud M, Shott SR, Amin RS, Ishman SL. **The Effects of Anesthesia and Opioids on the Upper Airway: A Systematic Review.** *Laryngoscope.* 2016; 126:270-84.
18. Flint H, Meyer M, Hossain M, Klein M. **Discussing Serious News: Teaching Communication Skills through Role Play with Bereaved Parents.** *Am J Hosp Palliat Care.* 2015.
19. Flores S, Daily J, Pratap JN, Cash MC, Hirsch R. **Management of a Child with Pulmonary Arterial Hypertension Presenting with Systemic Hypertension.** *Cardiol Young.* 2016; 26:378-81.
20. Francis L, Subramanyam R, Mahmoud M. **Severe Spinal and Chest Deformity Secondary to Neurofibromatosis.** *Can J Anaesth.* 2016; 63:488-9.
21. Furststein JS, Samol NB, Sadhasivam S. **Femoral Nerve Block for Anterior Cruciate Ligament Reconstruction: Letter to the Editor.** *Am J Sports Med.* 2015; 43:NP28-9.
22. Glover TL, Goodin BR, King CD, Sibille KT, Herbert MS, Sotolongo AS, Cruz-Almeida Y, Bartley EJ, Bulls HW, Horgas AL, Redden DT, Riley JL, 3rd, Staud R, Fessler BJ, Bradley LA, Fillingim RB. **A Cross-Sectional Examination of Vitamin D, Obesity, and Measures of Pain and Function in Middle-Aged and Older Adults with Knee Osteoarthritis.** *Clin J Pain.* 2015; 31:1060-7.
23. Henderson C, FitzGerald M, Hoehn K, Weidner N. **Pediatrician Ambiguity in Understanding Palliative Sedation at the End of Life.** *Am J Hosp Palliat Care.* 2015.
24. Hester MS, Hosford BE, Santos VR, Singh SP, Rolle IJ, LaSarge CL, Liska JP, Garcia-Cairasco N, Danzer SC. **Impact of Rapamycin on Status Epilepticus Induced Hippocampal Pathology and Weight Gain.** *Exp Neurol.* 2016; 280:1-12.
25. Jacobson CJ, Jr., Kashikar-Zuck S, Farrell J, Barnett K, Goldschneider K, Dampier C, Cunningham N, Crosby L, DeWitt EM. **Qualitative Evaluation of Pediatric Pain Behavior, Quality, and Intensity Item Candidates and the Promis Pain Domain**

- Framework in Children with Chronic Pain.** *J Pain.* 2015; 16:1243-55.
26. Jiang Y, Pun RY, Peariso K, Holland KD, Lian Q, Danzer SC. **Olfactory Bulbectomy Leads to the Development of Epilepsy in Mice.** *PLoS One.* 2015; 10:e0138178.
27. Kashikar-Zuck S, Carle A, Barnett K, Goldschneider KR, Sherry DD, Mara CA, Cunningham N, Farrell J, Tress J, DeWitt EM. **Longitudinal Evaluation of Patient-Reported Outcomes Measurement Information Systems Measures in Pediatric Chronic Pain.** *Pain.* 2016; 157:339-47.
28. Liu Y, Kang DL, Na HY, Li BL, Xu YY, Ni J, Wu JZ. **Consequence of Dexmedetomidine on Emergence Delirium Following Sevoflurane Anesthesia in Children with Cerebral Palsy.** *Int J Clin Exp Med.* 2015; 8:16238-44.
29. Loepke A, Vutskits L. **What Lessons for Clinical Practice Can Be Learned from Systematic Reviews of Animal Studies? The Case of Anesthetic Neurotoxicity.** *Paediatr Anaesth.* 2016; 26:4.
30. Mahmoud M, Mason KP. **A Forecast of Relevant Pediatric Sedation Trends.** *Curr Opin Anaesthesiol.* 2016; 29 Suppl 1:S56-67.
31. Mahmoud M, Mason KP. **Dexmedetomidine: Review, Update, and Future Considerations of Paediatric Perioperative and Periprocedural Applications and Limitations.** *Br J Anaesth.* 2015; 115:171-82.
32. Mahmoud M, Towe C, Fleck RJ. **Ct Chest under General Anesthesia: Pulmonary, Anesthetic and Radiologic Dilemmas.** *Pediatr Radiol.* 2015; 45:977-81.
33. McIntyre IW, Francis L, McAuliffe JJ. **Transcranial Motor-Evoked Potentials Are More Readily Acquired Than Somatosensory-Evoked Potentials in Children Younger Than 6 Years.** *Anesth Analg.* 2016; 122:212-18.
34. Miller J, Xue B, Hossain M, Zhang MZ, Loepke A, Kurth D. **Comparison of Dexmedetomidine and Chloral Hydrate Sedation for Transthoracic Echocardiography in Infants and Toddlers: A Randomized Clinical Trial.** *Paediatr Anaesth.* 2016; 26:266-72.
35. Minton TB, Rosing J, Spar DS, Strawn JR, Garcia-Delgar B, Coffey BJ. **Psychopharmacologic Management of Anxiety in an Adolescent with Congenital Long Qt Syndrome.** *J Child Adolesc Psychopharmacol.* 2016; 26:485-9.
36. Mochizuki H, Papoiu AD, Nattkemper LA, Lin AC, Kraft RA, Coghill RC, Yosipovitch G. **Scratching Induces Overactivity in Motor-Related Regions and Reward System in Chronic Itch Patients.** *J Invest Dermatol.* 2015; 135:2814-23.
37. Morch CD, Frahm KS, Coghill RC, Arendt-Nielsen L, Andersen OK. **Distinct Temporal Filtering Mechanisms Are Engaged During Dynamic Increases and Decreases of Noxious Stimulus Intensity.** *Pain.* 2015; 156:1906-12.
38. Navaratnam D, Fitzsimmons S, Grocott M, Rossiter HB, Emmanuel Y, Diller GP, Gordon-Walker T, Jack S, Sheron N, Pappachan J, Pratap JN, Vettukattil JJ, Veldtman G. **Exercise-Induced Systemic Venous Hypertension in the Fontan Circulation.** *Am J Cardiol.* 2016; 117:1667-71.
39. Ngamprasertwong P, Dong M, Niu J, Venkatasubramanian R, Vinks AA, Sadhasivam S. **Propofol Pharmacokinetics and Estimation of Fetal Propofol Exposure During Mid-Gestational Fetal Surgery: A Maternal-Fetal Sheep Model.** *PLoS One.* 2016; 11:e0146563.
40. Osterop SF, Virtanen MA, Loepke JR, Joseph B, Loepke AW, Vutskits L. **Developmental Stage-Dependent Impact of Midazolam on Calbindin, Calretinin and Parvalbumin Expression in the Immature Rat Medial Prefrontal Cortex During the Brain Growth Spurt.** *Int J Dev Neurosci.* 2015; 45:19-28.
41. Patino M, Glynn S, Soberano M, Putnam P, Hossain MM, Hoffmann C, Samuels P, Kibelbek MJ, Gunter J. **Comparison of Different Anesthesia Techniques During Esophagogastroduodenoscopy in Children: A Randomized Trial.** *Paediatr Anaesth.* 2015; 25:1013-9.
42. Patino M, Kurth C, J M. **Monitoring the Neonate: Basic Science.** In: J Lerman, ed. *Neonatal Anesthesia.* New York, NY: Springer; 2015:173-89.

43. Queme LF, Ross JL, Lu P, Hudgins RC, Jankowski MP. **Dual Modulation of Nociception and Cardiovascular Reflexes During Peripheral Ischemia through P2y1 Receptor-Dependent Sensitization of Muscle Afferents.** *J Neurosci.* 2016; 36:19-30.
44. Ross JL, Queme LF, Cohen ER, Green KJ, Lu P, Shank AT, An S, Hudgins RC, Jankowski MP. **Muscle Il1beta Drives Ischemic Myalgia Via Asic3-Mediated Sensory Neuron Sensitization.** *J Neurosci.* 2016; 36:6857-71.
45. Sadhasivam S, Zhang X, Chidambaran V, Mavi J, Pilipenko V, Mersha TB, Meller J, Kaufman KM, Martin LJ, McAuliffe J. **Novel Associations between Faah Genetic Variants and Postoperative Central Opioid-Related Adverse Effects.** *Pharmacogenomics J.* 2015; 15:436-42.
46. Samuels PJ, Sjoblom MD. **Anesthetic Considerations for Pediatric Obesity and Adolescent Bariatric Surgery.** *Curr Opin Anaesthesiol.* 2016; 29:327-36.
47. Singh SP, LaSarge CL, An A, McAuliffe JJ, Danzer SC. **Clonal Analysis of Newborn Hippocampal Dentate Granule Cell Proliferation and Development in Temporal Lobe Epilepsy.** *eNeuro.* 2015; 2.
48. Smith A, Abruzzo T, Mahmoud M. **Vein of Galen Malformation and High-Output Cardiac Failure.** *Anesthesiology.* 2016; 125:597.
49. Spaeth JP, Kreeger R, Varughese AM, Wittkugel E. **Interventions Designed Using Quality Improvement Methods Reduce the Incidence of Serious Airway Events and Airway Cardiac Arrests During Pediatric Anesthesia.** *Paediatr Anaesth.* 2016; 26:164-72.
50. Subramanyam R, Costandi A, Mahmoud M. **Congenital Lobar Emphysema and Tension Emphysema.** *J Clin Anesth.* 2016; 29:17-8.
51. Subramanyam R, Cudilo E, Hossain M, McAuliffe J, Wu J, Patino M, Gunter J, Mahmoud M. **To Pretreat or Not to Pretreat: Prophylactic Anticholinergic Administration before Dexmedetomidine in Pediatric Imaging.** *Anesth Analg.* 2015; 121:479-85.
52. Subramanyam R, Ishman SL, Fleck RJ, Mahmoud M. **Video Imaging of Arytenoid Prolapse.** *Can J Anaesth.* 2016; 63:350-1.
53. Subramanyam R, Yeramaneni S, Hossain MM, Anneken AM, Varughese AM. **Perioperative Respiratory Adverse Events in Pediatric Ambulatory Anesthesia: Development and Validation of a Risk Prediction Tool.** *Anesth Analg.* 2016; 122:1578-85.
54. Tawfik KO, Myer CMt, Shikary T, Goldschneider KR. **The Catheter Hub Disinfection Cap as Esophageal Foreign Body.** *Laryngoscope.* 2015; 125:2820-2.
55. Thienprayoon R, LeBlanc T. **Early Integration of Palliative Care into the Care of Patients with Cancer.** *Hematology Am Soc Hematol Educ Program.* 2015; 2015:479-83.
56. Thienprayoon R, Lee S, Leonard D, Winick N. **Hospice Care for Children with Cancer: Where Do These Children Die?** *J Pediatr Hematol Oncol.* 2015; 37:373-7.
57. Thienprayoon R, Marks E, Funes M, Martinez-Puente LM, Winick N, Lee SC. **Perceptions of the Pediatric Hospice Experience among English- and Spanish-Speaking Families.** *J Palliat Med.* 2016; 19:30-41.
58. Tighe PJ, King CD, Zou B, Fillingim RB. **Time to Onset of Sustained Postoperative Pain Relief (Suppr): Evaluation of a New Systems-Level Metric for Acute Pain Management.** *Clin J Pain.* 2016; 32:371-9.
59. Vaughn LM, DeJonckheere M, Pratap JN. **Putting a Face and Context on Pediatric Surgery Cancellations: The Development of Parent Personas to Guide Equitable Surgical Care.** *J Child Health Care.* 2016.
60. Wager TD, Atlas LY, Botvinick MM, Chang LJ, Coghill RC, Davis KD, Iannetti GD, Poldrack RA, Shackman AJ, Yarkoni T. **Pain in the Acc?** *Proc Natl Acad Sci U S A.* 2016; 113:E2474-5.
61. Wittkugel E, Varughese A. **Development of a Nurse-Assisted Preanesthesia Evaluation Program for Pediatric Outpatient Anesthesia.** *Paediatr Anaesth.* 2015; 25:719-26.

62. Wulsin AC, Solomon MB, Privitera MD, Danzer SC, Herman JP. [Hypothalamic-Pituitary-Adrenocortical Axis Dysfunction in Epilepsy](#). *Physiol Behav*. 2016.
63. Zeidan F, Adler-Neal A, Wells R, Stagnaro E, May L, Eisenach J, McHaffie J, Coghill R. [Mindfulness-Meditation-Based Pain Relief Is Not Mediated by Endogenous Opioids](#). *J Neurosci*. 2016; 36:3391-7.
64. Zeidan F, Emerson NM, Farris SR, Ray JN, Jung Y, McHaffie JG, Coghill RC. [Mindfulness Meditation-Based Pain Relief Employs Different Neural Mechanisms Than Placebo and Sham Mindfulness Meditation-Induced Analgesia](#). *J Neurosci*. 2015; 35:15307-25.
65. Zeidan F, Lobanov OV, Kraft RA, Coghill RC. [Brain Mechanisms Supporting Violated Expectations of Pain](#). *Pain*. 2015; 156:1772-85.

## Grants, Contracts, and Industry Agreements

### Annual Grant Award Dollars

Investigator	Title	Sponsor	ID	Dates	Amount
Vidya Chidambaran, MD	Morphine Pharmacogenomics to Predict Risk of Respiratory Depression in Children	National Institutes of Health	K23 HD082782	9/1/2014 - 6/30/2019	\$131,085
Robert C Coghill, PHD	Brain Mechanisms Supporting Individual Differences in Pain	National Institutes of Health	R01 NS085391	7/1/2015 - 4/30/2020	\$1,143,631
Steve Danzer, PHD	mTOR Regulation of Aberrant Neuronal Integration and Epileptogenesis in Epilepsy	National Institutes of Health	R01 NS062806	4/15/2015 - 3/31/2020	\$352,791
Steve Danzer, PHD	Identification and Reversal of Primary and Secondary Epileptogenic Changes	National Institutes of Health	R01 NS065020	5/1/2014 - 4/30/2019	\$341,250
Bethany Hosford	Impact of Targeted Granule Cell Ablation on Seizure Frequencies in the Epileptic Mouse	National Institutes of Health	F31 NS092363	9/18/2015 - 9/17/2016	\$32,203
Michael P Jankowski, PHD	Mechanisms of Muscle Afferent Sensitization after Ischemia	National Institutes of Health	R01 AR064551	9/17/2013 - 8/31/2018	\$325,125
Christopher D. King, PHD	Psychological and Physiological Correlates of Endogenous Pain Modulation in Patients with Temporomandibular Joint Disorder	National Institutes of Health	R00 DE022368	8/1/2015 - 7/31/2018	\$248,999
Erica Peiyeh Lin, MD	Protective Anesthetic Strategies during Neonatal Brain Ischemia	International Anesthesia Research Societ	IARS - Lin, Erica	7/1/2015 - 6/30/2017	\$75,000
Rajeev Subramanyam, MD-MS	Development and Prediction of a Pediatric Risk Prediction Tool for Post-Tonsillectomy Readmissions	Society for Pediatric Anesthesia	Peds Anest - Subrama	1/1/2016 - 12/31/2016	\$50,000

Total Annual Grant Award Dollars

\$2,700,084

### Annual Industry Award Dollars

Investigator	Industry Sponsor	Amount
Senthilkumar Sadhasivam, MD	Grunenthal Group	\$151,890
Total Annual Industry Award Dollars		\$151,890