Curriculum Vitae

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Education

1996	B.A. *magna cum laude*	Chemistry	Amherst College, Amherst, MA
2000	M.D.	Medicine	University of Pennsylvania, Philadelphia, PA

Postdoctoral Training

06/00-06/01	Intern	Transitional	Presbyterian Medical Center, Philadelphia, PA
09/01-09/04	Resident	Anesthesia and Critical Care	Massachusetts General Hospital, Boston, MA
10/10-11/10	Visiting Scholar	Neurobiology	University of California, San Diego

Faculty Academic Appointments

09/04-06/07	Instructor	Anaesthesia	Harvard Medical School Boston, MA
07/07-02/15	Assistant Professor	Anaesthesia	Harvard Medical School
03/15-	Associate Professor	Anaesthesia	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

09/04-09/07	Assistant in Anesthesia	Anesthesia and Critical Care	Massachusetts General Hospital
09/07-08/16	Assistant Anesthetist	Anesthesia and Critical Care	Massachusetts General Hospital
06/09-	Research Affiliate	Brain and Cognitive Sciences	Massachusetts Institute of Technology, Cambridge, MA

08/16-	Associate Anesthetist	Anesthesia, Critical Care and Pain Medicine	Massachusetts General Hospital

Committee Service

Local

2008-2010	Research Task Force	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2009-2015	Resident Selection Committee	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2010-	Research Council (Elected Member)	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
	2012-	Research Mentoring Committee
2015-	Educational Content Reviewer	Dept. of Continuing Education, Harvard Medical School
2015-	Anesthesia Appointments and Promotions Committee	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

Professional Societies

2001-	American Society of Anesthesiologists	
	2009-2012	Member, Abstract Review Subcommittee on Anesthetic Action and Biochemistry
	2010-	Member, Abstract Review Subcommittee on Experimental Neurosciences
	2012-2016	Chair, Abstract Review Subcommittee on Experimental Neurosciences
	2012-2016	Member, Scientific Advisory Committee
	2012-2016	Member, Educational Track Subcommittee on Neuroanesthesia
	2013-	Member, Committee on Research
	2016-	Member, Committee on Academic Anesthesiology
2001-	Massachusetts Society of Anesthesiologists	

2001-	International Anesthesia Research Society	
2007-	International Society for Anaesthetic Pharmacology	
2008-	Faculty of 1000 in Medicine	
2009-	Society for Neuroscience	
2011-2015	Society of Anesthesia and Sleep Medicine	
	2011-2013	Member, Newsletter Subcommittee
	2011-2014	Member, Abstract Review Subcommittee
2013-	Association of University Anesthesiologists	Elected Member
2016-	Society for Neuroscience in Anesthesiology and Critical Care	

Grant Review Activities

2011-	Review Committee, Departmental Clinical Research Grants (meets twice per year)	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2014-	Review Committee, Mentored Research Training Grants (meets twice per year)	Foundation for Anesthesia Education and Research
2016-	Review Committee, Mentored Research Awards (meets once per year)	International Anesthesia Research Society

Editorial Activities

Ad Hoc Reviewer

Anesthesia and Analgesia
Anesthesiology
BMC Anesthesiology
Brain Connectivity
Brain Research Bulletin
British Journal of Anaesthesia
Cerebral Cortex
Current Biology
Journal of Clinical Anesthesia
Journal of Neuroscience
Journal of Neurosurgical Anesthesiology
Journal of Pharmacology and Experimental Therapeutics
Journal of Visualized Experiments
Molecular Pharmacology
Neuroscience
Psychopharmacology
Sleep

Other Editorial Roles

2016-	Academic Editor	PLOS One

Honors and Prizes

1995	Howard Hughes Research Fellowship	Amherst College	Summer Research Fellowship
1996	Frank Fowler Dow Prize in Chemistry	Amherst College	Academic Achievement
1996	Sigma Xi Scientific Research Society	Amherst College	Academic Achievement
1999	Medical Student Travel Scholarship	Noguchi Medical Research Institute	Medicine Clerkship at the University of Tokyo, Japan
2009	Partners in Excellence Award	Partners® Healthcare	Patient care
2010	Citizenship Award	Dept. of Anesthesia, Critical Care and Pain Medicine, MGH	Contributions to Departmental Missions
2011	Best Abstract Award	Society of Anesthesia and Sleep Medicine Annual Meeting	
2012	NIH Director's Transformative Research Award	National Institutes of Health	
2012	Best Abstract Award	Society of Anesthesia and Sleep Medicine Annual Meeting	
2014	Scholar Award in Understanding Human Cognition	James S. McDonnell Foundation	
2016	Best Neuroscience Abstract Award	International Anesthesia Research Society Annual Meeting	
2016	Kosaka Award	International Anesthesia Research Society Annual Meeting	Outstanding Basic Science Abstract
2017	Kosaka Award Top Finalist	International Anesthesia Research Society Annual Meeting	Outstanding Basic Science Abstract
2017	Letter of Commendation	Dept. of Anesthesia, Critical Care and Pain Medicine, MGH	Outstanding Clinical Teaching

Report of Funded and Unfunded Projects

Funding Information

Past

2004-2007 Basic Science Research Training Grant for Anesthetists
NIH T32-GM07592
Investigator
The goal of this study was to establish the effects of inhaled anesthetics on human serotonin type 3 ($5\text{-}HT_3$) receptors using two-electrode voltage clamp electrophysiology.

2006-2009 Modulation of $5\text{-}HT_{3A}$ Receptor Kinetics by Inhaled Anesthetics
Foundation for Anesthesia Education and Research (Mentored Research Training Grant)
PI ($255,000)
The goal of this study was to establish the effects of inhaled anesthetics on human $5\text{-}HT_3$ receptor kinetics using patch-clamp techniques combined with ultrafast solution exchange.

2010-2014 Active Induction of Emergence from General Anesthesia
NIH K08-GM094394
PI ($380,000)
The goals of this study were to identify CNS arousal pathways that induce emergence from general anesthesia, and to establish the behavioral and neurophysiological correlates of active emergence.

Current

2012-2017 Redesigning General Anesthesia
NIH R01-GM104948 (NIH Director's Transformative Research Award)
Site PI ($875,000)
The goal of this study is to redesign general anesthesia by combining optogenetic, electrical and pharmacological manipulations in rodent models to create the behavioral state of general anesthesia.

2014-2020 Reanimation and Cognitive Recovery from General Anesthesia
James S. McDonnell Foundation (Scholar Award in Understanding Human Cognition)
PI ($600,000)
The goal of this study is to test the efficacy of methylphenidate for inducing reanimation and cognitive recovery from general anesthesia in patients undergoing surgery.

2017-2022 Integrated Systems Neuroscience Studies of Anesthesia
Project 3: Rodent Studies of Anesthetic Action
NIH P01-GM118269
PI ($1,770,790)
The goal of this study is to characterize the neurophysiology of general anesthesia in rodents.

Report of Local Teaching and Training

Teaching of Students in Courses

2004-	Core Clerkship in Anaesthesia Approx. 25 Medical students total	Harvard Medical School 2-3 days/year
2004-	Management of the Patient for Anaesthesia	Harvard Medical School

	and Surgery Approx. 25 Medical students total	2-3 days/year
2006-2009, 2011, 2013-2014	Objective Structured Clinical Examination Approx. 40 Medical students total	Harvard Medical School 1 day/year
2011-	Faculty Preceptor for HST-150: Clinical Pharmacology in the Operating Room Approx. 20 Medical students total	Harvard Medical School 1 day/year

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

2007-2013	Local Anesthetic Pharmacology for Obstetrics Anesthesia residents	Massachusetts General Hospital 30-minute lecture, 4 times per year
2012-2013	Is MAC Clinically Relevant? Anesthesia residents	Massachusetts General Hospital 30-minute lecture, once per year
2014-	Local Anesthetic Pharmacology Anesthesia residents	Massachusetts General Hospital 60-minute lecture, once per year

Clinical Supervisory and Training Responsibilities

2004-	Supervision and teaching of residents and medical students/MGH	10 hours/week, 45 weeks/year
2005-	Intensive one-on-one tutorial of anesthesia residents in first month of training/MGH	50 hours/week, 2 weeks/year

Laboratory and Other Research Supervisory and Training Responsibilities

2006-	Supervision/training of research associate	30 hours/week, 45 weeks/year
2011	Supervision/research training of senior anesthesia resident	30 hours/week, 6 months/year
2011, 2013-	Supervision/research training of summer student	30 hours/week, 8 weeks/year

Formally Supervised Trainees

2006-2009 Elizabeth W. Kelly, M.D. / Attending Obstetrician and Gynecologist, Albany Medical Center, Albany, NY
I trained and supervised Ms. Kelly as a Research Technologist, and we co-authored 2 publications (see Research investigations #12 and #16 in the Report of Scholarship). Her experience in my laboratory helped her to apply successfully to medical school.

2009-2012 David Palilla, M.D. / Attending Anesthesiologist, North Shore University Hospital, Manhasset, NY.
I taught Dr. Palilla exclusively during the first two weeks of his anesthesiology residency at MGH, and also served as his advisor and clinical mentor throughout his residency.

2010-2012 Jessica J. Chemali, B.E. / Graduate Student, Carnegie Mellon University, Pittsburgh, PA
I trained and supervised Ms. Chemali as a Research Technologist. We co-authored 10 publications (see Research investigations #17, #18, #20, #21, #23 - #27 and #30 in the Report of Scholarship), and her experience in my laboratory helped her to apply successfully to graduate school.

2010-2013 John Anderson-Dam, M.D. / Clinical Associate Professor and Associate Director of Surgical Critical Care, University of Southern California, Los Angeles, CA
I taught Dr. Anderson-Dam exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.

2011 Olatoye Olutola, M.D. / Resident in Surgery, Albany Medical Center, Albany, NY
I trained and supervised Mr. Olutola in my laboratory as part of the Summer Research Training Program sponsored by the Multicultural Affairs Office at MGH. We co-authored one publication (see Research investigation #30 in the Report of Scholarship). His experience in my laboratory helped him to apply successfully to medical school.

2011-2014 Susan Lien, M.D. / Attending Anesthesiologist, White Plains Medical Center, White Plains, NY
I taught Dr. Lien exclusively during the first two weeks of her anesthesiology residency at MGH, and also served as her advisor and mentor throughout her residency.

2011-2017 Norman E. Taylor, M.D., Ph.D. / Assistant Professor of Anesthesia, MGH
I trained and supervised Dr. Taylor in my laboratory during his anesthesiology residency at MGH. I also served as mentor for his NIH T-32 Award, and co-mentor for his research training grant from the Foundation for Anesthesia Education and Research. We co-authored 8 publications (see Research investigations #21, #27, #30, #32 - #35 and #37 in the Report of Scholarship). The work Dr. Taylor performed under my supervision received best abstract awards at annual meetings of the American Society of Anesthesiologists, Association of University Anesthesiologists, and the Society of Anesthesia and Sleep Medicine.

2012-2015 Michael R. King, M.D. / Instructor in Anesthesiology, Northwestern University, Chicago, IL
I taught Dr. King exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.

2012-2015 Jonathan D. Kenny / Graduate Student in Neuroscience, California Institute of Technology, Pasadena, CA
I trained and supervised Mr. Kenny as a Research Technologist. We co-authored 8 publications (see Research investigations #24, #27, #28, #30 and #32 - #35 in the Report of Scholarship). The work he performed under my supervision was selected for the Best Basic Science Abstracts Session at the 2013 American Society of Anesthesiologists meeting, where he was the only undergraduate student invited to give an oral presentation. His experience in my laboratory helped him to apply successfully to graduate school.

2013 Rachel Feingold / Summer Student, MGH
I trained and supervised Ms. Feingold in my laboratory as part of the "Students on the Forefront of Science" Program at the Brooks School in North Andover, MA.

2013-2016 Mitchell J. Donner, M.D. / Attending Anesthesiologist in Private Practice, Atlanta, GA

I taught Dr. Donner exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.

2014-2015 Yasuko Nagasaka, M.D., Ph.D. / Chair, Dept. of Anesthesiology, St. Luke's International Hospital, Tokyo, Japan
I served as Dr. Nagasaka's co-mentor for her research as a senior resident and fellow in the Dept. of Anesthesia, Critical Care and Pain Medicine at MGH. We co-authored one publication (see Research investigation #36 in the Report of Scholarship).

2014 Lidiana Lantigua / Summer Student, MGH
I trained and supervised Ms. Lantigua in my laboratory as part of the "Students on the Forefront of Science" Program at the Brooks School in North Andover, MA.

2014-2017 Emily Fish, M.D., M.P.H. / Attending Anesthesiologist in Private Practice, Mission Viejo, CA
I taught Dr. Fish exclusively during the first two weeks of her anesthesiology residency at MGH, and I also served as her advisor and clinical mentor throughout her residency.

2015 Valerie Nam / Summer Student, MGH
I trained and supervised Ms. Nam in my laboratory as part of the "Students on the Forefront of Science" Program at the Brooks School in North Andover, MA.

2015 James C. Simpson, M.D. / Anesthesiology Resident, MGH
I taught Dr. Simpson exclusively during the first two weeks of his anesthesiology residency at MGH.

2015-2016 Justin T. Lee / Research Technologist, MGH
I trained and supervised Mr. Lee as a Research Technologist. We co-authored two publications (see Research investigations #35 and #37 in the Report of Scholarship).

2015-2017 Jennifer A. Guidera / M.D.-Ph.D. Student, University of CA, San Francisco
I trained and supervised Ms. Guidera as a Research Technologist. We co-authored two publications (see Research investigations #35 and #37 in the Report of Scholarship). Her experience in my laboratory helped her to apply successfully to medical school.

2015- JunZhu Pei / Research Technologist, MGH
I trained and currently supervise Ms. Pei as a Research Technologist. We co-authored two publications (see Research investigations #35 and #37 in the Report of Scholarship).

2015- Ksenia Y. Vlasov / Research Technologist, MGH
I trained and currently supervise Ms. Vlasov as a Research Technologist. We co-authored two publications (see Research investigations #35 and #37 in the Report of Scholarship).

2016 Caroline Saef / Summer Student, MGH
I trained and supervised Ms. Saef in my laboratory as part of the "Students on the Forefront of Science" Program at the Brooks School in North Andover, MA.

2016- Eric Abhold, M.D. / Anesthesiology Resident, MGH
I taught Dr. Abhold exclusively during the first two weeks of his anesthesiology residency at MGH, and I currently serve as his advisor and clinical mentor.

2017- Kendrick Shaw, M.D. / Anesthesiology Resident, MGH

I currently serve as Dr. Shaw's advisor and clinical mentor.

2017 Madison Dunn / Summer Student, MGH
I trained and supervised Ms. Dunn in my laboratory as part of the "Students on the Forefront of Science" Program at the Brooks School in North Andover, MA.

2017- Stephen Campbell / Anesthesiology Resident, MGH
I taught Dr. Campbell exclusively during the first two weeks of his anesthesiology residency at MGH, and I currently serve as his advisor and clinical mentor.

Local Invited Presentations

No presentations below were sponsored by outside entities

2004 Modulation of 5-HT_3 Receptor Function by General Anesthetics / Invited Speaker, Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital

2005 General Anesthetics Modulate 5-HT_3 Receptor Gating / Invited Speaker, Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital

2006 5-HT_3 Receptors: Where are They and What Do They Do? / Invited Speaker, Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital

2007 The Putative Targets of General Anesthetic Actions / Invited Speaker, Research Seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital

2010 General Anesthesia and the Neurobiology of Arousal / Invited Speaker, Research Seminar
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2010 Active Induction of Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2011 Neural Mechanisms of Emergence from General Anesthesia / Invited Speaker, Research Seminar
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2011 A 43-year-old Woman with Cardiorespiratory Arrest After a Cesarean Section / Invited Speaker, Clinicopathological Conference
Dept. of Obstetrics and Gynecology, Massachusetts General Hospital

2011 Cardiopulmonary Collapse in Obstetrical Anesthesia: Causes and Care / Invited Speaker, Case Conference
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2012 A Guide to Writing the Career Development Plan for Your K08 Grant Application / Invited Speaker, Research Forum
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2013 Reanimation from General Anesthesia / Invited Speaker, "Harvard Anesthesia Update: Innovation and Transformation in Anesthesiology"
Harvard Medical School, Boston, MA

2013 Waking Up from General Anesthesia / Invited Speaker, Research Seminar for Summer Students
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2013 The Critical Role of the Mentor for the Early Stage Investigator / Invited Speaker, Research Forum
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2014 A Clinical Trial to Test for Reanimation and Cognitive Recovery from GA with Methylphenidate / Invited Speaker, Division of General Surgical Anesthesia Team Meeting
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2015 Reanimation from General Anesthesia: The Role of Dopamine / Invited Symposium Speaker, "Infants, Anesthesia, and 'Reanimation' using Monoaminergic Mechanisms"
Dept. of Pathology, Children's Hospital of Boston

2015 A Clinical Trial to Test for Reanimation and Cognitive Recovery from General Anesthesia with Methylphenidate / Invited Speaker, Nurse Anesthetist Team Meeting
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

2017 Targeting Arousal Circuits in the Brain to Induce Reanimation from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital

2017 Reanimation following General Anesthesia Care: A New Concept in Anesthesia / Invited Symposium Speaker, "Multidisciplinary Studies of Arousal Control"
Center for Neurosciences, Massachusetts General Hospital

2017 Invited Panel Speaker, "Twilight: Exploring the Unconscious Mind"
Hub Week, Massachusetts General Hospital

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

Regional

No presentations below were sponsored by outside entities

2007 The Multiple Sites and Multiple Mechanisms Hypothesis of General Anesthetic Actions / Grand Rounds
Dept. of Anesthesiology, University of Massachusetts, Worcester, MA

2009 Inducing Emergence from General Anesthesia / Invited Speaker, Research seminar
Dept. of Brain and Cognitive Sciences, Massachusetts Institute of Technology

2012 Activation of CNS Arousal Pathways to Induce Emergence from General Anesthesia / Invited Speaker, "35th Annual Anesthesia Symposium"
Dept. of Anesthesiology, Baystate Medical Center, Springfield, MA

2012 Mechanisms Underlying General Anesthesia: From Molecules to Neural Circuits / Invited Speaker, Research Seminar
Center for Biodynamics, Dept. of Mathematics, Boston University

2013 Dopamine Pathways and Reanimation from General Anesthesia / Invited Speaker, Research Seminar
Dept. of Brain and Cognitive Sciences, Massachusetts Institute of Technology

2014 Reanimation from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, University of Massachusetts, Worcester, MA

National

No presentations below were sponsored by outside entities

2005 Human NMDA Receptor Inhibition by Structurally Diverse General Anesthetics / Invited Speaker
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco

2006 The Kinetics of Conformational Transitions Induced by General Anesthetics in a Four-alpha-helix-bundle Protein / Invited Speaker
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco

2006 Do Isoflurane and Benzene Have Additive Inhibitory Effects on NMDA Receptors? / Invited Speaker
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco

2006 Isoflurane Accelerates Activation and Deactivation Rates for Human 5-HT_{3A} Receptors / Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2007 The Effects of Isoflurane on Human 5-HT_{3A} Receptor Kinetics / Invited Speaker
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco

2010 Mechanisms of General Anesthesia / Visiting Professor Lecture
Dept. of Anesthesiology, University of Michigan, Ann Arbor, MI

2010 Methylphenidate Restores the Righting Reflex in Rats During Continuous Exposure to Isoflurane / Abstract Selected for Oral Presentation
Association of University Anesthesiologists Annual Meeting, Denver, CO

2010 Methylphenidate, But Not Physostigmine, Restores Righting in Rats During Isoflurane Hypnosis / Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, San Diego, CA

2010 Anesthetic Action and Biochemistry / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA

2011 Neural Mechanisms of General Anesthesia / Visiting Professor Lecture

Dept. of Anesthesiology, Vanderbilt University, Nashville, TN

2011 Active Induction of Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Vanderbilt University, Nashville, TN

2011 Pharmacological Reversal of General Anesthesia / Invited Speaker, "Ambulatory Anesthesia Symposium"
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2011 Anesthetic Action and Biochemistry / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2011 Experimental Neuroscience: Neuroprotection / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, PA

2012 Is Median Alveolar Concentration (MAC) Clinically Relevant? / Visiting Professor Lecture
Dept. of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, PA

2012 General Anesthesia and the Neurobiology of Arousal / Visiting Professor Lecture
Dept. of Anesthesiology, Washington University, St. Louis, MO

2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Washington University, St. Louis, MO

2012 Inducing Emergence / Invited Speaker, "AUA President's Panel: The Emergence of Consciousness"
Association of University Anesthesiologists Annual Meeting, Cleveland, OH

2012 Manipulating Monoaminergic Arousal Pathways to Induce Emergence from General Anesthesia / Invited Symposium Speaker, "General Anesthesia: Sleep Circuits and Arousal Pathways"
SLEEP Annual Meeting, Boston, MA

2012 Electrical Microstimulation of the Ventral Tegmental Area Induces Emergence from General Anesthesia / Abstract Selected for Oral Presentation
Society of Anesthesia and Sleep Medicine Annual Meeting, Washington, DC

2012 Early Grants: What You Need To Do / Invited Panel Speaker, "Physician Scientist Panel," Foundation for Anesthesia Education and Research
American Society of Anesthesiologists Annual Meeting, Washington, DC

2012 Anesthetic Action and Biochemistry / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, Washington, DC

2012 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Washington, DC

2012 Experimental Neuroscience: Toxicity and Development / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, Washington, DC

2013 Drugs and Physical Interventions to Promote a Preferred Sequence of Brain Circuit Activation / Invited Lecture, "Anesthesiologists Concerned with Cognition, Emergence, Sleep and Sedation (ACCESS) Conference"
Dept. of Anesthesiology, Emory University, Atlanta, GA

2013 Reanimation from General Anesthesia: The Role of Dopamine / Invited Panel Speaker, "Basic Science of Sleep"
Society of Anesthesia and Sleep Medicine Annual Meeting, San Francisco, CA

2013 Hijacking Arousal Centers to Reverse General Anesthesia / Invited Panel Speaker, "Interfaces of Sleep and Anesthesia"
American Society of Anesthesiologists Annual Meeting, San Francisco, CA

2013 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Francisco, CA

2013 Experimental Neuroscience / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, San Francisco, CA

2014 Probing the Neural Circuitry of Emergence from General Anesthesia / Invited Keynote Speaker, Academic Career Enrichment Scholars (ACES) Annual Research Symposium
Dept. of Anesthesiology, Duke University, Durham, NC

2014 Reanimation: Hijacking Arousal Circuits in the Brain to Induce Active Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, University of Michigan, Ann Arbor, MI

2014 Inducing Emergence through the Dopaminergic System / Invited Symposium Speaker, "Basic Science Symposium: Neuroscience Issues in Emergence from Anesthesia"
Society for Neuroscience in Anesthesiology and Critical Care Annual Meeting, New Orleans, LA

2014 Hijacking Arousal Centers to Reverse General Anesthesia / Invited Panel Speaker, "Mechanisms of Induction and Emergence from General Anesthesia"
American Society of Anesthesiologists Annual Meeting, New Orleans, LA

2014 Late-breaking Abstracts: Basic Translational Science / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, New Orleans, LA

2014 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, New Orleans, LA

2015 VTA Dopamine Neurons Induce Reanimation and Cognitive Recovery from General Anesthesia / Invited Panel Speaker, "Steep Slopes: Understanding New Sites and Substrates for Sleep and Sedation"
Winter Conference on Brain Research, Big Sky, MT

2015 Low-Dose Isoflurane Profoundly Impairs the Ability of Rats to Perform a Visual Discrimination Task / Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, San Diego, CA

2015 Experimental Neuroscience: Mechanisms / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA

2015 Experimental Neuroscience / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA

2016 Reanimation: Stimulating Arousal Circuits in the Brain to Induce Active Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Weill Cornell Medical College, New York, NY

2016 Targeting Dopamine Circuits in the Brain to Induce Reanimation from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Emory University School of Medicine, Atlanta, GA

2016 General Anesthesia Reversal with Methylphenidate / Invited Symposium Speaker, "Novel Developments in Neuropharmacology"
Society for Neuroscience in Anesthesiology and Critical Care (SNACC) Annual Meeting, Chicago, IL

2016 Experimental Neuroscience: General Anesthetic Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2016 Young Investigator: Clinical Science / Invited Moderator, Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2016 Targeting Dopamine Neurons to Induce Reanimation From General Anesthesia / Invited Panel Speaker, "Underneath the Cortex: Recent Insights Into the Neurochemistry and Neurocircuitry of Sleep, Anesthesia and Wakefulness"
American Society of Anesthesiologists Annual Meeting, Chicago, IL

2016 Redesigning Recovery From General Anesthesia / Invited Speaker, "2016 NIH Common Fund High-Risk, High-Reward Research Symposium"
National Institutes of Health, Bethesda, MD

2017 GABA Neurons in the Rostromedial Tegmental Nucleus Modulate Arousal and Anesthetic Sensitivity in Mice / Abstract Selected for Oral Presentation
Association of University Anesthesiologists Annual Meeting, Washington, DC

2017 Reanimation: Activating VTA Dopamine Neurons to Induce Emergence from General Anesthesia / Invited Symposium Speaker, "Dopaminergic Control of Sleep and Wakefulness"
SLEEP Annual Meeting, Boston, MA

2017 Reanimation: Activating Subcortical Arousal Circuits to Induce Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, University of Wisconsin, Madison, WI

2017 Neuromonitoring / Invited Facilitator, Scientific Poster Session
Society for Neuroscience in Anesthesiology and Critical Care (SNACC) Annual Meeting, Boston, MA

2017 Reshaping Anesthesia Through Neuroscience / Invited Panel Moderator
American Society of Anesthesiologists Annual Meeting, Boston, MA

2017 Activating Arousal Circuits to Induce Emergence from General Anesthesia / Invited Symposium Speaker, "The Neuroscience and Clinical Implications of Emergence from General Anesthesia"
American Society of Anesthesiologists Annual Meeting, Boston, MA

2017 Intracranial Oscillatory Dynamics Induced by Propofol, Dexmedetomidine and Ketamine in Rats / Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, Boston, MA

2017 Experimental Neurosciences: Neurotoxicity and Cellular Pathways / Invited Moderator, Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, Boston, MA

International

No presentations below were sponsored by outside entities

2012 Active Reanimation from General Anesthesia / Invited Speaker, "International Science Symposium: Mechanisms of Anesthesia"
International Anesthesia Research Society Annual Meeting, Boston, MA

2013 Reanimation from General Anesthesia: Potential Clinical Applications / Invited Panel Speaker, "Neural Mechanisms of General Anesthesia: Clinical Implications"
International Anesthesia Research Society Annual Meeting, San Diego, CA

2013 Reanimation from General Anesthesia / Invited Panel Speaker, "Neuroscience of General Anesthesia"
European Society of Anaesthesiology Annual Meeting, Barcelona, Spain

2014 Activating Arousal Pathways to Induce Reanimation from General Anesthesia / Invited Panel Speaker, "Translational Neuroscience"
International Anesthesia Research Society Annual Meeting, Montreal, Canada

2014 The Role of Dopamine in Reanimation from General Anesthesia / Invited Symposium Speaker, "Mechanisms of Anesthetic Action and Consciousness"
9th International Symposium on Memory and Awareness in Anesthesia, Tokyo, Japan

2014 Mechanisms of Anesthesia / Invited Symposium Moderator
9th International Symposium on Memory and Awareness in Anesthesia, Tokyo, Japan

2015 Reanimation and Cognitive Recovery from General Anesthesia / Invited Speaker (Lecture given in Japanese)
Dept. of Anesthesiology, Yokohama City University, Yokohama, Japan

2015 Reanimation: Inducing Active Emergence from General Anesthesia / Invited Speaker

(Lecture given in Japanese)
Japanese Society of Anesthesiologists Annual Meeting, Kobe, Japan

2015 Ventral Tegmental Area Stimulation Induces Reanimation and Cognitive Recovery from General Anesthesia / Invited Symposium Speaker, "Neural Circuit Mechanisms of General Anesthesia"
9th International Conference on Mechanisms of Anesthesia, Bonn, Germany

2016 Recent Advances in the Study of Anesthetic Mechanisms: From Molecules to Neural Circuits / Invited Keynote Speaker
Beijing Society of Anesthesiology Annual Meeting, Beijing, China

2017 Recent Advances in Neural Circuit Mechanisms of General Anesthesia / Invited Panel Moderator
International Anesthesia Research Society Annual Meeting, Washington, DC

2017 Subcortical Arousal Circuits and Emergence from General Anesthesia / Invited Symposium Speaker
10th International Symposium on Memory and Awareness in Anesthesia, Helsinki, Finland

2017 Invited Poster Discussion Moderator
10th International Symposium on Memory and Awareness in Anesthesia, Helsinki, Finland

2017 Reanimation: Targeting Neural Circuits of Arousal to Induce Emergence from General Anesthesia / Invited Symposium Speaker, "Anesthesia, Sleep and Cognition"
International Basic and Clinical Research Forum of Anesthesiology, Xi'an, China

Report of Clinical Activities and Innovations

Current Licensure and Certification

2001 United States Medical Licensing Examination
2004 Massachusetts Medical License
2005 Diplomate, American Board of Anesthesiology
2015 Maintenance of Certification, American Board of Anesthesiology

Practice Activities

2004-	Anesthesiology	Mass. General Hospital	1 day/week

Clinical Innovations

Development of intravenous methylphenidate for reanimation and cognitive recovery from general anesthesia	I discovered that intravenous methylphenidate restores conscious behaviors in rodents under general anesthesia, and filed a patent application for human use in 2011. In 2013, I received FDA approval to administer IV methylphenidate as an investigational new drug (IND), and the Partners IRB approved our clinical trial to test the efficacy of methylphenidate for reanimation and cognitive recovery from general anesthesia in surgical patients at MGH. In 2014, I received the James S. McDonnell Foundation Scholar Award to fund our clinical study, which is now underway.

Report of Technological and Other Scientific Innovations

Development of intracranial stimulation for the recovery of consciousness	I discovered that electrical stimulation of the ventral tegmental area (VTA), a key dopamine nucleus in the brain, restores conscious behaviors in rodents under general anesthesia. This was the first report of anesthetic reversal in freely behaving animals using intracranial stimulation. This technology may be applied to promote recovery of consciousness and cognition in patients suffering from brain injury.

Report of Scholarship

Publications

Peer reviewed publications in print or other media

Research investigations

1. **Solt K**, Johansson JS. Binding of the active metabolite of chloral hydrate, 2,2,2-trichloroethanol, to serum albumin demonstrated using tryptophan fluorescence quenching. *Pharmacology* 2002;64(3):152-9. PMID: 11834892.

2. Johansson JS, **Solt K**, Reddy KS. Binding of the general anesthetics chloroform and 2,2,2-trichloroethanol to the hydrophobic core of a four-alpha-helix bundle protein. *Photochem Photobiol* 2003;77(1):89-95. PMID: 12856888.

3. Dougan ML, Chin JL, **Solt K**, Hansen DE. Rapid cleavage of cyclic tertiary amides of Kemp's triacid: effects of ring structure. *Bioorg Med Chem Lett* 2004;14(16):4153-6. PMID: 15261260.

4. Stevens R, Rusch D, **Solt K**, Raines DE, Davies PA. Modulation of human 5-HT3AB receptors by volatile anesthetics and n-alcohols. *J Pharmacol Exp Ther* 2005;314(1):338-45. PMID: 15831437.

5. **Solt K**, Stevens RJ, Davies PA, Raines DE. General anesthetic-induced channel gating enhancement of 5-HT_3 receptors depends on receptor subunit composition. *J Pharmacol Exp Ther* 2005;315(2):771-6. PMID: 16081679.

6. **Solt K**, Johansson JS, Raines DE. Kinetics of anesthetic-induced conformational transitions in a four-alpha-helix bundle protein. *Biochemistry* 2006;45(5):1435-41. PMID: 16445285.

7. Eger EI, Liao M, Laster MJ, Won A, Popovich J, Raines DE, **Solt K**, Dutton RC, Cobos FV, Sonner JM. Contrasting roles of the NMDA receptor in the production of immobilization by conventional and aromatic anesthetics. *Anesth Analg* 2006;102(5):1397-406. PMID: 16632817.

8. **Solt K**, Eger EI, Raines DE. Differential modulation of human N-methyl-D-aspartate receptors by structurally diverse general anesthetics. *Anesth Analg* 2006;102(5):1407-11. PMID: 16632818.

9. Dutton RC, Laster MJ, Xing Y, Sonner JM, Raines DE, **Solt K**, Eger EI. Do NMDA receptors mediate the capacity of inhaled anesthetics to suppress the temporal summation that contributes

to MAC? *Anesth Analg* 2006;102(5):1412-8. PMID: 16632819.

10. Husain SS, Nirthanan S, Ruesch D, **Solt K**, Cheng Q, Li GD, Arevalo E, Olsen RW, Raines DE, Forman SA, Cohen JB, Miller KW. Synthesis of trifluoromethylaryl diazarine and benzophenone derivatives of etomidate that are potent general anesthetics and effective photolabels for probing sites on ligand-gated ion channels. *J Med Chem* 2006;49(16):4818-25. PMID: 16884293.

11. Antognini JF, Raines DE, **Solt K**, Barter LS, Atherley RJ, Bravo E, Laster MJ, Jankowska K, Eger EI. Hexafluorobenzene acts in the spinal cord, whereas o-difluorobenzene acts in both brain and spinal cord, to produce immobility. *Anesth Analg* 2007;104(4):822-8. PMID: 17377088.

12. Kelly EW, **Solt K**, Raines DE. Volatile aromatic anesthetics variably impact human gamma-aminobutyric acid type A ($GABA_A$) receptor function. *Anesth Analg* 2007;105(5):1287-92. PMID: 17959956.

13. **Solt K**, Ruesch D, Forman SA, Davies PA, Raines DE. Differential effects of serotonin and dopamine on human 5-HT_{3A} receptor kinetics: interpretation within an allosteric kinetic model. *J Neurosci* 2007;27(48):13151-60. PMID: 18045909.

14. Eger EI, Tang M, Liao M, Laster MJ, **Solt K**, Flood P, Jenkins A, Raines D, Hendrickx JF, Shafer SL, Yasumasa T, Sonner JM. Inhaled anesthetics do not combine to produce synergistic effects regarding minimum alveolar anesthetic concentration in rats. *Anesth Analg* 2008;107(2):479-85. PMID: 18633026.

15. Jenkins A, Lobo IA, Gong D, Trudell JR, **Solt K**, Harris RA, Eger EI. General anesthetics have additive actions on three ligand-gated ion channels. *Anesth Analg*. 2008;107(2):486-93. PMID: 18633027.

16. **Solt K**, Kelly EW, Cotten JF, Raines DE. Inhibition of α4β2 neuronal nicotinic acetylcholine receptors by volatile aromatic anesthetics depends on drug hydrophobicity. *Anesth Analg* 2010;110(2):455-60. PMID: 19917625.

17. **Solt K**, Cotten JF, Cimenser A, Wong KFK, Chemali JJ, Brown EN. Methylphenidate actively induces emergence from general anesthesia. *Anesthesiology* 2011;115(4):791-803. PMID: 21934407.

18. Chemali JJ, Wong KF, **Solt K**, Brown EN. A state-space model of the burst suppression ratio. *Conf Proc IEEE Eng Med Biol Soc.* 2011;2011:1431-4. PMID: 22254587.

19. Gong JJ, Wong KF, Cotten JF, **Solt K**, Brown EN. Correcting for serial dependence in studies of respiratory dynamics. *Conf Proc IEEE Eng Med Biol Soc* 2011;2011:1721-4. PMID: 22254658.

20. Chemali JJ, Van Dort CJ, Brown EN, **Solt K**. Active emergence from propofol general anesthesia is induced by methylphenidate. *Anesthesiology* 2012;116(5):998-1005. PMID: 22446983.

21. Taylor NE, Chemali JJ, Brown EN, **Solt K**. Activation of D1 dopamine receptors induces emergence from isoflurane general anesthesia. *Anesthesiology*. 2013;118(1):30-9. PMID: 23221866.

22. Wong KFK, Gong JJ, Cotten JF, **Solt K**, Brown EN. Assessing the effects of pharmacological agents on respiratory dynamics using time-series modeling. *IEEE Trans Biomed Eng* 2013;60(4):1118-25. PMID: 23193230.

23. Shanechi MM, Chemali JJ, Liberman M, **Solt K**, Brown EN. A Brain-machine Interface for control of burst suppression in medical coma. *Conf Proc IEEE Eng Med Biol Soc* 2013;2013:1575-8. PMID: 24110002.

24. Ching S, Liberman MY, Chemali JJ, Westover MB, Kenny JD, **Solt K**, Purdon PL, Brown EN. Real-time closed loop control in a rodent model of medically-induced coma. *Anesthesiology* 2013;119(4):848-60. PMID: 23770601.

25. Chemali JJ, Ching S, Purdon PL, **Solt K**, Brown EN. Burst suppression probability algorithms: state-space methods for tracking EEG burst suppression. *J Neural Eng* 2013;10(5):056017. PMID: 24018288.

26. Shanechi M, Chemali JJ, Liberman MY, **Solt K**, Brown EN. A Brain-machine interface for control of medically-induced coma. *PLOS Comput Biol* 2013;9(10):e1003284. PMID: 24204231.

27. **Solt K**, Van Dort CJ, Chemali JJ, Taylor NE, Kenny JD, Brown EN. Electrical stimulation of the ventral tegmental area induces reanimation from general anesthesia. *Anesthesiology* 2014;121(2): 311-9. PMID: 24398816.

28. Kenny JD, Westover MB, Ching S, Brown EN, **Solt K**. Propofol and sevoflurane induce distinct burst suppression patterns in rats. *Front Syst Neurosci* 2014;8:237. PMID: 25565990.

29. Zeng C, Long X, Cotten JF, Forman SA, **Solt K**, Faingold CL, Feng H. Fluoxetine prevents respiratory arrest without enhancing ventilation in DBA/1 mice. *Epilepsy Behav* 2015; 45:1-7. PMID: 25771493.

30. Kenny JD, Taylor NE, Brown EN, **Solt K**. Dextroamphetamine (but not atomoxetine) induces reanimation from general anesthesia: Implications for the roles of dopamine and norepinephrine in active emergence. *PLOS One* 2015;10(7):e0131914. PMID: 26148114.

31. Purdon PL, Pavone KJ, Akeju O, Smith AC, Sampson AL, Lee J, Zhou DW, **Solt K**, Brown EN. The ageing brain: An age-dependent analysis of the electroencephalogram during propofol and sevoflurane general anaesthesia. *Br J Anaesth* 2015;115(suppl 1): i46-i57. PMID: 26174300.

32. Chemali JJ, Kenny JD, Olutola O, Taylor NE, Kimchi EY, Purdon PL, Brown EN, **Solt K**. Ageing delays emergence from general anaesthesia in rats by increasing anaesthetic sensitivity in the brain. *Br J Anaesth* 2015;115(suppl 1): i58-i65. PMID: 26174302.

33. Muindi F, Kenny JD, Taylor NE, **Solt K**, Wilson MA, Brown EN, Van Dort CJ. Electrical stimulation of the parabrachial nucleus induces reanimation from isoflurane general anesthesia. *Behav Brain Res* 2016;306:20-25. PMID: 26971629

34. Kenny JD, Chemali JJ, Cotten JF, Van Dort CJ, Kim SE, Ba D, Taylor NE, Brown EN, **Solt K**.

Physostigmine and methylphenidate induce distinct arousal states during isoflurane general anesthesia in rats. *Anesth Analg* 2016;123(5):1210-1219. PMID: 26991753

35. Taylor NE, Van Dort CJ, Kenny JD, Pei J, Guidera JA, Lee JT, Vlasov KY, Boyden ES, Brown EN, **Solt K**. Optogenetic activation of dopamine neurons in the ventral tegmental area induces reanimation from general anesthesia. *Proc Nat Acad Sci USA* 2016;113(45):12826–12831. PMID: 27791160

36. Nagasaka Y, Wepler M, Thoonen R, Sips PY, Allen K, Graw JA, Yao V, Burns SM, Muenster S, Brouckaert P, Miller K, **Solt K**, Buys ES, Ichinose F, Zapol WM. Sensitivity to sevoflurane anesthesia is decreased in mice with a congenital deletion of guanylyl cyclase-1 alpha. *BMC Anesthesiol* 2017;17(1):76. PMID: 28615047

37. Guidera JA, Taylor NE, Lee JT, Vlasov KY, Pei J, Stephen EP, Mayo JP, Brown EN, **Solt K**. Sevoflurane induces coherent slow-delta oscillations in rats. *Front Neural Circuits* 2017;11:36. PMID: 28725184

38. An J, Purdon PL, **Solt K**, Sims NM, Brown EN, Westover MB. Design, implementation, and evaluation of a physiological closed-loop control device for medically-induced coma. *Conf Proc IEEE Eng Med Biol Soc* 2017:4313-4316. PMID: 29060851

39. Zhang H, Zhao H, Zeng C, Van Dort C, Faingold CL, Taylor NE, **Solt K**, Feng HJ. Optogenetic activation of 5-HT neurons in the dorsal raphe suppresses seizure-induced respiratory arrest and produces anticonvulsant effect in the DBA/1 mouse SUDEP model. *Neurobiol Dis* 2018;110:47-58. PMID: 29141182

Non-peer reviewed scientific or medical publications/materials in print or other media

Proceedings of meetings

1. **Solt K**, Stevens RJ, Rusch D, Raines DE, Davies PA. General anesthetic action on 5-HT_3 receptors: influence of subunit composition. In: Mashimo T, Ogli K, Uchida I, eds. *International Congress Series 1283* (Proceedings of the 7th International Conference on Basic and Systemic Mechanisms of Anesthesia held in Nara, Japan, Feb. 25-27, 2005); Amsterdam, Netherlands: Elsevier; 2005. p. 79-84.

Reviews, chapters, monographs and editorials

1. Saifee O, **Solt K**. Intravenous and inhalation anesthetics. In: Dunn PF, ed. *Clinical anesthesia procedures of the Massachusetts General Hospital*, 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007. p. 172-189.

2. **Solt K**, Forman SA. Correlating the clinical actions and molecular mechanisms of general anesthetics. *Curr Opin Anaesthesiol* 2007;20(4):300-6. PMID: 17620835.

3. Benkwitz C, **Solt K**. Intravenous and inhalation anesthetics. In: Levine WC, ed. *Clinical anesthesia procedures of the Massachusetts General Hospital*, 8th ed. Philadelphia, PA:

Lippincott Williams & Wilkins; 2010. p. 150-164.

4. **Solt K**, Raines DE. Mechanisms of anesthetic actions. In: Vacanti CA, Sikka PK, Urman RD, Dershwitz M, Segal BS, eds. *Essential Clinical Anesthesia*, 1st ed. New York, NY: Cambridge University Press; 2011. p. 233-235.

5. **Solt K**. Exploring the role of dopamine in emergence from general anesthesia. *Society of Anesthesia and Sleep Medicine Newsletter* 2012;1(3):6-9.

6. **Solt K**. General anesthesia: activating a sleep switch? *Curr Biol* 2012;22(21):R918-9. PMID: 23137688.

7. Brown EN, **Solt K**, Purdon PL, Johnson-Akeju O. Monitoring brain state during general anesthesia and sedation. In: Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Cohen NH, eds. *Miller's Anesthesia*, 8th ed. Philadelphia, PA: Elsevier; 2014. p. 1524-1540.

8. Lee JS, **Solt K**. Intravenous and inhalation anesthetics. In: Pino RM, ed. *Clinical anesthesia procedures of the Massachusetts General Hospital*, 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2015. p. 162-176.

Case report

1. Ecker JL, **Solt K**, Fitzsimons MG, MacGillivray TE. A 43-year-old woman with cardiorespiratory arrest after a cesarean section. *N Engl J Med* 2012;367(26):2528-36. PMID: 23268668.

Letters to the editor

1. Brown EN, **Solt K**. Management of opioid analgesic overdose. *N Engl J Med* 2012;367(14):1370-1. PMID: 23034040.

2. **Solt K**, Chemali JJ, Van Dort CJ, Brown EN. In reply: Should we use psychostimulant drugs to boost the emergence from general anesthesia? *Anesthesiology* 2012;117(6):1394-5. PMID: 23168434.

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

1. **Solt K**, Johansson JS. Binding of anesthetic alkanes and an alcohol to a designed four-alpha-helix bundle. *Biophys J*. 2000;78:152A.

2. Johansson JS, **Solt K**. The anesthetic alcohols and alkanes probably act at different sites. *Anesthesiology*. 2000;93:A95.

3. Johansson JS, **Solt K**, Scharf D. Two anesthetic alkanes and an alcohol bind to the hydrophobic core of a four-alpha-helix bundle scaffold. *Association of University Anesthesiologists Annual Meeting*, Salt Lake City, UT, 2000.

4. Johansson JS, **Solt K**. High affinity binding of the active metabolite of chloral hydrate to serum albumin. *Eur J Anaesthesiol*. 2001;18:359A.

5. Rusch D, **Solt K**, Stevens RJ, Davies P, Raines D. The importance of receptor subunit composition and anaesthetic molecular volume in defining modulation of 5-HT_{3AB} receptors by anaesthetics. *Eur J Anaesthesiol*. 2004;21:143A

6. Stevens RJ, Rusch D, **Solt K**, Raines DE, Davies PA. Volatile anesthetics enhance the open probability of 5-HT_{3A} channels. Program 626.3. *Society for Neuroscience Annual Meeting*, San Diego, CA, 2004.

7. **Solt K**, Stevens RJ, Rusch D, Davies PA, Raines DE. Introduction of the 5-HT_{3B} subunit decreases the sensitivity of 5-HT_{3A} receptors to the potentiating actions of general anesthetics. *Anesthesiology*. 2004;101:A107.

8. **Solt K**, Davies PA, Stevens RJ, Rusch D, Raines DE. Volatile anesthetics reduce the agonist EC_{50} of the human 5-HT_{3A} receptor by increasing channel gating probability. *Anesthesiology*. 2004;101:A106.

9. Feinberg-Zadek PL, Rusch D, **Solt K**, Raines DE, Davies PA. The 5-HT_{3B} subunit influences 5-HT_3 receptor kinetics and pharmacology. Program 957.3. *Society for Neuroscience Annual Meeting,* Washington, DC, 2005.

10. **Solt K**, Rusch D, Stevens RJ, Davies PA, Raines DE. Introduction of the 5-HT_{3B} subunit decreases the sensitivity of 5-HT_{3A} receptors to changes in channel gating induced by general anesthetics. *Association of University Anesthesiologists Annual Meeting*, Baltimore, MD, 2005.

11. **Solt K**, Stevens R, Davies PA, Raines DE. Co-expression of the 5-HT_{3B} subunit attenuates general anesthetic action on 5-HT_3 receptor channel gating efficacy. *Anesthesiology*. 2005;103:A664.

12. **Solt K**, Liao M, Eger EI, Laster M, Raines DE. Contrasting effects of NMDA receptor inhibition by MK-801 on the immobilizing potencies of aromatic and non-aromatic inhaled anesthetics. *Anesthesiology*. 2005;103:A663.

13. **Solt K**, Eger EI, Raines DE. Modulation of human NMDA receptors by chemically diverse general anesthetics: Differential inhibition at 1 MAC. *Anesthesiology*. 2005;103:A683.

14. **Solt K**, Johansson JS, Raines DE. The kinetics of anesthetic-induced conformational transitions in a four-alpha-helix bundle protein. *Association of University Anesthesiologists Annual Meeting*, Tucson, AZ, 2006.

15. **Solt K**, Ruesch D, Davies PA, Raines DE. Isoflurane accelerates the activation and deactivation rates of human 5-HT_{3A} receptors. *Anesthesiology* 2006;105:A174. *Selected for Oral Presentation, American Society of Anesthesiologists Annual Meeting,* Chicago, IL, 2006.

16. Antognini JF, Raines DE, **Solt K**, Barter L, Atherley R, Bravo E, Laster M, Eger EI. Hexafluorobenzene acts in spinal cord, while o-difluorobenzene can act in either brain or spinal cord, to produce immobility. *Society for Neuroscience Annual Meeting*, Atlanta, GA, 2006.

17. **Solt K**, Kelly EW, Raines DE. Human $GABA_A$ receptor enhancement by volatile aromatic

anesthetics correlates inversely with NMDA receptor inhibition. *Association of University Anesthesiologists Annual Meeting*, Chicago, IL, 2007.

18. Davies PA, **Solt K**, Raines DE. Single channel studies defining anesthetic alcohol action on the 5-HT_{3A} receptor. *Anesthesiology* 2007;107:A230.

19. **Solt K**, Kelly EW, Raines DE. The variable effects of volatile aromatic anesthetics on $GABA_A$ receptor function. *Anesthesiology* 2007;107:A8.

20. **Solt K**, Cotten JF, Cimenser A, Brown EN. Methylphenidate restores the righting reflex in rats during continuous exposure to isoflurane. *Selected for Oral Presentation, Association of University Anesthesiologists Annual Meeting,* Denver, CO, 2010.

21. Olbrecht VA, **Solt K**, Barth WH, Leffert LR. Twin Delivery in a Parturient with a Complete Absence of Factor X and Minor Factor VII Deficiency. *Selected for Oral Presentation, Society for Obstetric Anesthesia and Perinatology Annual Meeting,* San Antonio, TX, 2010.

22. **Solt K**, Cotten JF, Cimenser A, Brown EN. Methylphenidate produces behavioral and neurophysiological evidence of arousal during isoflurane hypnosis. *International Conference on Mechanisms of Anesthesia*, Toronto, Canada, 2010.

23. **Solt K**, Cotten JF, Cimenser A, Brown EN. Methylphenidate, but not physostigmine, restores righting in rats during isoflurane hypnosis. *Anesthesiology* 2010;113:A378. *Selected for Oral Presentation, American Society of Anesthesiologists Annual Meeting*, San Diego, CA, 2010.

24. **Solt K**, Cotten JF, Cimenser A, Brown EN. Distinct arousal states are induced by monoaminergic and cholinergic stimulation during isoflurane general anesthesia. Program 168.22. *Society for Neuroscience Annual Meeting*, San Diego, CA, 2010.

25. **Solt K**, Chemali JJ, Cotten JF, Brown EN. Physostigmine and methylphenidate induce distinct arousal states during isoflurane anesthesia. *Association of University Anesthesiologists Annual Meeting*, Philadelphia, PA, 2011.

26. Chemali JJ, Wong KFK, **Solt K**, Brown EN. A state-space model of the burst suppression ratio. *IEEE Engineering in Medicine and Biology Society Annual Meeting*, Boston, MA, 2011.

27. Gong JJ, Wong KFK, Cotten JF, **Solt K**, Brown EN. Correcting for serial dependence in studies of respiratory dynamics. *IEEE Engineering in Medicine and Biology Society Annual Meeting*, Boston, MA, 2011.

28. Taylor NE, Chemali JJ, Brown EN, **Solt K**. The D1 dopamine receptor agonist chloro-APB induces emergence from isoflurane anesthesia. *1st Place Abstract, Society of Anesthesia and Sleep Medicine Annual Meeting*, Chicago, IL, 2011.

29. Chemali JJ, Brown EN, **Solt K**. Methylphenidate actively induces emergence from propofol general anesthesia. *Society of Anesthesia and Sleep Medicine Annual Meeting*, Chicago, IL, 2011.

30. Taylor NE, Chemali JJ, Brown EN, **Solt K**. The D1 dopamine receptor agonist chloro-APB

induces emergence from isoflurane anesthesia. *Anesthesiology* 2011;115:A322.

31. Chemali JJ, **Solt K**, Brown EN. Methylphenidate actively induces emergence from propofol general anesthesia. Program 266.08. *Society for Neuroscience Annual Meeting,* Washington, DC, 2011.

32. Taylor NE, Chemali JJ, Brown EN, **Solt K**. Activation of D1 dopamine receptors restores the righting reflex during continuous isoflurane anesthesia. Program 266.22. *Society for Neuroscience Annual Meeting,* Washington, DC, 2011.

33. **Solt K**, Van Dort CJ, Chemali JJ, Taylor NE, Brown EN. Electrical microstimulation of the ventral tegmental area induces emergence from general anesthesia. *1st Place Abstract, Society of Anesthesia and Sleep Medicine Annual Meeting*, Washington, DC, 2012.

34. **Solt K**, Van Dort CJ, Chemali JJ, Taylor NE, Brown EN. Electrical microstimulation of the ventral tegmental area induces emergence from general anesthesia. *Anesthesiology* 2012;117:A543.

35. **Solt K**, Van Dort CJ, Chemali JJ, Taylor NE, Brown EN. VTA stimulation induces emergence from general anesthesia. Program 74.17. *Society for Neuroscience Annual Meeting*, New Orleans, LA, 2012.

36. Shanechi M, Chemali JJ, Liberman M, **Solt K**, Brown EN. A brain-machine interface for control of medically-induced coma. Program 288. *Computational and Systems Neuroscience (Cosyne) Annual Meeting*, Salt Lake City, UT, 2013.

37. Taylor NE, Van Dort CJ, Kenny JD, Brown EN, **Solt K**. Optogenetic Stimulation of Dopamine Neurons in the Ventral Tegmental Area Induces Reanimation From General Anesthesia. *Junior Faculty Research Award, Association of University Anesthesiologists Annual Meeting*, Miami, FL, 2013.

38. Ching S, Liberman M, Chemali JJ, Westover MB, **Solt K**, Purdon PL, Brown EN. Real-Time Measurement and Closed Loop Control of Burst Suppression for Management of Medical Coma. Program 1064. *IEEE Engineering in Medicine and Biology Society Annual Meeting*, Osaka, Japan, 2013.

39. Shanechi M, Chemali JJ, Liberman M, **Solt K**, Brown EN. A brain-machine interface for control of medically-induced coma. Program 2477. *IEEE Engineering in Medicine and Biology Society Annual Meeting*, Osaka, Japan, 2013.

40. Taylor NE, Van Dort CJ, Kenny JD, Brown EN, **Solt K**. Optogenetic Stimulation of Dopamine Neurons in the Ventral Tegmental Area Induces Reanimation From General Anesthesia. *Anesthesiology* 2013;119:BOS1. *Selected for Oral Presentation, Best of Abstracts: Basic Science Session, American Society of Anesthesiologists Annual Meeting,* San Francisco, CA, 2013.

41. Kenny JD, Brown EN, **Solt K**. Dextroamphetamine Restores Conscious Behaviors Including the Righting Reflex During Sevoflurane General Anesthesia. *Anesthesiology* 2013;119:BOS2. *Selected for Oral Presentation, Best of Abstracts: Basic Science Session, American Society of*

Anesthesiologists Annual Meeting, San Francisco, CA, 2013.

42. **Solt K**, Chemali JJ, Olutola O, Kenny JD, Brown EN. Aged Rats Exhibit Prolonged Emergence from General Anesthesia. *Anesthesiology* 2013;119:A3057.

43. Shanechi M, Chemali JJ, Liberman MY, **Solt K**, Brown EN. A Brain-Machine Interface for Control of Medically-Induced Coma. Program 373.10. *Society for Neuroscience Annual Meeting,* San Diego, CA, 2013.

44. Taylor NE, Van Dort CJ, Kenny JD, Brown EN, **Solt K**. Reanimation from General Anesthesia Induced by Optical Control of Dopamine Neurons in the Ventral Tegmental Area. Program 839.12. *Society for Neuroscience Annual Meeting,* San Diego, CA, 2013.

45. Kenny JD, Brown EN, **Solt K**. Dextroamphetamine Induces Reanimation from Sevoflurane General Anesthesia by Enhancing Dopaminergic Neurotransmission. Program 227.04. *Society for Neuroscience Annual Meeting,* San Diego, CA, 2013.

46. Kenny JD, Ching S, Westover MB, Brown EN, **Solt K**. Sevoflurane and propofol induce distinct EEG burst-suppression patterns in rats. *International Anesthesia Research Society Annual Meeting,* Montreal, Canada, 2014.

47. **Solt K**, Chemali JJ, Olutola O, Kenny JD, Brown EN. Aging Delays Emergence from General Anesthesia in Rats. *9th International Symposium on Memory and Awareness in Anesthesia*, Tokyo, Japan, 2014.

48. Taylor NE, Zheng S, Van Dort CJ, Brown EN, **Solt K**. The Role of Glutamatergic and Dopaminergic Neurons in the Periaqueductal Gray on the Descending Inhibition of Pain. Abstract BOS08. *Best Basic Science Abstract Award, American Society of Anesthesiologists Annual Meeting,* New Orleans, LA, 2014.

49. Kenny JD, Westover MB, Ching S, Brown EN, **Solt K**. Distinct burst-suppression patterns are induced by propofol and sevoflurane in rat. Program 188.18. *Society for Neuroscience Annual Meeting,* Washington, DC, 2014.

50. Taylor NE, Zheng S, Van Dort CJ, Brown EN, **Solt K**. DREADD activation of dopaminergic neurons in the periaqueductal gray produces antinociception. Program 337.07. *Society for Neuroscience Annual Meeting,* Washington, DC, 2014.

51. Muindi F, Van Dort CJ, Kenny J, Taylor NE, **Solt K**, Wilson M, Brown EN. Electrical stimulation of the parabrachial nucleus induces reanimation from general anesthesia. Program 549.11. *Society for Neuroscience Annual Meeting,* Washington, DC, 2014.

52. Kenny JD, Taylor NE, Brown EN, **Solt K**. Low-dose isoflurane induces profound cognitive dysfunction in rats. *Association of University Anesthesiologists Annual Meeting*, Nashville, TN, 2015.

53. Taylor NE, Pei J, Van Dort CJ, Brown EN, **Solt K**. DREADD activation of dopaminergic and glutamatergic neurons in the periaquaductal gray produces differing analgesic responses.

American Pain Society Annual Meeting, Palm Springs, CA, 2015.

54. **Solt K**, Kenny JD, Taylor NE, Brown EN. Low-Dose Isoflurane Profoundly Impairs the Ability of Rats to Perform a Visual Discrimination Task. Abstract A1041, *American Society of Anesthesiologists Annual Meeting,* San Diego, CA, 2015.

55. Kenny JD, Taylor NE, Lee JT, Guidera JA, Brown EN, **Solt K**. Electrical Stimulation of the Ventral Tegmental Area Restores the Ability to Perform a Touchscreen-based Visual Discrimination Task in Rats Sedated with Isoflurane. *Association of University Anesthesiologists Annual Meeting,* San Francisco, CA, 2016.

56. Taylor NE, Pei J, Vlasov KY, Guidera JA, Lee JT, **Solt K**, Brown EN. The analgesic effects of dopamine. *Junior Faculty Research Award, Association of University Anesthesiologists Annual Meeting,* San Francisco, CA, 2016.

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