# Journal-related Activities and Other Special Activities at the 2022 American Society of Anesthesiologists Meeting

Michael J. Avram, Ph.D., Deborah J. Culley, M.D., Andrew Davidson, M.B.B.S., M.D., Evan D. Kharasch, M.D., Ph.D., Sachin Kheterpal, M.D., M.B.A., Martin J. London, M.D., Marcos F. Vidal Melo, M.D., Ph.D.

As in previous years, ANESTHESIOLOGY will sponsor several sessions at the annual meeting of the American Society of Anesthesiologists (ASA; Schaumburg, Illinois), Anesthesiology 2022. The meeting is being held in New Orleans, Louisiana. Details about the format and meeting attendance can be found on the website, asahq.org/annualmeeting.

## Big Data Studies: How to Design, Conduct and Read Them

**Saturday October 22, 2022, 1:15 PM to 3:15 PM**
**Room 243**

### Moderator

Sachin Kheterpal, M.D., M.B.A., Editor, ANESTHESIOLOGY, University of Michigan, Ann Arbor, Michigan.

### Speakers

**"Progress and Missteps in Perioperative Medicine Big Data Research" by Sachin Kheterpal, M.D., M.B.A., University of Michigan, Ann Arbor, Michigan.**
**"Choosing Wisely in Big Data Analysis: Risk Adjustment, Prediction, or Causation" by Elizabeth L. Whitlock, M.D., M.A., M.Sc., University of California, San Francisco, California.**
**"High-Stakes Epidemiology: Using Big Data to Estimate Causal Effects" by Brian T. Bateman, M.D., Stanford University School of Medicine, Stanford, California.**
**"Exciting Developments in Big Data Analysis Methods" by Timothy T. Houle, Ph.D., Massachusetts General Hospital, Boston, Massachusetts.**

### Description

Research, quality improvement, clinical guideline, and policy-making efforts based upon "big data" are increasingly common in perioperative medicine. All anesthesiologists must be facile in understanding and communicating the strengths and weaknesses of these databases and projects. This session will arm every anesthesiologist with the skills necessary to consume or create the in vogue and ubiquitous "big data" study with a discerning eye.

## Initial Results: Major Clinical Trials

**Saturday, October 22, 2022, 3:30 PM to 4:30 PM**
**Room 243**

### Moderators

Evan D. Kharasch, M.D., Ph.D., Editor-in-Chief, ANESTHESIOLOGY, Duke University Medical Center, Durham, North Carolina; Deborah J. Culley, M.D., Executive Editor, ANESTHESIOLOGY, University of Pennsylvania, Perelman School of Medicine, Philadelphia, Pennsylvania.

### Description

ANESTHESIOLOGY is sponsoring its seventh Major Clinical Trials Session, a high-profile, large-audience forum for initial presentations of major randomized clinical trial results. It is designed for substantial trials, usually randomized and blinded, with a clinically important primary outcome.

## 31st Journal Symposium: Delirium

**Sunday, October 23, 2022, 8:30 AM to 11:30 AM**
**Room 243**

### Moderators

Deborah J. Culley, M.D., Executive Editor, ANESTHESIOLOGY, University of Pennsylvania, Perelman School of Medicine, Philadelphia, Pennsylvania; Andrew Davidson, M.B.B.S.,

Michael J. Avram, Ph.D.: Northwestern University Feinberg School of Medicine, Chicago, Illinois.

Deborah J. Culley, M.D.: University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania.

Andrew Davidson, M.B.B.S., M.D.: Royal Children's Hospital, Melbourne, Australia.

Evan D. Kharasch, M.D., Ph.D.: Duke University Medical Center, Durham, North Carolina.

Sachin Kheterpal, M.D., M.B.A.: University of Michigan, Ann Arbor, Michigan.

Martin J. London, M.D.: University of California, San Francisco, San Francisco, California; Veterans Affairs Medical Center, San Francisco, California.

Marcos F. Vidal Melo, M.D., Ph.D.: Columbia University Irving Medical Center, New York, New York.

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M.D., Executive Editor, ANESTHESIOLOGY, Royal Children's Hospital, Melbourne, Australia.

## Description

Postoperative delirium affects a substantial portion of surgical patients and is associated with both short- and long-term complications and morbidity. The science behind delirium is rapidly evolving with better diagnostic tools, a greater understanding of the neurobiology, and greater understanding of the possible etiology. The symposium will feature both plenary lectures by experts in the field and presentations of eight featured top abstracts selected for their relevance to the mechanism and biology of postoperative delirium in both pediatric and geriatric patients. The full text for each abstract can be found at the ASA abstract website.

## Speakers

**"Removing the Confusion about Delirium" by Jamie W. Sleigh, M.D.**
The University of Auckland, Hamilton, New Zealand.
**"Pediatric Delirium: Do We Know What We Think We Know" by Andrew Davidson, M.B.B.S., M.D.**
Royal Children's Hospital, Melbourne, Australia.

## JS01

**"Postoperative Changes in the Cerebrospinal Fluid Proteome Suggest a Role of the Complement Pathway in Postoperative Delirium" by Jake Thomas, B.S., Matt Foster, Ph.D., Joseph Lucas, Ph.D., Mary Wright, M.S., Joseph Mathew, M.D., M.B.A., Miles Berger, M.D., Ph.D., Michael Devinney, M.D., Ph.D.**
Duke University School of Medicine, Durham, North Carolina (J.T.); Department of Anesthesiology, Duke University Medical Center, Durham, North Carolina (M.F., M.W., J.M., M.B., M.D.); Vital Statistics, L.L.C., Chapel Hill, North Carolina (J.L.)

## JS02

**"Emergence Delirium and Behavior at 3 Months after General Anesthesia in Preschool Children" by Amira Joseph, M.D., David O. Warner, M.D., Yu Shi, M.D.**
Mayo Clinic College of Medicine, Rochester, Minnesota

## JS03

**"Demographic Characteristics as Predictors of Clinical Outcomes in Very Elderly Adults" by Guillermo Madrid, M.D., M.Sc., Laura Cristina Moyano, M.D., Jairo Ricardo Moyano, M.D., Ph.D., Maria Jose Pelaez Jaramillo, M.D.**
Anesthesiology, Fundacion Santa Fe de Bogota, Bogota, Colombia

## JS04

**"A Proteomic-derived Predictive Model for Postoperative Delirium in Cardiac Surgical Patients" by Tanvi Khera, M.D., Maria Carolina-Bittercourt Gonçalves, Ph.D., Shilpa Narayanan, B.A., Simon T. Dillon, Ph.D., Yoojin Jung, Ph.D., Hasan H. Otu, Ph.D., Long H. Ngo, Ph.D., Edward R. Marcantonio, M.D., Towia A. Libermann, Ph.D., Balachundhar Subramaniam, M.D.**
Anesthesia Critical Care and Pain Medicine, and Department of Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts (T.K., M.C-B.G., S.N., S.T.D., Y.J., L.H.N., E.R.M., T.A.L., B.S.); Electrical and Computer Engineering, University of Nebraska–Lincoln, Lincoln, Nebraska (H.H.O.)

## JS05

**"Anesthesia/Surgery Induces Delirium-like Behavior in Aged Mice Via Cells–Mediated Increase of TAU-PT217 in Blood" by Jing Lu, M.D., Ph.D., Feng Liang, Ph.D., Ping Bai, Ph.D., Zhengwang Sun, Ph.D., Wenjie Tian, M.D., Ph.D., Changning Wang, Ph.D., Edward R. Marcantonio, M.D., M.S., Guang Yang, Ph.D., Zhongcong Xie, M.D., Ph.D.**
Anesthesiology, Critical Care and Pain Medicine, Cardiology, and Radiology, Massachusetts General Hospital, Boston, Massachusetts (J.L., F.L., Z.S., W.T., C.W.); Medicine, Beth Israel Deaconess Medical Center, and Harvard Medical School, Boston, Massachusetts (E.R.M.); Columbia University, New York, New York (G.Y.); Massachusetts General Hospital–Harvard Medical School, Boston, Massachusetts (P.B., Z.X.)

## JS06

**"Postoperative Delirium and Altered Connectivity within the Default Mode Network and Hippocampus" by Heather Acuff, M.D., Ph.D., Laurel Zelnik, B.S., Joshua Siegel, M.D., Ph.D., Jacob Bolzenius, Ph.D., Mehdi Kafashan, Ph.D., Thomas Nguyen, B.S., Anhthi Luong, B.S., Michael S. Avidan, M.B., B.Ch., Tammie Benzinger, M.D., Ph.D., Ben Julian Palanca, M.D., Ph.D.**
Anesthesiology, and Washington University School of Medicine, Washington University in St. Louis, St. Louis, Missouri (H.A., L.Z., J.B., M.K., T.N., A.L., M.S.A., T.B., B.J.P.); PeaceHealth Medical Group Anesthesiology, Longview, Washington (J.S.)

## JS07

**"Association of Malnutrition and Frailty with Postoperative Delirium in Older Patients after Hip Fracture Surgery" by Benayas Dereje Begashaw, B.Sc., Esteban Franco-Garcia, M.D., Marilyn Heng, M.D., M.P.H., Oluwaseun Johnson-Akeju, M.D., M.Sc., John A. Reich, M.D., Sadeq A. Quraishi, M.D.**

Tufts Medical Center, Tufts University School of Medicine, Boston, Massachusetts (B.D.B., J.A.R., S.A.Q.); Department of Medicine, Department of Orthopaedic Surgery, and Department of Anesthesiology, Critical Care and Pain Medicine, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts (E.F-G., M.H., O.J-A.)

### JS08

**"Postoperative Delirium and Blood Brain Barrier Breakdown in Older Noncardiac Surgical Patients" by Megan Wong, B.S., Mary Cooter Wright, M.S., Pallavi Avasarala, Ayesha Syed, B.A., Edward R. Marcantonio, M.D., Niccolo Terrando, Ph.D., Joseph P. Mathew, M.D., M.B.A., Miles Berger, M.D., Ph.D., Michael Devinney, M.D.**

Duke University School of Medicine, Durham, North Carolina (M.W.); Duke University Medical Center, Durham, North Carolina (M.C.W., P.A., A.S., N.T., J.P.M., M.B., M.D.); Beth Israel Deaconess Medical Center, Boston, Massachusetts (E.R.M.)

## Best Abstracts: Clinical Science and Basic Science

Anesthesiology is sponsoring two Best Abstract sessions: one in basic science and another in clinical science. The abstracts were chosen by a panel of editors who examined the highest scoring abstracts from the ASA subcommittees, choosing those with important scientific and clinical application and novelty. The following are summaries of the excellent abstracts that will be presented.

## Best Abstracts: Basic Science

**Sunday, October 23, 2022, 1:00 PM to 2:55 PM**
**Room 243**

### Moderators

Michael J. Avram, Ph.D., Assistant Editor-in-Chief, Anesthesiology, Northwestern University Feinberg School of Medicine, Chicago, Illinois; Deborah J. Culley, M.D., Executive Editor, Anesthesiology, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania; Martin J. London, M.D., Editor, Anesthesiology, University of California, San Francisco School of Medicine and the Veterans Affairs Medical Center, San Francisco, California.

### 6935

**"Discovery of a Quinone Analog as a Novel Anesthetic Agent" by Richard Levy, M.D., Abhishek Srivastava, B.S., Keren Griffiths, M.D., Ph.D., Yash Somnay, M.D., Ph.D.**

Columbia University, New York, New York

Propofol interferes with electron transfer at the level of coenzyme Q and induces excessive proton leak within mitochondria. Synthetic coenzyme Q analogs have similar biologic activity *in vitro*. The hypothesis that quinone analogs would induce propofol-like sedation and hypnosis was tested in mice using the short-chain coenzyme Q analog ubiquinone-5. Ubiquinone-5 immediately induced loss of righting reflex with an ED50 of 81 mg/kg, and latency to return of righting reflex was correlated with dose. Ubiquinone-5 induced excessive proton leak in isolated forebrain mitochondria, inhibited electron transport chain enzyme complex activities, and compromised mitochondrial membrane potential.

### 6834

**"A Genetically Engineered Mouse that Improves TRPV1-mediated Insulin Release and Glucose Handling Is Protected from Cardiac Injury" by Eric Gross, M.D., Ph.D., Yang Bian, Ph.D., Shufang He, Ph.D.**

Anesthesiology, Perioperative and Pain Medicine, Stanford University, Stanford, California (E.G., Y.B.); Anesthesiology, Perioperative and Pain Medicine, Stanford University, Stanford, California, and Second Hospital of Anhui Medical University, Hefei City, Anhui Province, China (S.H.)

Transient receptor potential vanilloid 1 (TRPV1) regulates myocardial reperfusion injury, but the region of TRPV1 important for limiting organ injury is unclear. Because TRPV1 activation antagonizes insulin release from pancreatic β cells, mice with a missense mutation in TRPV1 (K710N) were studied to determine whether a specific amino acid within the C terminus of TRPV1 causes resistance to cardiac injury by modifying insulin release and glucose handling. A discrete amino acid of TPRV1, K710, was found to regulate the response to a glucose challenge and insulin release, changes in which led to improved glycolytic handling and protection of cardiomyocytes from cellular stress.

### 7088

**"β-Arrestin Recruitment Does Not Explain Respiratory Depression from Opioids of the Nitazene Family" by Barbara Palkovic, M.D., Daniel J. Sprague, M.D., Ph.D., John D. McCorvy, Ph.D., Maggie M. Calkins, B.S., Thomas M. Langer III, M.D., Ph.D., Jennifer J. Callison, B.S., Eckehard A. Stuth, M.D., Astrid G. Stucke, M.D.**

Faculty of Medicine Osijek, Osijek, Croatia (B.P.); Cell Biology, Neurobiology and Anatomy, and Department of Anesthesiology, Medical College of Wisconsin, Milwaukee, Wisconsin (D.J.S., J.D.M., M.M.C., T.M.L., J.J.C., E.A.S., A.G.S)

Opioid-induced respiratory depression has been attributed to recruitment of the β-arrestin scaffold rather than G protein activation, both of which result from binding of the agonist to the mu-opioid receptor. The hypothesis that respiratory depression strongly correlates with β-arrestin recruitment

was tested by studying *in vitro* and *in vivo* effects of opioids of the nitazene family that are biased toward either mechanism. Although activation of G protein *versus* β-arrestin pathway by nitazene mu-opioid receptor agonists varied with their molecular structure, the degree of β-arrestin recruitment did not correlate with the magnitude of respiratory depression.

## 6819

**"Effects of Low *versus* High Positive End-expiratory Pressure on Mechanical Power and Pulmonary Neutrophilic Inflammation in Experimental Acute Respiratory Distress Syndrome" by Nikola Anusic, M.D., Martin Scharffenberg, M.D., Robert Huhle, M.D., Jakob Wittenstein, M.D., Marcelo Gama De Abreu, M.D.**

Outcomes Research, Cleveland Clinic, Cleveland, Ohio (N.A.); Universitätsklinikum Carl Gustav Carus Dresden, Dresden, Germany (M.S., R.H., J.W.); Outcomes Research Department, Anesthesiology Institute, Cleveland Clinic Foundation, Cleveland, Ohio (M.G.D.A.)

Mechanical ventilation may cause ventilator-induced lung injury. Mechanical power, which describes the energy transferred to the respiratory system per unit time, has been associated with surrogates of ventilator-induced lung injury. The hypothesis that protective mechanical ventilation strategies using different levels of positive end-expiratory pressure differ in their mechanical power and pulmonary neutrophilic inflammation was tested in a randomized study of 24 anesthetized pigs in which lung injury had been induced by saline lavage. Protective mechanical ventilation with low compared to high positive end-expiratory pressure increased mechanical power and worsened lung inflammation.

## 6589

**"Altered Astrocytic Bioenergetics and Delayed Emergence from Propofol in a Rodent Model of Alcohol Intolerance" by Candida Goodnough, M.D., Ph.D., Ryan Ozawa, B.S., Rafaela Rodrigues Hell, Ph.D., Katie Chang, Eric R. Gross, M.D., Ph.D.**

Stanford University, Stanford, California

Alcohol intolerance is due to a genetic variant in the mitochondrial enzyme aldehyde dehydrogenase 2 (ALDH2*2), which limits the metabolism of acetaldehyde, a metabolite of ethanol. The hypothesis that the inactivating genetic variant ALDH2*2 will delay recovery from anesthesia due to an altered mitochondrial redox state was tested in wild-type ALDH2 and ALDH2*2 knock-in mice. There was no difference between groups in time to loss of righting reflex or duration of propofol-induced general anesthesia, but ALDH2*2 mice had delayed recovery from anesthesia as defined by behavioral tests. Bioenergetics were altered in mitochondria of ALDH2*2 astrocytes at baseline and in the presence of propofol.

## 7059

**"Mitigation of Burn-induced Motor Neuron Apoptosis, Synaptic Denervation, and Muscle Wasting by Decreasing Spinal Microglia Inflammatory Responses" by Jingyuan Chen, M.D., Ph.D., Yoshinori Kitagawa, M.D., Ph.D., Yang Ren, M.D., Shingo Yasuhara, M.D., Ph.D., J.A. Jeevendra Martyn, M.D., F.R.C.A.**

Department of Anesthesiology, The First Affiliated Hospital, Sun Yat-Sen University, Guangzhou, China (J.C.); Tottori University Hospital, Yonago, Japan (Y.K.); Shriners Hospital for Children and Harvard Medical School, Boston, Massachusetts (Y.R., S.Y., J.A.J.M.)

The hypothesis that microglia-mediated cytokine release plays a pivotal role in motor neuron loss, distant synaptic disintegration, and muscle wasting after burn injury and that mitigation of microglia activation by α7AChR stimulation would attenuate these was tested in wild-type and α7AChR knock-out mice randomly divided into sham-burn or third degree 30% total body surface area burn injury groups. The selective α7AChR agonist GTS-21 or saline was administered after burn injury. GTS-21 ameliorated burn injury–induced microglia activation, as evidenced by decreased inflammatory cytokine release, and alleviated motor neuron loss, synaptic disintegration, and muscle wasting in wild-type but not knock-out mice.

## 6762

**"Dysfunction of the Endogenous Opioid System in Descending Pain-modulating Circuits Is Involved in the Augmented Pain Response after Traumatic Brain Injury" by Qiliang Chen, M.D., Ph.D., David J. Clark, M.D., Ph.D.**

Department of Anesthesiology, Perioperative and Pain Medicine, Stanford–Anesthesia School of Medicine, Stanford, California (Q.C.); Stanford–Anesthesia School of Medicine, Palo Alto, California (D.J.C.)

The hypothesis that traumatic brain injury exacerbates pain in response to a subsequent soft tissue injury by virtue of dysfunctional descending pain modulation was tested in a mouse model of mild traumatic brain injury. Animals with traumatic brain injury experienced a prolonged period of allodynia after a distal periphery injury. Their eventual recovery from allodynia was dependent on endogenous opioid tone on the pronociceptive neurons in the descending pain-modulation system. Loss of these pronociceptive neurons prevented the development of allodynia after traumatic brain injury.

## 6462

**"Electroacupuncture Relieves Incision Pain by Regulating Inflammation and Immune System in Rats" by Lulin Ma, M.D., Ph.D., Daling Deng, M.D., Tianhao Zhang, M.D., Yuanyuan Ding, M.D., Wenjing Zhao, M.D., Xiangdong Chen, Ph.D.**

Department of Anesthesiology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Transcriptomic (messenger RNA [mRNA]) methods were used to detect the gene changes of dorsal root ganglia of male Sprague-Dawley rats randomly assigned to control, incision, and incision plus electroacupuncture groups. Pain behaviors were measured in the three groups the day before and 2, 4, and 24 h after surgery. Dorsal root ganglia were collected for mRNA sequencing 24 h after surgery. In the incision plus electroacupuncture group, the mechanical withdrawal threshold and thermal withdrawal latency increased, the cumulative pain score decreased, and there were 4 upregulated genes and 12 downregulated genes identified compared to the incision group.

## 6486

**"The Biphasic Effects of Sevoflurane of Different Concentration on Airway Inflammation in Developing Asthmatic Rats" by Guangting Zhang, M.S., Fenglin Wang, M.S., Yin Ran, M.S., Yannan Zhou, M.S., Xiaoxi Zhang, M.S., Dexing Liu, M.D.**

Anesthesiology Department, Affiliated Hospital of Zunyi Medical University, Zunyi, Guizhou, China

The effects of different concentrations of sevoflurane on airway inflammation were studied in a developing female Sprague-Dawley rat ovalbumin-induced allergic asthma model. Sevoflurane concentrations of 0.4%, 0.8%, 1.6%, or 3.2% were inhaled for 30 min. Sevoflurane had opposite, concentration-dependent effects on airway inflammation. At 0.4%, sevoflurane aggravated alveolar septal thickening and inflammatory infiltration and upregulated IL-4 and IgE but downregulated IFN-γ concentrations. In contrast, 3.2% sevoflurane alleviated alveolar septal thickening and inflammatory infiltration, and downregulated IL-4 and IgE but upregulated IFN-γ concentrations.

## 7012

**"Volatile Anesthetic Loading of the Sonoparticles: A Preparation for Future Clinical Applications" by Siavash Sedghi, M.D., Amir Teimouri Dereshgi, M.D., Eric Young, B.S., Bruce A. Davidson, Ph.D., Hilliard Kutscher, Ph.D., Paul R. Knight, M.D., Ph.D., Nader D. Nader, M.D., Ph.D.**

Anesthesiology, Jacobs School of Medicine and Biomedical Sciences, Buffalo, New York

Although use of volatile anesthetics for ischemic preconditioning is well established, airway compromise is a major drawback when they are given at high enough concentrations to have systemic effects. The objective of these *in vitro* experiments was to load sevoflurane in Food and Drug Administration–approved (for use as a contrast material during ultrasonic examination) lipid microsphere sonoparticles as a vehicle and evaluate its release in response to externally delivered sound shock waves compared to its release from intralipid 20% and from 0.9% normal saline. The sonoparticle preparation released sevoflurane most rapidly and at the highest concentration (3.5%) during the 30-min sonication period.

## 7036

**"Intergenerational Effects of Surgery and Sevoflurane Anesthesia in Young Adult Rats with Traumatic Brain Injury" by Anatoly Martynyuk, D.Phil., Lingsha Ju, M.D., Jiepei Zhu, D.Phil., Nikolaus Gravenstein, M.D., Christoph N. Seubert, M.D., Terrie Vasilopoulos, D.Phil.**

Department of Anesthesiology, University of Florida College of Medicine, Gainesville, Florida

The effects of general anesthesia/surgery, traumatic brain injury, and subsequent repeated exposure to sevoflurane on neurobehavioral and neuroendocrine abnormalities in exposed young adult males (F0 generation) and their future offspring (generation F1) was tested in male Sprague-Dawley rats. Surgery, traumatic brain injury, and subsequent exposure to sevoflurane in young adult male rats led to proinflammatory, neuroendocrine, and neurobehavioral abnormalities in the exposed rats and in their future, primarily male, offspring.

## 6677

**"MicroRNAs Involved in Dexmedetomidine Preconditioning-induced Neuroprotection" by Hyunyoung Seong, M.D., Daun Jeong, M.Sc., Jang Eun Cho, M.D., Ph.D.**

Anesthesiology and Pain Medicine, Anam Hospital, Korea University College of Medicine, Seoul, Korea (H.S., J.E.C.); Institute for Healthcare Service Innovation, Korea University, Seoul, Korea (D.J.)

Dexmedetomidine has been reported to protect the brain from cerebral ischemia. MicroRNAs play important roles in ischemic tolerance induced by preconditioning. The association of microRNAs with the preconditioning effects of dexmedetomidine in neural ischemia was studied in mice administered dexmedetomidine before transient infarcts were induced by middle cerebral artery occlusion for 1 h. The infarct volume was reduced, expression of five microRNAs was increased, and expression of three microRNAs was decreased in mice preconditioned with dexmedetomidine. *In vitro*, microRNA-323 inhibition reduced cell apoptosis in an oxygen-glucose–deprived environment and had a neuroprotective effect.

# Best Abstracts: Clinical Science

**Sunday, October 23, 2022, 3:05 PM to 5:00 PM**
**Room 243**

## Moderators

Michael J. Avram, Ph.D., Assistant Editor-in-Chief, ANESTHESIOLOGY, Northwestern University Feinberg

School of Medicine, Chicago, Illinois; Deborah J. Culley, M.D., Executive Editor, Anesthesiology, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania; Martin J. London, M.D., Editor, Anesthesiology, University of California, San Francisco School of Medicine and the Veterans Affairs Medical Center, San Francisco, California.

## 7146

**"Artificial Intelligence-based Phenotyping of Thoracic Surgery to Anticipate Clinical Trajectory" by Pascal Laferriere-Langlois, M.D., Fergus Imrie, Ph.D., Maxime Cannesson, M.D.**

Anesthesiology, and Department of Electrical and Computer Engineering, University of California in Los Angeles, Los Angeles, California

Classifying a patient's risk is important for clinical treatment, decision sharing, optimal resource distribution, and billing. Records of 1,933 surgical procedures performed by the thoracic surgery department since 2013 were extracted from the electronic medical record, 105 readily extractable features were extracted from each, and artificial intelligence, with clustering, was applied to identify phenotypes among these patients. Three phenotypes with distinct care trajectories and outcomes were identified among the records extracted. Patients with phenotype 3 (N = 424) experienced 66.7% of the deaths, 67.3% of prolonged intensive care unit stays, and 73.0% of prolonged hospital stays.

## 6467

**"Preoperative Ultrasound-guided Percutaneous Cryoneurolysis for Treating Pain Following Mastectomy" by Adam Schaar, M.D., Brian M. Ilfeld, M.D., John J. Finneran IV, M.D., Matthew W. Swisher, M.D., Engy Tadros Said, M.D., Rodney A. Gabriel, M.D., Jacklynn F. Sztain, M.D., Bahareh Khatibi, M.D., Andrea Trescot, M.D., Anne M. Wallace, M.D.**

Department of Anesthesiology, and Department of Surgery, University of California San Diego, San Diego, California (A.S., B.M.I., J.J.F., M.W.S., E.T.S., R.A.G., J.F.S, B.K., A.M.W.); Florida Pain Relief Group, Tampa, Florida (A.T.)

This randomized, observer- and participant-masked, sham-controlled pilot study evaluated preoperative ultrasound-guided percutaneous cryoneurolysis for the treatment of pain after mastectomy. On postoperative day 2, participants who had received active cryoneurolysis (n = 31) had a median [interquartile range] pain score, measured on a 0 to 10 numerical rating scale, of 0 [0 to 1.4] *versus* 3.0 [2.0 to 5.0] in patients given sham (n = 29). Cryoneurolysis decreased cumulative opioid use during the first 3 weeks by 98%. Chronic pain had developed after 1 yr in one (3%) active and five (17%) sham participants.

## 6433

**"Perioperative Mortality of the COVID-19 Patient" by Michael Aziz, M.D., Katie J. Schenning, M.D., M.P.H., Vikas N. O'Reilly-Shah, M.D., Michael R. Mathis, M.D.** Anesthesiology & Perioperative Medicine, Oregon Health & Science University, Portland, Oregon (M.A., K.J.S.); University of Washington, Seattle, Washington (V.N.O-S.); University of Michigan, Ann Arbor, Michigan (M.R.M.)

The 30-day mortality of 3,721 elective surgical patients who had recovered from previous COVID-19 infection was compared to that of a propensity-matched cohort of 3,721 elective surgical patients without previous COVID-19 infection in a multicenter retrospective observational study of cases performed between April 2020 and April 2021. Among COVID-19–exposed patients, 160 (4.3%) expired within 30 days of surgery, whereas 63 (1.7%) of the propensity-matched control patients expired within 30 days of surgery.

## 6517

**"Automated End-tidal Control Device Achieves and Maintains Concentration of Exhaled Agent and Oxygen Effectively" by Guy Dear, F.R.C.A., Matthew A. Klopman, M.D., Melissa D. McCabe, M.D., Melinda S. Seering, M.D.**

Anesthesiology, Duke University, Durham, North Carolina (G.D.); Emory University, Sandy Springs, Georgia (M.A.K.); Loma Linda University Medical Center, Loma Linda, California (M.D.M.); Anesthesia, University of Iowa, Iowa City, Iowa (M.S.S.)

Automated gas control alters fresh gas flow and controls end-tidal anesthetic and oxygen concentrations using an end-tidal control device. A multicenter randomized controlled trial compared end-tidal control with standard anesthesia practice in 220 patients. End-tidal control achieved the desired end-tidal anesthetic and oxygen concentrations quickly and maintained the end-tidal concentration within a closer tolerance with minimal overshoot than standard anesthesia practice. End-tidal control reduced mean inhaled agent usage by 26% for desflurane, 30% for isoflurane, and 5% for sevoflurane.

## 6642

**"Persistent Brain Connectivity Changes in Healthy Volunteers following Nitrous Oxide Inhalation" by Ben Palanca, M.D., Ph.D., Thomas A. Zeffiro, Ph.D., Britt M. Gott, M.S., Thomas Nguyen, B.S., Charles F. Zorumski, M.D., Charles R. Conway, M.D., Peter Nagele, M.D., M.S.** Anesthesiology, and Psychiatry, Washington University School of Medicine in St. Louis, St. Louis, Missouri (B.P., B.M.G., T.N., C.F.Z., C.R.C.); Diagnostic Radiology and Nuclear Medicine, University of

Maryland School of Medicine, Baltimore, Maryland (T.A.Z.); University of Chicago Medicine, Chicago, Illinois (P.N.)

Nitrous oxide alleviates treatment-resistant depression. The effects of nitrous oxide on brain connectivity after inhalation were determined in a single-blinded crossover study of 16 healthy volunteers who underwent inhalation sessions of a 50% nitrous oxide/oxygen mixture for 1 h or an oxygen/air mixture for 1 h, in a randomized order. Functional magnetic resonance imaging identified increases in global connectivity to primary visual regions at 2 and 24 h after nitrous oxide inhalation that are consistent with reported changes in visual perception of the external world.

## 6276

**"A Liberal Transfusion Strategy Leads to Higher Infection Rates, Orthopaedic Trauma and Anemia: Conservative *versus* Liberal Transfusion Strategy (ORACL), A Prospective Randomized Study 30 Day Inpatient Complications" by Leilani Mullis, M.D., Brian Mullis, M.D., Walt Virkus, M.D., Laurence Kempton, M.D.**

Indiana University School of Medicine, Indianapolis, Indiana

There is ongoing debate about what level of anemia should be used as a transfusion trigger for asymptomatic trauma patients no longer in a resuscitative phase. To determine if a more conservative strategy is safe and decreases the risk of infection, 99 asymptomatic young orthopedic trauma patients no longer being resuscitated were randomly assigned to a conservative transfusion strategy of 5.5 g/dl or a liberal strategy of 7.0 g/dl in this multicenter pilot study. A conservative transfusion strategy of 5.5 g/dl led to a lower deep infection rate without an increase in adverse outcomes.

## 6461

**"Signaling Cascades of Circulating Glycosaminoglycans Reflect Pulmonary Injury in COVID-19" by Melanie Borrmann, M.D., Florian Brandes, M.D., Benedikt Kirchner, M.Sc., Matthias Klein, M.D., Marlene Reithmair, M.Sc., Michael Pfaffl, M.Sc., Gustav Schelling, M.D., Markus Rehm, M.D., Agnes Meidert, M.D.**

Department of Anesthesiology, Ludwig Maximilian University of Munich, Munich, Germany (M.B., F.B., M.R., A.M.); Division of Animal Physiology and Immunology, Technical University of Munich, Weihenstephan, Germany (B.K., M.P.); Department of Neurology, Ludwig Maximilian University of Munich, Munich, Germany (M.K.); Institute of Human Genetics, Munich, Germany (M.R.); Ludwig Maximilian University of Munich, Munich, Germany (G.S.)

The circulating glycosaminoglycans hyaluronan and heparan sulfate were measured in 20 patients with COVID-19 pneumonia, 20 patients with COVID-19 acute respiratory distress syndrome (ARDS), and 20 healthy controls, and molecular signaling networks targeted by these glycocalyx components were identified. Plasma hyaluronan and heparan sulfate concentrations increased with disease severity and were higher in COVID-19 ARDS than in COVID-19 pneumonia and in healthy volunteers. Plasma hyaluronan concentrations were also higher in pneumonia than in healthy controls. Hyaluronan, heparan sulfate, and their upregulated degradative enzymes HYAL1 and HPSE activated cytokine signaling in immune cells and aggravated vascular barrier dysfunction in COVID-19 ARDS.

## 7277

**"2019 Multicenter Hypotension Prediction Index Clinical Study" by Xiaodong Bao, M.D., Ph.D., Kamal Maheshwari, M.D., Donald H. Penning, M.D., Sydney E. Rose, M.D., Gaurav Malhotra, M.D., David R. Drover, M.D., Nirav J. Shah, M.D., Karen B. Domino, M.D., Claudia F. Clavijo, M.D.**

Massachusetts General Hospital, Boston, Massachusetts (X.B.); Cleveland Clinic, Solon, Ohio (K.M.); Henry Ford Hospital–Residents, Detroit, Michigan (D.H.P.); Oregon Health and Science University, Portland, Oregon (S.E.R.); University of Pennsylvania Medical–Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania (G.M.); Stanford–Anesthesia School of Medicine, Stanford, California (D.R.D.); University of Michigan Medical School, Ann Arbor, Michigan (N.J.S.); Anesthesiology Department–Active, University of Washington, Seattle, Washington (K.B.D.); University of Colorado, Aurora, Colorado (C.F.C.)

The Hypotension Prediction Index software (Edwards Lifesciences, USA) provides insight into the likelihood of a patient experiencing a future hypotensive event, defined as mean arterial pressure less than 65 mmHg for at least 1 min. In a propensity matching model, 445 (3%) cases received advanced hemodynamic monitoring with the software, and 15,639 (97%) control cases did not. The patients underwent a surgical procedure for a median (IQR) duration of 291 (227 to 394) min. Patients treated using advanced hemodynamic monitoring guidance experienced hypotension for 9 (2 to 20) min, while the historical control group experienced it for 15 (5 to 39) min.

## 6919

**"Effects of Pectoralis and Serratus Blocks for Minimally Invasive Cardiac Procedures on Opioid Consumption and Pulmonary Mechanics" by Omer Bakal, M.D., Donn Marciniak, M.D., Esra Kutlu Yalcin, M.D., Xuan Pu, M.S., Hassan Hamadnalla, M.D., Hani A. Essber, M.D., Tyler Karras, D.O., Stephanie Ezeoke, M.S., Alparslan Turan, M.D., Andrej Alfirevic, M.D.**

Department of Outcomes Research, Department of Cardiothoracic Anesthesiology, and Department of Quantitative Health Services, Cleveland Clinic, Cleveland, Ohio (O.B., D.M., E.K.Y., X.P., H.A.E., T.K., S.E., A.T., A.A.); Henry Ford Health System, Detroit, Michigan (H.H.)
The hypothesis that use of ultrasound guided pectoral fascial plane and serratus anterior plane blocks using a mixture of bupivacaine and liposomal bupivacaine would decrease postoperative opioid consumption and improve respiratory function during the first 3 postoperative days was tested in a randomized controlled trial of 194 patients undergoing minimally invasive cardiac surgery for mitral valve repair or replacement. There was no difference in the cumulative opioid consumption and pulmonary mechanics during the first 3 postoperative days between patients who received blocks and those who had standard parenteral analgesia intraoperatively.

### 6630

**"A Randomized, Double-blind Trial Comparing Oliceridine and Morphine on Ventilation in an Elderly Population" by P. Simons, M.D., Albert Dahan, M.D., Ph.D., Mark Demitrack, M.D., Michael Fossler, Pharm.D, Ph.D., Erik Olofsen, Ph.D., Maarten van Lemmen, B.Sc., Simone Jansen, M.D., Rutger van der Schrier, M.D.**

Department of Anesthesiology, Leiden University Medical Center, Leiden, Netherlands (P.S., A.D., E.O., M.vL., S.J., R.vdS.); Trevena, Chesterbrook, Pennsylvania (M.D., M.F.)
Oliceridine differs from classical opioids in that it is biased toward activation of the G-protein intracellular pathway that is predominantly associated with analgesia, with limited recruitment of the β-arrestin pathway that is associated with opioid-related adverse events. The hypothesis that IV oliceridine would produce less respiratory depression than IV morphine at equianalgesic doses was tested in a randomized crossover trial of 18 volunteers 55 yr and older. In contrast to 2 mg morphine, 0.5 mg oliceridine was nearly devoid of respiratory depressant effects. Similarly, in contrast to 8 mg morphine, the respiratory depressant effect of 2 mg oliceridine waned within 3 h.

### 7269

**"Improvement of Forced Vital Capacity after Saline Washout in the Setting of Post Interscalene Catheter Phrenic Nerve Palsy" by Mariam Sarwary, M.D., Jean Louis E. Horn, M.D., Jan Boublik, M.D., Ph.D., Ban Tsui, M.D.**

Stanford University, Fremont, California; Stanford University, Stanford, California
A randomized, double-blinded study of 21 patients undergoing elective primary total shoulder arthroplasty with an ultrasound-guided interscalene nerve block was conducted to determine whether a large volume normal saline washout bolus through the interscalene catheter can reverse phrenic nerve paralysis resulting from the block. Patients were administered 10 ml 0.5% ropivacaine before surgery and an additional 10 ml 0.5% ropivacaine upon arrival to the recovery room. Thirty minutes later, they received either a 30 ml normal saline washout or no intervention. Clinical improvement of forced vital capacity was observed 30 min after the saline washout.

### 6256

**"EEG-guided Anesthesia in Children Shortens Recovery Time with No Difference Thus Far in Emergence Delirium" by Kiyoyuki Miyasaka, M.D., Yasuyuki Suzuki, M.D., Ph.D., Yasuko Nagasaka, M.D., Ph.D.**

Department of Anesthesia, National Center for Child Heath and Development, Tokyo, Japan (K.M., Y.S.); Tokyo Women's Medical University, Tokyo, Japan (Y.N.)
The hypothesis that pediatric anesthesia emergence delirium may be reduced by an electroencephalogram (EEG)-guided anesthesia management strategy designed to minimize exposure to anesthetics was tested in randomized controlled trial comparing the incidence of pediatric anesthesia emergence delirium after sevoflurane anesthesia maintained at 1.0 minimum alveolar concentration and EEG-guided sevoflurane anesthesia. Sixty children at least 1 and less than 6 yr old scheduled for surgical procedures involving minimal postoperative pain were studied. There was no difference between the groups in the proportion of patients with a pediatric anesthesia emergence delirium score of 10 or more despite reduced exposure to sevoflurane in the EEG group. Recruitment is ongoing.

## 22nd Annual Celebration of Research

**Monday, October 24, 2022, 9:30 AM to 11:30 AM**
**LaNouvelle Ballroom B**

### Moderator

Evan D. Kharasch, M.D., Ph.D., Editor-in-Chief, ANESTHESIOLOGY, Duke University Medical Center, Durham, North Carolina.

### Description

Sponsored by ANESTHESIOLOGY, join us for the 22nd Annual Celebration of Research, when the recipients of the 2022 ASA Excellence in Research Award and the James E. Cottrell, M.D., Presidential Scholar Award will be awarded. Each recipient will present brief lectures on their research accomplishments. The Foundation for Anesthesia Education and Research (Schaumburg, Illinois) Excellence in Mentoring Award recipient and the winner of the Resident Research Essay contest will be announced. There will be a brief update on Foundation for Anesthesia Education and Research activities.

## Clinical Trials in Anesthesiology: New Findings, New Understanding

**Monday, October 24, 2022, 1:15 PM to 3:15 PM**
**Room 243**

### Moderator

Marcos F. Vidal Melo, M.D., Ph.D., Associate Editor, ANESTHESIOLOGY, Columbia University Irving Medical Center, New York, New York.

### Description

Discussion of four recently published clinical trial studies, presented by one of the authors and counterpointed by a friendly critique by another speaker. Speakers will comment on the methods and their implementation, providing education on those methods and relevant aspects of their implementation and results interpretation in the process. This will be followed by a response from the author.

### Speaker

**"First-Attempt Success Rate of Video Laryngoscopy in Small Infants (VISI): A Multicenter, Randomized Controlled Trial" by Annery G. Garcia-Marcinkiewicz, M.D.**
Department of Anesthesiology and Critical Care Medicine, The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania

### Debater

Michael Aziz, M.D., Department of Anesthesiology and Perioperative Medicine, Oregon Health & Science University, Portland, Oregon.

### Speaker

**"Spinal Anesthesia with Targeted Sedation Based on Bispectral Index Values Compared with General Anesthesia with Masked Bispectral Index Values to Reduce Delirium: The SHARP Randomized Controlled Trial" by Charles H. Brown IV, M.D., M.H.S.**
Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland

### Debater

Christopher G. Hughes, M.D., Department of Anesthesiology Critical Care Medicine, Vanderbilt University Medical Center, Nashville, Tennessee.

### Speaker

**"Aggressive Intraoperative Warming *versus* Routine Thermal Management during Noncardiac Surgery (PROTECT): A Multicenter, Parallel Group, Superiority Trial" by Eva Rivas Ferreira, M.D.**
Department of Anesthesia, Hospital Clinic of Barcelona, August Pi i Sunyer Biomedical Research Institute, Universidad de Barcelona, Barcelona, Spain

### Debater

Harriet W. Hopf, M.D., University of Utah, Salt Lake City, Utah.

### Speaker

**"Tranexamic Acid in Patients Undergoing Noncardiac Surgery" by Maura Marcucci, M.D., M.Sc.**
Department of Health Research Methods, Evidence, and Impact, and Department of Medicine, McMaster University, Hamilton, Canada

### Debater

Jerrold H. Levy, M.D., F.C.C.M., Executive Editor, ANESTHESIOLOGY, Duke University, Durham, North Carolina.