



## ON THE COVER:

For over 15 yr, Dr. Guy Weinberg has examined the potential utility of lipid emulsion infusion to treat local anesthetic toxicity and its underlying mechanisms. This has led to widespread clinical application, not only in anesthesia, but also in life-saving treatment in other areas of medical care. He chose a life preserver image for his educational Web site, [www.lipidrescue.org](http://www.lipidrescue.org), and we used this theme to create the cover art.

## THIS MONTH IN ANESTHESIOLOGY

9A

## EDITORIAL VIEWS

### Ether Day's William T. G. Morton: Public Benefactor . . . and Antisocial Narcissist?

*George S. Bause*

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### Notorious Oxide

*Peter Nagele*

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### Genetic Contributions to Opioid Side Effects: Helix Me, Helix Me Not

*Roger B. Fillingim*

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### Transient Receptor Potential Ankyrin 1 as a Target for Perioperative Pain Management

*Magdalene M. Moran*

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## SPECIAL ARTICLES

### An Appraisal of William Thomas Green Morton's Life as a Narcissistic Personality

*Ramon F. Martin, Ajay D. Wasan, and Sukumar P. Desai*

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W. T. G. Morton's demonstration of ether as an anesthetic was inspired by a narcissistic personality trait/disorder that also limited his further development of anesthesia as a specialty.

## PERIOPERATIVE MEDICINE

### Effect of Nitrous Oxide Exposure during Surgery on the Homocysteine Concentrations of Children

*Dubraïicka Pichardo, Igor A. Luginbuehl, Yaseer Shakur, Paul W. Wales, Ahmed El-Sohemy, and Deborah L. O'Connor*

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Children exposed to nitrous oxide ( $\geq 2$  h) showed increased postoperative plasma total homocysteine concentrations. The duration of exposure, initial plasma total homocysteine, and serum vitamin B12 concentrations were associated with this increase.

◇ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

📄 See [page2anesthesiology.org](http://page2anesthesiology.org) for content related to this article

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CME CME Article

- ◆◆🌐🇺🇸 **Aversive and Reinforcing Opioid Effects: A Pharmacogenomic Twin Study** 22  
*Martin S. Angst, Laura C. Lazzeroni, Nicholas G. Phillips, David R. Drover, Martha Tingle, Amrita Ray, Gary E. Swan, and J. David Clark*
- The clinical utility of opioids is limited by adverse drug effects including respiratory depression. This study was designed to gain a better understanding of the genetic and environmental mechanisms contributing to an individual's susceptibility to adverse opioid effects. A classical twin study paradigm was used to estimate the genetic and/or shared environmental contribution to acute adverse and affective opioid response. The  $\mu$ -opioid receptor agonist alfentanil and saline placebo were administered as target-controlled infusions under carefully monitored laboratory conditions. Measured outcomes included respiratory depression, sedation, nausea, pruritus, drug liking, and drug disliking. This study demonstrates that genetic, environmental, and demographic factors work together to control adverse and reinforcing opioid responses, but contribute differently to specific responses.
- Identification of Two Mutations (F758W and F758Y) in the *N*-methyl-D-aspartate Receptor Glycine-binding Site that Selectively Prevent Competitive Inhibition by Xenon without Affecting Glycine Binding** 38  
*Scott P. Armstrong, Paul J. Banks, Thomas J. W. McKittrick, Catharine H. Geldart, Christopher J. Edge, Rohan Babla, Constantinos Simillis, Nicholas P. Franks, and Robert Dickinson*
- We have identified two mutations that prevent xenon from binding at the glycine site of the *N*-methyl-D-aspartate receptor. These mutations could be used in knock-in animals to understand the mechanism(s) of xenon anesthesia and neuroprotection.
- 🇺🇸 **Solubility of Haloether Anesthetics in Human and Animal Blood** 48  
*Joao H. N. Soares, Robert J. Brosnan, Fabíola B. Fukushima, Joanne Hodges, and Hong Liu*
- Blood solubility for desflurane, sevoflurane, isoflurane, and methoxyflurane differs significantly between humans and most animals. Unlike in humans, desflurane blood solubility is not statistically different from sevoflurane blood solubility for some animal species.
- 🌐🇺🇸 **Transfusion of Stored Autologous Blood Does Not Alter Reactive Hyperemia Index in Healthy Volunteers** 56  
*Lorenzo Berra, Andrea Coppadoro, Binglan Yu, Chong Lei, Ester Spagnolli, Andrea U. Steinbicker, Kenneth D. Bloch, Tian Lin, Fatima Y. Sammy, H. Shaw Warren, Bernadette O. Fernandez, Martin Feelisch, Walter H. Dzik, Christopher P. Stowell, and Warren M. Zapol*
- Transfusion of autologous blood stored for 40 days in healthy volunteers does not alter reactive hyperemia.
- 🇺🇸 **Noxious Stimulation Attenuates Ketamine-induced Neuroapoptosis in the Developing Rat Brain** 64  
*Jia-Ren Liu, Qian Liu, Jing Li, Chongwha Baek, Xiao Hui Han, Umeshkumar Athiraman, and Sulpicio G. Soriano*
- Concurrent noxious stimulation attenuates ketamine-induced neuroapoptosis and regulates cyclin D1 signaling in neonatal rats.
- ◆🇺🇸 **Comparative Effectiveness of Regional *versus* General Anesthesia for Hip Fracture Surgery in Adults** 72  
*Mark D. Neuman, Jeffrey H. Silber, Nabil M. Elkassabany, Justin M. Ludwig, and Lee A. Fleisher*
- Among 18,158 patients undergoing hip fracture surgery in New York state, regional anesthesia was associated with a 29% lower adjusted odds of inpatient mortality and a 24% lower adjusted odds of an inpatient respiratory complication.
- 🇺🇸 **Sugammadex Ideal Body Weight Dose Adjusted by Level of Neuromuscular Blockade in Laparoscopic Bariatric Surgery** 93  
*Sandra Llauradó, Antoni Sabaté, Eva Ferreres, Inmaculada Camprubí, and Anna Cabrera*
- This study explored the sugammadex ideal body weight dose adjusted according to train-of-four ratio after laparoscopic bariatric surgery. Sugammadex dosing cannot be safely calculated based on ideal body weight.

## CONTENTS

### **Variability in Blood and Blood Component Utilization as Assessed by an Anesthesia Information Management System** 99

*Steven M. Frank, Will J. Savage, Jim A. Rothschild, Richard J. Rivers, Paul M. Ness, Sharon L. Paul, and John A. Ulatowski*

Methods are described for using data acquired from an anesthesia information management system to assess blood and blood component utilization. Significant variability in blood utilization was identified among individual medical providers compared with their peers.

## ■ CRITICAL CARE MEDICINE

### **Utilization of Critical Care Services among Patients Undergoing Total Hip and Knee Arthroplasty: Epidemiology and Risk Factors** 107

*Stavros G. Memtsoudis, Xuming Sun, Ya-Lin Chiu, Michael Nurok, Ottokar Stundner, Stephen M. Pastores, and Madhu Mazumdar*

In this study, the authors determined the incidence of critical care service utilization among orthopedic patients, analyzed patient and healthcare system-related demographics and identified risk factors for requiring critical care service.

### **Effects of Pharyngeal Cooling on Brain Temperature in Primates and Humans: A Study for Proof of Principle** 117

*Yoshimasa Takeda, Hiroshi Hashimoto, Koji Fumoto, Tetsuya Danura, Hiromichi Naito, Naoki Morimoto, Hiroshi Katayama, Soichiro Fushimi, Akihiro Matsukawa, Aiji Ohtsuka, and Kiyoshi Morita*

Pharyngeal cooling was initiated before return of spontaneous circulation. Pharyngeal cooling can rapidly and selectively induce hypothermia without having adverse effects on systemic circulation and the pharyngeal epithelium.

### **Age-dependent Role of Microvascular Endothelial and Polymorphonuclear Cells in Lipopolysaccharide-induced Acute Kidney Injury** 126

*Francis M. Wulfert, Matijs van Meurs, Neng F. Kurniati, Rianne M. Jongman, Martin C. Houwertjes, Peter Heeringa, Michel M.R.F. Struys, Jan G. Zijlstra, and Grietje Molema*

The glomerular endothelial response and the interaction with the innate immune system in sepsis is age-dependent in mice. This might explain the vulnerability of the kidney in the elderly.

## ■ PAIN MEDICINE

### **Transient Receptor Potential Ankyrin 1 Ion Channel Contributes to Guarding Pain and Mechanical Hypersensitivity in a Rat Model of Postoperative Pain** 137

*Hong Wei, Mari Karimaa, Timo Korjamo, Ari Koivisto, and Antti Pertovaara*

Blocking the transient receptor potential ankyrin 1 channel in the operated skin area in the rat reduced sustained and mechanically evoked postoperative pain behavior, whereas blocking the spinal transient receptor potential ankyrin 1 channel reduced tactile allodynia-like behavior.

### **Regulation of Peripheral Clock to Oscillation of Substance P Contributes to Circadian Inflammatory Pain** 149

*Jing Zhang, Huili Li, Huajing Teng, Ting Zhang, Yonglun Luo, Mei Zhao, Yun-Qing Li, and Zhong Sheng Sun*

Spinal substance P is involved in circadian nociception transmission, which is regulated by peripheral clock in dorsal root ganglia.

### **Gene Expression in Skin, Muscle, and Dorsal Root Ganglion after Plantar Incision in the Rat** 161

*Christina M. Spofford and Timothy J. Brennan*

Tissue-specific gene expression after incision reveals unique patterns when compared with other pain models.

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### ■ CLASSIC PAPERS REVISITED

#### **Testing the Link between Sympathetic Efferent and Sensory Afferent Fibers in Neuropathic Pain** 173

*Srinivasa N. Raja and Rolf-Detlef Treede*

This article is a revisiting of original material published as: Raja SN, Treede RD, Davis KD, Campbell JN: Systemic  $\alpha$ -adrenergic blockade with phentolamine: A diagnostic test for sympathetically maintained pain. *ANESTHESIOLOGY* 1991; 74:691–8.

### ■ EDUCATION

#### IMAGES IN ANESTHESIOLOGY

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*David W. Barbara, Benjamin C. Smith, and Katherine W. Arendt*

#### **Muscle Trauma from Tourniquet (Mis)Use** 179

*Vidya Chidambaran, Joanna Rosing, Ximena Soler, and Senthilkumar Sadhasivam*

#### CLINICAL CONCEPTS AND COMMENTARY

#### **Lipid Emulsion Infusion: Resuscitation for Local Anesthetic and Other Drug Overdose** 180

*Guy L. Weinberg*

Rapid infusion of lipid emulsion can reverse toxicity caused by lipophilic drugs, including local anesthetics.

#### REVIEW ARTICLE

#### **<sup>CME</sup> Obesity Hypoventilation Syndrome: A Review of Epidemiology, Pathophysiology, and Perioperative Considerations** 188

*Edmond H. L. Chau, David Lam, Jean Wong, Babak Mokhlesi, and Frances Chung*

Obesity hypoventilation syndrome is associated with increased morbidity and mortality. It is often unrecognized in surgical patients. This review presents the prevalence, pathophysiology, clinical assessment, and perioperative management of this disease entity.

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#### **An Unusual Cause of Fat Embolism Syndrome** 216

*Xavier Repessé, Laurent Bodson, Siu Ming Au, Bernard Page, Jean-François Côté, Cristi Marin, Mostafa El Hajjam, Cyril Charron, and Antoine Vieillard-Baron*

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*Victor C. Baum*

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*David J. Murray, Catherine Krucylak, and Jacob AuBuchon*

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*Harshad Gurnaney, Aditee Ambardekar, and Alan Jay Schwartz*

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