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- ◆ **Oxygen and Life on Earth: An Anesthesiologist's Views on Oxygen Evolution, Discovery, Sensing, and Utilization** 7
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- This article discusses the change from Earth's anoxic to oxic atmosphere in relation to the development of life, highlighting potential lessons for modern medicine to be learned from shifting anoxic physiology to oxic physiology.
- ◆ **Hyperglycemia and Acute Coronary Syndrome: A Scientific Statement from the American Heart Association Diabetes Committee of the Council on Nutrition, Physical Activity, and Metabolism** 14
Prakash Deedwania, Mikhail Kosiborod, Eugene Barrett, Antonio Ceriello, William Isley, Theodore Mazzone, and Philip Raskin
- Outcome from acute coronary syndrome is worse in patients with hyperglycemia, but whether this relationship is causal is not known. This article includes consensus guidelines from the American Heart Association and highlights gaps in our knowledge and the need for future study.
- PERIOPERATIVE MEDICINE
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- ◇◆ **High-throughput Operating Room System for Joint Arthroplasties Durably Outperforms Routine Processes** 25
Michael P. Smith, Warren S. Sandberg, Joseph Foss, Kathleen Massoli, Mona Kanda, Wael Barsoum, and Armin Schubert
- The authors' high-throughput system for joint arthroplasties persistently processes more cases in comparable time than routine operating rooms. Performance improvement stems primarily from nonoperative time reduction. System costs were higher, but contribution margin improved by 19.6%.
- ◆ **Influence of Methylene tetrahydrofolate Reductase Gene Polymorphisms on Homocysteine Concentrations after Nitrous Oxide Anesthesia** 36
Peter Nagele, Barbara Zeugswetter, Caspar Wiener, Hansjörg Burger, Michael Hüpf, Martina Mittlböck, and Manuela Födinger
- This study shows that patients with a homozygous *MTHFR* 677C>T or 1298A>C genotype are at a higher risk of developing abnormal plasma homocysteine concentrations after nitrous oxide anesthesia.

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Total Intravenous Anesthesia Including Ketamine *versus* Volatile Gas Anesthesia for Combat-related Operative Traumatic Brain Injury 44

Kurt W. Grathwohl, Ian H. Black, Phillip C. Spinella, Jason Sweeney, Joffre Robalino, Joseph Helminiak, Jamie Grimes, Richard Gullick, and Charles E. Wade

Total intravenous anesthesia often including ketamine was not associated with improved neurologic outcome in combat-related traumatic brain injury compared with volatile gas anesthesia. Multiple confounders limit conclusions that can be drawn from this study.

◇ **Randomized Prospective Study Comparing the Laryngeal Tube Suction II with the ProSeal™ Laryngeal Mask Airway in Anesthetized and Paralyzed Patients** 54

Tatsuaki Kikuchi, Yoshinori Kamiya, Tsuyoshi Ohtsuka, Tomoko Miki, and Takahisa Goto

The Laryngeal Tube Suction II is inferior to the ProSeal™ Laryngeal Mask Airway in terms of successful insertion and cuff sealing performance.

Cardiac Surgery Fast-track Treatment in a Postanesthetic Care Unit: Six-month Results of the Leipzig Fast-track Concept 61

Joerg Ender, Michael Andrew Borger, Markus Scholz, Anne-Kathrin Funkat, Nadeem Anwar, Marcus Sommer, Friedrich Wilhelm Mohr, and Jens Fassl

The study compared a newly developed fast-track concept to standard perioperative management for cardiac surgery patients. Fast-track patients had significantly shorter extubation times and shorter hospital lengths of stay, without any increase in morbidity or mortality.

Comparison of Thoracic Epidural Pressure in the Sitting and Lateral Decubitus Positions 67

Nam Su Gil, Jong-Hwan Lee, Seung Z. Yoon, Yunseok Jeon, Young Jin Lim, and Jae Hyon Bahk

Thoracic epidural pressure is more negative in the sitting position than in the lateral decubitus position.

Differential Role of Calcium/Calmodulin-dependent Protein Kinase II in Desflurane-induced Preconditioning and Cardioprotection by Metoprolol: Metoprolol Blocks Desflurane-induced Preconditioning 72

Markus Lange, Thorsten M. Smul, Andreas Redel, Christopher Lotz, Virginija Jazbutyte, Verena Schnupp, Norbert Roewer, and Franz Kehl

Desflurane-induced preconditioning is mediated by calcium/calmodulin-dependent protein kinase II, and metoprolol dose-dependently abrogates desflurane-induced preconditioning against myocardial infarction.

■ **CRITICAL CARE MEDICINE**

Randomized Controlled Trial Comparing Adaptive-support Ventilation with Pressure-regulated Volume-controlled Ventilation with Automode in Weaning Patients after Cardiac Surgery 81

Pascale C. Gruber, Charles D. Gomersall, Patricia Leung, Gavin M. Joynt, Siu Keung Ng, Ka-man Ho, and Malcolm J. Underwood

This randomized controlled trial demonstrated that weaning in adaptive-support ventilation mode results in earlier extubation, without an increase in clinician intervention, when compared with pressure-regulated volume-controlled ventilation with automode after uncomplicated cardiac surgery.

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Early Biochemical Markers of Inflammation in a Swine Model of Endotracheal Intubation 88

Carlos A. Puyo, Sally M. Tricomi, and Thomas E. Dahms

In a swine model of tracheal intubation, a significant increase in polymorphonuclear cells at 1, 2, and 4 h after intubation and a significant increase in interleukin 6 at 4 h after intubation were observed.

Differential Effects of α_2 -adrenoceptors in the Modulation of the Thermoregulatory Response in Mice Induced by Meperidine 95

Jan Höcker, Andrea Paris, Jens Scholz, Peter H. Tonner, Martin Nielsen, and Berthold Bein

Meperidine-induced reduction in thermoregulatory threshold appears to be mediated mainly by activation of α_{2A} -adrenoceptors. This effect cannot be reversed by naloxone.

■ **PAIN MEDICINE**

Lack of Analgesia by Oral Standardized Cannabis Extract on Acute Inflammatory Pain and Hyperalgesia in Volunteers 101

Birgit Kraft, Nathalie A. Frickey, Rainer M. Kaufmann, Marcus Reif, Richard Frey, Burkhard Gustorff, and Hans G. Kress

Orally administered cannabis extract did not show analgesic efficacy in two different acute pain models in human volunteers, the sunburn model and intradermal capsaicin. Electrical pain thresholds were even significantly diminished, suggesting hyperalgesia.

Electrophysiologic Characteristics of Large Neurons in Dorsal Root Ganglia during Development and after Hind Paw Incision in the Rat 111

Douglas G. Ririe, Baogang Liu, Bridgette Clayton, Chuanyao Tong, and James C. Eisenach

Changes occur in the electrophysiology of large neurons from intact dorsal root ganglia during development and after skin incision in the rat.

Lack of Impact of Intravenous Lidocaine on Analgesia, Functional Recovery, and Nociceptive Pain Threshold after Total Hip Arthroplasty 118

Frédéric Martin, Kamel Cherif, Marc Emile Gentili, Dominique Enel, Emuri Abe, Jean Claude Alvarez, Jean Xavier Mazoit, Marcel Chauvin, Didier Bouhassira, and Dominique Fletcher

Low-dose perioperative intravenous lidocaine after total hip arthroplasty offers no beneficial effect on postoperative analgesia and does not modify pressure and punctuate pain thresholds and periincisionnal hyperalgesia.

Cholinesterase Inhibitor Donepezil Dilates Cerebral Parenchymal Arterioles *via* the Activation of Neuronal Nitric Oxide Synthase 124

Katsutoshi Nakahata, Hiroyuki Kinoshita, Keiko Hama-Tomioka, Yuko Ishida, Naoyuki Matsuda, Noboru Hatakeyama, Masanori Haba, Toshikazu Kondo, and Yoshio Hatano

Donepezil produces vasodilation induced by a selective activation of neuronal nitric oxide synthase in cerebral parenchymal arterioles. This agent may be capable of enhancing this enzyme directly or *via* acetylcholinesterase in the arteriolar wall.

Temporal Effects of Topical Morphine Application on Cutaneous Wound Healing 130

Jerri M. Rook, Wohaib Hasan, and Kenneth E. McCarson

Alterations in the temporal processes of wound healing not only result in delayed wound closure but also produce long-term architectural deficits, jeopardizing the integrity of the healed skin following topical morphine administration.

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■ REVIEW ARTICLE

- ◇ **Obesity-induced Insulin Resistance and Hyperglycemia: Etiologic Factors and Molecular Mechanisms** 137

J. A. Jeevendra Martyn, Masao Kaneki, and Shingo Yasuhara

Obesity is a major cause of type 2 diabetes, clinically evidenced as hyperglycemia. The altered glucose homeostasis is caused by faulty signal transduction *via* the insulin signaling proteins, which results in decreased glucose uptake by the muscle, altered lipogenesis, and increased glucose output by the liver. There are substantial differences in the molecular mechanisms of insulin resistance in muscle *versus* liver. Hormones and cytokines from adipocytes can enhance or inhibit both glycemic sensing and insulin signaling. In addition, the role of the central nervous system in glucose homeostasis also has been established.

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Richard A. Jaffe, Jason A. Talavera, Jennifer M. Hah, and John G. Brock-Utne

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