Journal-related Activities and Other Special Activities at the 2012 American Society of Anesthesiologists Annual Meeting

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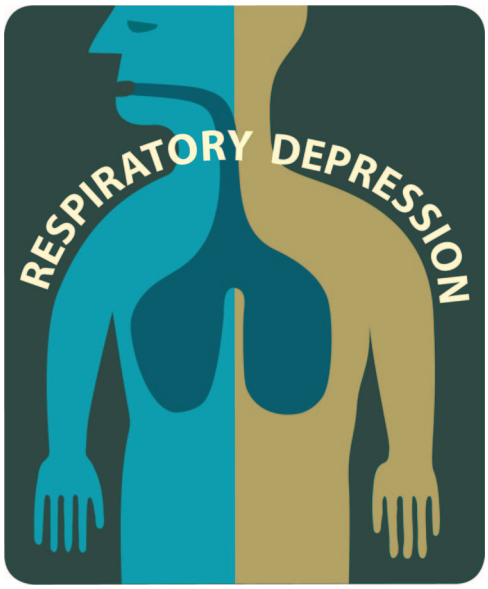

21st Annual Journal Symposium: Respiratory Depression

Tuesday, October 16, 2012, 8:00 AM to 11:00 AM, West Salon G, Walter E. Washington Convention Center, Washington, D.C.

This year ANESTHESIOLOGY will sponsor three sessions at the Annual Meeting of the American Society of Anesthesiologists (ASA). The Journal Symposium will highlight postoperative respiratory depression, in lectures and presentations of original research. Various perioperative interventions associated with anesthesia and surgery significantly influence respiratory function. Patterns and severity of the perioperative respiratory depression may significantly depend on coexisting diseases, consciousness, and other structural and functional factors relating to breathing stability. This symposium will explore mechanisms and clinical management for preventing, detecting, and treating respiratory depression that should change our clinical practice and patient outcome. This symposium provides the scientist and clinician with state-of-the-art information to help guide clinical practice.

Two invited speakers will lead the session. Kingman Strohl, M.D., Professor of Medicine and Physiology & Biophysics, Division of Pulmonary, Critical Care, and Sleep Medicine at University Hospitals Case Medical Center, Case Western Reserve University, will provide new evidence of the pathophysiology of respiratory depression that incorporates breathing patterning and genetic predisposition as factors operating in our clinical practice. Matthias Eikermann, M.D., Ph.D., Assistant Professor of Department of Anesthesia, Critical Care, and Pain Medicine at Massachusetts General Hospital, and Harvard Medical School, will discuss how anesthesia, surgery, and immobility influence perioperative respiratory muscle function.

These lectures will be followed by the oral presentations of 10 abstracts, summarized below, that were selected for their relevance to the Symposium topic. The full text for each abstract can be found at the ASA abstract Web site.

"Association of Preoperative Oximetry Parameters with Postoperative Adverse Events" by F. Chung, L. Zhou, and P. Liao, Department of Anesthesia, University Health Network, Toronto, Ontario, Canada. The authors explored the association of parameters extracted from preoperative nocturnal oximetry with postoperative adverse events in 573 surgical patients. Mean Spo_2, oxygen desaturation index (hourly desaturation events with Spo_2 drop to 4% or more for 10 s or more), and cumulative time percentage with Spo_2 less than 90% were identified to be significant indicators for postoperative adverse events. Preoperative nocturnal oximetry may be useful in stratifying patients for the risk of postoperative adverse events.

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"Perioperative Auto-CPAP Treatment Improved Oxygen Saturation in Patients with Moderate or Severe Obstructive Sleep Apnea (OSA)" by P. Liao and F. Chung, Department of Anesthesia, University Health Network, University of Toronto, Toronto, Ontario, Canada. The authors examined whether perioperative auto-CPAP treatment improves oxygenation in 177 patients with moderate and severe obstructive sleep apnea, randomly assigned to either auto-CPAP group (n = 87) or control group (n = 90). Because of the dropout from postoperative pain, nausea, and vomiting, 100 (auto-CPAP = 39, control = 61) completed follow-up for 5 postoperative nights. The overall CPAP compliance rate was 45% (39/87). No significant postoperative pressure increase was observed. Compared with the control group, variables of sleep-disordered breathing severity were improved (oxygen desaturation index and cumulative time percentage with Spo_2 less than 90% in auto-CPAP group were significantly decreased) on preoperative and postoperative nights.

"Differential Effects of Co- and Pre-Administration of Picrotoxin with Flumazenil on Diazepam-Induced Hypoglossal Nerve Inhibition" by S. Nakamura, M. Suzuki, M. Nishida, T. Mieda, K. Terayama, H. Nagasaka, T. Azma, A. Kitamura, N. Matsumoto, Division of Anesthesia, JA Kumagaya General Hospital, Kumagaya, Japan, Department of Pharmacology, Saitama Medical University, Hidaka, Japan, Hanyu General Hospital, Hanyu, Japan, SMU International Medical Center, Hidaka, Japan, Meikai University, Sakado, Japan, Saitama Medical University, Moroyama, Japan. In anesthetized adult rabbit preparation, the authors examined how patterns of administration of flumazenil (a specific benzodiazepines receptor antagonist) and/or picrotoxin (a noncompetitive $GABA_A$ receptor antagonist) change diazepam-induced inhibition of the hypoglossal nerve activity. They found that flumazenil alone, picrotoxin alone, and administration of both drugs reversed the depressed hypoglossal nerve activity, as expected. In contrast, flumazenil with preadministered picrotoxin resulted in marked excitation of the hypoglossal nerve activity (150%-control).

"Predictors of the Ability to Protect the Airway in Long-term Ventilated Patients" by H. Mirzakhani, J. Williams, J. Mello, F. Xue, E. M. Kelly, S. J. Emma, M. Eikermann. Speech, Language, Swallowing and Reading Disabilities, Anesthesia, Critical Care and Pain Medicine, Pulmonary and Critical Care Unit, Massachusetts General Hospital, Boston, Massachusetts. The authors tested a hypothesis that manual muscle testing predicts the ability to protect the airway during swallowing in long-term ventilated, tracheostomized patients. They assessed the ability to protect the airway during fiberoptic endoscopic evaluation of swallowing by using the penetration-aspiration scale (PAS, 0–8), and valleculae and pyriform sinus residue scale (VPSR, 0–4) in 30 long-term ventilated patients. Medical research council (MRC) score independently predicted inability to clear secretions from the perilaryngeal area during swallowing (VPSR more than 1, odds ratio: 0.84 [CI: 0.77 to 0.98], P value = 0.024). Area under the curve of the receiver-operating curve for medical research council score to predict VPSR score more than 1 was 0.753 (P value = 0.019). PAS score was significantly correlated with residue ($r = 0.7$, $P < 0.001$). The authors conclude that muscle strength measurement might be a viable tool to predict a patient's predisposition to aspiration.

"Development and Validation of the MGH Postoperative Respiratory Complications Prediction Score (PORCS)" by B. Brueckmann, J. Wanderer, B. T. Bateman, M. G. Sundrup, C. L. Schlett, M. Eikermann, Department of Anesthesia, Critical Care and Pain Medicine, Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts. To predict preoperatively adverse respiratory outcome, defined as reintubation after primary extubation in the operating room, a total of 55,488 patients undergoing surgery under general anesthesia were randomly split by half into development and validation dataset (each n = 27,744). The overall reintubation rate was 0.7% (n = 384), and a large portion (36%) died subsequently. The Massachusetts General Hospital postoperative respiratory complications prediction score, including independent predictors for reintubation determined by development dataset, was validated to predict severe postoperative respiratory complications.

"Risk Factors for Opioid-induced Respiratory Depression Deduced from Thirty Years of Case Reports" by A. Dahan, M. Niesters, L. Aarts, F. Overdyk, Department of Anesthesiology, Leiden University Medical Center, Leiden, Netherlands. Opioid-induced respiratory depression (OIRD) is a potentially life-threatening complication of opioid therapy. The authors identified available case reports on risk factors for OIRD; 185 relevant papers describing 246 individual patients were identified. Most reports involved opioid-use for acute pain relief, but reports related to chronic pain treatment appeared to be increasing during the last few years. Frequently reported associations accompanying OIRD were age more than 60 yr, sleep disordered breathing, renal impairment, and drug interactions with sedative (benzodiazepines), opioid cocktails, droperidol, magnesium, and propofol.

"Nocturnal Oxyhemoglobin Desaturation Predicts Spontaneous Pain in Subjects with Sleep-disordered Breathing, Independently of Sleep Fragmentation and Systemic Inflammation: A Reanalysis of the Cleveland Family Study" by A. Doufas, L. Tian, F. Davies, Department of Anesthesia, Health Research and Policy, Stanford University School of Medicine, Stanford, California. The authors evaluated if nocturnal desaturation (expressed as respiratory disturbance status), sleep disruption (electroencephalogram), and inflammation (cytokine expression), all of which are signs and symptoms of sleep-disordered breathing, have differential effects on pain behavior (chest pain, morning headache, headache during sleep). They found that nadir Sao_2 was negatively associated with pain, an association that remained significant after adjusting for sleep fragmentation and inflammation. In contrast, the obstructive apnea-hypopnea index was positively associated with pain adjusted for sleep fragmentation and inflam-

mation. These findings support that nocturnal desaturation may promote pain behavior in subjects suffering for sleep-disordered breathing independently of disturbances in their sleep continuity and the presence of systemic inflammation.

"Ketamine to Avoid Hypoventilation in Patient Undergoing Deep Sedation: A Randomized Controlled Double-blinded Study" by G. De Oliveira, Jr., P. Fitzgerald, R. McCarthy, Department of Anesthesiology, Northwestern University, Chicago, Illinois. Ketamine has been shown to activate breathing and abolish the coupling between loss of consciousness and upper airway dilator muscle dysfunction in rodents, but it is unknown if ketamine can prevent hypoventilation in humans undergoing deep sedation utilizing a common and standard anesthetic regimen. The authors evaluated in a randomized trial the effect of ketamine to prevent hypoventilation in patients undergoing deep sedation. In female patients undergoing breast segmental mastectomy under monitored anesthesia care during propofol sedation, ketamine (0.5 mg/kg bolus IV followed by 1.5 $mcg^{-1} \cdot kg^{-1} \cdot min^{-1}$ infusion) compared with saline was associated with a more than 50% decrease in the duration of hypoventilation (transcutaneous carbon dioxide value more than 50 mmHG), and a significantly higher median respiratory rate, without a difference in propofol consumption between groups. These data suggest that preclinical data reporting on a ketamine-induced respiratory stimulating effect translate to humans under propofol anesthesia.

"Evaluation of the Accuracy of a Continuous, Noninvasive System for Monitoring Tidal Volume, Respiratory Rate, and Minute Ventilation in Nonintubated Patients" by J. E. Freeman, N. Yocum, A. Panasyuk, M. Lalli, S. Panasyuk, D. Fahy, E. Messana, C. J. Voscopoulos, Respiratory Motion, Inc, Waltham, Massachusetts, Brigham and Women's Hospital, Boston, Massachusetts. This authors compared in 47 subjects the accuracy and precision of a "bio-impedance" respiratory monitor (ExSpiron; Respiratory Motion, Inc., Waltham, MA) for continuous, real-time respiration monitoring of tidal volume and respiratory rate with a handheld spirometer (Wright Respirometer, nSpire Health, Inc., Longmont, CO) during series of 1-min breathing tests taken at two subsequent days. Preliminary data analysis did not reveal major differences in values derived from the two data acquisition techniques of tidal volume and respiratory rate monitoring.

"Accuracy of Acoustic Respiration Rate Monitoring in Pediatric Patients" by M. Patino, M. Mahmoud, D. Kurth, D. T. Redford, T. Quigley, P. Szmuk, Anesthesia, Cincinnati Children's Hospital Medical Center, Cincinnati, OH. The authors compared automated measurements of respiratory rate taken by acoustic respiratory monitoring (Rainbow Acoustic Monitoring, RAM, Masimo Corporation, Irvine, CA) and capnography in 26 pediatric, postanesthesia care unit patients (ages: 14 months–14 yr [average 7.6]) with the assessment of a respiratory therapist who reviewed the capnography and acoustic monitor derived waveforms manually. Preliminary statistical analysis revealed that respiratory rate measurements *via* acoustic monitoring and capnography produce similar readings of respiratory rate.

Best Abstracts: Basic Science and Clinical Science

ANESTHESIOLOGY will sponsor two Best Abstract sessions this year, one in basic science and one in clinical science. These 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. Subsequently, a combination of these editors and appointees from the ASA will choose one abstract in each category to receive the Best Abstract award for basic and for clinical science at the meeting in Washington, D.C.

Following are summaries of the superlative abstracts that will be presented.

Best Abstracts: Basic Science

Monday, October 15, 2012, 8:00 AM to 11:00 AM, Room 144C, Walter E. Washington Convention Center, Washington, D.C.

"Effects of Forebrain HCN1 Channels Contribute to Hypnotic Actions of Ketamine" by Xiangdong Chen, M.D., Ph.D., Douglas A. Bayliss, Ph.D., Department of Anesthesiology, West China Hospital of Sichuan University, Chengdu, China, Department of Pharmacology, University of Virginia, Charlottesville, Virginia. Not all of the effects of ketamine can be explained by its blockade of the *N*-methyl-D-aspartate receptor. A hyperpolarization-activated current carried by HCN1 channels was inhibited by ketamine in wild-type cortical neurons but not in neurons from forebrain specific HCN1 knockout mice. The median ketamine dose required to produce loss-of-righting reflex was increased by approximately 34% and its duration of action was reduced in HCN1 knockout mice. This suggests the hypnotic action of ketamine is at least partially affected by its selective inhibition of HCN1 channels.

"Assessment of Homology Templates and the Anesthetic Binding Site within the GABA Receptor" by Edward Bertaccini, M.D., James R. Trudell, Ph.D., Department of Anesthesia, 112A, Stanford University and Palo Alto VA Hospital, Palo Alto, California, Stanford University, Stanford, California. Anesthetics bind to ligand-gated transmembrane ion channels, such as γ-aminobutyric acid and glycine receptors, and modulate their activity. Molecular modeling facilitates understanding of the structure of ligand-gated ion channels, using as templates well characterized coordinate systems of highly homologous proteins. Six templates were assessed by mapping three residues on transmembrane segments 1–3 that modulate anesthetic action to aligned structures and create the anesthetic binding pocket. Consensus structural alignment of five homologous templates identified an intersubunit binding cavity within the transmembrane domain, characteristics of which allow

reasonable correlations of ligand docking scores of a series of propofol derivative with ligand-binding affinities.

"Specific Hypersensitivity to Volatile Anesthetics in a Mouse Lacking *Ndufs4*, a Subunit of Mitochondrial Complex I" by Phil G. Morgan, M.D., Albert Quintana, Ph.D., Richard D. Palmiter, Ph.D., Margaret M. Sedensky, M.D., Department of Anesthesiology and Pain Medicine, Seattle Children's Research Institute, HHMI, Biochemistry, University of Washington, Department of Anesthesiology and Pain Medicine, University of Washington, Seattle, Washington. Evidence that mitochondrial function underlies the actions of potent volatile anesthetics has been obtained in studies of the nematode *C. elegans*, knockout mice, and children with defects in complex I of the mitochondrial electron transport chain. The median effective anesthetic doses of halothane, isoflurane, propofol, and ketamine were determined in wild-type mice and in mice with a knockout mutation in a subunit of mitochondrial complex I. Knockout mice required less than half the concentration of halothane and isoflurane and half the dose of propofol, but nearly 50% more ketamine. These results suggest the contribution of mitochondrial complex I to potent volatile anesthetic sensitivity is not the result of nonspecific central nervous system depression.

"Antisense Inhibition of De Novo Pkmζ Synthesis: A Novel, Highly Specific, and Potent Amnestic Agent" by Panayiotis Tsokas, Ph.D., Changchi Hsieh, M.A., Ira S. Kass, Ph.D., Todd C. Sacktor, M.D., James E. Cottrell, M.D., Departments of Anesthesiology and Physiology and Pharmacology, SUNY Downstate Medical Center, Physiology and Pharmacology, SUNY Downstate Medical Center, Neurology, SUNY Downstate Medical Center, Brooklyn, New York. Protein kinase Mζ (PKMζ) is a brain-specific, active form of protein kinase Cζ that is needed for the formation and storage of long-term memory. During spatial learning and the induction of protein synthesis-dependent long-term potentiation, which is a cellular mechanism underlying learning and memory, PKMζ is synthesized in the hippocampus from a PKMζ mRNA. An antisense oligodeoxynucleotide sequence targeting the translation start site of PKMζ blocks PKMζ synthesis. Injection of the antisense oligodeoxynucleotide into the hippocampus of rats bilaterally blocked *de novo* PKMζ synthesis during active place avoidance and prevented memory consolidation but did not affect either basal PKMζ levels or short-term memory.

"TRIF Signaling Contributes to Myocardial Ischemia–Reperfusion Injury by Mediating Cardiomyocyte Apoptosis" by Chan Chen, M.D., Yan Feng, M.D., Ph.D., Lin Zou, M.D., Ph.D., Howard H. Chen, Ph.D., Jun-Mei Xu, M.D., Ph.D., Jia-Yan Cai, B.S., David Sosnovik, M.D., Wei Chao, M.D., Ph.D., Department of Anesthesia, Critical Care and Pain Medicine, Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts, Department of Anesthesiology, the Second XiangYa Hospital, Central South University, Changsha, Hunan, China. Inflammation and apoptosis after ischemia and reperfusion contribute to myocardial infarction and left ventricular failure. Toll-like receptors, which signal by MyD88- and TRIF-dependent pathways, play a role in myocardial ischemia–reperfusion injury. TRIF-deficient mice had smaller myocardial infarctions and better preservation of left ventricular function after 45 min of ischemia and 24 h of reperfusion. TRIF-deficient mice also had attenuated myocardial infarction and apoptosis after 45 min of ischemia and 4 h of reperfusion. However, TRIF deficiency did not affect myocardial cytokine production and neutrophil recruitment after ischemia–reperfusion. TRIF signaling may contribute to myocardial ischemia–reperfusion injury and resulting left ventricular dysfunction by mediating cardiac myocyte apoptosis.

"Unlike Opioids, Ischemic Preconditioning, and Isoflurane, Intralipid is Able to Protect Caveolin-3 Knockout Mice Against Ischemia–Reperfusion Injury" by Siamak Rahman, M.D., Heidi Fridolfsson, Ph.D., David M. Roth, M.D., Ph.D., Hemal H. Patel, Ph.D., Mansoureh Eghbali, Ph.D., Department of Anesthesiology, UCLA, Los Angeles, California, UCSD, San Diego, California. Postischemic intralipid administration in both *in vitro* and *in vivo* models of ischemia–reperfusion injury reduced infarct size 70%. Mice overexpressing cardiac specific caveolin-3 had smaller infarcts after ischemia–reperfusion injury, whereas caveolin-3 knockout mice could not be protected by classic protective interventions. Langendorff isolated perfused preparations of hearts from caveolin-3 knockout mice that were subjected to ischemia–reperfusion injury had improved functional recovery when they were reperfused with a Krebs–Henseleit bicarbonate buffer containing 1% intralipid that was not different than the recovery of hearts from wild-type mice that were similarly perfused. These results suggest caveolin-3 is not required for intralipid cardioprotection.

"Functional Neural Connectivity of the Macaque Sensorimotor Network Under Propofol Anesthesia" by Yumiko Ishizawa, M.D., Ph.D., Demetrio Sierra, Ph.D., Ayako Uchida, B.S., John T. Gale, Ph.D., Emery N. Brown, M.D., Ph.D., Emad N. Eskandar, M.D., Department of Anesthesia, Critical Care & Pain Medicine, Department of Neurosurgery, Massachusetts General Hospital, Boston, Massachusetts. During motor maintenance in awake monkeys, synchronized β oscillations bind multiple sensorimotor areas into a large-scale network. To determine the effects of anesthetic-induced loss of response on neural functional connectivity in the primate cerebral cortex, local field potentials were measured in the primary sensory cortex, the secondary sensory cortex, and a frontal association cortex of two adult macaque monkeys. Local and distant coherence, or coupling of the systems as a function of frequency, was calculated. At propofol-induced loss of response there was a disruption of β oscillation between sensorimotor areas and alteration of coherence, although distinct sensory responses remained in all three areas.

"Anesthetics Interfere with Axon Guidance and Growth Cone Function in Developing Neocortical Neurons *via* a $GABA_A$ Receptor Mechanism" by Cyrus D. Mintz, M.D., Ph.D., Kendall M. S. Barrett, B.S., Sarah C. Smith, M.D., Deanna L. Benson, Ph.D., Neil L. Harrison, Ph.D., Department of Anesthesiology, Columbia University, Department of Neuroscience, The Mount Sinai School of Medicine, New York, New York. Childhood exposure to general anesthetics may result in learning disabilities. Brain function depends on circuit formation in which developing axon growth cones follow chemotropic guidance cues to dendritic targets. Anesthetic agents that are $GABA_A$ receptor agonists, including isoflurane, propofol, thiopental, and midazolam, interfered with axon guidance by inhibiting the repulsive activity of guidance cues at the axonal growth cone, but agents without activity at the $GABA_A$ receptor, including fentanyl and dexmedetomidine, did not. These results suggest exposure of the developing brain to anesthetics may disrupt brain circuit formation, which could be another form of anesthetic neurotoxicity.

"The Subsequent Memory and Subsequent Forgetting Effects of Propofol Revealed with Event-related Functional Magnetic Resonance Imaging (fMRI)" by Michael T. Alkire, M.D., Hiroki Hayama, Ph.D., Kristin Drumheller, M.S., Chris Reist, M.D., Larry Cahill, Ph.D., VA Long Beach Healthcare System, Long Beach, California, and University of California, Irvine, Irvine, California. The amnesic action of propofol has been attributed to suppression of working memory networks in cortical areas based on positron emission tomography findings. Using event-related functional magnetic resonance imaging, this neuroanatomical construct for propofol's amnesic effect was confirmed, extended, and clarified. Much of the amnesic effect of low-dose propofol was found to be affected by subsequent forgetting effects in both medial and lateral parietal areas and lateral and midline prefrontal cortex. In addition, low-dose propofol was found to greatly attenuate hippocampal subsequent memory effect.

"The Effects of Disparities in Disease Prevalence on Type I Error Rates When Comparing Mortality Between Populations Matched on Imperfect Markers of Disease: A Database Simulation Study" by Robert B. Schonberger, M.D., Todd A. Gilbertsen, B.S., Feng Dai, Ph.D., Department of Anesthesiology, Yale-New Haven Hospital System, Yale Center for Analytical Sciences, Yale School of Public Health, New Haven, Connecticut. Observational studies often fail to control for unmeasured confounding variables. Monte Carlo simulations of the effect on mortality of two hypothetical drugs were conducted to illustrate how even controlling for imperfect markers of disease between two populations can lead to spurious results, especially when the prevalence of the confounders differ in the two populations. As sensitivity and specificity of markers for confounders decline, even measured confounders distort results. Multivariable studies will be especially vulnerable to type I error when groups of patients that carry large baseline differences in the prevalence of imperfect markers are propensity score-matched using those markers as independent variables in the propensity score models.

"Naloxone Blocks Lipid Rescue of Bupivacaine-induced Cardiotoxicity in a Dose-dependent Manner" by Parisa Partownavid, M.D., Soban Umar, M.D., Ph.D., Siamak Rahman, M.D., Mansoureh Eghbali, Ph.D., Department of Anesthesiology, University of California, Los Angeles, Los Angeles, California. Large doses of naloxone completely prevent the cardioprotective effect of ischemic preconditioning. Asystole was induced by injecting bupivacaine intravenously in intubated and ventilated male rats that were anesthetized with ketamine and xylazine. Rats resuscitated with intralipid and cardiac massage had full recovery of left ventricular systolic function within 5 min of resuscitation. However, those pretreated with 1 mg/kg naloxone 2 min before inducing asystole had no recovery of cardiac function. Rats pretreated with 1 μg/kg naloxone recovered fully within 10 min of lipid therapy, whereas those pretreated with 5 μg/kg and 10 μg/kg recovered only partially after lipid rescue. Thus, naloxone pretreatment dose-dependently prevented lipid rescue of bupivacaine-induced asystole.

"The μ Opioid Receptor Promotes Opioid and Growth Factor-induced Epithelial Mesenchymal Transition (EMT) in Human Nonsmall Cell Lung Cancer" by Jonathan Moss, M.D., Ph.D., Frances E. Lennon, Ph.D., Tamara Mirzapoiazova, M.D., Ph.D., Bolot Mambetsariev, Ph.D., Ravi Salgia, M.D., Ph.D., Patrick A. Singleton, Ph.D., University of Chicago, Chicago, Illinois. The expression of μ opioid receptor in human nonsmall cell lung cancer cells increased tumor growth and metastasis. Cancer metastasis has numerous phenotypic similarities to epithelial-mesenchymal transition. Treatment of human nonsmall cell lung cancer cells with opioids (DAMGO, morphine, or fentanyl) or growth factors (epidermal growth factor or insulin-like growth factor) and cells with μ opioid receptor overexpression had increased protein levels consistent with epithelial-mesenchymal transition phenotype. These effects were prevented by silencing μ opioid receptor expression with small hairpin RNA. These data suggest the μ opioid receptor directly affects epithelial-mesenchymal transition in lung cancer, an effect that is enhanced by opioids and growth factors.

Best Abstracts: Clinical Science

Tuesday, October 16, 2012, 1:00 PM to 3:00 PM, Washington Convention Center, West Salon G.

"Prefrontal White Matter and Functional Network Changes After Cardiac Surgery" by Gina C. Badescu, M.D., Jeffrey N. Browndyke, Ph.D., Todd B. Harshbarger, Ph.D., Tiffany Bisanar, R.N., Monique Fontes, B.A., Mihai V. Podgoreanu, M.D., Mark F. Newman, M.D., Joseph P. Mathew, M.D., Departments of Anesthesiology and Psychiatry, Duke University, Durham, North Carolina. Postoperative cognitive decline is common following cardiac surgery. Investigators sought to determine the frequency and nature of white matter patency and func-

tional network changes associated with cardiac surgery by studying 11 patients undergoing cardiac surgery and nine nonsurgical controls. The investigators found significant regional differences in white matter patency that were correlated with postoperative cognitive decline. Furthermore, perioperative alterations in the governing functional networks appear to be associated with residual white matter changes in the prefrontal lobe at 6 weeks after surgery.

"High-Sensitive Troponin T in Prediction and Diagnosis of Perioperative Myocardial Infarction" by Peter Nagele, M.D., M.S., Frank Brown, B.S., Mitchell Scott, Ph.D., Brian Gage, M.D., M.S., Phil J. Miller, Ph.D., Anesthesiology, Department of Pathology and Immunology, Department of Internal Medicine, Biostatistics, Washington University, St. Louis, Missouri. The high-sensitive troponin T (hsTnT) assay allows for detection of circulating plasma troponin T levels in stable patients in the absence of an acute coronary syndrome. Patients undergoing surgery had serial blood draws and ECGs at baseline, end of surgery, and on postoperative day 1–3. Plasma hsTnT (Roche) as well as regular troponin I (Siemens) were measured, and the change (δ) between baseline and peak troponin was calculated. The results of the study indicate that preoperative hsTNT concentrations can be detected in most adult patients before surgery and may be useful in preoperative risk stratification for postoperative myocardial infarction. Furthermore, the postoperative increase in hsTnT may be useful as objective quantification of perioperative myocardial injury.

"Epidural Blockade Affects the Predictive Accuracy of a Target-controlled Infusion with Propofol" by Elske Sitsen, M.D., Agnes Lesman, M.D., Erik Olofsen, M.Sc., Albert Dahan, M.D., Ph.D., Jaap Vuyk, M.D., Ph.D., Department of Anesthesiology, Leiden University Medical Center, Leiden, Netherlands. Previous studies report on the hypnotic sparing effect of central neuraxis blockade (CNB). The mechanism and the magnitude of the sedative-sparing effect of CNB are unclear. Investigators studied the influence of epidural blockade with ropivacaine on the pharmacokinetics and pharmacodynamics of propofol in a double-blind manner in patients scheduled for general surgery. The investigators found that with an increasing epidural blockade level, the measured blood propofol concentrations increasingly exceed those predicted. This suggests that CNB not only affects the pharmacodynamics of propofol but may also influence the pharmacokinetics of propofol as well. A reduction in hepatic clearance of propofol may be responsible.

"Optimizing Preoperative Blood Ordering for Low Blood Loss Surgical Procedures Using Data Acquired grom an Anesthesia Information Management System" by James Rothschild, M.D., Courtney G. Masear, M.D., Will J. Savage, M.D., Paul M. Ness, M.D., Steven M. Frank, M.D., Department of Anesthesiology/Critical Care Medicine, Pathology, The Johns Hopkins Medical Institutions, Baltimore, Maryland. The investigators utilized methods to accurately collect and analyze data using an anesthesia information management system to develop protocols to reduce unnecessary preoperative blood orders. Data were extracted and analyzed for a 2-yr period to assess transfusion requirements and preoperative blood orders. Eleven procedures were identified that had both very low transfusion rates and preoperative blood ordered. Only 21 of 9,265 patients (0.23%) were transfused, but more than one-third of all patients had either a type and screen or type and cross-match ordered. As a result of this analysis, we plan to implement preoperative blood-ordering algorithms that eliminate or decrease unnecessary blood orders.

"The Effect of Intensive Glucose Control on Outcomes Following Major Noncardiac Surgery (DeLiT Trial)" by Basem B. Abdelmalak, M.D., Ankit Maheshwari, M.D., Jing You, B.A., Angela Bonilla, M.D., Daniel I. Sessler, M.D., Departments of General Anesthesiology and Outcomes Research, Anesthesiology Institute, Quantitative Health Science, Outcomes Research, Cleveland Clinic, Cleveland, Ohio. Treatment of hyperglycemia improves outcomes in critically ill patients. However, the effects of intraoperative intensive *versus* conventional glucose control on perioperative outcomes in major noncardiac surgery remain unknown. Patients scheduled for major noncardiac surgery during general anesthesia were enrolled in the DeLiT trial. Median intraoperative time-weighted average glucose for the intensive control patients (108 mg/dL) was lower than that for standard care patients (139 mg/dl) ($P < 0.001$). Tight glucose control had no effect on the primary outcome of major morbidity, with odds ratio (95% CI) of 0.96 (0.45–2.0), $P = 0.86$. Despite no severe hypoglycemic events, tight glucose control did not reduce (or increase) the risk of severe morbidity after major noncardiac surgery.

"β-Blockade and Clinical Outcomes in Aneurysmal Subarachnoid Hemorrhage" by Melody M. Chang, M.D., Jessie J. Southerland, M.D., Dare Adewumi, M.D., Rafeek Woods, M.D., Olaide Ajayi, M.D., Rajeev Samuel, B.S., Bryan S. Lee, B.S., Frank Hsu, M.D., Richard L. Applegate, II, M.D., Ihab Dorotta, M.D., Department of Anesthesiology, Neurosurgery, Loma Linda University Medical Center, Loma Linda, California. The clinical course of patients suffering from aneurysmal subarachnoid hemorrhage may be complicated by hypertension and neurogenic myocardial stunning. Management of these complications often involves the use of β-blockers. The investigators sought to examine if there was any relationship of β-blockade to the incidence and severity of radiographic vasospasm in aneurysmal subarachnoid hemorrhage by retrospectively examining 219 adult patients. The use of β-blockers in aneurysmal subarachnoid hemorrhage is associated with increased incidence of radiographic cerebral vasospasm. However, despite the increased rate of vasospasm, the use of β-blockers was associated with improved discharge characteristics.

"Is Recovery from Acute Kidney Injury Associated with Improved Survival?" by Milo Engoren, M.D., Cynthia Arslanian-Engoren, Ph.D., Thomas A. Schwann, M.D., Sachin Kheterpal, M.D., Robert H. Habib, Ph.D., Department of Anesthesiology, University of Michigan, Ann Arbor, Michigan, University of Toledo, Toledo, Ohio,

American University of Beirut, Beirut, Lebanon. Acute kidney injury (AKI) after cardiac surgery is associated with increased short- and long-term mortality, but whether recovery from AKI improves survival to the levels experienced by patients without AKI has not been settled. The investigators examined the association of renal recovery from AKI on survival using data from 1,591 patients. Recovery from AKI-minimal was not associated with a lower relative risk of perioperative death.

"Temporal Trends and Predictors of Severe Maternal Sepsis and Mortality During Hospitalization for Delivery" by Melissa E. Bauer, D.O., Brian Bateman, M.D., Amy Shanks, M.S., Jill Mhyre, M.D., Department of Anesthesiology, University of Michigan, Ann Arbor, Michigan, Massachusetts General Hospital, Boston, Massachusetts. Sepsis emerged as the leading cause of direct maternal death in the most recent Saving Mothers' Lives report from the United Kingdom. The investigators examined incidence, risk factors, and outcomes for severe maternal sepsis during hospitalization for delivery using the largest administrative dataset of admissions available in the United States, the Nationwide Inpatient Sample. The rate of delivery-related sepsis was higher than previous estimates, and the rate of death and severe sepsis among parturients with sepsis increased markedly between 1998 and 2008. Chronic renal insufficiency, chronic liver disease, stillbirth, retained products of pregnancy, and cesarean delivery were the strongest predictors of severe sepsis during hospitalization for delivery.

"Administration of Propofol After Learning Improves Memory Performance in Human Subjects *via* Loss of Competitive Consolidation: Evidence That Propofol Amnesia Occurs at the Induction of Consolidation" by Kane Pryor, M.D., Anne S. Blackstock-Bernstein, B.A., Daniel Feiler, B.A., Eugene Vortsman, B.A., James C. Root, Ph.D., Department of Anesthesiology, Weill Cornell Medical College, New York, University of Rochester Medical School, Rochester, New York, New York College of Osteopathic Medicine, Old Westbury, New York. Subclinical doses of propofol are capable of causing a selective anterograde amnesia characterized by a failure of memory consolidation processes, likely focused in a hippocampal-amygdala network. Elucidation of the mechanism holds potential as a significant advance in the study of memory systems and pathology in humans. Subjects were randomly assigned to placebo (21) or 0.90 mcg/ml propofol (20) groups. After drug administration, propofol subjects were able to recall more words than placebo subjects at all timepoints. At amnestic doses, propofol exhibits no retrograde amnesia and does not degrade the early consolidation of previously learned material. Our findings strongly support the model in which the critical target of propofol is an initiation/induction event in the consolidation cascade.

"Genetic Polymorphisms in the Dopamine Receptor D2 are Associated with Acute Pain Severity After Motor Vehicle Collision" by Yawar J. Qadri, M.D., Ph.D., Andrey V. Bortsov, M.D., Ph.D., Robert A. Swor, D.O., David A. Peak, M.D., Jeffrey S. Jones, M.D., Niels K. Rathlev, M.D., David C. Lee, M.D., Robert M. Domeier, M.D., Phyllis L. Hendry, M.D., Samuel A. Mclean, M.D., M.P.H., University of North Carolina, Chapel Hill, North Carolina, William Beaumont Hospital, Royal Oak, Michigan, Massachusetts General Hospital, Boston, Massachusetts, Spectrum Health - Butterworth Campus, Grand Rapids, Michigan, Baystate Medical Center, Springfield, Massachusetts, North Shore University Hospital, Manhasset, New York, St. Joseph Mercy Hospital, Ann Arbor, Michigan, University of Florida-Jacksonville, Jacksonville, Florida. Dopamine is implicated in nociceptive pathways. Investigators tested the hypothesis that genetic variants in the gene encoding dopamine receptor D2 (DRD2) are associated with the severity of reported pain after minor trauma exposure. Patients who presented to the emergency department (ED) after motor vehicle collisions and were discharged home were recruited at the time of ED evaluation. Overall pain intensity in ED was assessed using a 0–10 numeric rating scale. DNA was extracted from blood samples (PAXgene Blood Tube) and targeted genotyping (Sequenom platform) of 12 specific single nucleotide polymorphisms in the DRD2 gene was performed. Individuals presenting to the ED after a minor motor vehicle collision with the rs6276 AA genotype report less pain as compared with the patients with the AG or GG genotype. This genetic variant in the gene encoding DRD2 is associated with pain severity after motor vehicle collisions and may be a target for future therapies.

"Chronic Pain Syndrome After Knee Arthroscopy in Young Veterans with and without Posttraumatic Stress Disorder (PTSD)" by Irene Rozet, M.D., Issuta Nishio, M.D., Ph.D., Reinette Robbertze, M.D., Adrian Vladimir Hernandez Diaz, M.D., Ph.D., Department of Anesthesiology and Pain Medicine, University of Washington, Seattle, Washington, Department of Health Outcomes and Clinical Epidemiology, Cleveland Clinic, Cleveland, Ohio. Development of chronic pain syndrome (CPS) leads to disability. Posttraumatic stress disorder (PTSD) has been reported to be associated with CPS, although an acute and chronic perception of pain in patients with PTSD is poorly understood. We hypothesized that army veterans with PTSD are at risk for developing CPS after elective knee surgery. Medical records of adult (18–50-yr-old) patients who underwent elective ambulatory knee arthroscopy at a single veterans' hospital were reviewed. Opioid consumption before surgery, but not PTSD, was a strong predictor for developing postoperative CPS.

"Use of Ultrasound Guidance for Peripheral Nerve Blockade is Associated with a Reduced Incidence of Local Anesthetic Systemic Toxicity" by Michael J. Barrington, FANZCA, Roman Kluger, FANZCA, Department of Anaesthetics, St. Vincent's Hospital, Melbourne, Australia. Local anesthetic systemic toxicity (LAST) is a known life-threatening complication of regional anesthesia. The Australian and New Zealand Registry of Regional Anaesthesia is a multicenter, prospective clinical registry that monitors and reports on the quality and safety of peripheral nerve blockade. There were 21 episodes of LAST, giving an incidence of 0.87 per 1,000 peripheral nerve blockades. Paravertebral and upper

limb blocks and increasing local anesthetic dosage were associated with an increased risk of LAST. Importantly, this large series provides the strongest evidence to date that ultrasound-guidance significantly decreases the incidence of LAST.

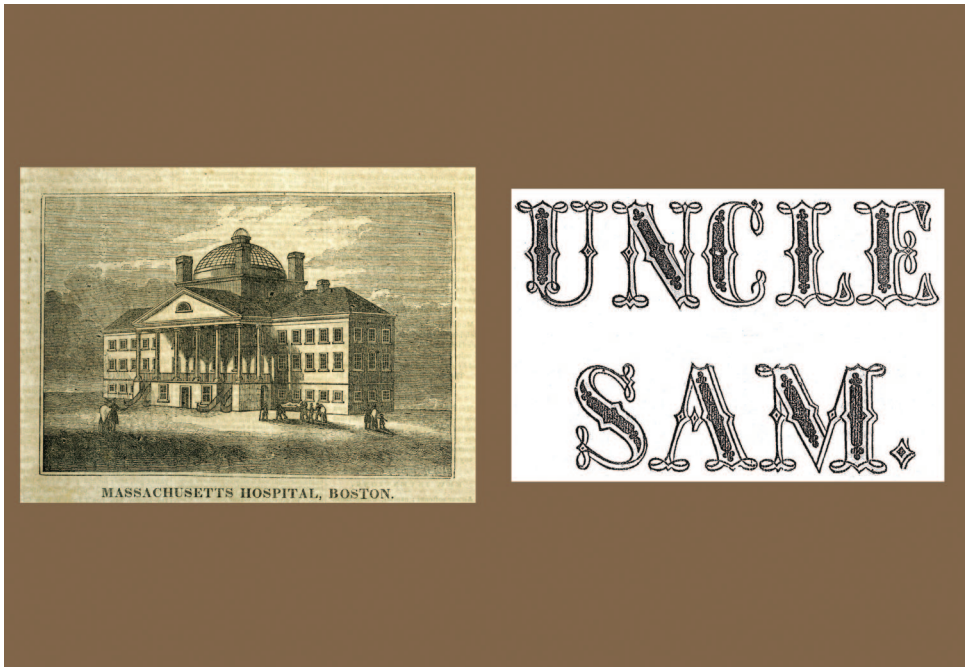
10th Annual Celebration of Research Luncheon Session

Monday, October 15, 2012, 12:30 PM to 2:00 PM, Ballroom A, Walter E. Washington Convention Center, Washington, D.C. Lunch will be provided!

This year's Celebration of Research will take place on Monday during the Annual Meeting. James C. Eisenach, M.D., Editor-in-Chief of ANESTHESIOLOGY, will serve as moderator. Featured speakers will be the 2012 recipient of the ASA Excellence in Research Award, Ralph Lydic, Ph.D., Professor, Department of Anesthesiology, University of Michigan Medical School, Ann Arbor, Michigan, and the recipient of the 2012 Presidential Scholar Award, Peter Nagele, M.D., M.Sc., Assistant Professor, Department of Anesthesiology, Washington University School of Medicine, St. Louis, Missouri. The recipients of the 2012 Resident Research Awards will also be introduced during the Celebration event. Additional information regarding Journal-related activities and FAER-related activities will be included in the Celebration of Research booklet distributed at the 2012 Annual Meeting.

ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

Uncle Sam and Massachusetts General Hospital



On Saturday morning, March 16, 1844, a Boston newspaper named *Uncle Sam* featured an engraving of "Massachusetts Hospital, Boston." Just 31 months later, on October 16, 1846, dentist William Thomas Green Morton gave his public demonstration of surgical anesthesia at that hospital. The weekly paper, *Uncle Sam*, would evolve into a literary magazine; Massachusetts General Hospital, into a complex so massive that visitors now have difficulty finding the Ether Dome. (Copyright © the American Society of Anesthesiologists, Inc.)

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