Distinguished Lecturer Series

Emery N. Brown, M.D., Ph.D.

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Professor of Computational Neuroscience, Massachusetts Institute of Technology
Professor of Health Sciences and Technology, Harvard-MIT Division of Health-Sciences and Technology, MIT

"The Dynamics of the Unconscious Brain Under General Anesthesia"

Thursday, January 17, 2013

Andrus Gerontology Center (GER 124) **Lecture 3:00 PM**
Andrus Gerontology Center Patio **Reception 4:00 PM**
Hosted by Drs. Urbashi Mitra, Alice Parker

General anesthesia is a drug-induced, reversible condition comprised of five behavioral states: unconsciousness, loss of memory, loss of pain sensation, akinesia, and hemodynamic stability with control of the stress response. The mechanisms by which anesthetic drugs induce the state of general anesthesia are considered one of the biggest mysteries of modern medicine. We use three experimental paradigms to study general anesthesia-induced loss of consciousness in humans: combined fMRI/EEG recordings, high-density EEG recordings and intracranial recordings. These studies are allowing us to establish precise neurophysiological, neuroanatomical and behavioral correlates of unconsciousness under general anesthesia. Combined with our mathematical modeling work on how anesthetics act on neural circuits to produce the state of general anesthesia we offer specific hypotheses as to how changes in level of activity in specific circuits lead to the unconscious state. Our findings suggest that the state of general anesthesia is not as mysterious as currently believed.

Emery N. Brown is professor of computational neuroscience and health sciences and technology at MIT, the Warren M. Zapol Professor of Anesthesia at Harvard Medical School, and a practicing anesthesiologist at Massachusetts General Hospital. Dr. Brown received his B.A. from Harvard College (magna cum laude), his M.A. and Ph.D. in statistics from Harvard University and his M.D. (magna cum laude) from Harvard Medical School. Dr. Brown's methodology research develops signal processing and statistical methods to characterize how neurons in the brain represent and transmit information. His experimental research is characterizing the neurophysiology of how anesthetics act in the brain to create the state of general anesthesia. Dr. Brown is a fellow of the IEEE and of the American Academy of Arts and Sciences, a member of the Institute of Medicine, a 2007 recipient of an NIH Director's Pioneer Award and a 2012 recipient of an NIH Director's Transformative Research Award.

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