Bioelectronic Medicine
A next generation of treatment

Bioelectronic medicine is the synergy between biology and technology, using electronics to harness the power of nerve signals to treat human disease.

March 19, 2014
7:30am to 3:30pm
Goldman International Conference Center
350 Community Drive
Manhasset, NY 11030
Centricity Series is a full-day symposium that brings leading physicians and scientists together to discuss innovative clinical approaches and cutting-edge biomedical research focused on a specific disease or disorder. Presentations focus on disease diagnosis, treatment, prognosis and prevention. Both professionals and the public are invited to attend.

Each symposia series is videotaped and made available free of charge. To view these videos, please visit molmed.org/video. To register for or view upcoming events, please visit molmed.org/events/centricity.

The 2012-2013 Centricity Series agenda included topics such as bone health for women, Tourette syndrome, pulmonary hypertension, and musculoskeletal disease. The meetings take place at the Feinstein Institute for Medical Research in Manhasset, NY, and are open to all levels of medical professionals and scientists.
A collaborative symposium for all levels of medical professionals and scientists

Program

Program Goal
This Centricity Series facilitates interaction and a sharing of knowledge among expert clinicians and scientists through presentations and discussions detailing novel biomedical research and clinical observations. The focus of this symposium is bioelectronic medicine. Bioelectronic medicine is a next generation of treatment. It is the synergy between biology and technology, using electronics to harness the power of nerve signals to treat human disease. Join us in this discussion about a pioneering and promising new way to treat patients.

Objectives
At the conclusion of the course, participants will be able to:
- Explore and discuss the definition of bioelectronic medicine
- Network with potential collaborators both within and outside the North Shore-LIJ Health System
- Increase knowledge about the clinical and research advances in the field of bioelectronic medicine

Target Audience
Primary care physicians, physician assistants, nurses, nurse practitioners, biomedical scientists and other healthcare professionals.

Acknowledgements
Centricity Series is supported by Molecular Medicine and The Feinstein Institute for Medical Research.

Symposium Course Chairman
Kevin J Tracey, MD
President and CEO
The Feinstein Institute for Medical Research

Symposium Course Directors
Sangeeta S Chavan, PhD
Associate Investigator/Lab Manager
Laboratory of Biomedical Science
The Feinstein Institute for Medical Research

Peder S Olofsson, MD, PhD
Institute Scientist
Laboratory of Biomedical Science
The Feinstein Institute for Medical Research
AGENDA

7:30 am  Registration and Breakfast

8:20 am  Opening Remarks
 Kevin J Tracey, MD, President and CEO, The Feinstein Institute for Medical Research

SESSION ONE

8:30 am  Rethinking Inflammation: Neural Circuits in the Regulation of Immunity
 Peder S Olofsson, MD, PhD, Institute Scientist, Laboratory of Biomedical Science,
 The Feinstein Institute for Medical Research

9:00 am  Use of Bioelectronic Devices to Explore the Cytokine Specific Neurograms of the Vagus Nerve
 Patricio T Huerta, PhD, Associate Investigator, Laboratory of Immune and Neural Networks,
 The Feinstein Institute for Medical Research

9:30 am  Monitoring the Injured Brain
 Raj K Narayan, MD, FACS, Professor and Chairman, Department of Neurosurgery,
 North Shore-LIJ Health System; Investigator, The Feinstein Institute for Medical Research

10:00 am  Break

SESSION TWO

10:20 am  Integrated Biosensors
 H Tom Soh, PhD, Ruth Garland Professor, University of California at Santa Barbara

10:50 am  Implanted Nerve Stimulators in the Treatment of Rheumatoid Arthritis
 Yaakov Levine, PhD, SetPoint Medical Corporation

11:20 am  Vagus Nerve Stimulation Attenuates Traumatic Hemorrhage
 Jared M Huston, MD, Assistant Professor of Surgery, North Shore University Hospital

11:50 am  Lunch

SESSION THREE

12:50 pm  Transcranial Magnetic Stimulation in Degenerative Neurological Disease
 David Eidelberg, MD, Investigator & Head, Susan and Leonard Feinstein
 Center for Neurosciences, The Feinstein Institute for Medical Research

1:20 pm  Robotics and Neuro-Recovery
 Bruce T Volpe, MD, Investigator, Laboratory of Biomedical Science,
 The Feinstein Institute for Medical Research

1:50 pm  Bioelectronics and Intestinal Motility
 Larry S Miller, MD, Chief, Division of Gastroenterology, North Shore-LIJ Health System

2:20 pm  Closing Remarks — Kevin J Tracey, MD

2:30 pm  Reception / Meet & Greet
Kevin J Tracey, MD

Dr. Kevin Tracey studied chemistry at Boston College where he became convinced that the optimal path to improving medicine would be one that combined basic science research with direct patient care. He received his medical degree at Boston University and trained in neurosurgery at Cornell University Medical College. Dr. Tracey joined North Shore University Hospital in 1992 and founded the laboratory of biomedical science, with a main focus on defining the body's mechanisms that normally prevent the overproduction of TNF. Dr. Tracey's research led to the discovery of the inflammatory reflex, initially by electrically stimulating the vagus nerve to control macrophage TNF production via alpha-7 nicotinic receptors. Recent clinical trials indicate that implanting a vagus nerve stimulator in patients with rheumatoid arthritis may revolutionize future therapy.
Peder S Olofsson, MD, PhD

After a brief career as software developer for industrial sensors, Peder Olofsson was an attending physician in Anesthesiology and Intensive Care Medicine at the Karolinska University Hospital. He received his PhD in experimental medicine from the Karolinska Institute in Stockholm, Sweden. An interest in improving treatment for inflammatory diseases led him to the emerging field of neural reflex control of the immune system. Peder relocated to Dr. Kevin Tracey’s Laboratory of Biomedical Science at The Feinstein Institute, and proceeded to discover that specialized lymphocytes relay neural signals to regulate inflammation. He is currently exploring this key component of the neuro-immune interface.
Use of Bioelectronic Devices to Explore the Cytokine Specific Neurograms of the Vagus Nerve

Patricio T Huerta, PhD

Dr. Patricio T Huerta studied biology and philosophy at the University of Chile, earned a PhD in neuroscience at Brandeis University, and was a postdoctoral fellow at MIT, working in the lab of Dr. S Tonegawa. His research has focused on the mechanisms by which brain oscillations and the synaptic receptor NMDAR participate in the neural basis of memory. Dr. Huerta also explores the interactions between the brain and the immune system in health and disease. His lab has developed clinically relevant murine models for neuropsychiatric systemic lupus erythematosus (collaborating with Dr. Betty Diamond), and cytokine-induced cognitive deficit following septic shock (collaborating with Dr. Kevin Tracey) and chronic hypoxia (collaborating with Dr. Edmund Miller). Dr. Huerta’s lab has recently uncovered the neurograms carried by the vagus nerve in response to cytokines. His laboratory’s overarching goal is to isolate key neural and immune mechanisms that point to therapies for brain disorders and autoimmunity.
Monitorying the Injured Brain

Raj K Narayan, MD, FACS

Raj Narayan, MD, FACS, is professor and chairman of the Department of Neurosurgery at Hofstra North Shore-LIJ School of Medicine and executive director of the Cushing Neuroscience Institute. He has over 30 years of experience in traumatic brain injury research and is an experienced clinical trials expert. Dr. Narayan has been closely involved with the conception and development of the ‘smart sensor’ along with Dr. Chunyan Li, and their team is funded by a DOD grant in collaboration with their erstwhile colleagues at the University of Cincinnati. Dr. Narayan, an internationally recognized expert in the treatment of head injury, has published more than 100 peer-reviewed papers and 60 book chapters. He also has co-edited the reference textbook Neurotrauma (McGraw-Hill) and helped develop the national evidence-based Guidelines for the Management of Severe Traumatic Brain Injury.
H Tom Soh, PhD

Dr. Soh received his BS with a double major in Mechanical Engineering and Materials Science with Distinction from Cornell University and his PhD in Electrical Engineering from Stanford University. Prior to joining UCSB in 2003, Dr. Soh served as the technical manager of MEMS Device Research Group at Bell Laboratories and MEMS R&D group at Agere Systems. His current research interests are in analytical biotechnology, especially in high-throughput screening, directed evolution, and integrated biosensors. He is co-director at the Center for Stem Cell Biology & Engineering and Associate Director of the California Nanosystems Institute (CNSI). He is the recipient of MIT Technology Review’s “TR 100” Award (2002), ONR Young Investigator Award (2004), Beckman Young Investigator Award (2005), ALA Innovator Award (2009), NIH Director’s TR01 Award (2009), John Simon Guggenheim Fellowship (2010), NIH Edward Nagy Award (2011), Garland Endowed Chairship at UCSB (2011), and Humboldt Research Fellowship (2012).
Implanted Nerve Stimulators in the Treatment of Rheumatoid Arthritis

Yaakov Levine, PhD

Dr. Yaakov Levine studied bioengineering at Cornell University, trained at The Feinstein Institute for Medical Research, and received a PhD in biomedical engineering from Stony Brook University, working with Drs. Kevin Tracey, Richard Clark, and Yehuda Tamari. During this time he became focused on developing engineered, nonpharmacological treatments for clinical diseases. Dr. Levine transitioned to industry where he has held various research positions at Cytec Corporation, Circulatory Technology, Inc., and SetPoint Medical Corporation. Dr. Levine currently leads the Advanced Research group at SetPoint Medical Corporation, a California-based neurostimulation company focused on the application of bioelectronic medicine to treat chronic inflammatory diseases such as rheumatoid arthritis and Crohn’s disease.
Vagus Nerve Stimulation Attenuates Traumatic Hemorrhage

Jared M Huston, MD

Dr. Jared M Huston was born and raised on Long Island. He earned his undergraduate degree from the University of Pennsylvania, and medical degree from Stony Brook University School of Medicine. Dr. Huston completed his residency in general surgery at The New York Presbyterian Hospital-Weill Cornell Medical Center, and joined the surgical faculty at Hofstra North Shore-LIJ School of Medicine in 2012. Dr. Huston has been collaborating with Dr. Kevin Tracey and the Laboratory of Biomedical Science at The Feinstein Institute for Medical Research since 2003. He has authored more than 50 peer-reviewed manuscripts, book chapters and abstracts. He has lectured nationally and internationally on his work involving the neural control of inflammation and hemostasis. Dr. Huston is a member of numerous surgical and scientific professional societies, and holds patents related to his research discoveries. Dr. Huston has won multiple career development awards for his early basic science research endeavors.
Transcranial Magnetic Stimulation in Degenerative Neurological Disease

David Eidelberg, MD

Dr. David Eidelberg is director of The Feinstein Center for Neurosciences and heads the NIH Morris K. Udall Center of Excellence for Parkinson’s Disease Research at The Feinstein Institute. He is internationally recognized for his pioneering work on network abnormalities in neurodegenerative disorders. His work has led to the development of novel imaging methods for differential diagnosis and for the accurate assessment of disease progression and the response to treatment. Dr. Eidelberg received his medical degree from Harvard Medical School. After completing residency training in neurology at Harvard, he pursued postdoctoral training in brain imaging in London and New York. He moved to North Shore in 1988 to establish the functional imaging laboratory and the clinical movement disorders program. In 2001, he became the director of the new Center for Neurosciences at The Feinstein Institute, where he is currently professor of neurology and neuroscience.
Bruce T Volpe, MD

Dr. Bruce Volpe graduated Yale University with a BS and an MD, trained in internal medicine at the University of Chicago and Columbia Presbyterian, and in neurology at Cornell-New York Hospital; where he was a Professor of Neurology who headed clinical units at Cornell affiliated hospitals, and directed neurorehabilitation fellows there. He tested whether the first interactive robotic devices were effective, at the dawn of the modern age of neuro-recovery. Now at The Feinstein Institute for Medical Research, he is extending the reach of restoration after neurological injury with non-invasive technology, and applying quantitative histopathology in collaborative projects to study the effect of autoantibodies on the brain and the toxic delayed effects of severe sepsis on the brain. He is a member of the Departments of Neurology and Physical Medicine and Rehabilitation and a Professor of Medicine at the North Shore-LIJ Hospital Center.
Bioelectronics and Intestinal Motility

Larry S Miller, MD

Dr. Larry Miller holds a number of patents for endoscopic methods and devices and is a well-funded NIH investigator. He invented a method to study the anatomy and physiology of gastrointestinal motility simultaneously, using high-resolution endoluminal ultrasound and manometry. This work has led to improved understanding of a range of disorders, including achalasia, Barrett’s esophagus, fecal incontinence, and gastroesophageal reflux disease (GERD), also the focus of his current research. His current research lab at The Feinstein Institute for Medical Research focuses on the mechanism of gastro-esophageal reflux. Recently, Dr. Miller and his colleagues isolated the muscle groups that allow acid to enter the esophagus, and those that act to prevent it.