PROCEEDINGS OF THE
HEART-BRAIN SUMMIT
JUNE 15-17, 2006
Hosted by the Earl and Doris Bakken Heart-Brain Institute at Cleveland Clinic

Supplement 1 to Volume 74, February 2007

Supplement Editor
MARC S. PENN, MD, PhD
Director, Earl and Doris Bakken Heart-Brain Institute
Cleveland Clinic

Course Directors
JAMES B. YOUNG, MD
Chairman, Division of Medicine
Cleveland Clinic

JOSEPH F. HAHN, MD
Chief of Staff
Cleveland Clinic

Introduction: Heart-brain medicine: Where we go from here and why ..................................... S4
Marc S. Penn, MD, PhD, Cleveland Clinic, Cleveland, Ohio, and Earl E. Bakken, DSc (hon), Medtronic, Inc., Minneapolis, Minnesota, and North Hawaii Community Hospital, Kamuela, Hawaii

Opening remarks: The dream behind the summit ..................................................... S7
Earl E. Bakken, DSc (hon), Medtronic, Inc., Minneapolis, Minnesota, and North Hawaii Community Hospital, Kamuela, Hawaii

Keynote address: 'Voodoo' death revisited: The modern lessons of neurocardiology ..................... S8
Martin A. Samuels, MD, DSc (hon), Brigham and Women's Hospital, Boston, Massachusetts

The broken heart syndrome ..................................................................... S17
Ilan S. Wittstein, MD, Johns Hopkins University School of Medicine, Baltimore, Maryland

Brain imaging in cardiovascular disease: State of the art .............................................. S23
Michael Phillips, MD, Cleveland Clinic, Cleveland, Ohio

Cortical control of the heart ..................................................................... S27
Stephen Oppenheimer, MD, PhD, Sentient Medical Systems, Cockeysville, Maryland

Neurological mechanisms of chest pain and cardiac disease ........................................... S30
Robert D. Foreman, PhD, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma

Hypertension in sleep apnea: The role of the sympathetic pathway ..................................... S34
Diana L. Kunze, PhD; David Kline, PhD; and Angelina Ramirez-Navarro, PhD, MetroHealth Medical Center and Case Western Reserve University, Cleveland, Ohio

(continued on next page)
CONTENTS

Inflammation: Implications for understanding the heart-brain connection ........................................... S37
Mehdi H. Shishehbor, DO; Carlos Alves, MD; and Vivek Rajagopal, MD, Cleveland Clinic, Cleveland, Ohio

The anti-ischemic effects of electrical neurostimulation in the heart ...................................................... S42
Jessica de Vries, MD, University of Groningen, The Netherlands; Robert D. Foreman, PhD, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma; and Mike J.L. DeJongste, MD, PhD, University of Groningen, The Netherlands

The little brain on the heart ......................................................................................................................... S48
J. Andrew Armour, MD, PhD, Hôpital du Sacré-Coeur and Université de Montréal, Montréal, Québec, Canada

Open heart surgery and cognitive decline ................................................................................................. S52
Mark F. Newman, MD, Duke University Medical Center, Durham, North Carolina

The heart and the brain within the broader context of wellness ............................................................... S56
Michael O’Donnell, PhD, MBA, MPH, Cleveland Clinic, Cleveland, Ohio

The heart-brain interaction during emotionally provoked myocardial ischemia: Implications of cortical hyperactivation in CAD and gender interactions .......................................................... S59
Robert Soufer, MD, Yale University, New Haven, Connecticut; and Matthew M. Burg, PhD, Yale University, New Haven, Connecticut, and Columbia University, New York, New York

Depression and heart disease ..................................................................................................................... S63
François Lespérance, MD, Montréal Heart Institute, and Nancy Frasure-Smith, PhD, McGill University and Montréal Heart Institute, Montréal, Québec, Canada

Sick at heart: The pathophysiology of negative emotions ......................................................................... S67
Laura D. Kubzansky, PhD, MPH, Harvard School of Public Health, Boston, Massachusetts

Role of the brain in ventricular fibrillation and hypertension: From animal models to early human studies ................................................................................................................................. S73
James E. Skinner, PhD, Vicor Technologies, Inc., Boca Raton, Florida

New paradigms in heart-brain medicine: Nonlinear physiology, state-dependent proteomics ................ S79
James E. Skinner, PhD, Vicor Technologies, Inc., Boca Raton, Florida

Subarachnoid hemorrhage: A model for heart-brain interactions ........................................................... S86
J. Javier Provencio, MD, Cleveland Clinic, Cleveland, Ohio

Cardiac denervation in patients with Parkinson disease ............................................................................ S91
David S. Goldstein, MD, PhD, National Institutes of Health, Bethesda, Maryland

Aging and the brain renin-angiotensin system: Insights from studies in transgenic rats ....................... S95
Debra I. Dietz, PhD; Sherry O. Kasper, PhD; Atsushi Sakima, MD; and Carlos M. Ferrario, MD, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Contextual cardiology: What modern medicine can learn from ancient Hawaiian wisdom ............... S99
Paul Pearseall, PhD, University of Hawai‘i at Manoa and Hawaii State Consortium for Integrative Medicine, Honolulu, Hawaii

Cardiocerebral resuscitation: The optimal approach to cardiac arrest .................................................... S105
Gordon A. Ewy, MD, University of Arizona College of Medicine, Tucson, Arizona

S2 CLEVELAND CLINIC JOURNAL OF MEDICINE VOLUME 74 • SUPPLEMENT 1 FEBRUARY 2007

Downloaded from www.ccjm.org on March 25, 2021. For personal use only. All other uses require permission.
Heart transplantation: A magnified model of heart-brain interactions .............................................. S110
Mohamad H. Yamani, MD, and Randall C. Starling, MD, MPH, Cleveland Clinic, Cleveland, Ohio

Patent foramen ovale and migraine .................................................. S114
Gian Paolo Anzola, MD, S. Orsola Hospital FBF, Brescia, Italy

Patent foramen ovale and stroke: To close or not to close? .............................................. S118
Anthony J. Furlan, MD, Cleveland Clinic, Cleveland, Ohio

Sudden unexplained death in epilepsy: The role of the heart ............................................... S121
Stephan U. Schuele, MD, Cleveland Clinic, Cleveland, Ohio, and Northwestern University, Chicago, Illinois; Peter Widdess-Walsh, MD, Adriana Bermeo, MD, and Hans O. Lüders, MD, PhD, Cleveland Clinic, Cleveland, Ohio

Hydrocephalus and the heart: Interactions of the first and third circulations ......................... S128
Mark Luciano, MD, PhD, and Stephen Dombrowski, PhD, Cleveland Clinic, Cleveland, Ohio

Cognitive impairment in chronic heart failure .............................................. S132
Cathy A. Sila, MD, Cleveland Clinic, Cleveland, Ohio

Cardiac events and brain injury: Ethical implications ............................................... S138
Paul J. Ford, PhD, Cleveland Clinic, Cleveland, Ohio

Articles in these proceedings were either submitted as manuscripts by the Summit faculty or developed by the Cleveland Clinic Journal of Medicine staff from transcripts of audiotaped Summit presentations and then reviewed and revised by the Summit faculty.