DYNAMICS OF RESPIRATORY VARIABILITY:
MECHANISMS AND ANALYSIS

May 17, 1997
The Tuscan Inn
425 Northpoint Street
San Francisco, California

Sponsored by

BIOMEDICAL TECHNOLOGY PROGRAM
NATIONAL CENTER FOR RESEARCH RESOURCES
NATIONAL INSTITUTES OF HEALTH

Chairman and Organizer
Michael C.K. Khoo, Ph.D.
Biomedical Simulations Resource
Abstract:
Breath-to-breath ventilation and its associated timing and volume components exhibit a considerable degree of variability. Based on the belief that this variability represents physiological noise, researchers and clinicians commonly adopt the practice of averaging. However, an alternative view is that respiratory fluctuations reflect the dynamic behavior of a complex and nonlinear self-regulating system. This workshop will address (1) state-of-the-art tools that are can be used to characterize and better understand respiratory variability, and (2) potential mechanisms underlying spontaneous changes in ventilation.

Program:
7:30 - 8:00: Registration

8:00 - 8:10: Introduction and Overview
Michael C.K. Khoo, Univ. of Southern California, Los Angeles, CA

8:10 - 8:50: Correlation analysis of breath-to-breath ventilation
Martin J. Tobin, Loyola University of Chicago, Maywood, IL

8:50 - 9:30: Recurrence quantification analysis of piecewise-deterministic respiratory dynamics
Charles L. Webber, Jr., Loyola University of Chicago, Maywood, IL, and
Joseph P. Zbilut, Rush Medical College, Chicago, IL

9:30 - 10:10: Nonlinear dynamics of respiratory rhythm generation
David Paydarfar, Tufts University, Boston, MA

10:10 - 10:30: Coffee Break

10:30 - 11:10: Quantitative assessment of respiratory variability using cortical evoked potentials
J. Andrew Daubenspeck, Dartmouth Medical School, Lebanon, NH, and
Metin Akay, Rutgers University, Piscataway, NJ

11:10 - 11:50: Fluctuations in state and ventilatory stability
Michael C.K. Khoo, Univ. of Southern California, Los Angeles, CA

11:50 - 1:00: Lunch Break

1:00 - 1:40: Chemoreflex-mediated mechanisms of respiratory variability
Eugene N. Bruce, University of Kentucky, Lexington, KY

1:40 - 2:20: Cyclic variability in the arousal threshold
Richard B. Berry, University of California-Irvine & VA Medical Ctr., Long Beach, CA

2:20 - 3:00: Role of dynamic changes in brain blood flow on respiratory variability

3:00 - 3:20: Coffee Break

3:20 - 4:00: Changes in respiratory variability from increased inspiratory controller gain during sleep
Magdy K. Younes, Univ. of Manitoba, Winnipeg, Canada

4:00 - 4:40: Contributions of respiratory control system inertia to sleep-disordered breathing
Jerome A. Dempsey, Univ. of Wisconsin, Madison, WI

4:40 - 6:00: General Discussion & Reception
1997 Workshop

ADVANCED METHODS OF
PHARMACOKINETIC AND PHARMACODYNAMIC
SYSTEMS ANALYSIS

May 16-17, 1997
Marina del Rey, California

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