



Département de psychiatrie  
Centre de neurosciences psychiatriques  
Site de Cery  
CH-1008 Prilly - Lausanne

## Centre de Neurosciences Psychiatriques

# CNP SEMINAR

## ANNOUNCEMENT

Wednesday, June 27, 2012, 13:30

**“EORS, the epigenetic oxidative redox theory of aging: How redox is more important than ROS in the aging brain”**

### Prof Gregory J. Brewer, PhD

Kenneth Stark Endowed Chair in Alzheimer Research  
Departments of Neurology and  
Medical Microbiology, Immunology and Cell Biology  
Southern Illinois University Sch. Med.  
Springfield, IL 62794-9626

*Invited by Kim Do Cuénod  
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**Prof Gregory J. Brewer's** RO1 project on Mitoenergetic Failure in Brain Aging (RO1 AG032431) indicates a focus on redox bioenergetics and epigenetic control of metabolism. He began studies of bioenergetics in 1999 in Zurich at the ETH. In 2008, he invented a neuron culture medium called NbActiv4 that results in a doubling of synapse density and a >4-fold increase in spike rates associated with a lower resting oxygen consumption and a greater O<sub>2</sub> max capacity. Other publications relating to metabolism include studies of glucose uptake, improvements in brain mitochondrial function with anti-oxidants and detailed analyses of whole neuron metabolism with age-related loss of function due to substrate limitations at complex I and cytochrome C as well as enzymatic deficits at complex IV. Most significantly, these age-related deficits could be reversed by simple treatment with estrogen for a few days or nicotinamide overnight and involve epigenetic changes.

#### **Recent publications :**

1. Boehler, M.D., Leondopulos, S.S., Wheeler, B.C., Brewer, G.J. 2012. Hippocampal networks on reliable patterned substrates. *J. Neurosci. Meth.* 203:344-353.
2. Walker, MW, LaFerla, F; Oddo, S, and Brewer, G.J. 2012. Reversible early age epigenetic histone modifications in a mouse model of Alzheimer's disease: effects on BDNF expression, AGE, DOI: 10.1007/s11357-011-9375-5 [Springer doi](#). (**Major epigenetic changes in histone acetylation and methylation occur early in aging and in 3xTg-AD mice**)
3. Leondopulos, S.S., Boehler, M.D., Wheeler, B.C., Brewer, G.J. 2012. Chronic stimulation of cultured neural networks boosts oscillatory activity in the beta and theta frequencies, *J. Neural Eng.* 9 026015 [doi:10.1088/1741-2560/9/2/026015](#). [PM:22361724](#). (**EEG-like frequencies emerge spontaneously in networks that self-assemble on electrode arrays opening access to establishing I/O dependence and the mechanistic basis of each frequency.**)
4. Ghosh, D, LeVault, K, Barnett, A, Brewer, GJ 2012. Oxidized redox state in cultured hippocampal neurons precedes cognitive losses and macromolecular ROS damage in 3xTg-AD mice, *J. Neurosci.* 32:5821-5832. [PM:22539844](#) (**The redox state is shifted in the oxidizing direction with age and in an AD mouse model, but the shift is rapidly reversible and can be decoupled from ROS damage**)