Département de psychiatrie

Centre de Neurosciences Psychiatriques

CNP SEMINAR

ANNOUNCEMENT

Thursday October 3rd 2024, 11:00 - 12:00

Measuring Oxidative Stress (OxSt) by the Iridium Reducing Capacity Assay (Ir-RCA)

By: **Prof.Gregory F. Payne**

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Summary:
Oxidative stress (OxSt) acts globally and spans body systems (e.g., the nervous, immune, and endocrine systems). Currently, there is no single, generally accepted measurement of OxSt. Many possible measurement approaches focus on the bottom-up analysis of individual molecules (e.g., reactive species, antioxidants, hormones or signaling molecules) or combinations of molecules (e.g., proteomics or metabolomics). Efforts to develop a global measurement of OxSt often detect a sample's ability to reduce a metal-ion (e.g., iron or copper) or quench a free radical. Here, we review results from a recently developed iridium-reducing capacity assay (Ir-RCA) for measuring OxSt and suggest this method offers several key benefits. First, the Ir-RCA employs simple optical and/or electrochemical measurements that can be extended to high throughput formats. Second, the Ir-RCA is especially sensitive for detecting thiols which are major antioxidant moieties and sites of oxidative modification. Third, the Ir-RCA measures stable molecular features of a sample. Fourth, the Ir-RCA has been "validated" by showing statistically significant differences in persons diagnosed with schizophrenia (N=73) versus healthy controls (N=45). Fifth, the Ir-RCA measurement of OxSt levels is "movable": psychosocial stressors can increase this measure of OxSt, while beneficial dietary interventions can decrease this measure of OxSt. Future directions for the Ir-RCA will be discussed.

Invited by: pascal.steullet@chuv.ch

Short Bio:

Greg Payne did his B.S./M.S/PhD and postdoctoral training at Cornell University and The University of Michigan. He is currently a Professor at the University of Maryland. His group does research at the intersection of materials science, biology and information sciences. His work is especially focused on understanding the role of redox (reduction-oxidation reactions) as a modality for biological communication and as a means to span bio-device communication. His work is internationally recognized by invitations to be keynote speaker at several scientific conferences and he currently holds Guest or Chair Professor positions at several universities around the world.

Publications :

- *Kim, E., T.E. Winkler, C. Kitchen, M. Kang, G. Banis, W.E. Bentley, D.L. Kelly, R. Ghodssi, G.F. Payne. 2017. Redox Probing for Chemical Information of Oxidative Stress. Analytical Chemistry.* ***89****, 1583-1592.* ***DOI:*** *10.1021/acs.analchem.6b03620.*
- *Kim, E., Z. Keskey, M. Kang, C. Kitchen, W.E. Bentley, S. Chen, D.L. Kelly, and G.F. Payne. 2019. Validation of Oxidative Stress Assay for Schizophrenia. Schizophrenia Research,* ***212****; 126-133.* ***DOI:*** *10.1016/j.schres.2019.07.057.*
- *Kim, E., Z. Zhao, J.R. Rzasa, M. Glassman, W.E. Bentley, S. Chen, DL. Kelly, G.F. Payne. 2021. Association of acute psychosocial stress with oxidative stress: Evidence from serum analysis. Redox Biology,* ***47,*** *102138. DOI: 10.1016/j.redox.2021.102138.*
- *Kim, E., S. Redwood, F. Liu, D.J.O. Roche, S. Chen, W.E. Bentley, W.W. Eaton, D. Cihakova, M.V. Talor, D.L. Kelly, G.F. Payne. 2024. Pilot study indicates that a gluten-free diet lowers oxidative stress for gluten-sensitive persons with schizophrenia. Schizophrenia Research.* ***269****, 71-78. https://doi.org/10.1016/j.schres.2024.05.001.*

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