

Since 1970, Linus Pauling established that the C-Vitamin could potentially and selectively kill tumors by the induction of the hydrogen peroxide in the malignant cells, but not in the healthy cells. Increased levels of reactive oxygen species (ROS) including H₂O₂ are thought to play an important role in the initiation and progression of cancer. Previous reports showed that vitamin C treatment induced cytotoxicity by adenosine triphosphate (ATP) depletion in some cancer cells. High-dose vitamin C suppressed tumor growth in animal models and tissue culture and, therefore, may indeed have applications as a novel treatment for various cancers. ALA, a member of the B vitamin family is a coenzyme in the multienzyme complexes of dehydrogenase and aminocaproic acid decarboxylase and can inhibit cancer cell proliferation in cervical cancer and colon cancer. Hydrogen cyanide is thought to be the main anticancer compound formed from laetrile via in situ release. Artemisinins have demonstrated cytotoxic effects against a variety of cancer cells by inducing cell cycle arrest, promoting apoptosis, preventing angiogenesis, and abrogating cancer invasion and metastasis. The aim is to show the integrative intravenous oncology protocols and the possible anticancer mechanisms behind.

E-mail address: ronimoya@gmail.com

<http://dx.doi.org/10.1016/j.freeradbiomed.2018.04.479>

P-333

Novel mechanisms involving redox biology are essential to support axonal growth

Ernesto Muñoz-Palma^{1,2,3}, Carlos Wilson^{1,2,3}, Marco T. Nuñez^{1,2,3}, Christian Gonzalez-Billault^{1,2,3}

¹ Dept. Biology, Faculty of Sciences, Universidad de Chile

² Geroscience Center for Brain Health and Metabolism (GERO), Santiago, Chile

³ The Buck Institute for Research on Aging, Novato, CA, USA

Physiological levels of ROS are important for several processes in the nervous system, ranging from neuronal precursors proliferation, to axonal guidance and neurotransmission. ROS also support neurite outgrowth and axonal specification, but the mechanisms by which ROS are able to shape neurons remain unknown. We recently showed that NADPH oxidase activity is essential to sustain axon growth. Now, we report that Ca₂⁺ release from the endoplasmic reticulum (ER) is coupled to ROS signaling dependent on NOX2. In this work, we explore the contribution of the link between NOX and RyR-mediated Ca²⁺ release towards axonal specification of rat hippocampal neurons. Using genetic approaches, we find that NOX activation promotes both axonal development and Rac1 activation through a RyR-mediated mechanism, which in turn activates NOX through Rac1, one of the NOX subunits. Collectively, these data suggest a feed-forward mechanism that integrates both NOX activity and RyR-mediated Ca²⁺ release to support cellular mechanisms involved in axon development. Finally, we explore the contribution of calcium entry from the extracellular milieu as a triggering factor to promote the concerted functions of NOX and RyR2 during axon specification.

E-mail address: chrgronza@uchile.cl

Acknowledgements

This work was supported by Fondap 15150012

<http://dx.doi.org/10.1016/j.freeradbiomed.2018.04.480>

P-334

Brain nutrition, aging and neuroplasticity

Roni Moya

CESPU – Portugal, Gandra, Portugal

Neuroplasticity allows the neurons in the brain to compensate for injury and disease and to adjust their activities in response to new situations or to changes in their environment. The aging brain can adapt through cellular defence mechanisms, such as redox capacity, DNA repair, release of neurotrophins (BDNF, IGF-1), promotion of neurogenesis and the capability of the dendrites and synapses to change in response of the environmental stress. The brain's perfect immunity regulation by the microglia and the central nervous system's anti-oxidant capacity enhancement depends on several concepts, including the best nutritional foods and supplements, hormones, physical activity and learning procedures. The aim of this talk is to reveal the biochemical and immunological mechanisms behind the brain aging in order to prevent the neurodegenerative diseases and stimulate the neuroplasticity with the use of dietary functional substances, natural immune-modulatory molecules and bio-identical hormones.

E-mail address: ronimoya@gmail.com

<http://dx.doi.org/10.1016/j.freeradbiomed.2018.04.481>

P-335

Phosphinate-based mitochondria targeted fluorescent probe for in vitro and in vivo detection of superoxide anion

Saipeng Huang, Xiaojie Zhang, Hongying Jia, Libo Du, Yang Liu

State Key Laboratory for Structure Chemistry of Unstable and Stable Species, Center for Molecular Science, Institute of Chemistry, Chinese Academy of Sciences, Peking University, Beijing, P R China

Superoxide anion has attracted great attention because it is the precursor of other reactive oxygen species (ROS). Herein, we prepared a new fluorescent probe based on phosphinate, consisting of a fluorescein, a superoxide anion responsive group, and a mitochondrial-targeted site, triphenylphosphonium salt (PF-MitoSOX). The probe PF-MitoSOX was synthesized and characterized by FTIR, ¹H-NMR, ³¹P-NMR, and CIMS. The dose-dependent fluorescence enhancement of PF-MitoSOX showed a good linearity with the detection limit of 4.6 pM for superoxide anion. The specificity of PF-MitoSOX was examined by measuring its fluorescence response after exposure to various analytes. Except superoxide anion, PF-MitoSOX did not show apparent fluorescence increase in the presence of other ROS or relevant substances, including hydrogen peroxide, singlet oxygen, nitric oxide, hypochlorite, hydroxy radical, glutathione. These results suggested that PF-MitoSOX was highly selective for superoxide anion. Moreover, the fluorescent imaging results illustrated that PF-MitoSOX not only can detect intracellular superoxide anion, but also can conveniently visualize changes in superoxide anion concentration in cells and *C.elegans*.

E-mail address: yliu@iccas.ac.cn

<http://dx.doi.org/10.1016/j.freeradbiomed.2018.04.482>