

令和 7 年 01 月 20 日 Jan. 20, 2025

大学院学生各位 To All Graduate Students

基盤医学特論 開講通知
Information on Special Lecture Tokuron 2024.4-2025.3

Title: Saying NO to Aging: New Concepts for Redox Pharmacology and Precision Medicine

Teaching Staff: Chang Chen; Professor, Institute of Biophysics, Chinese Academy of Sciences, Beijing, China.

日時: 令和 7 年 2 月 27 日(木) 15:45-17:15

Time and Date: 15:45-17:15, Feb 27th (Thu.), 2025

場所: 医系研究棟3号館3階 共通会議室 310

Room: Conference Room 310, Medical Science Research Building 3 (3F)

Language: English



Abstract: Population ageing is becoming an important issue all over the world. Antioxidants have been tried to use as anti-aging intervention for many years according to the Free Radical Theory of Aging. However, the clinical results are still disappointed. We have recently proposed the concept of Precision Redox and the "5R" principles as the key for antioxidant pharmacology, i.e., Right species, Right place, Right time, Right level and Right target as guidelines for redox medicine development. Our latest results further validate the above concepts. We find that Ca^{2+} /calmodulin-dependent protein kinase II α S-nitrosation (SNO-CaMKII α) physiologically increases during learning and memory tasks, while as significantly decreases during the natural aging process. Mice with mutations at the major CaMKII α S-nitrosation site (C280/289V) exhibit cognitive impairments and attenuated long-term potentiation (LTP). The absence of SNO-CaMKII α increases synapsin I (SYNI) phosphorylation resulting in excessive presynaptic release probability, causing reductions in learning and memory responses which occur not only in C280/289V mice, but also in Alzheimer's disease (AD) mice and naturally aging mice. According to the "5R" principle, we designed a glue molecule that precisely increases SNO-CaMKII α and successfully rescued the learning and memory impairment of mice. Our findings demonstrate that downregulation of SNO-CaMKII α is a new mechanism mediating aging-related learning and memory decline and shed new lights on redox pharmacology and precision medicine.

Information about the speaker:

Professor Chang CHEN is presently Principal Investigator at Institute of Biophysics, Chinese Academy of Sciences (CAS), Professor of University of CAS, and Vice Director of the National Laboratory of Biomacromolecules (2012-2023). Her major research interests are nitric oxide and S-nitros(yl)ation and other thiol modification in redox signalling transduction; redox regulation in aging and the related diseases; mechanism of traditional Chinese medicine.

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