香港中文大學
院士講座系列

The 15th Lecture Series by Academicians from the Chinese Academy of Sciences (CAS)

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Speaker: **Prof. LIU Changsheng**
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Chinese Academy of Sciences
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Title: **Materiobiology and Aging Interventions**
材料生物學與衰老干預

Language: **Putonghua**

Date: **Tuesday, 1 April 2025**
Time: **16:40 – 18:00**
Venue: **LKC-LT1, 3/F, Sino Building**
Registration: **https://www.cuhk.edu.hk/cneo/cas_2025/**

Biography

Prof. Changsheng Liu, Academician of Chinese Academy of Sciences, President of Shanghai University, Academic leader of Basic Science Center of National Natural Science Foundation. He is member of the Chinese Academy of Medical Sciences, member of the National Natural Science Foundation and the Advisory Committee, member of the national "Nanotechnology" special expert group, and member of Materials Science and Technology Commission of the Ministry of Education. He has been engaged in biomaterials research for a long time, and has developed a variety of bioactive materials, growth factor fabrication and novel activation technologies. He developed self-curing calcium phosphate artificial bone, which was approved for the first registration in China and widely used in clinic. He has published more than 900 high-level papers. He has won the second prize of the National Natural Science Award, the second Prize of the National Science and Technology Progress Award (both ranked first), the Innovation Award of Ho Leung Ho Lee Fund. He has won many honorary titles such as the International Federation of Biomaterials Societies, the American Academy of Medicine and BioEngineering, and Bioactive Materials Lifetime Achievement Award, etc.

Abstract

The high incidence of age-related diseases seriously affects the physical and mental health of patients and causes significant family and social burden. Research, intervention and prevention of aging is of great significance to delay systemic aging, and it is also a scientific and social problem faced by global population aging.

Recent studies have shown that biomaterials can exhibit a variety of new biological effects, which can affect the rapid initiation of cell response in the aging microenvironment, endogenous stem cell homing and differentiation, and assist in the clearance and reversal of senescent cells. For example, the absence of sulfonated glycosaminoglycan in aging bone tissue leads to impaired sensory innervation and delayed healing of elderly femur fractures. The addition of exogenous biomimetic materials can restore the neurotrophic response, induce and promote the growth of sensory neurons, enhance the sensory nerve innervation of bone injury tissue in old mice, and accelerate the healing. Moreover, it was found that sulfonated chitosan has anti-aging potential, which can target macrophages, reduce the aging phenotype of macrophages, and then improve the aging microenvironment and delay aging. In addition, the material can also show a variety of biological effects related to anti-aging during the repair process. For example, the classical calcium - phosphorus based materials can delay the bone loss under aging while promoting the repair and regeneration of bone tissue. The biological effects of the materials can clear ROS and regulate the aging microenvironment of cells. With the help of material design, it can cooperate with anti-aging drugs to clear senescent cells and promote the healing of damage under aging. Further research on aging intervention based on new effects of materiobiology will provide a new strategy for delaying aging.

ALL ARE WELCOME