



June 23, 2019

The Japan Society of Mechanical Engineers
Hokkaido Branch
“Biomechanics Research Meeting”
36th Seminar

Chairman: Toshiro Ohashi

The Biomechanics Research Meeting will sponsor presentations by Prof. In-San Kim from Korea Institute of Science and Technology (KIST), Korea/Korea University, Korea and Prof. Kuiwon Choi from Korean Institute of Science and Technology (KIST), Korea. Faculty members, graduate students, and undergraduates are encouraged to participate in the seminar.

Date&Time: July 4, 2019, 16:00 - 17:30

Place: Room A1-17, Faculty of Engineering, Hokkaido University

16:00 - 16:45

Title: Complex Adaptive Cancer Immunotherapy

Speaker: Prof. In-San Kim

Center for Theragnosis, Biomedical Research Institute, Korea Institute of Science and Technology (KIST), Korea

KU-KIST Graduate School of Converging Science and Technology, Korea University, Korea

Abstract:

Immunotherapy is revolutionizing the treatment of cancer. The current immunotherapeutics that work by taking the brakes off T cells have been particularly transformational, dramatically improving outcomes for some cancer patients. But we still need to answer to those patients whose cancers do not respond to these immunotherapeutics, and those whose cancers respond initially but then become resistant to the treatments. The more we study the major issues of tumors, the more we come to realize that they cannot be understood in isolation. Tumors are systemic problems, which mean that they are interconnected and interdependent. Cancer cells are present within a complex adaptive ecosystem consisted of associated cells including immune cells, connective tissue cells, endothelial cells within a scaffold of matrix altogether forming tumor microenvironment. Cancer, perhaps uniquely among human illnesses, is a disease that arises through Darwinian interactions of microenvironmental selection and phenotypic adaptation, which are both causes and consequences of its complexity and heterogeneity. Since a life has begun 3.5 billion years ago, they ensured continuous interaction between the diverse species, both cooperative and fiercely competitive in nature. So they have developed complex and sophisticated immune system to survive. Can we develop better systems to fight against cancer than our own immune system? Even though we do not understand completely our own immune systems, we could try at least to awaken our own immune system to fight against cancer. In an attempt to trigger our own immunity against cancers, we utilized the characteristic of genetic instability to our advantage, as the expression of cancer cell neoantigens triggers immunity against cancer cells, which can be called “intrinsic cancer vaccination”. For this purpose, we designed protein nanocages or extracellular vesicles (exosomes), which hold not only ligands for enhancing cancer cell phagocytosis but also drugs for inducing immunogenic cancer cell death. This strategy will allow us to

avoid using known tumor specific antigens, ex vivo manipulation and adoptive cell therapy, instead, efficiently present neoantigens of cancer cells to our immune system. This strategy could be combined with other treatment modalities to potentiate the therapeutic efficacy.

16:45 - 17:30

Title: H-TRAIN : Hongreung Biomedical Cluster

Speaker: Prof. Kuiwon Choi

H-TRAIN Program, Korean Institute of Science and Technology (KIST), Korea

Abstract:

H-TRAIN Program is a translational research program developed in 2018. The purpose of the program is to facilitate commercialization of the biomedical technologies developed in KIST. This program is originated from Translational Research Center (TRC) Program in KIST since 2012, then updated and renamed as H-TRAIN. Hongreung is the area where the origin of Korean R&D since 1966 when KIST was developed. KAIST has once also been located in this area, although KASIT moved to other city in late 1980's. Around this area there exist more than 10 universities, 2 major university hospitals, 2 specialized government hospitals and 3 government-sponsored research institutes including KIST. Approximately 5,000 ph.D.s are working in this area. Recently, Seoul city developed the Seoul Bio-hub in this area to promote industrialization of biomedical technologies as an accelerating organization. For now, there are more than 30 start-ups are under incubation and more start-ups will be accommodated soon. In Korea, the biomedical area is now considered as one of main future growth engine of Korean economy. Thus a lot of efforts both from the Government and local governments has been put into this area. The role of GRIs becomes more emphasized and the industrialization of the biomedical technologies is essential to the future of Korea. This is why H-TRAIN was born in KIST. In this presentation, I will introduce the H-TRAIN program along with the future of Hongreung Biomedical Cluster.

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