



July 10, 2017

The Japan Society of Mechanical Engineers
Hokkaido Branch
“Biomechanics Research Meeting”
29th Seminar

Chairman: Toshiro Ohashi

The Biomechanics Research Meeting will sponsor presentations by Prof. Yoshinori Sawae from Kyushu University, Japan and Prof. Dan Bader from University of Southampton, UK and Eindhoven University of Technology, the Netherlands. Faculty members, graduate students, and undergraduates are encouraged to participate in the seminar.

Date&Time: July 10, 2017, 16:30 - 18:00

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

16:30 - 17:15

Speaker: Prof. Yoshinori Sawae

Professor, Faculty of Engineering, Kyushu University, Japan

Title: Biotribology of Natural Synovial Joint and Joint Prosthesis

The word “Biotribology” was defined in 1971 to embrace “all aspects of tribology (friction, wear and lubrication) concerned with biological systems”. It covers many events encountered during our daily life as research interests, for example, friction between a glass and fingers for gripping, wear of teeth during brushing and so on. Among them, the lubrication mechanism of natural synovial joint is a popular research topic in biotribology. The smooth movement of human diarthrodial joints has attracted huge interests of researchers not only in biomedical field but also in engineering field, since the typical friction coefficient of synovial joints is extremely lower, around 0.001, compared with that of man-made bearing systems, those friction coefficient is usually 0.1 to 0.01. The wear of prosthetic joint materials is another important issue for biotribology. Metal ions and polymer wear particles released from sliding surfaces of joint prosthesis implanted in human body are usually very toxic and exert adverse reactions in the surrounding living tissue. Therefore, it is recognized as a main factor restricting the lifetime of current artificial joints. This presentation attempts to present recent progress of biotribology research on the natural synovial joint and joint replacements.

17:15 - 18:00

Speaker: Prof. Dan Bader

**Professor, Faculty of Health Sciences, University of Southampton, UK and
Department of Biomedical Engineering, Eindhoven University of Technology, the
Netherlands**

Title: Biomechanics can Induce Soft Tissue Remodeling: A Strategy for Cartilage Tissue Engineering

It is well established that in the healthy state of soft tissues, appropriate levels of physical activity are important in providing mechanical stimuli for cells to remodel their extracellular matrix. This motivates the use of biomechanical conditioning of cell-seeded constructs in the tissue-engineered functional repair of articular cartilage. This presentation will describe the relative success of such a strategy, involving both compressive and shear loading of chondrocyte-seeded 3D hydrogel constructs. In addition, it will highlight some of the signalling pathways associated with these mechanotransduction events.

Contact:

Toshiro Ohashi

Division of Human Mechanical Systems and Design, Faculty of Engineering, Hokkaido University

Tel&Fax: 011-706-6424, Email: ohashi@eng.hokudai.ac.jp