Biotribology Research in Japan

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The word “Biotribology” was first introduced by Dowson and Wright to cover “all aspects of tribology related to biological systems” in 1973\(^1\). Just two years later, a Research Committee on Biotribology was established by Sasada et al. in The Japanese Society of Lubrication Engineers\(^2\). Since then, various research activities on biotribology have been conducted extensively in many Japanese universities and research institutes.

The friction, wear and lubrication of natural and artificial load bearing joints have been popular research topics of biotribology. The highly sophisticated lubrication mechanism and resultant low friction and wear characteristics of natural synovial joints attract huge interests of tribologists and many experimental and theoretical studies have been conducted\(^3\)\(^-\)\(^5\). The wear behavior of prosthetic joint materials and characteristics of released wear particles are recognized as major factors deciding the longevity of joint prostheses. Therefore, the lubrication mode of artificial joints and consequent friction and wear of materials used in sliding surfaces of joint prostheses have been investigated\(^6\)\(^,\)\(^7\) and research outcomes were utilized to improve the function and longevity of joint prostheses\(^8\).

The friction of skin is another major research subject for biotribology since it plays important roles in our daily activities and its mechanism is quite complicated. It also closely related to the haptic or tactile sense, which provides valuable information not only for industrial applications\(^9\) but also for the cosmetic and hair care products\(^10\). The area of interests is extending to other biological surfaces elaborated by various creatures, such as snail, earth warm, gecko, etc.

1) D. Dowson and V. Wright: Bio-tribology, Proceedings of the Conference on The rheology of lubrication organised by The Institute of Petroleum, The Institution of Mechanical Engineers and the British Society of Rheology (1973) 81.