Seunghwan Lee et al., Madridge J Pharm Res. 2018
http://dx.doi.org/10.18689/2638-1591.a2.002

Development of Injectable Drugs to Improve the Life Time and Biocompatibility of Prosthetic Articular Joints

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Wear problems of bearing materials for prosthetic articu Hepatoprotective Properties of the Salt-Like lar joints, such as total hip arthroplasty (THA) or total knee arthroplasty (TKA), have long been recognized as a major cause of degradation and failure of the implants. Thus, improvement of anti-wear properties of implant materials is a key requirement to improve lifetime of prosthetic articular joints. To date, efforts to solve this problem have been directed towards the development and application of new materials with superior anti-wear properties. The present study proposes to solve this problem by administering external lubricants to prosthetic articular joints. This approach is primarily based upon recent development of various lubricant additives that improve anti-wear properties even in aqueous environment. With an aim to reduce the wear of ultrahigh molecular weight polyethylene (UHMWPE), external lubricants were formulated by dissolving commercial amphiphilic copolymers in aqueous buffer solution. Tribological studies have shown that the tested copolymers displayed immediate reduction effects in the coefficient friction upon injection for the sliding contacts between CoCrMo pin and UHMWPE disk in calf serum as model synovial fluid.For in-vitro cytotoxicity tests, cell morphology and standard MTT assay on murine fibroblast and osteoblast showed a positive result.Near future studies pursue to investigate the impact on wear properties of UHWMPE and extended biocompatibility. Ultimately, it is the aim to develop drugs in the form of pre-filled syringe to improve lifetime and biocompatibility of prosthetic articular joints.

Biography:

Dr. Seunghwan Lee completed PhD in physical chemistry in 2000(University of Houston), then worked in the field of biotribologyand biomimetic lubrication at ETHZ, Switzerland until 2008.Since 2009, he has been leading a research group focusing on biotribology of mucin, mucus, orthopaedic implants, and antifouling properties at the Department of Mechanical Engineering, DTU, Denmark.