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DISTINGUISHED BIOMEDICAL ENGINEERING WEBINAR

"Effect of Stress on Degradation of Biodegradable Materials"

Yubo Fan, PhD
Beihang University

ABOUT THE WEBINAR

Biodegradable devices have been developed and investigated as alternatives for the currently-used permanent cardiovascular stents or bone plate/screw. Biodegradable metals (magnesium alloys et al) are the most widely used degradable biomaterials in biomedical applications, including implantable orthopaedic fixation devices and cardiovascular stents. A number of studies have been launched during last twenty years in view of how physiological and biochemical environment in vivo significantly affects biodegradation process. However, there are little studies focused on the effect of mechanical stresses on degradation process in view of biomechanics. Meanwhile, there are many challenges in the design of biodegradable implants. Auxetic structure with a negative Poisson's ratio (NPR) would expand in the transverse direction when stretched, which might provide new insights into solving the loosening of screw after implanted. So it is important to analyze the mechanical performances during biodegradation process for the understanding and better design of implantable biodegradable devices. In this study, the effects of different mechanical stresses on the degradation of aliphatic biodegradable materials combined with 3D printing were observed by experimental and numerical simulation. It was concluded that mechanical stresses would be an important factor for the design of implantable devices made up of biodegradable polyesters or magnesium alloys.

ABOUT THE SPEAKER

Yubo Fan, PhD

Professor and Dean, School of Biological Science and Medical Engineering, Beihang University, Beijing; Past President, Chinese Society of Biomedical Engineering; Director, Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education; Director, Beijing Key Lab for Design & Evaluation Technology of Implantable & Interventional Medical Devices

Professor Yubo Fan acquired his B.S. degree in Mechanics from Pekin University in 1987, and Ph.D. in Biomechanics from Sichuan University of Science and Technology in 1992. He is a Changjiang Scholar and Obtainer of National Outstanding Youth Funds(NSFC). Currently, he is Director of the Beijing Advanced Innovation Centre for Biomedical Engineering, Director of the Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, and Dean of the School of Engineering Medicine at Beihang University. Prof. Fan is the founding Dean of the School of Biological Science and Medical Engineering at Beihang University. He is a Fellow of AIMBE, IAMBE and FBSE. Dr. Fan is past president of the Chinese Biomedical Engineering Society (CSBME), past Chair of the World Association for Chinese Biomedical Engineers (WACBE), and past council member of the World Council of Biomechanics. He is vice president of the China Strategic Alliance of Medical Devices Innovation. His research areas include Biomaterials, Biomechanics, Mechanobiology, and Rehabilitation Engineering. He has more than 300 peer reviewed journal papers published in international academic journals.

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