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Biomolecular engineering of elastin protein for cell transplantation

Won Bae Jeon
Daegu Gyeongbuk Institute of Science and Technology, South Korea

With the astonishing increase in the fields of regenerative medicine, biomaterial engineering has become a critical approach to generate biocompatible carriers for cell transplantation. Native ECM materials derived from animal tissues have been considered to be the best choices for cell culture or tissue engineering. However, possible pathogen contamination by cellular remnants from foreign animal tissues is an unavoidable issue that has limited the use of native ECM for human benefit. Elastin-like proteins (ELPs) are genetically engineered biopolymers consist of the VPGXG pentapeptide, where the guest position X accepts any amino acid except for proline. ELPs are responsible to temperature change; solubilized ELPs associate with each other above a certain transition temperature and form self-assembled coacervates comprising β-spiral structures. ELP are non-toxic to the cells and tissues and are easily biodegradable, and can be processed into various types of formulations such as in situ aggregates, microfibers, cell sheets, hydrogels, and fusion with growth factors to support different cell types, and thus, their contribution to the repair of cartilage, blood vessels, neurons, and heart is beginning to emerge. This presentation highlights the development of the ELP-based recombinant proteins that are being increasingly used for the delivery of chemotherapeutics and, in particular, to provide a cell-friendly ECM environment for cell transplantation.

Biography

Dr. Won Bae Jeon, PhD, is the Director of the Laboratory of Biochemistry and Cellular Engineering and an Adjunct professor of the Department of New Biology. He got his BSc from Seoul National University and MSc and PhD from South Korea Advanced Institute of Science and Technology, and performed postdoctoral research at the University of Wisconsin-Madison.

wbjeon@dgist.ac.kr

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