Julia Durzynska

Adam Mickiewicz University, Poland

IGF system in medicine: Nanoparticles technology in targeted therapies

Insulin-like growth factor 1 (IGF-1) system is responsible for organismal growth as it controls important cellular processes. The IGF-1 system is composed of a bioactive ligand IGF-1, IGF binding proteins (IGF-BPs) and IGF-1 receptor (IGF-1R) localized in the cell membrane. Once activated, it transfers the signal into the nucleus where a transcription program ensues. Recently, studies have focused on human IGF-1 isoforms and their specific Post-Translational Modifications (PTMs). As a result of alternative splicing of IGF-1 there are three pro-forms IGF-1A, IGF-1B and IGF-1C produced and can be broken down to mature IGF-1 and E-peptides. But they can skip removal, thus modifying activity, bioavailability, cellular localization and stability of IGF-1. Glycosylated IGF-1A is less active and could constitute a storage form, while IGF-1B localizes to nucleoli, where its precise bioactivity is to be uncovered. Furthermore, a nuclear translocation and activity of IGF-1R in transcription was demonstrated. IGF-BPs also display a much broader spectrum of activities than it was previously thought. Components of the IGF system are being developed towards therapies, including Nanoparticles (NPs). For better impact of IGF-1 on the differentiation potential of human chondrocytes IGF-1 was coupled to silica NPs or to cationic nanocarriers to improve delivery and efficacy of growth factor treatment of osteoarthritis. In another study, mesoporous silicon NPs were used as optimal carriers for sustained release of unstable peptide hormones. The growing knowledge of the IGF-1 system complexity should be taken into consideration in the field of nanomedical tools in order to create better therapies.

Biography

Julia Durzyńska has completed her PhD from Nantes University, France. She has worked as an Assistant Professor at the University of Poznań, Poland. She has obtained Postdoctoral studies at University of Pennsylvania, Philadelphia, USA. She has published over 20 papers in reputed journals.