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Design of extracellular protein based particles for intra and extra-cellular targeting

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In recent years, a significant amount of effort has been dedicated to the development of both nano- and micro-technologies as they offer endless possibilities with regards to their biological applications. At the forefront of these technologies is the synthesis of particles for various applications in targeted drug and growth factor delivery, gene therapy, medical imaging and tissue engineering. In this study we used the layer-by-layer self-assembly method to synthesis protein-based microparticles using extracellular matrix proteins, such as collagen and fibronectin, in a simple and scalable way. Particle characterisation was performed using fluorescence microscopy, zeta potential analysis and scanning electron microscopy. Furthermore, two different cell types were used to investigate microparticle toxicity, attachment and/or internalisation. The results obtained not only showed a significant reduction in the cytotoxicity of these protein-based particles but also a significant increase in their attachment and internalisation by cells compared to their polymeric counterparts. In addition, we provide evidence for use of such particles in achieving the sustained release of Bone Morphogenic Protein-2 which is widely used for bone tissue engineering. This study has implications in the development of functional, biocompatible and non-toxic particles for intra and extra-cellular targeting and sustained release of various drugs, growth factors and genetic materials for numerous applications in medicine.

Biography

Nicolas P. Omorphos has completed his intercalated degree in Surgical Sciences at the age of 23 years from University College London and is now continuing his MBBS studies at University College London. This is his first of many papers to be published in the future.

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