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Nanomaterials for drug delivery and in vivo imaging

LECTURE INVITATION

Pull Them Together to Drive Them in: Plasma Membrane Targeting for Enhancing Endocytosis and Intracellular Efficiency of Therapeutics

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The lecture will take place on Tuesday February 21st 2017 (10 am) in Seminar Room 2 at the Faculty of Pharmaceutical Sciences, Ottergemsesteenweg 460, 9000 Ghent, Belgium.

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LECTURE ABSTRACT

Targeting disease processes inside cells with biopharmaceuticals represents a major challenge, not least in overcoming biological barriers such as those posed by the plasma membrane. Investment in this approach is justified when one considers the number individual intracellular targets now available to us as we continue to understand disease processes at the gene, protein and signaling level. This is true for many high-burden diseases such as cancer, infectious diseases and inherited genetic defects such as cystic fibrosis.

Our research at Cardiff University is focused on studying endocytosis and specifically on designing methods to analyse individual endocytic pathways to characterise how drug delivery vectors (DDVs) and associated therapeutics bind to and gain access to cells. As vectors we have paid particular attention to natural ligands, cell penetrating peptides, antibodies and polymer conjugates. We have made significant contributions to the current understanding of the way DDVs interact with cells, enter cells and traffic on endocytic pathways that critically govern their intracellular fate.

In this lecture I will describe work we have performed focusing on technologies and in vitro models we have exploited to study cell binding and endocytosis of DDVs including cell penetrating peptides, ligand decorated nanoparticles and antibodies targeting plasma membrane receptors on cancer cells. I will highlight how we recently demonstrated that internalisation of receptors, and associated ligands, can be significantly enhanced through manipulating ligand and receptor association, and how normal endocytic routes can be modified to reach a desired intracellular location. Our involvement in a €30M FP7 Innovative Medicine Initiative (IMI-EFPIA) consortium (COMPACT www.compact-research.org/) will also be discussed. This represents a public-private collaboration between 14 European academic institutes and pharmaceutical companies aiming to improve the cellular delivery of biopharmaceuticals across major biological barriers of the intestine, lung, blood brain barrier and skin.

BIOSKETCH

Arwyn Jones is originally from Groesffordd, Llanddoged in North Wales and gained his BSc and MSc (Clinical Biochemistry) at the university of Coventry and Leeds respectively. He was awarded his PhD in protein biochemistry and crystallography from Birkbeck College, University of London. Then he undertook postdoctoral positions investigating endocytosis at the University of Liverpool and Harvard University, Boston USA. In 2000 he was awarded a European Molecular Biology Organization fellowship to work at the European Molecular Biology Laboratory (EMBL), Heidelberg Germany, and continued at the EMBL when he was awarded an Alexander von Humboldt Foundation Scholarship. He was appointed as Lecturer at the Cardiff School of Pharmacy and Pharmaceutical Sciences at Cardiff University in 2002 where he is now a Professor in Membrane Traffic and Drug Delivery. He currently sits on the Editorial Board of the Journal of Controlled Release and Membranes. He is also very active in public engagement with science and has organised a number of large scientific exhibitions at the National Eisteddfod of Wales.

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