Ruđer Bošković Institute

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DEVELOPMENT OF SYSTEMICALLY TARGETABLE "PRECISION VIROTHERAPIES": A NEW PARADIGM IN CANCER TREATMENT

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Oncolytic viruses hold great promise as novel therapeutic agents for treating cancer. If appropriately harnessed, they can replicate within tumour cells, expanding the therapy within the tumour microenvironment and inducing a lytic, immunogenic form of cell death. Their potency can be further enhanced through the engineering of the viral genome to encode therapeutic transgenes, forcing the local overexpression and secretion of immunomodulatory anti-cancer transgene products by infected cancer cells. To date however, intravenous approaches to oncolytic virotherapy – necessary to target metastatic deposits - have been thwarted by the lack of tumour selectivity of the administered viral platforms, and their loss and uptake by "off target" cells and tissues.

In this talk, I shall describe our approach to developing highly tumour selective oncolytic virotherapies ("precision virotherapies") based on adenovirus. To achieve this, we integrate basic virology that underpins the adenovirus: host protein interactions that naturally dictate tropism and pathogenicity of adenovirus, with knowledge of cancer cells to define means to target viral platforms selectively to cancer cells. Using advanced engineering approaches, we selectively refine adenoviral platforms into agents suitable for systemic targeting of virotherapies to cancer cells.

Such precision virotherapies, which deliver therapeutic payloads selectively to tumour cells, may enable an ambitious selection of ultra potent immune activators to be safely delivered to tumours in vivo, lighting an "immunological fire" in the tumour.

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Alan L. Parker obtained his PhD from the University of Birmingham for work on Development of peptide-targeted gene delivery systems. Currently he is Professor of Translational Virotherapies and Head of Solid Cancers at Division for Cancer and Genetics, Cardiff University. As Tenured Group leader he is developing a programme of research focussing on the basic virology of low adenovirus to develop novel conditionally replicating “precision immunovirotherapies”, and new technologies for improving efficacious viral delivery to tumours in vivo. He is author on more than 70 scientific peer reviewed articles and inventor of 6 international patents. He is also Founder & Chief Scientific Officer of Trocept Therapeutics at Oxford Business Park, Oxford, a start up company developing novel immuno-oncology therapeutics.