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Dendrimer nanocarriers and their aerosol formulations: New opportunities for the regional and systemic delivery of drugs to and through the lungs

Introduction: The development of innovative aerosol formulations for the delivery of small molecule and biologics to and through the lungs can help promote the opportune expansion of the pulmonary drug delivery market. Nanocarriers are of particular relevance in this context, as they can be utilized to modulate the interaction between the active ingredient and the pulmonary epithelium, thus enhancing drug efficacy and decreasing toxicity, by mechanisms that include, among others, improved transport across cellular and extracellular barriers, targeting of cell populations and intracellular targeting.

Results & Discussion: In this work, we will present many opportunities for dendrimers as drug carries for local and systemic administration of drugs via the pulmonary route, and strategies for their formulations in portable inhalers, including dry powder inhalers and pressurized metered-dose inhalers. We will show how dendrimer chemistry can be used to control not only the lung residence time, but also local (cellular) and systemic biodistribution and PK upon pulmonary administration? We will also show how such results can be explored to develop efficient chemotherapies for the treatment of lung cancers/metastases?

Biography

Sandro R P da Rocha is a Professor in Pharmaceutics and the Director for Pharmaceutical Engineering—School of Pharmacy, Chemical and Life Science Engineering and Massey Cancer Center. He has his expertise in the broad area of Nano Medicine. His long-term goal is to develop innovative drug and gene nanocarriers and engineer formulations for their pulmonary administration, for the treatment of local lung diseases and systemic disorders. His group uses a combined experimental and computational strategy to probe these interfaces.

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