

MSE-Colloquium@NTU

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Lecture Theatre 7, Nanyang Technological University



Nanomaterials in Medicine - A Report Card in 2015

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About the Talk

This talk surveys the evolution of applications of nanomaterials in medicine. There are 4 medical technologies that are impacted by nanomaterials: (1) ex-vivo diagnostics; (2) drug/gene delivery; (3) tissue engineering; (4) in-vivo imaging. The importance of nanomaterials varies across these 4 technologies. Innovations in these technologies are also sporadic, and commercial success has not lived up to expectations. The rate of translation of nanomedicinal products where nanomaterials play a key role is low. Of roughly 2000 patented applications, only about 10% have led to clinical trials, and even fewer have resulted in an approved product. Where have we done well? I will examine the progress made in 3 categories (ex-vivo diagnostics, targeted delivery in cancer, and bioactive nanomaterials) and point out examples of success and failure, and what materials scientists and engineers can do to better translate nanomedicine ideas to the patient.

About the Speaker

Professor Subbu Venkatraman has a PhD in Polymer Chemistry from Carnegie-Mellon University. He has spent about 15 years in biomedical R&D in the USA, working with various applications of polymeric biomaterials. He held a senior position in R&D at Alza Corporation, prior to joining NTU as an Associate Professor in 2000. Since then, he has published extensively in the field of biomaterials, with a total of 189 publications, H-index of 28 and a citation count of 2987. He also holds 12 issued US patents and 20 filings in biomaterials. His work in biomaterials has led to 3 successful spin-off companies, with one of them (Amaranth Medical) obtaining substantial series C funding. He has also received the 2014 President's Technology Award together with Prof. Freddy Boey and Adjunct A/P Tina Wong, for their innovative application of nanostructures and novel drug delivery approach to combat blindness from glaucoma. His research group is interested in designing and modifying polymers for biomedical applications. In this work, they are closely associated with local hospitals and researchers, including the National Heart Centre, Tan Tock Seng Hospital and the National Cancer Centre. Current research interests include:

- Nanomedicine
- Localized drug/gene delivery
- Biodegradable polymers
- Injectable implants and nanoparticles
- Hemocompatibilization of polymers