Stevens Institute of Technology

Nanotechnology Graduate Program

Multifunctional Polymer Nanoparticles for Targeted DNA Vaccine Delivery

Wednesday, February 21, 2007
Babbio 122, 11:00am

Dr. Chun Wang
Department of Biomedical Engineering
University of Minnesota

DNA vaccine has shown considerable promise in combating a wide range of devastating diseases including cancer and bacterial and viral infections. Compared with conventional pathogen-based and subunit vaccines, DNA vaccine possesses several advantages, including the potential of eliciting both antibody and cell-mediated immune responses. Various forms of DNA vaccine are currently being evaluated in animal models and human trials. One major obstacle to successful clinical use of DNA vaccines is the difficulty of delivering DNA molecules to antigen-presenting cells (APCs) that mobilize the immune system. While viruses are widely investigated for DNA vaccine delivery application, synthetic polymers present a promising alternative avenue that is safe, inexpensive, and versatile. The long-term object of our work is to develop a platform DNA vaccine delivery technology based on rationally designed polymer-based nanostructures, for safe, clinical use in humans with high potency. We hypothesize that DNA vaccine incorporated in multifunctional structurally defined polymer nanoparticles that target APCs, achieve high levels of antigen expression and presentation, and activate resting APCs, will be able to generate potent long-lasting antigen-specific immune responses in vivo. In this talk, I will describe the background and rationale of our approach and report our recent progress.

Dr. Chun Wang is Assistant Professor in Biomedical Engineering at University of Minnesota, Minneapolis, MN. His research interests focus on gene delivery, tissue engineering and responsive biomaterials. Dr. Wang received his BS in Chemistry from Nankai University, China in 1992, and M.S. and Ph.D. in Bioengineering from University of Utah in 1998 and 2001, respectively. Then he was a postdoctoral researcher at MIT with Dr. Robert Langer, working on gene delivery and responsive hydrogel. He was coauthored more than 20 technical papers in peer-reviewed journals such as Nature, Nature Materials, Advanced Materials, Journal of Controlled Release. He has received a number of awards such as Dow Corning Graduate Student Outstanding Research Award (1998), Capsugel Award for Innovative Aspects of Controlled Release Drug Release (1999) from Controlled Release Society, Individual National Research Service Award (2001-2004) from NIH, and McKnight Land-Grant Professorship (2007-2009) from Univ. of Minnesota. He received the prestigious Faculty Early Career Development (CAREER) award from NSF in 2006. His current research is funded by NSF, NIH, DOD, and University of Minnesota.

Light refreshments will be served prior to seminar

Co-sponsored by the CBME Department

STEVENS Institute of Technology