



**Aliasger K. Salem, Ph.D.**

University of Iowa

Department of Pharmaceutical Sciences and Experimental Therapeutics, with additional appointments in the Department of Chemical and Biochemical Engineering, Department of Biomedical Engineering, and the Holden Comprehensive Cancer Center

### **"The Versatile Utility of Biodegradable Particles in Vaccinations"**

**Abstract:** Antigen-loaded or antigen-coated biodegradable particles are capable of being actively taken up by antigen-presenting cells (APCs), and they have shown promising potential in immunotherapy by initiating a strong immunostimulatory cascade that results in potent antigen-specific immune responses against the target antigen. Such particle based carrier systems offer versatility in that they can simultaneously co-deliver adjuvants with the antigens to enhance APC activation and maturation.

For example, treating mice with biodegradable particles co-loaded with an immunostimulatory adjuvant such as CpG ODN and a model antigen (Ovalbumin/OVA) induced significantly higher amounts of anti-OVA antibody production than other preparations such as the soluble OVA and CpG ODN ( $P < 0.01$ ) and stimulated stronger IgG2a production than delivery of particles entrapping antigen alone.

Biodegradable polymers that can be used to prepare these particles include poly(lactide-co-glycolide) (PLGA) and polyanhydrides. We have shown that the size of particles used to vaccinate mice can affect the magnitude of the antigen-specific immune response stimulated with smaller particles, generating higher antigen-specific cytotoxic T cell responses.

Antigen coated biodegradable particles have also shown strong potential as a prime for heterologous prime-boost adenovirus based vaccines generating antigen-specific CD8<sup>+</sup> T cell responses that were equally as effective as homologous adenovirus vaccine prime-boosts but with reduced risk of formation of therapy suppressive anti-adenovirus antibodies and other potential adverse effects.

**Brief Bio:** Aliasger K. Salem completed his PhD at the School of Pharmacy and Pharmaceutical Sciences at the University of Nottingham in the UK. Cancer Center. Prior to joining the University of Iowa in 2004, he was a postdoctoral fellow at the Johns Hopkins School of Medicine. Salem was an American Cancer Society Research Scholar from 2009 to 2013. Prof. Salem is currently the program leader of the Cancer Signaling and Experimental Therapeutics (CSET) program at the Holden Comprehensive Cancer Center.