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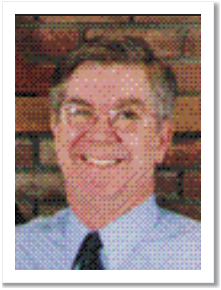

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Fc receptor-targeted vaccines: A novel adjuvant-independent approach for mucosal vaccination against intracellular and extracellular mucosal pathogens

Numerous studies have demonstrated that targeting immunogens to Fc receptors (FcR) on antigen (Ag) presenting cells (APC) can enhance humoral and cellular immunity *in vitro* and *in vivo*. However, until recently, the ability of such immunogens to enhance protection against infection had not been addressed. Furthermore, despite the potential advantages of targeting Ag to FcR at mucosal sites, very little is known regarding the role of FcR in mucosal immunity, or the efficacy of FcR-targeted mucosal vaccines. Thus, we examined the potential for FcR-targeted mucosal vaccines to protect against intracellular and extracellular mucosal pathogens. Two independent targeting strategies were tested. One strategy utilized mAb-Ag complexes and the other an FcR-targeted-Ag fusion protein, both administered intranasally. Following immunization with either the mAb-Ag complexes or the FcR-targeted fusion protein, and subsequent intranasal challenge, we observed enhanced protection against *F. tularensis*, a Category A intracellular mucosal pathogen, and *S. pneumoniae*, a more common extracellular mucosal pathogen, respectively. The mechanisms of immune enhancement behind this strategy were also studied. Results indicate that a combination of factors are involved, including extended release of Ag-MHC complexes to the APC surface, and enhanced trafficking of Ag to lymphoid tissue. In conclusion, the use of FcR-targeted immunogens administered intranasally represents a novel mucosal vaccine approach that can: protect against both intracellular and extracellular mucosal pathogens, enhance humoral and cellular immune responses, be applied to killed and recombinant vaccines, and does not require traditional adjuvant. These studies were supported by grant funds from NIH (R01AI07640801, R21AI06547601, and P01AI056320).

Biography

Edmund Gosselin received his Ph.D. in Medical Sciences at the University of Massachusetts, Worcester, MA, in 1988. He completed a postdoctoral fellowship at Dartmouth Medical School in 1993, where he focused on targeting Ag to FcR on APC to enhance T cell activation. Dr. Gosselin then moved to Albany Medical College, where his research has focused on the development of FcR-targeted immunogens as an adjuvant-independent approach for mucosal vaccination. In 2008, he published the first paper demonstrating that immunogens targeted to FcR intranasally can enhance protection against subsequent challenge with a mucosal Category A intracellular pathogen, *F. tularensis*.