Mucosal adjuvants, their mode of action and female genital tract immunity

The vast majority of life threatening pathogens invade body and or establish infection at the mucosal surfaces. Therefore, the development of safe and potent mucosal adjuvants to generate vaccine specific immune responses at the mucosal surfaces remains a top priority. Sexually transmitted infections remain a serious socioeconomic burden accounting for a devastating mortality and morbidity especially in developing countries. With exception of recently developed vaccines for genital human papiloma virus infection, no vaccines have yet been developed for sexually transmitted infections such as genital herpes and HIV. This is at least in part due to the lack of potent and safe vaccine adjuvants. We have recently documented the potential of the Toll-like receptor 9 targeting molecule CpG ODN and the invariant NKT cell agonist α-galactosylceramide to serve as potent mucosal adjuvants for induction of immunity in the murine female genital tract to genital herpes infection. We have also recently documented the ability of mucosal immunization for induction of protective immunity to primary as well as recurrent genital herpes infection in guinea pigs.

Rational design of potent and safe mucosal adjuvants for human use requires a deep understanding of the mode of action of successful candidate adjuvants. Further, use of immunostimulatory molecules as adjuvant is often associated with a potential safety concerns. Currently, our research is focused on understanding the mode of action of lead mucosal adjuvants capable of generating immunity in the female genital tract when given mucosally together with antigen. This includes different immunological readouts as well as systems biology approach, including whole mouse genome microarray analysis and real time PCR to comprehend the molecular signature of adjuvanticity of these candidate adjuvants in the murine female genital tract mucosa.

Research group:

Group leader: Ali M. Harandi, MsPh, PhD, Associate Professor/Docent

Group memeebrs: Madeleine Lindqvist, Karolina Thörn, Josefine Person

Collaboration/Networks in Academia:

- Dr. Thomas Kariuki, director of the Institute of Primates Research, Nairobi, Kenya
- Prof. Robin Shattock, St. George Hospital, University of London, UK
- Prof. Quentin Sattentau, University of Oxford, UK
- Prof. Oliver Perez Martin, head Dept. of Immunology, Finlay Institute, Cuba
- Docent Marianne Jansson, Karolinska Institute, Sweden
- Prof. Olle Olofson, University of Gothenburg, Sweden
- Dr. Charlotte Örndal, Lab for clinical Pathology and Cytology, Sahlgrenska University Hospital, Sweden.
- Prof. Farrokh Modabber, Drug for Neglected disease Initiative, Switzerland
- Prof. Luis De la Maza, University of California, Irvine, USA
- Prof. Gary Nabel, NIH, USA
Prof. AE Aboulata, Plant Virus and Mycoplasma Research Center, Egypt
Partner of European Vaccines and Microbicides Enterprise (Europrise) involving 132 institutions from 22 countries

Important Publications:


Harandi, A. M., Svennerholm, B., Holmgren, J., Eriksson, K. Interleukin-12 (IL-12) and IL-18 are important in innate defense against genital herpes simplex virus type 2 infection in mice but are not required for the development of acquired gamma interferon-mediated protective immunity. *Journal of Virology* (2001) 75: 6705-6709.