



NSI Meeting Announcement

Date: Wednesday, April 26, 12:00 – 13:00

Venue: Rikshospitalet, Seminar room A3.3067

Lunch Seminar

by

Dr Finn-Eirik Johansen

“Conserved features of secretory immunity in mammals, birds and amphibians”

Abstract

One of the most characteristic features of the mammalian mucosal immune system is the dominant presence of secretory immunoglobulins (SIg), particularly SIgA, an antibody class unique to the mucosae. At least 80% of all Ig-producing plasma cells in the body are found in the intestinal lamina propria, and most of these cells produce polymeric IgA (pIgA; mainly as dimers). The J chain is crucial in SIg formation because it serves to polymerize IgA and IgM and endows the resulting polymers with a binding site for the polymeric Ig receptor (pIgR). Thus, both pIgA and pentameric IgM are actively transcytosed to external secretions after binding this glycoprotein expressed on the basolateral surface of secretory epithelium that lines the mucosal surfaces.

We have co-expressed J chain from human, mouse, chicken, *Xenopus laevis* bullfrog, and nurse shark with human IgA and shown that tetrapod J chain efficiently induced IgA polymerization while J chain from nurse shark did not. Correctly assembled polymers showed high affinity to human pIgR. Sequence analysis of J chain identified two regions, conserved only in tetrapods, which were dispensable for polymeric IgA (pIgA) formation but required for pIgR binding. Furthermore, we isolated pIgR cDNA from the amphibian *Xenopus laevis* and demonstrated that it could bind human pIgA although IgA does not exist in this species.

Using a "natural" infection model, we demonstrated that pIgR^{-/-} mice are profoundly sensitive to infection with *Salmonella typhimurium* via the fecal-oral route and, moreover, shed more bacteria that readily infected other animals. These results imply an important evolutionary role for natural SAbs in protecting both the individual and the herd against infections, and suggest that a major role of SAbs may be to prevent the spread of microbial pathogens throughout the population. The functional conservation between each polypeptide chain specifically involved in the generation of SAbs from amphibians, birds and mammals suggests that this important mucosal defense mechanism originated early in tetrapod evolution and has been maintained since.

About the speaker

Finn-Eirik Johansen, PhD, is an associate professor at the Institute of Pathology, University of Oslo and a senior scientist at the Department of Pathology, Rikshospitalet-Radiumhospitalet University Hospital. His research focus is on aspects of secretory immunoglobulin biogenesis and function: function of the J chain; function and regulation of the polymeric Ig receptor (pIgR); and analysis of pIgR knockout mice.

Dr Johansen has received several awards for his scientific contributions, including the Rikshospitalet Excellence in Research Award for Younger Researchers and the Medinnova Idea Award.

Welcome!



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