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Salmonella transforms follicle-associated epithelial cells into M cells to promote intestinal invasion – A new paradigm in host-pathogen interaction

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Abstract

S. Typhimurium targets antigen-sampling micro fold (M) cells as the preferred cell type to translocate across the gut epithelium. Although M cells represent a small proportion of the specialized follicular associated epithelium (FAE) overlying mucosa-associated lymphoid tissues, their density increases during Salmonella infection. The molecular mechanism underlying this Salmonella-mediated increase in M cell density was uncertain. Using in vitro and in vivo infection models we demonstrate that the S. Typhimurium type III effector protein SopB induces an epithelial-mesenchymal transition (EMT) of FAE enterocytes into M cells. This cellular trans-differentiation depends on the activation of Wnt/□-catenin signaling leading to induction of both RANKL and its receptor RANK. The autocrine activation of RelB expressing FAE enterocytes by RANKL/RANK induces EMT regulator Slug that marks epithelial trans-differentiation into M cells. This study demonstrates a novel host-pathogen interaction in which S. Typhimurium transforms primed epithelial cells into M cells to promote host colonisation and invasion.

Biography:

Dr. Arvind Mahajan, PhD, is currently Director Research with Lohmann Animal Health, Research Centre Hannover, Germany. Previously he worked in mixed Veterinary Practice and led vaccine research on food borne pathogens as Group Leader at the Roslin Institute and faculty in Division of Infection and Immunity at the Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK. Dr. Mahajan received his Doctorate in Veterinary Microbiology from the University of Edinburgh, UK. He obtained his MSc in Immunology from Hammersmith Hospital, Imperial College School of Medicine, London, UK. Dr. Mahajan's research in field ofmucosal immunity has been published in high-impact Cell and Nature press journals. He is a recipient of Ker Memorial Award for his outstanding research in infectious diseases at the Centre of Infectious Diseases, University of Edinburgh, UK. Dr. Mahajan has been an Advisory Board member and consultant to many leading Animal Health Pharmaceutical Companies.