ARVIND MAHAJAN

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RESUME

- Cellular Microbiologist leading vaccine research programme on foodborne pathogens at The Roslin Institute, University of Edinburgh. Expertise in application of molecular and proteomic techniques to aid discovery of new targets for use in vaccine design and development. Consultant to animal health companies & collaborations in and among academia, government and industry.

- Leading translational research with the focus on delivering products which benefit human and animal health. Authored/co-authored 30 peer-reviewed papers and 1 Patent Application; Received Ker Memorial Award for the outstanding research in field of infectious disease by Centre of Infectious Diseases at the University of Edinburgh.

EDUCATION

PhD (Veterinary Microbiology) The Royal (Dick) School of Veterinary Studies, University of Edinburgh UK
M.Sc. (Immunology) Hammersmith Hospital, Imperial College School of Medicine, London UK
M.V.Sc. (Veterinary Microbiology) College of Veterinary Sciences, Palampur India
B.V.Sc. & A.H. College of Veterinary Sciences, Palampur India

CAREER HISTORY

Group Leader, Division of Infection and Immunity, Roslin Institute, University of Edinburgh, UK.

- Programme Director "One Health" Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK
- Leading industry funded research on identification and characterisation of vaccine targets against zoonotic foodborne pathogens specifically, *E. coli* O157:H7 and *Salmonella enterica* servor Typhimurium
- Member of the Scottish Consortium working with Novartis Animal Health on vaccination strategies to control *E. coli* O157:H7 prevalence in cattle
- Member of Advisory Board to Big DNA Ltd. – developing phage DNA based platform technology to produce cheap and stable vaccines

Lecturer, Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK.
Post-Doctoral Scientist, Moredun Research Institute, Edinburgh, UK.
Assistant Professor, Veterinary Microbiology, College of Veterinary Sciences, Palampur (HP), India.
Veterinary Microbiologist, Veterinary Polyclinic Shahpur (HP), India.

Novel Vaccine Strategies to Control Zoonotic Infections

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Abstract

As for today 50% of known human pathogens are zoonotic and 75% of newly emerging infectious organisms come from animals. With the ever increasing global demand for food, intensive animal rearing for food production, the increased transportation of animals and food products – poses new scenarios for zoonotic infections. Several microorganisms have established in the farm animals, which may not cause overt clinical disease in animals are pathogenic to humans. One of the ways to minimize cases of zoonotic infections is to prevent their colonization of reservoir animal populations using vaccines as one of the control procedures. Evidence shows that Avian Influenza, West Nile Virus, rabies and anthrax vaccines which protect animals reduce or prevent transmission of zoonosis to animals. Domestic livestock species are asymptomatic reservoirs to many of the known human food borne pathogens including, Salmonella enteric serovar Typhimurium, Campylobacter jejuni, *Escherichia coli* O157:H7. Working with *Escherichia coli* O157:H7, commensal organism in cattle but cause serious disease like HUS in man, as a model organism we have identified certain generic approaches that can be applied to control other zoonotic pathogens of livestock origin. Animal challenges and in vitro binding assays have been used to investigate the contribution of several bacterial factors including, fimbrial adhesins, autotransporters and, H7 flagella, Shiga toxin, the type III secretion system, and specific translocated effector proteins. Vaccine formulations have focused on generating adaptive mucosal responses that block adherence in the gastrointestinal tract. More recent trials have tested H7 flagellin in combination with other colonization factors and these formulations have produced significant 2-3 log10 reductions in overall bacterial shedding that correlate with the generation of antibodies against the tested antigens. The work indicates that a multivalent vaccine targeting the various colonization strategies utilized by E. coli O157:H7 and such other enteric pathogens, maybe highly efficacious in control.