Indira T Kudva, J Veterinar Sci Techno 2016, 7:6(Suppl)
http://dx.doi.org/10.4172/2157-7579.C1.018

Shiga toxin-producing *Escherichia coli* and rectoanal junction persistence in ruminants: A study of bacterial-epithelial interactions

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Escherichia coli O157:H7 (O157) was the first Shiga toxin-producing *E. coli* serotype to be associated with bloody diarrhea or hemorrhagic colitis (HC) and hemolytic uremic syndrome (HUS) in humans. It has since been implicated in several outbreaks in the U.S. and globally. Non-O157 STEC have not been associated with major outbreaks but still cause 64% of all STEC infections in the U.S. Cattle are well documented ruminant reservoirs of STEC and the primary site of STEC persistence in these animals is the rectoanal junction (RAJ). To investigate this persistence at the RAJ we have analyzed O157 adherence at a histological level, developed a novel adherence assay using squamous epithelial cells at the RAJ, evaluated role of well characterized STEC adherence proteins, in STEC attachment to the RAJ and explored the similarities in RAJ-STEC interactions with another ruminant animal. STEC show distinct adherence patterns on the columnar epithelial and squamous epithelial (RSE) cells at the RAJ. The novel RSE cell adhesion assay provides a convenient means of directly evaluating bacterial interactions with host-specific cells. We have determined that proteins other than LEE and intimin-γ proteins are involved in STEC adherence to RSE cells. Such proteins with adhesin potential have been shortlisted using proteomics for development of efficacious anti-adhesion modalities. We have also found that bison and cattle RAJ share similar distribution of epithelial cell markers and O157 adheres to RSE cells from both animals in similar patterns, supporting bison as likely 'wildlife' reservoirs for O157.

Biography

Indira T Kudva is a Research Microbiologist and Lead Scientist at the National Animal Disease Center, USDA, Ames, Iowa. She has received her BSc in Zoology and MSc in Medical Microbiology from India, PhD in Microbiology, Molecular Biology and Biochemistry from the University of Idaho and trained as a Postdoctoral Fellow at the University of Idaho, Massachusetts General Hospital and Harvard Medical School. She has over 25 years of experience in the field of microbiology, molecular biology and infectious diseases. She has 29 peer-reviewed publications, 3 invited reviews, 27 meeting abstracts, 18 invited talks, 8 funded grants and novel inventions (4 patent applications). She is also an adjunct Assistant Professor at the School of Veterinary Medicine, Iowa State University, the Executive Editor for the "*Virulence Mechanisms of Bacterial Pathogens*" book, 5th Edition, ASM press and is on the Editorial Boards of the *Applied and Environmental Microbiology* (ASM press) and the SRL *Proteomics and Bioinformatics* (Sci Res Literature) journals.

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