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Strategies toward developing a universal ExPEC vaccine capable of broad protection

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Extra-intestinal Pathogenic *E. coli* (ExPEC) are etiologic agents of a diverse spectrum of invasive infections in humans. They constitute an increasing problem for human medicine, especially in female, newborn, elderly, and immunocompromised patients. An increase in the appearance of antibiotic resistance among ExPEC strains complicates the therapeutic management of the infections. As the proportion of elderly and immunocompromised patients increases worldwide, the number of ExPEC infections increases and their treatment is more challenging. The difficulty of developing an effective vaccine against ExPEC is related to their diversity. A polyvalent subunit vaccine may lead to a useful strategy to prevent ExPEC infections. Multiple bacterial common antigens and/or plasmid-associated antigens of ExPEC have been evaluated individually and in combinations for their broad protection against ExPEC in animal models for sepsis and urinary tract (UTI) infections, using both active and passive immunization protocols. We have also used Recombinant attenuated *Salmonella* vaccine (RASV) to serve as “factories” to synthesize protective antigens and induce high protective immune responses, and as it has adjuvant properties, induce both mucosal and systemic antibodies. Our studies evaluated both antibody titers to the antigens by measuring the IgG responses and protection using challenge studies in animal models for sepsis and UTI. They showed that vaccinated mice were less susceptible to ExPEC infections. These encouraging results highlight the importance of using certain antigen combinations in an ExPEC vaccine and warrant further investigations.

Biography

Melha Mellata has completed her PhD in Microbiology/Immunology from the University of Montreal and Postdoctoral studies from Washington University in Saint Louis and Arizona State University (ASU). She is now an Assistant Research Professor at ASU conducting research on the virulence and zoonotic risk of *E. coli* and collaborates with worldwide experts to design vaccines against bacterial pathogens for use in both humans and chickens. She has published papers in reputable journals.

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