Emergent Enteroinvasive E. coli Clinical Isolates Form Biofilms Over Biological and Inert Surfaces

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Intestinal Escherichia coli pathogens are leading causes of acute gastroenteritis (AGE) worldwide and they are top causes of death in children under 5 years of age. Children in Colombia, South America suffer from intestinal E. coli AGE and at present a case control study is underway to evaluate the contribution of these pathogens and other non-E. coli pathogens in AGE. Different pathotypes of E. coli isolates were identified from these studies by polymerase chain reaction (PCR) assays which target well-characterized bacterial virulence factors. Enteroinvasive E. coli (EIEC) is a pathovar of E. coli that can penetrate and multiply within epithelial cells of the colon causing widespread cell destruction. The clinical syndrome is similar to Shigella dysentery and includes colitis and dysentery-like diarrhea with fever. The objective of this study is to determine the phenotypic and genotypic features of EIEC clinical isolates isolated from children with AGE in Colombia. Two EIEC isolates were evaluated for the presence of invasiveness-related gene ipaH and type III secretion system (TTSS) genes through cell adherence, cell invasion, transmission electron microscopy (TEM) and multi locus sequence typing. EIEC clinical isolates from a Colombian child with AGE carry the invasiveness-related gene ipaH, Shigella TTSS genes spa47, mxiH, mxiD, and ipaD. Gentamicin invasion assays showed that both EIEC strains were invasive at higher levels even when compared with Salmonella spp., suggesting that TTSS is fully expressed. I also observed EIEC strains tightly adhering not only to HeLa cells but also to glass surfaces in a pattern resembling enteroaggregative adherence and biofilm formation.