

**Immunohistochemical, histological and ultrastructural evaluation of protection
provided by cholera vaccine against *V. cholerae* O139**

ABSTRACT

In our previous study, complete protection was observed in rabbit immunized with 1×10^{10} CFU of live attenuated VCUSM21P vaccine against challenge with 1×10^9 CFU *Vibrio cholerae* O139. In the present study, we investigated whether the vaccines can effectively protect immunized animals from any pathologic changes using histological, immunohistochemical and ultrastructural techniques. Severe pathology is evident in wild type injected ileum in non-immunized, showing extensive villous destruction, edema, necrosis and inflammation with infiltration of large numbers of inflammatory cells, extensive damage to the villi and microvilli with pore formation. Histology of ileum injected with wild type in immunized rabbit shows no significant pathological changes except for a few inflammatory cells in lamina propria with mild edema in mucosa and submucosa. immunohistochemical staining revealed O139 antigens of wild type are seen in the lamina propria of edematous villi, muscularis mucosa and submucosa with weak presence in the muscle coat in non-immunized rabbit after challenged with wild type in non-immunized rabbits, but in immunized rabbit localisation of the O139 LPS antigen is seen at the tips of the intact villi, within lamina propria and muscularis mucosa only. These observations suggest that the vaccine can effectively protect animals from any pathologic changes and eliminate *V. cholerae* O139 from the immunized animals.