Mechanisms of Intestinal Adaptation

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Tropical enteropathy: an adaptation of the small intestine to accelerated cell loss in ‘contaminated’ environments

V.I. MATHAN, J. PONNIAH and M. MATHAN

Intestinal mucosal morphology of apparently healthy people living in tropical developing countries is different from that seen in temperate zones. This difference is characterized by an increase in the thickness of the crypts and an apparent reduction of the villus height, and is accompanied by widespread prevalence of d-xylose malabsorption. This phenomenon, designated 'Tropical enteropathy', appears to be related to environmental factors since: (1) while the gut morphology of the fetus in utero is normal, changes appear soon after birth; (2) it develops in expatriates from temperate zones to the tropics and 'recovers' on their return; (3) it does not develop in 'protected' expatriates in the tropics; (4) it gradually disappears in emigrants from the tropics to temperate zones; (5) it is more marked proximally than distally in the small intestine except at the very terminal ileum; (6) the prevalence of enteropathy parallels the extent of environmental contamination and the incidence of acute diarrhoeal disease.

The cell turnover and migration in jejunal mucosa was studied by organ culture in vitro of biopsies obtained from healthy volunteers with tropical enteropathy using tritiated thymidine labelling of nuclei. Tissue was examined at 6, 12 and 24 h to determine the extent of labelling of crypt cells and the migration of enterocytes to the villi. The average number of mitoses per hundred crypt cells (1.73) was nearly double that reported from temperate zones in controls. The rate of migration of enterocytes to the villi was more rapid (20% of the distance between crypt base and villus tip at 12 h and 30% at 24 h in the USA compared to 35% at 12 h and 45% at 24 h in southern India). The accelerated turnover and migration of enterocytes to the villi is likely to be a compensatory mechanism induced by greater enterocyte loss, and would appear to be the basis of the changes seen in tropical enteropathy.
MECHANISMS OF INTESTINAL ADAPTATION

References


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S.J. BAKER, MD, (MAD)

Pleomorphic coronavirus-like organisms have been observed in the stool of apparently healthy south Indians with tropical sprue. The present communication describes the findings of the jejunal epithelial cell biopsy in a patient with tropical sprue and the finding of corona virus-like particles in his stool.

CASE REPORT

Daily fecal fat excretion was 28 g in a 21-year-old woman with tropical sprue and the results expressed as percent normal (mean, 0.6%), normal being less than 1% of the dose. Using this method of measurement, the fat content of the stool was estimated to be 30% of the daily intake.

Jejunal biopsy specimens were fixed in formalin and embedded in paraffin. Tissue sections were stained with hematoxylin and eosin.

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