Is the dual sugar test of intestinal permeability diagnostic for determining altered barrier function?

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A healthy small intestine is essential for absorption of the nutrients from the food we eat, and after digestion by commensal bacteria and host enzymes, uptake of amino acids, sugars and fats into blood stream occurs predominantly by active processes using transporters on the epithelial cells of the lumen. The epithelial layer acts as a physical barrier to the luminal contents, commensals and pathogens, so that only nutrients can be taken up though the epithelial layer. This requires a means to enforce and maintain strong, close interactions between cells, referred to as barrier function. To do this, cell cell contacts are maintained by a set of proteins know as tight junction proteins. Altered regulation of these tight junctions results in increased intestinal permeability and this enables unintended uptake of macromolecules, toxins and pathogens. This can lead to inflammation and irritation. There is evidence that excessive intestinal permeability contributes to multiple gastroenterological disorders, and long term remission is linked to restored and maintained barrier function.

We have evaluated a dual sugar test using Lactulose and Rhamnose as reporters of epithelial permeability, and we use a 90 minute transit time to report on small intestinal permeability. The test uses a small blood sample rather than a urine sample, and is analysed using high resolution HPLC to determine the relative ratio of Lactulose to Rhamnose in the serum. We will present analysis of the normal range for the test performed on children and adolescents, and the determination of a cut off for this to be used as a diagnostic test. We propose that this is a simple minimally invasive test that reports a biochemical measure of barrier function, and can be used to diagnose and monitor intestinal permeability.