

Intestinal Permeability (IP)

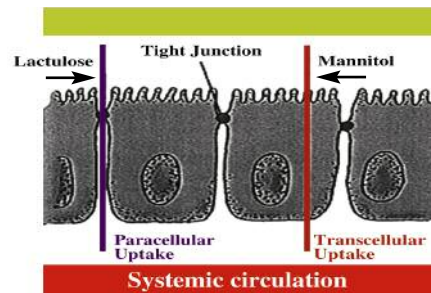
The penetration of the intestinal mucosal barrier appears to correlate with clinical disease. The small intestine has the paradoxical dual function of being a digestive/absorptive organ as well as a barrier to the penetration of toxic compounds and macromolecules.

Lactulose is only slightly absorbed by paracellular absorption (between the mucosal cells) and serves as a marker for mucosal integrity and "leaky gut". Increased paracellular permeability allows macromolecules, toxins and antigens to cross the intestinal barrier and is associated with a number of clinical conditions.

Mannitol is readily absorbed by transcellular absorption (through the mucosal cells) and serves as a marker for transcellular uptake. Reduced transcellular absorption may be an indicator of malabsorption.

Conditions Associated with Altered Intestinal Permeability

- Inflammatory Bowel Disease
- Malnutrition/Malabsorption
- Accelerated Ageing
- Crohn's Disease
- Ulcerative Colitis
- Endotoxaemia
- Irritable Bowel Syndrome
- Autism
- Coeliac Disease
- Chemotherapy
- Inflammatory Joint Disease
- Food Allergy & Food Sensitivity
- Trauma
- Alcoholism



Interpretation of Result

Parameter	Interpretation	Treatment Considerations
Lactulose/Mannitol Normal	Repeat challenge after a test meal. If increased lactulose excretion check for food sensitivity/food allergy.	Begin elimination diet.
High Lactulose	Mucosal hyperpermeability (leaky gut)	Glutamine, glucosamine, FOS, aloe vera, slippery elm, psyllium, pectin, vitamins A, C & E, zinc, selenium, carotenoids, folic acid, essential fatty acids, gamma oryzanol, bioflavonoids (quercetin)
High Mannitol	Possible malabsorption	Pre and probiotics, glutamine, glucosamine, aloe vera, zinc
High Lactulose/Mannitol Ratio	Increased permeability of the intestinal mucosal epithelium to large, possibly antigenic and inflammatory molecules, (i.e. leaky gut)	Consider possibility of mild inflammatory bowel disease or gluten enteropathy. Also consider exposure to ethanol, NSAIDs, cytotoxic drugs, infection, food allergy, bacterial overgrowth resulting from hypochlorhydria, maldigestion or stasis

Note: Dietary sources of mannitol consumed during testing may give an increased result. Dietary sources of mannitol include pumpkin, mushrooms, beetroot, onion and kelp. Mannitol is also commonly used as an artificial sweetener in chewing gum and confectionery.