THE GUT BARRIER

AN IMPORTANT LINE OF DEFENSE

The nutrient absorption function of the intestine is well established, but it also has a very important role acting as a barrier to block pathogens and toxins from entering the body

COMPONENTS OF THE GUT BARRIER

Microbial Barrier

Microbes here help to compete with pathogens, limiting their adherence to epithelial cell surfaces

Chemical Barrier

A layer of mucus that prevents contact between bacteria and the epithelial cells

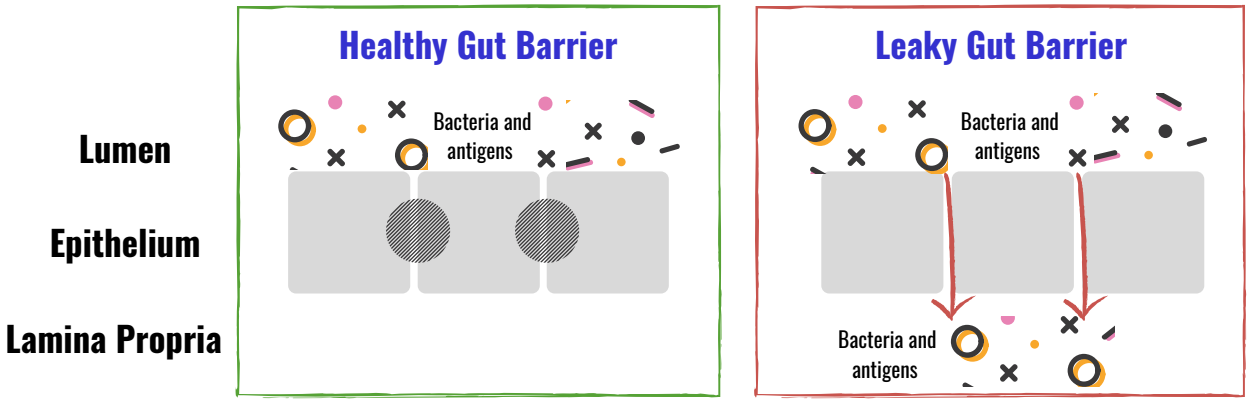
Physical Barrier

A layer of epithelial cells between the intestinal lumen and inner milieu. Junctions between these cells inhibit passage of large molecules and affect the permeability of the paracellular pathway

Immunological Barrier

Contains secretory immunoglobulin A (sIgA) which binds to antigenic substances, then triggering various immune response pathways to secrete cytokines such as interleukin (IL)-10 and IL-12

GUT BARRIER DYSFUNCTION



Disturbed gut barrier such as impaired tight junctions

Increased permeability allowing the crossing of luminal bacteria and antigens over the epithelium

An aberrant immune response, and may increase the risk of inflammatory and autoimmune diseases

Reference: Anderson RC et al. The role of intestinal barrier function in early life in the development of colitis. Colitis. 2012. DOI: 10.5772/25753. (Accessed on InTechOpen).

腸道屏障 重要的防綫

腸道吸收營養素的功能確立已久，但其實腸道亦可擔當屏障的重要角色，有阻隔病原體 (pathogen) 及毒素進入體內的作用

腸道屏障的元素

腸道内的微生物會與病原體競爭，減少病原體黏附上皮細胞表面 (epithelial cell surfaces)

微生物屏障 (Microbial Barrier)

一層可阻止細菌與上皮細胞接觸的黏液

化學屏障 (Chemical Barrier)

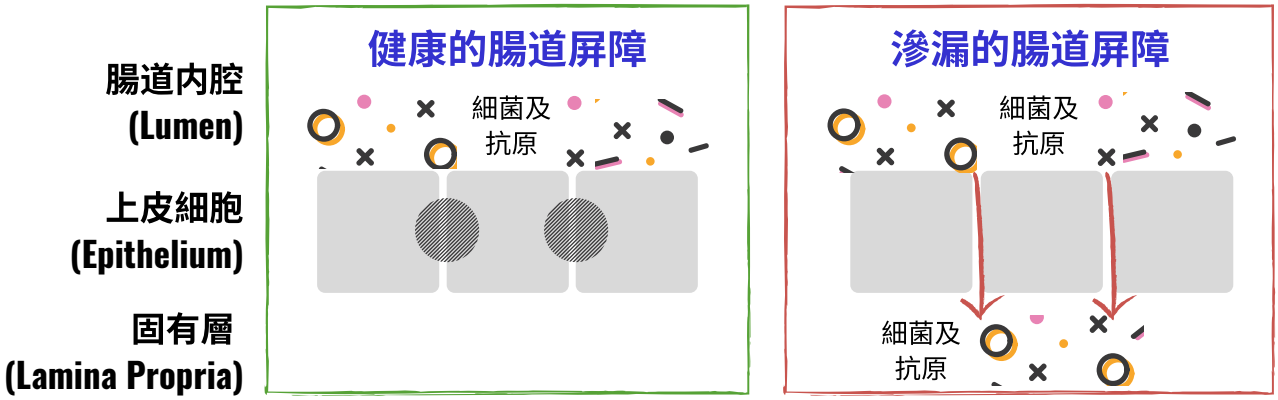
於腸道内腔 (lumen) 及内在環境 (inner milieu) 之間的一層上皮細胞，細胞之間的連接 (junction) 可禁止大分子通過，並會影響相鄰細胞間運輸 (paracellular pathway) 的滲透性

物理屏障 (Physical Barrier)

含有分泌型免疫球蛋白A (sIgA)，sIgA 與抗原 (antigen) 結合後，會引起不同免疫反應，並分泌介白素-10 (IL-10) 及介白素-12 (IL-12) 等細胞因子 (cytokine)

免疫屏障 (Immunological Barrier)

腸道屏障功能失調



失去平衡的物理屏障，如受損的緊密連接 (tight junctions)

增加滲透性，讓細菌及抗原通過上皮細胞

引起異常的免疫反應，並可能會增加患上炎症及自體免疫性疾病的風險

Reference: Anderson RC et al. The role of intestinal barrier function in early life in the development of colitis. Colitis. 2012. DOI: 10.5772/25753. (Accessed on InTechOpen).