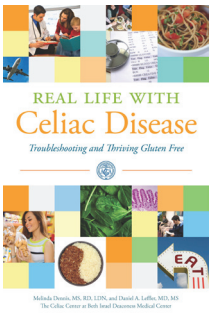


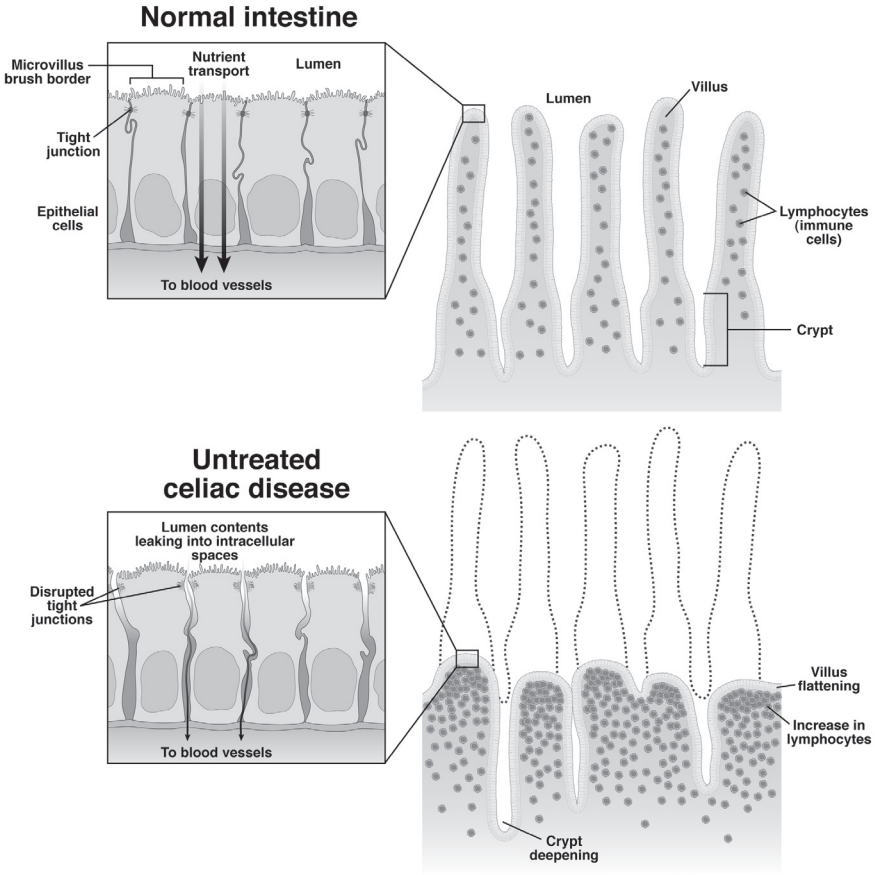
What Your Gut Looks Like on Gluten—

If you have untreated celiac disease or gluten intolerance

An excerpt from *Real Life with Celiac Disease*

Untreated celiac disease or gluten intolerance damages the small intestine. In particular, gluten ingestion leads to inflammation that damages the fingerlike projections called villi that line the intestine. The villi, and the microvilli that cover the villi like hairs, greatly increase surface area for absorption of nutrients. In fact, if the intestine were only a simple tube, it would spread out to be 2 square feet in area, but with the folds and villi, it would cover an entire tennis court! In addition, the villi hold many of the enzymes needed to digest and absorb nutrients. You can see why it requires a biopsy and microscopic examination to determine the extent of damage to the small intestine.

In active, or untreated, celiac disease, the first and mildest change is an increase in villi white blood cells (intraepithelial lymphocytes). Damage to the connections between intestinal cells (tight junctions) and deposits of tissue transglutaminase antibody may be seen even earlier, but the importance of these problems is unclear, and they are difficult to measure. As inflammation continues, the villi become damaged, and the crypts deepen as they try to produce new cells quickly to replace the damaged villi. Soon the intestine cannot keep up with repairs, and the villi begin to shorten and they can be completely lost. Fortunately, the intestine has incredible regenerative ability and in most cases, if you stop the inflammation, the villi will heal.



From *Real Life with Celiac Disease: Troubleshooting and Thriving Gluten Free* by Melinda Dennis, MS, RD, LDN, and Daniel A. Leffler, MD.

www.reallifewithceliacdisease.com