Diabetes In The Gut

When thinking about diabetes and dysmetabolism, we look at a number of tissues such as adipose, liver, muscle and pancreas, but are we considering enough the role of the gut? Metabolic syndrome is defined as a cluster of physiological abnormalities that increase the risk of developing cardiovascular disease and type 2 diabetes. Risk factors include a large waistline, a high triglyceride level, a low HDL cholesterol level, high blood pressure and high fasting blood sugar.

What about increased intestinal permeability? According to a 2016 study, the gut's immune system is an important contributor to metabolic disease, and may be a therapeutic target when looking at systemic inflammation in insulin resistance. Altered gut immunity is associated with changes to the gut microbiota, intestinal barrier function, gut-residing immune cells, and oral tolerance to luminal antigens, which may increase the risk for pathogenic infections and, also, drive chronic inflammation.

A recent study entitled, Hyperglycemia drives intestinal barrier dysfunction and risk for enteric infection investigated the role of leptin, gut microbiota and obesity as mediators of gut permeability through several mouse models of obesity and diabetes. They found that regardless of leptin or obesity status, all of the mice who displayed increased permeability and persistent infection were hyperglycemic, concluding that "hyperglycemia drives intestinal barrier permeability, through GLUT2-dependent transcriptional reprogramming of intestinal epithelial cells and alteration of tight and adherence junction integrity".

After extensive association between dysmetabolism and intestinal permeability in rodents, the authors of the study wanted to determine if hyperglycemia influenced gut permeability in humans. Mirroring results in the rodent study, they describe a "mechanistic role for intracellular hyperglycemia in the intestinal epithelia, independent of the microbiome, in driving intestinal permeability".

In summary, the study makes a pretty convincing case that glucose toxicity impacts the gut, and that intestinal permeability should be included as one more risk factor in metabolic syndrome. Also, patients with hyperglycemia may benefit from extra gut health support.

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