

How Thyroid Hormones Impact Gut Health

Gallbladder

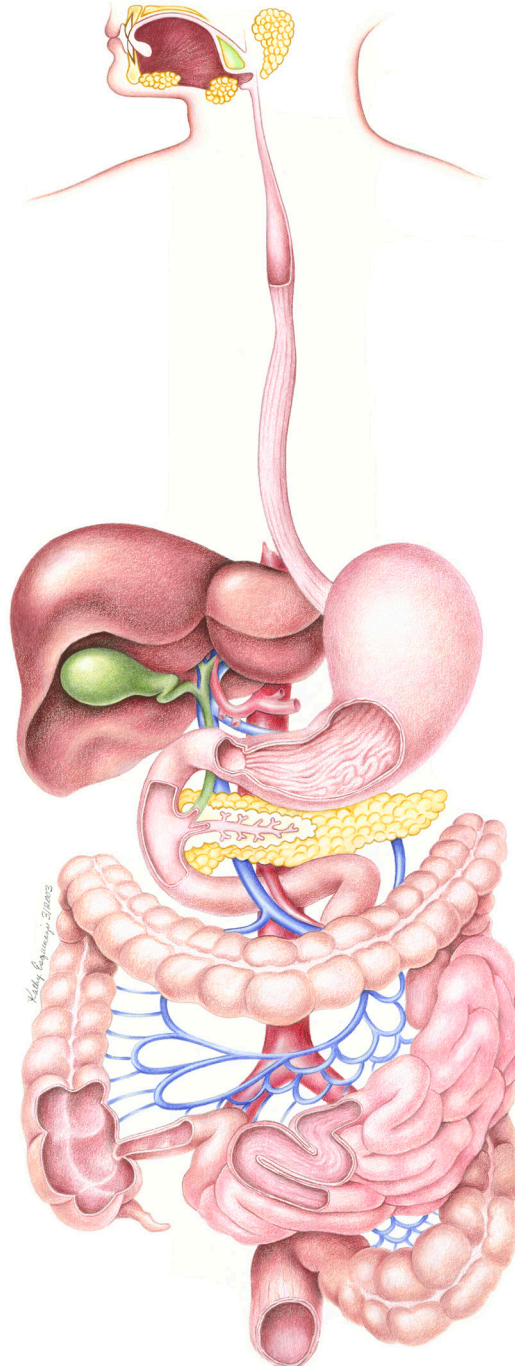
- Bile production and flow: T4 relaxes sphincters allowing bile to flow into the small intestine. Low T4 = slow flow of bile. Bile can form sludge and eventually gallstones. Additionally, pituitary TSH controls bile synthesis.
- Build-Up and Blockages: Low T4 slows down cholesterol clearance from liver. Can lead to cholesterol and bile backup in liver and GB.
- GB contractions: GB contractions are dependent on T4. Low T4 = impaired GB bile output.

Liver

- T4 level influence bile acid composition, bile salt secretion, and bilirubin excretion. Low T4 and subsequent dilution of bile acids as well as decreased secretion can have downstream effects on intestinal bacterial balance.
- There is a bidirectional relationship between bile acids and gut microbiota—bile acids are metabolized by microbiota and also can fuel microbiota growth and abundance.

Large Intestine

- Since thyroid hormone plays a big role in peristalsis, constipation is a big side effect when TH are sub-optimal.
- Thyroid hormone, along with short chain fatty acids (butyrate) help to strengthen intercellular tight junctions. Butyrate is produced in the colon from fermenting fibers.
- Extended time of substances, including toxins, inside the colon can lead to higher quantity of reabsorption.
- Higher incidence of fecal impaction and mega-colon in those with hypothyroidism.
- Those with hypothyroidism have an increased threshold for rectal pressure, which may lead to decreases in recognizing the need to have a bowel movement.



Esophagus

- Thyroid hormone, T4, plays a role in esophageal peristalsis.
- Decreased T4 levels lead to decreased esophageal sphincter. This decreased pressure allows the sphincter to stay dilated and less constriction. This over-dilation can then lead to gastroesophageal reflux.

Stomach

- Delayed gastric emptying into the small intestine.
- Low or no stomach acid production. Stomach acid not only digests food, but helps prevent bacterial and parasitic intrusion into the lower intestinal tract.
- This can be due to autoimmune gastritis, low gastrin production, impaired secretion of acid from parietal cells, and/or impaired bicarbonate secretion into the small intestines—all of which are T4 dependent.

Small Intestine

- Thyroid hormone sets the pace of intestinal peristalsis; a slow peristaltic rate is the biggest influencing factor for the development of SIBO (small intestinal bacterial overgrowth).
- Low thyroid hormone leads to interstitial edema (fluid retention) in the gut that affects myo-electrical activity (electrical signaling) involved in the peristaltic rate.
- Low levels of T4 can lead to a hyper-relaxation of the sphincter of Oddi which allows for the concentration and flow of bile into the small intestine. Slow trickles of diluted bile are not optimal for food digestion nor microbial balance.

**This is not even an exhaustive list.
Can you believe it?!**