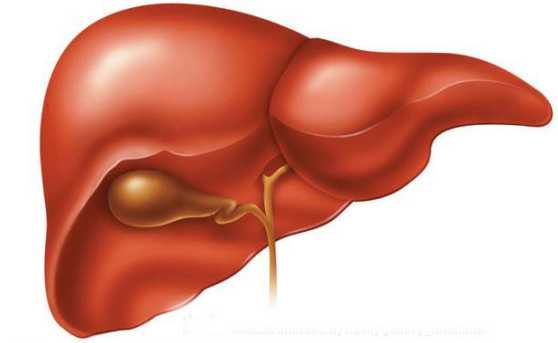


THE LIVER AND THE GUT



Liver & Gut

- A quintessential relationship
- One does not work well without the other
- There is a continuous bidirectional communication between these organs through the bile, hormones, inflammatory chemicals, and products of digestion and absorption.
- Quantity, quality, and composition of the intestinal bacteria has direct and indirect effects on liver function and physiology as well as liver disease



Gut Health For Detoxing

- Most of us consider the role of toxins and how they might be contributing to a health issue
- Toxins damage tissue in the body, alter DNA, cause free radical damage and cause symptoms and neurological problems
- We tend to think of the liver when the word “detoxing” is used
- What is the connection of the gut to the liver?



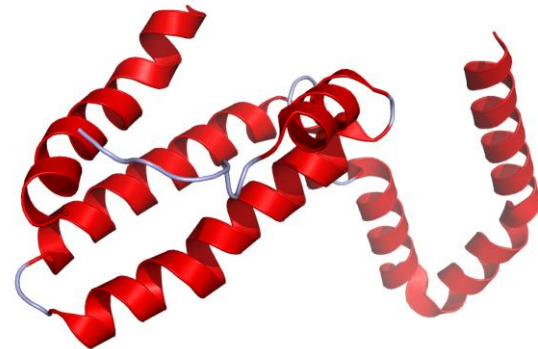
How the Gut Helps the Liver

- Help the liver with glucose, glycogen and triglyceride metabolism
- Eliminates toxins produced by bad bacteria which can irritate the liver
- Stimulate enzyme production in the liver to be used for detoxification
- Help prevent and heal a fatty liver and lower liver enzymes (L. plantarum and B. Bifidum)
- Can detox out chemical and heavy metals before they enter blood stream and save the liver some work



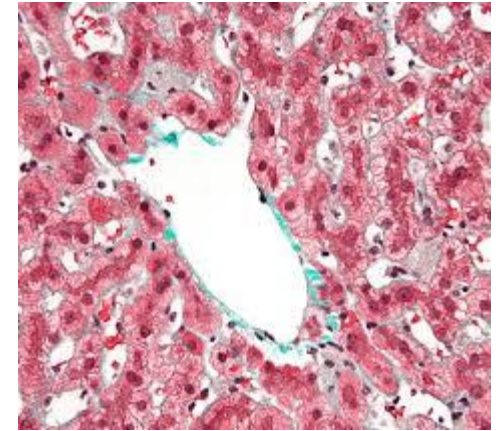
LPS

- Lipopolysaccharides are endotoxins (combination of lipid and a polysaccharide)
- They are produced by bad bacteria and illicit an immune response
- They have been indicated in brains conditions such as autism, Alzheimer's, Parkinson's and can damage neurons
- LPS cause liver damage (stimulates Kupffer cell activity)
- Il-10 (the good guy) regulates inflammatory cytokines



LPS

- The inflammatory cytokines are secreted by Kupffer cells in the liver – linked to liver disease (NAFLD and AFLD)
- One theory suggest IL-10 counters the damage and therefore prevents “liver death” cause by the these cytokines
- IL-10 also prevents the ability of LPS to lock onto receptors and do damage
- *L. plantarum* and *L. reuteri* enhance IL-10 production
- SCFA produced in the colon migrate to the liver to promote T-reg cells which stimulate IL-10 production



Hepatic Encephalopathy

- A deterioration in brain function in people with acute liver failure or chronic liver disease
- The brain requires a healthy liver to function

Three Types:

- A) Acute liver failure (with no previous liver disease)
- B) Portal systemic failure – where blood flows around the liver and liver cannot remove toxins – occurs from trauma or congenital problem
- C) Cirrhosis (late stage)



HE

- Ammonia produced by bad bacteria can enter bloodstream (leaky gut) – is normally removed by the liver
- Can build up in the blood and move to the brain and cause damage
- Brain edema – frequently seen in those with cirrhosis – puts pressure on the skull
- Symptoms: Trouble sleeping, difficulty concentrating, memory issues, slow reaction times, anxiety, mood and personality changes
- Severe state: Drowsiness, disorientation, slurred speech, unconsciousness, coma

Issues That Make HE Worse

- Constipation
- Infections
- Kidney problems
- Dehydration
- Surgery
- Sleeping pills, antidepressants, tranquilizers
- Alcohol
- Portosystemic shunt (small tube placed in the liver to allow blood to flow through the liver)

Treatment

Conventionally: Lactulose, antibiotics, liver transplant

Alternative:

- a) Probiotics
- b) Antimicrobials,
- c) Branch-chain amino acids – Isoleucine, leucine and valine helps remove ammonia
- d) Fibre – ground chia, ground flax or psyllium seed/husk – helps remove ammonia
- e) Prebiotics foods and fermented foods

Probiotics

- 70 severely alcoholic men were given *L. plantarum* and *B. bifidum* or a vitamin supplement as a placebo
- They also had higher liver enzymes when compared 24 non-drinking healthy men
- After five days – liver enzymes were lower and gut bacteria levels were higher
- Milk thistle is liver protective but alone it does not provide the correction of liver disease in those with severe Cirrhosis – pair it with probiotics



Liver/Gut

- Liver prepares toxins to detoxification (Phase 1 and Phase 2 and conjugated toxin attaches to bile for removal)
- Ensures that the toxins prepared by the liver for removal actually leave the body and only bile detaches
- Bile is antibacterial and helps neutralize stomach acid which creates the right environment for gut bacteria to function
- Bile acids are an acids but bile is a combination of acids and salts, phospholipids, cholesterol, water, electrolytes



Supporting Liver

- Milk thistle – Capsules or tincture contains silymarin – repairs hepatic cells – promotes phase I and II
- Jerusalem artichokes promote phase I and II and stimulate bile production (available as supplement and as food)
- Sarsaparilla – blood purifier, helps binds endotoxins in the blood and eliminate them – also helps with skin conditions like psoriasis
- Burdock can protect the liver from damaging chemicals and free radical damage

Supporting The Liver

- Chanca piedra for gallbladder, liver and kidney support
- Bitter foods for stimulating bile production
- Liver friendly foods : Cruciferous vegetables, citrus fruits, d'glucorate foods (apples, broccoli, grapefruit), tea polyphenols, berries, garlic, onions
- Probiotics – *L. rhamosus* and *L. breve* lower TNF Alpha and *L. paracasei* lowers IL-6 related to LPS and liver issues
- *L. casei* and *B. Lactis* reduce tissue damage in the liver (and the intestinal mucosa)



Fermented Foods

- Study of people with chronic liver disease consumed one cup yogurt 3 times a day and saw an increase in intestinal flora balance and had a therapeutic effect for their liver disease
- Kefir fed to mice improved NAFLD, energy expenditure and metabolic rate (improved fat metabolism)
- Kimchi contains bio-chemicals such as isocyanate and sulfide that help detox out heavy metals from the liver and kidneys



And Finally..

- Having a good liver strategy as part of your gut health protocol will be helpful
- It will also help with immune tolerance, inflammation and reactions to substances (see the allergy video)
- Working on the gut will help with the liver function – especially when the client has a liver issues so be good to the liver

