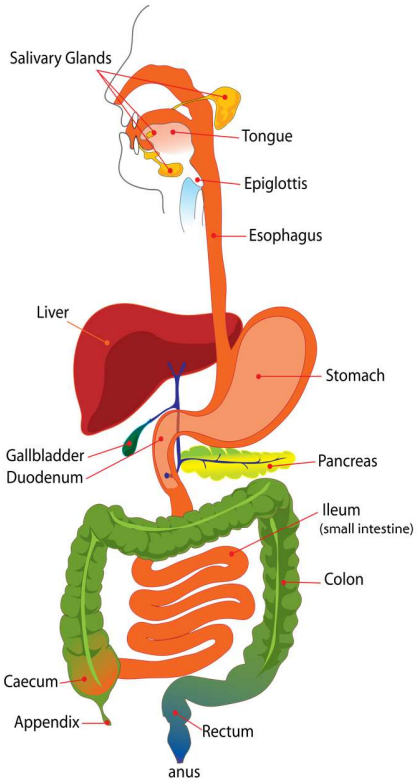
THE DIGESTIVE SYSTEM

Presentation by Emma Cohen

- Importance of healthy gut is not to be discounted, with many issues caused by GUT Dysbiosis.
- Gut issues cause inflammation not only of body but also the brain
- Immune system health depends on gut health. Having the correct nutrients – body nutrients (90 nutrients), including enzymes which break down fats, proteins, carbohydrates and sugars, and correct HCL levels, are vital for proper gut functioning
- Hydration is vital for correct HCL manufacturing
- Low cortisol production which leads to lower inflammation, which aids digestion and prevents Leaky gut
- Elimination of toxins is one of the most important aspects of digestion as this also helps lower inflammation



- Video on how the digestive system works: https://youtu.be/3B5W4PWWX7U

1 THE GUT

- The gut (gastrointestinal tract) is the long tube that starts at the mouth and ends at the back passage (anus).
- The gut (gastrointestinal tract) processes food - from the time it is first eaten until it is either absorbed by the body or passed out as stools (faeces).
- The process of digestion begins in the mouth. Here your teeth and chemicals made by the body (enzymes) begin to break down food.
- Muscular contractions help to move food into the oesophagus and on to the stomach.
- Chemicals produced by cells in the stomach begin the major work of digestion.
- While some foods and liquids are absorbed through the lining of the stomach, the majority are absorbed in the small intestine.
- Muscles in the wall of the gut mix your food with the enzymes produced by the body. They also move food along towards the end of the gut.
- Food that can't be digested, waste substances, germs (bacteria) and undigested food are all passed out as faeces.

2 THE MOUTH

- First place for digestion
- Chew food, mix with salivery enzymes – amylase (sugars, carbs) and Lipase (breaks down fats)
- Mixing food into BOLUS to be swallowed
- Saliva also contains special chemicals that help to stop germs (bacteria) from causing infections.

3 THE EOSOPHAGUS

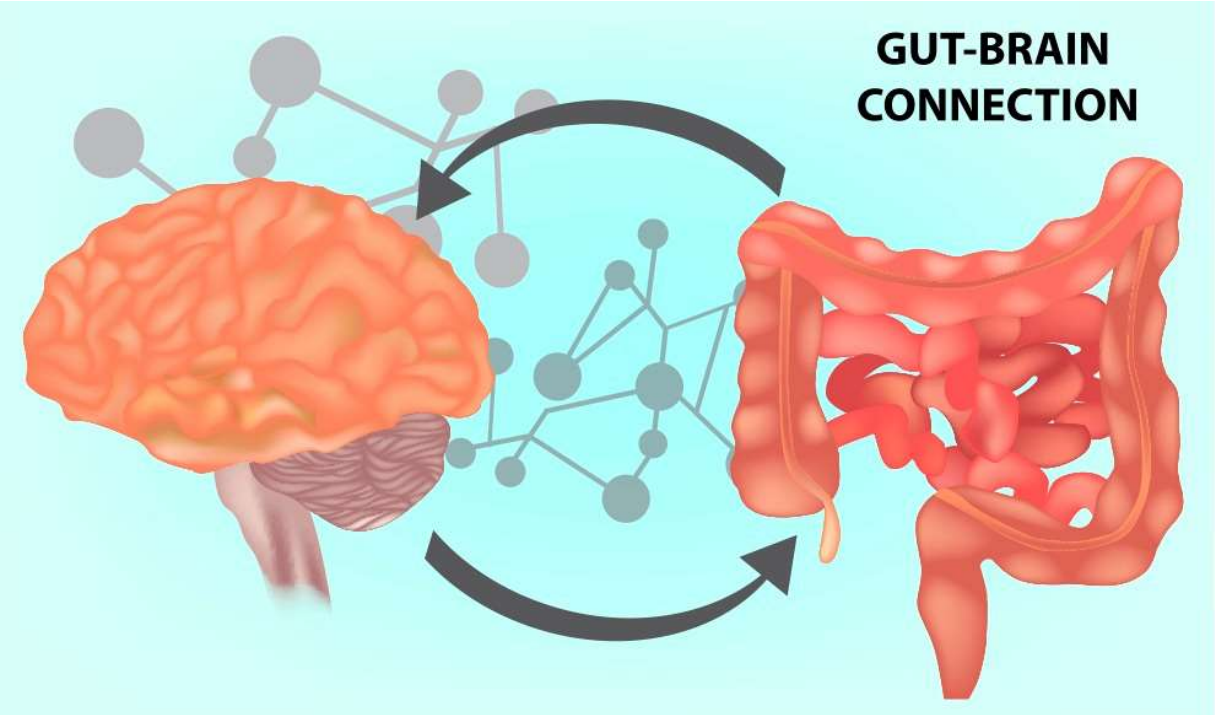
- Tube that food passes though via peristalsis action; from mouth to stomach

4 THE STOMACH

- Stomach, located of LHS of upper abdomen. The stomach receives food from eosophagus. Via the Eosphageal sphincter at the Gastroeosphangeal junction, just beneath diaphragm. The stomach empties via the Pyloric sphincter
- The Chyme (chewed food) enters the stomach where it is digested by gastric juices secreted via stomach lining

- "the little **brain**", a network of neurons that line your stomach and your **gut**, called the Enteric Nervous system
- When digested the Chyme is then moved down the stomach to the PYLORIC Sphincter where is released into duodenum (small intestine)
- The blood supply that serves the stomach comes from the Common Hepatic artery via the left and right gastro- omental arteries
- The veinous system to the stomach is the Hepatic portal vein
- The nervous system that services the stomach is the Autonomic nervous system. Both Oarasympathic (VAGUS nerve) and the sympathetic (T6-T9 spinal cord)
- Gastric secretions are HCL acid – PEPSINOGEN (when activated by HCL it becomes protease pepsin – a protein digesting enzyme, INTRINSIC FACTOR, BICARBONATE and MUCUS
- Gastric juice containing HCL to the PH of less than 3 can kill most pathogens within 15 min.
- When gastric juice has a higher PH then a bacterial overgrowth can occur. Heliobacter Pylori is a very common stomach bacteria – treated with Tetracycline antibiotics and Bismuth (Pepto Bismol)

5 GUT BRAIN LINK



6 HYDROCHLORIC ACID PRODUCTION

- HCL is produced by the **parietal cells** of the stomach.
- HCL is basically made from reactions between CHLORIDE ions, HYDROGEN ions, CARBON DIOXIDE and WATER
- High and Low Gastric acid conditions need to be dealt with, both causing gastric reflux issues

7 WHAT CAUSES LOW HCL

- Eating under stress. Hydrochloric acid secretion may be completely inhibited by our emotions. It is the low-grade, long-term, emotionally oriented life stress that is more the culprit here. NOTE: Intense stress caused by high stress situations or desire for high achievement is associated more with HCL over (hyper) secretion and peptic ulcer disease (at least initially). As the stress continues, the body is exhausted and HCL production is no longer adequate.
- Eating a nutritionally deficient diet of processed and fast foods
- Lack of sufficient minerals in the daily diet
- Excess carbohydrate consumption and poor food combining
- Zinc deficiency
- B vitamin deficiency especially thiamine deficiency
- Refined sugar, which depletes minerals
- Chronic illness
- Drinking ice water with meals
- Age - as you get older, stomach acid production tends to decrease, especially if there is any chronic illness
- Antacid use
- Taking prescription and over the counter drugs that suppress HCL production either directly or indirectly
- Candida

8 WHAT INCREASES HCL

- Relax at Mealtimes
- Make sure that when you eat, you are relaxed and at peace.
- Wake Up Your Digestion with One or More of the Following:
    - Celery Juice: First thing in the morning - Drink 16 oz. freshly juiced celery on an empty stomach (important). Celery juice helps to restore your stomach's production of HCL and strengthens digestion.

- Sauerkraut Juice: Take a SHOT first thing in the morning! Sauerkraut Juice provides the enzyme methylmethionine also known as vitamin U which stimulates HCL production and helps to soothe and heal the digestive tract. Also, may be taken 20 minutes before each meal to enhance digestion.
- Increase salt and water production
- Apple Cider Vinegar: First thing in the morning - Drink 1/2 t. - 2 T. Raw cider vinegar (it must be raw) in 1/2 cup warm water to stimulate HCL and bile production. Also, for digestive stimulation and to reduce heartburn, take 20 minutes before each meal.
- Bitters: Digestive bitters stimulate HCL secretion, pancreatic enzyme and bile production. Take 15-20 minutes prior to meals with a glass of water.

9 DUODENUM, JEJUNUM & ILEUM = SMALL INTESTINE

- Mixes chyme with digestive juices excreted from the pancreas (PANCREATIC ENZYMES, INSULIN), liver (BILE) and intestine
- Wall of small intestine absorb water and nutrients via theor VILLI – most absorption happens here
- Peristalsis action pushes chyme further down Gi tract to large intestine
- BICARBONATE ions are excreted by pancreas to alkalise chyme
- Both LIVER and PANCREAS work together to assimilate glucose

10 LARGE INTESTINE

- Follows from Ileum
- The inside of the large intestine is wider than the small intestine. It does not contain villi, and mainly absorbs water
- Bacteria in the large intestine also help with the final stages of digestion
- Once chyme has been in the large intestine for 3-10 hours it becomes semi-solid. This is because most of the water has been removed. These remnants are now known as stools (faeces)

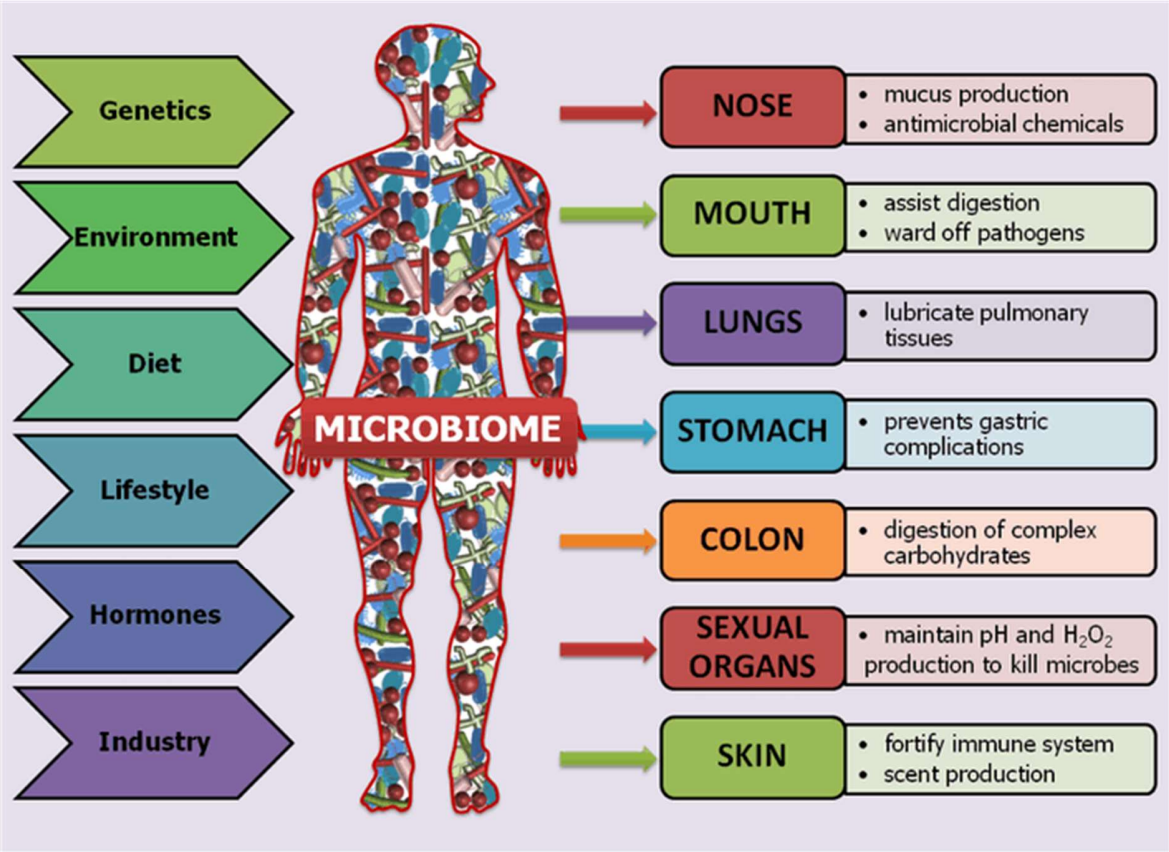
11 RECTUM

- Movements of the muscles found in the large intestine help to digest the chyme and move faeces towards the rectum.
- When faeces are present in the rectum, the walls of the rectum stretch
- This stretch activates special receptors. These receptors send signals via nerves to the spinal cord
- The spinal cord signals back to the muscles in the rectum, increasing pressure on the first sphincter of the back passage (anus)

- The second, or external sphincter of the anus is under voluntary control. This means you can decide whether you will open your bowels or not. Young children have to learn to control this during toilet training

12 DISORDERS OF THE GUT

- Acid reflux and oesophagitis
- Anal fissure
- Appendicitis
- Barrett's oesophagus
- Cancer of the bowel, Liver, Stomach, Pancreas, Oesophagus
- Cholecystitis. Coeliac disease
- Constipation
- Crohn's disease
- Cystic fibrosis
- Diarrhoea
- Diverticula
- Duodenal ulcer
- Dyspepsia
- Gallstones
- Gastroenteritis
- Piles (haemorrhoids)
- Helicobacter pylori and stomach pain
- Hiatus hernia
- Irritable bowel syndrome
- Mesenteric adenitis
- Pancreatitis
- Itchy bottom (pruritus ani)
- Pyloric stenosisBlood in stools (faeces), called rectal bleeding
- Stomach (gastric) ulcer
- Threadworms. Toddler's diarrhoea
- Ulcerative colitis.

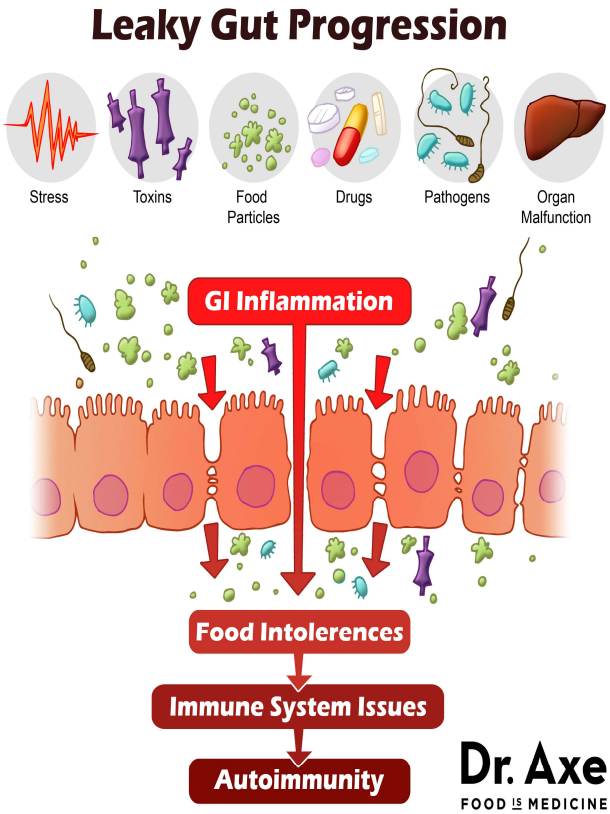


13 MICROBIOME

- **Microbes and health — Dysbiosis:** Evidence suggests that the composition of the intestinal microbiota can influence susceptibility to chronic disease of the intestinal tract including ulcerative colitis, Crohn's disease, celiac disease and irritable bowel syndrome, as well as more systemic diseases such as obesity, type 1 diabetes and type 2 diabetes. Interestingly, a considerable shift in diet has coincided with increased incidence of many of these inflammatory diseases. It was originally believed that the composition of the intestinal microbiota was relatively stable from early childhood; however, recent evidence suggests that diet can cause dysbiosis, an alteration in the composition of the microbiota, which could lead to aberrant immune responses.
- Not only is it a good idea to eat fermented foods or to consume probiotic supplements to ensure you get the good microbes into your gut but also so that you keep the bad ones out.
- Dysbiosis is a microbial imbalance on or within the body or an overgrowth of 'bad' microbes which can lead to health issues. This becomes a problem only when they get out of control and out-compete the 'good guys'. For example, most of us know that a candida (yeast) overgrowth

14 MICROBIOME AND HEALTH – LEAKY GUT AND AUTOIMMUNE

- The gut lining is maintained by gut microbes. When there is an imbalance of gut microbes then the cells of the gut lining can start to deteriorate. This can lead to leaky gut (increased intestinal permeability), meaning that things that should not normally pass through the gut lining can start to pass through, like undigested food particles. This leads to a myriad of issues including food sensitivities and autoimmune disease.



- Leaky Gut Video: https://youtu.be/d4N85-4CqVk

15 AUTOIMMUNE DISEASE

- Autoimmune disease is when the body starts to attack itself. Two examples of how autoimmune can start in the gut due to dysbiosis and leaky gut are mimicry and toxin exposure.
- Mimicry can occur when an undigested food particle passes through the gut lining. The immune system does not recognize the undigested food particle because it is not fully digested and should not be in the bloodstream.
- The immune system then labels it as an invader and creates antibodies against it. Since food is made out of the same building blocks we are made out of, it can resemble our own body's proteins. When this mimicry happens the antibodies that were created can attack our own proteins.

- This is similar to what happens with toxins. Toxins can pass through the gut lining when it is leaky and then attach to proteins. When they attach to our native proteins they change their three dimensional shape and the immune system no longer recognizes the protein as our own but as an invader and creates antibodies against it.

16 HEALING THE GUT

- Keep gut microbes happy and healthy by including a variety and abundance of probiotic-rich fermented foods into diet.
- Avoiding refined carbohydrates, processed foods, and sugars also benefits your gut microbe balance.
- Making sure to include not only probiotics but also prebiotics (foods that feed gut microbes) which include foods that are high in fiber; chicory root has a very high percentage of prebiotic fiber per gram.
- Avoiding stress, pharmaceutical drugs (especially antibiotics), and alcohol will also do a lot of good for your population of gut microbes.
- Watch Histamine and Lectins in diet, these inflame gut lining

17 DRUGS & NUTRIENTS THEY DEPLETE

GASTRIC DRUGS

- Antacids (Maalox, Mylanta), H2 blockers (Pepcid®, Zantac®), Proton Pump Inhibitors (PPIs) – Nexium®, Prevacid®, Protonix®, and Aciphex®
  These drugs are powerful acid-reducing medications. They reduce stomach acid and cause lots of side effects related to acid blockade. Several studies have shown that the use of acid-suppressing drugs us linked to increased risk of certain type of pneumonia. Why would this be?
- Stomach acid kills all kind of bacteria, viruses, and other microorganisms that could cause dangerous diseases if let to pass further in the body. Suppressing acid production, then, reduces this natural bodily defense against hazardous “bugs”. Protein digestion is also impaired in patients taking Antacids and PPIs. They may benefit from the supplementation of pre-digested protein, such as Whey protein.

Nutrients depleted:

- Acid suppressing medications deplete vitamin B12 (thus, cause anemia), vitamin D, and calcium.

Needed supplements:

- Vitamin B12, Whey Protein Supplement, Calcium (1,000- 1,200mg), Omega-3 fatty acids (1,000-2,000 mg), high-quality, broad-spectrum probiotic

DRUGS FOR CONSTIPATION

- Mineral Oil, Lactulose (Enulose®), Miralax and Senna (Senokot®)
- These products work mostly by helping retain water in the stool and increasing the motility of the GI tract to remove stool from the body. None of these drugs are recommended for any more than short- term use, and can cause diarrhea, nausea, and black, tarry stools

Nutrients depleted:

- Fat Soluble Vitamins: A, D, E, and K. Also, deplete Vitamin B12, Calcium, Iron and Zinc. It is believed that many Americans are borderline Zinc deficient, drugs or no drugs, and even a small depletion can worsen preexisting deficiency. Symptoms of low Zinc level are: acne, joint pain, menstrual problems, poor immunity, and brittle hair.

Needed supplements:

- Broad Spectrum Probiotic (daily), Omega-3 fatty acids (1,000 mg), Calcium (1,000-2,000 mg) and 500mg of Magnesium, Zinc (25-50mg).