The Players Part I

Quick Review

Understanding some of the key systems and their relationship to hormones is the best place to start

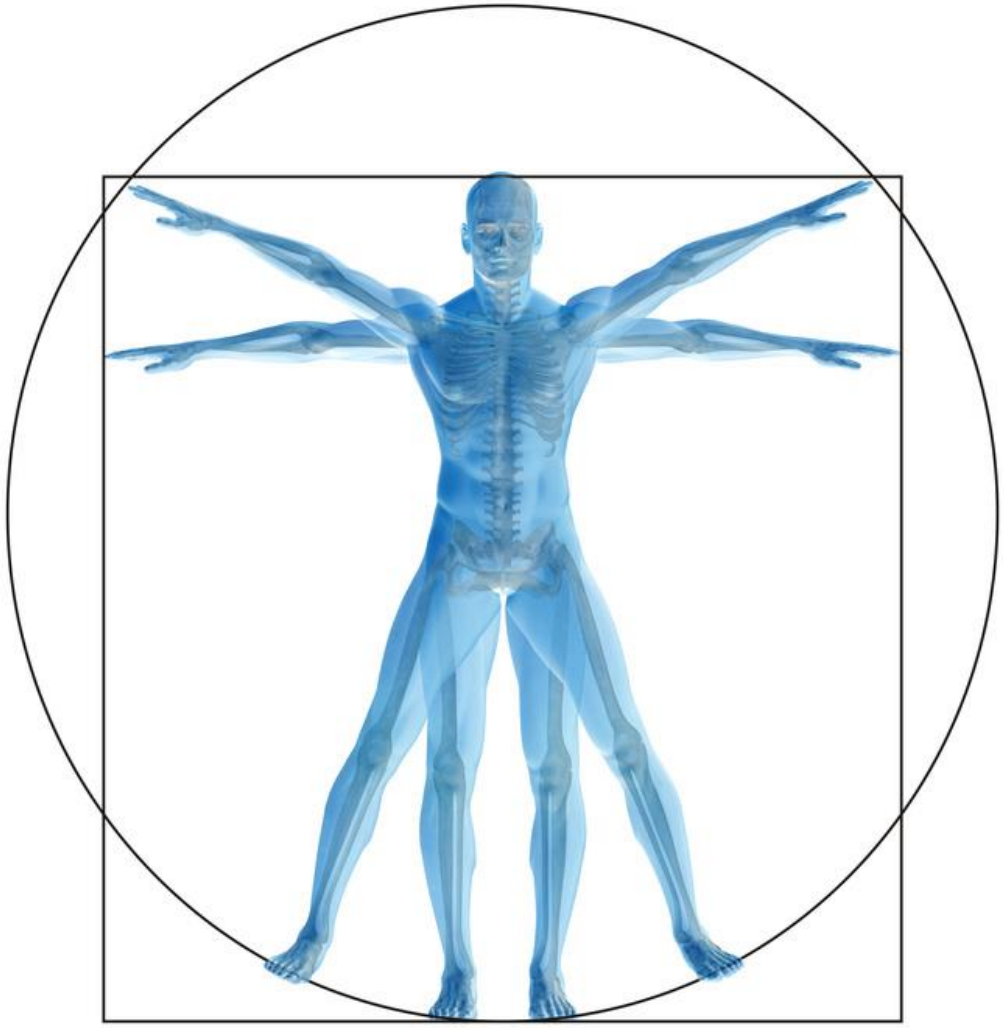
It will help with some of the hormone interconnections

Key to understanding protocols

Your protocols must function like a conductor, conducting an orchestra

The Players

- Liver
- Thyroid
- Pancreas
- Reproductive System
- Hypothalamus
- Pituitary
- Pineal Gland
- Gut Bacteria
- Adrenals
- Digestive System



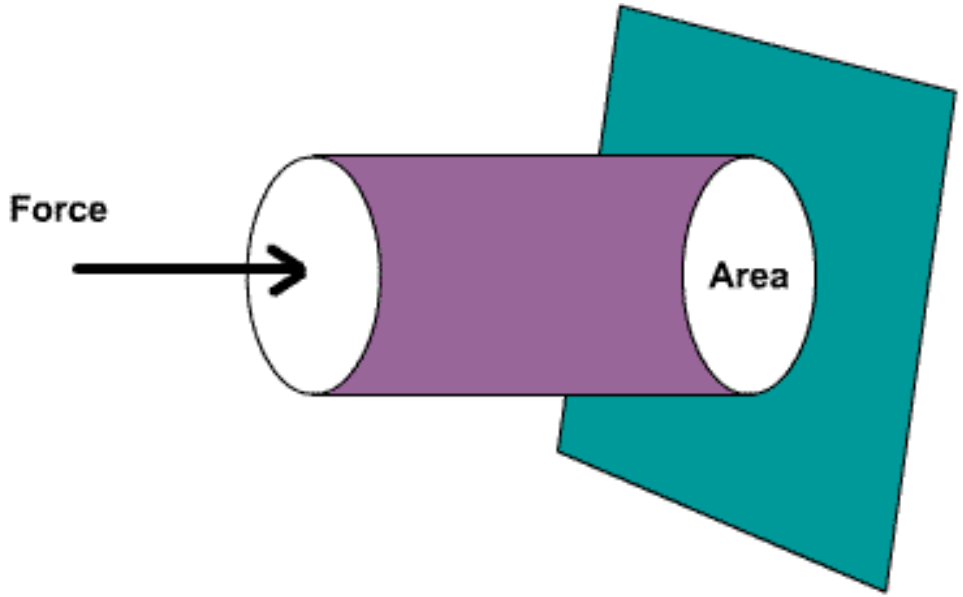
The Players

The liver, the adrenals, the thyroid, the pancreas and the gut are the major players

The reproductive system, pituitary, hypothalamus, pineal gland and digestive system are actually secondary players, at the mercy of the major players

As with other hormones in the body as well

The major players even exert pressure on each other



The Liver

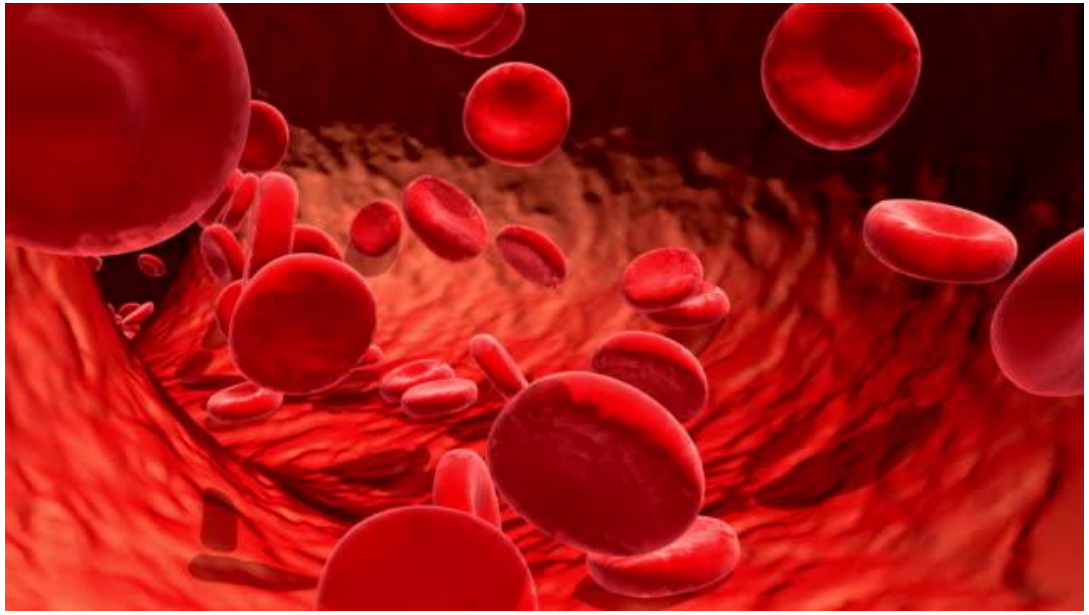
A gland consisting of a left and right lobe with the gallbladder sitting underneath it

Main functions:

- Filters blood from the digestive tract
- Detoxifies toxins, chemicals and drugs
- Makes bile and controls secretion into intestines
- Regulates the supply and production of glucose and glycogen

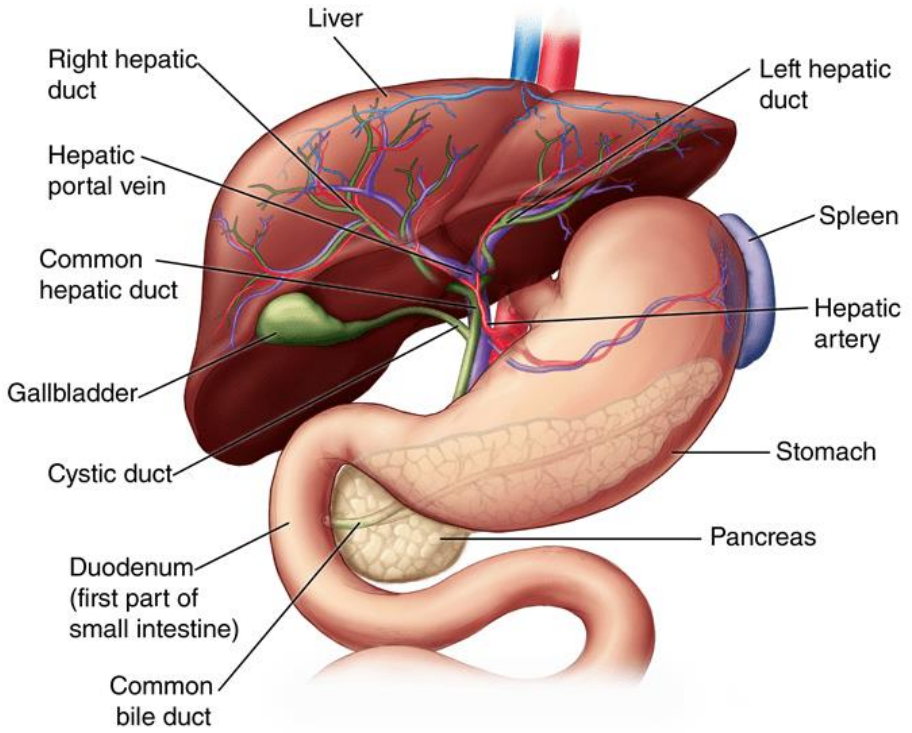
The Liver

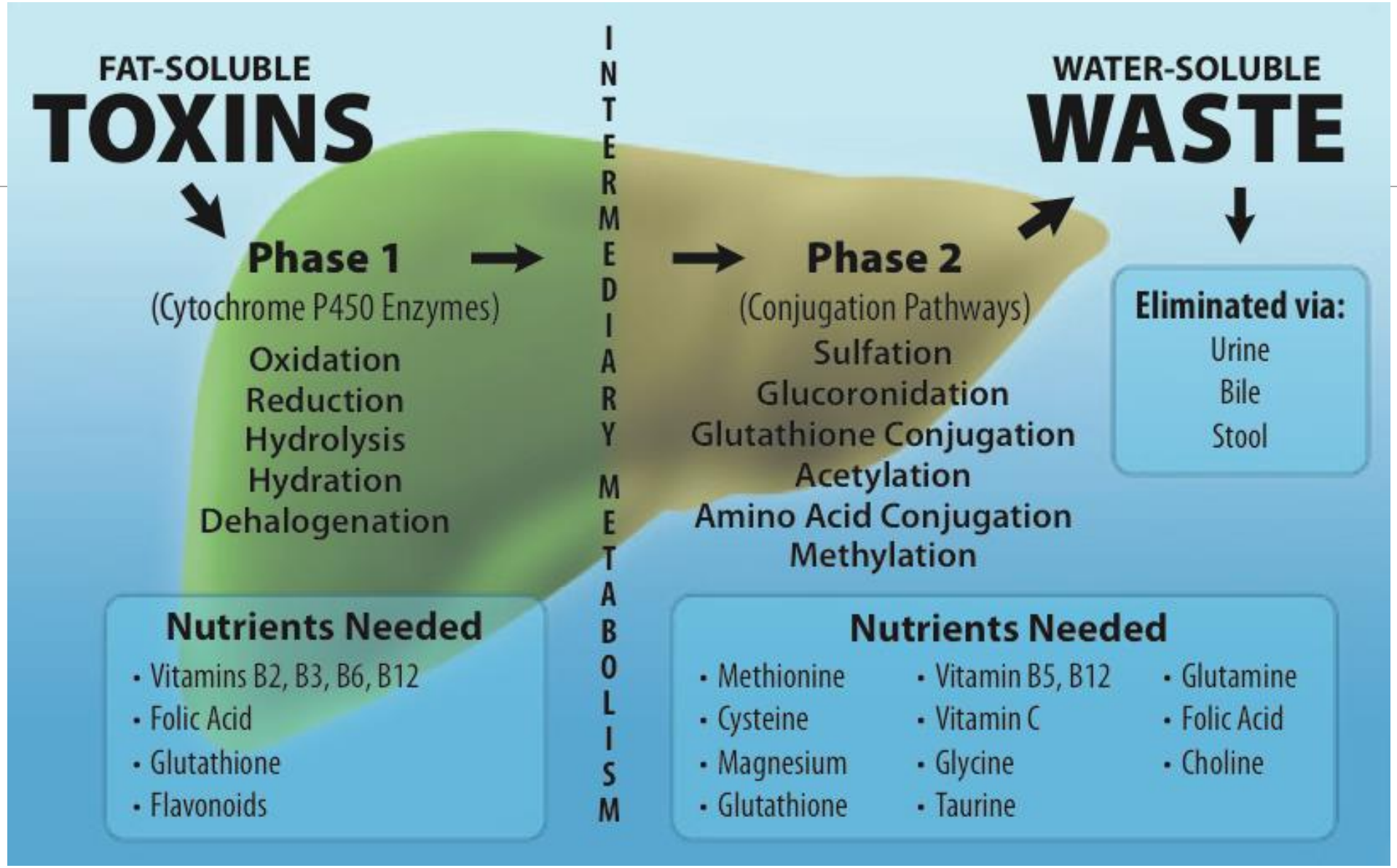
- Manufactures special proteins involved with transporting substances in the blood, helps with blood clotting and other things that help fight infection
- Helps regulate metabolism (converting T4 to T3 along with kidneys, gut and muscles)
- Production and storage of fat
- Converts nutrients from our diet into substances we need, stores them and supplies the cells when needed



Liver's Hormone Role

- Regulates the balance of sex hormones, thyroid hormones and adrenal hormones – cortisol and cortisone
- Produces and regulates cholesterol needed to make steroid hormones such as testosterone, estrogen, progesterone and cortisol
- Detoxification of toxins and sex hormones, cortisol and xenoestrogens




FAT-SOLUBLE
TOXINS
Phase 1
(Cytochrome P450 Enzymes)
Oxidation
Reduction
Hydrolysis
Hydration
Dehalogenation
INTERMEDIARY METABOLISM
Phase 2
(Conjugation Pathways)
Sulfation
Glucoronidation
Glutathione Conjugation
Acetylation
Amino Acid Conjugation
Methylation
WATER-SOLUBLE
WASTE
Eliminated via:
Urine
Bile
Stool
Nutrients Needed
• Vitamins B2, B3, B6, B12
• Folic Acid
• Glutathione
• Flavonoids
Nutrients Needed
• Methionine
• Cysteine
• Magnesium
• Glutathione
• Vitamin B5, B12
• Vitamin C
• Glycine
• Taurine
• Glutamine
• Folic Acid
• Choline

Liver Detoxification

The key to understanding liver detoxification – a fat-soluble toxin must be converted to a water-soluble compound in order to be excreted

This decision to detox the toxin should occur as needed – this means nutrients needed to detox must be there

Cytochrome P450 enzymes are made ahead of time and will be waiting when the toxins arrive in the liver

The liver likes consistency – CYP 450 enzymes needed for the things you ingest or make daily will be ready (as long as nutrients present)

Liver also uses stored nutrients for Phase II

Detoxing

Remember – all nutrients pass through the liver

In theory, they may be used for detoxification

If a person doesn't consume enough nutrients, then choices have to be made

Storing of toxins or excess hormones in fat cells is an option; if there is neither enough nutrients nor energy (carbohydrates) for detoxification, they may not be removed

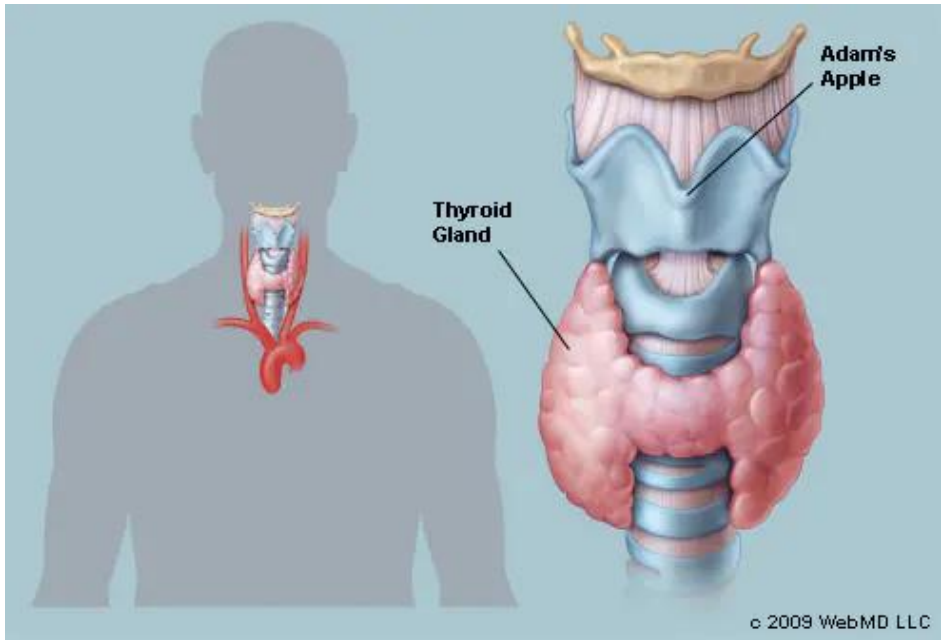
Thyroid

A butterfly-shaped gland at the base of the neck in front of the throat

It has 2 lobes, one on either side of the windpipe, connected by the isthmus

Makes the hormone triiodothyronine (T3) – 20%, thyroxine (T4) – 80% and calcitonin (helps regulate calcium, potassium and phosphate levels by opposing the action of the parathyroid)

Rest of T4 to T3 conversion done elsewhere



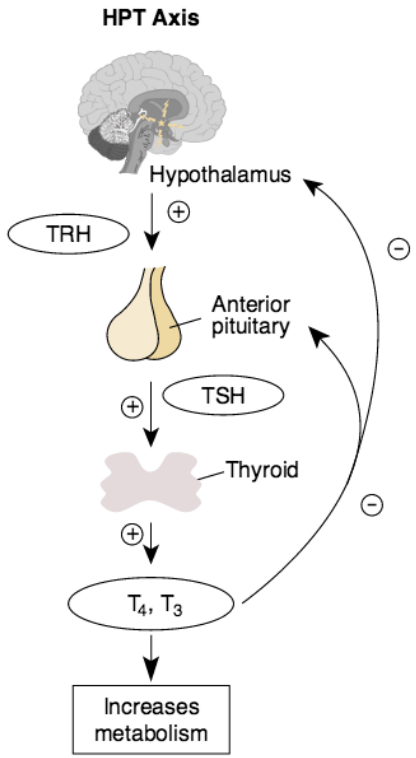
Thyroid

Hypothalamus releases TRH (thyrotropin-releasing hormone) to tell the pituitary to release TSH (thyroid-stimulating hormone), which in turn stimulates the thyroid to produce hormones

The HPT axis – hypothalamus-pituitary-thyroid

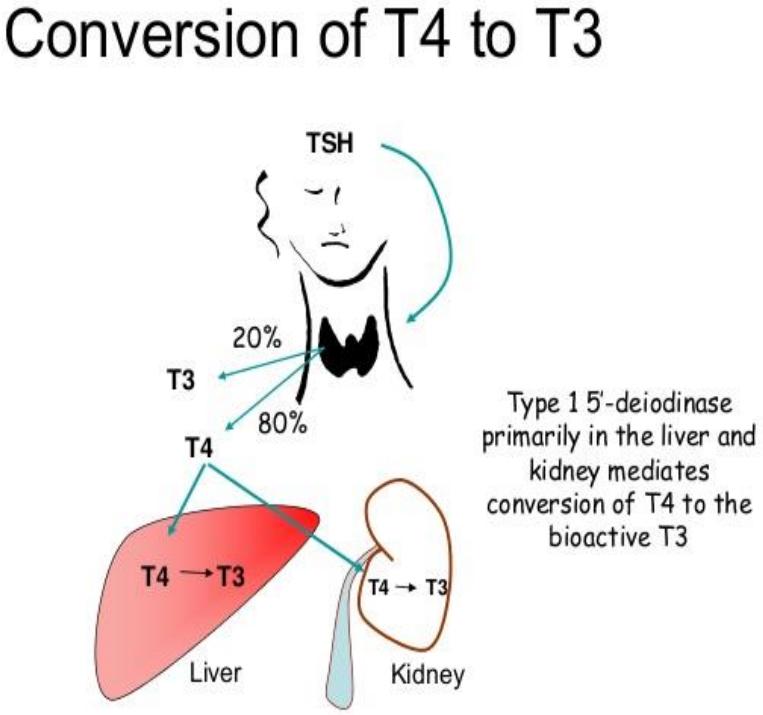
Once the thyroid has been stimulated, the thyroid has the power to control the production of thyroid hormones

Negative feedback – thyroid controls production of the thyroid hormones by signaling the hypothalamus to stop releasing TRH



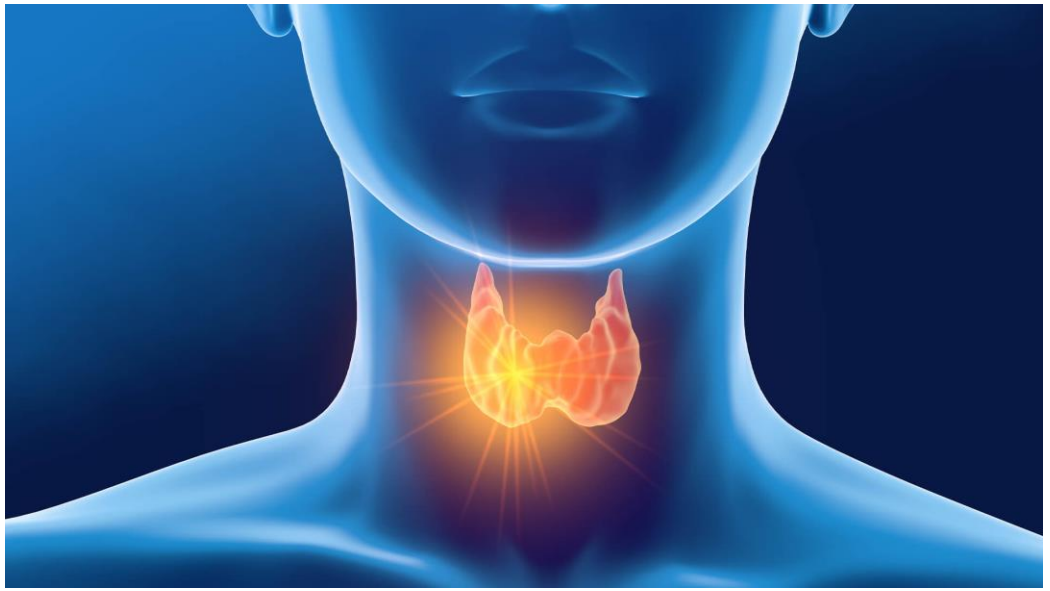
Role Of The Thyroid

- T3 affects almost every physiological function in the body
- T3 is 4 times as powerful as T4
- Every cell in our body relies on thyroid hormones for its metabolism
- The thyroid uptakes iodine into the cells of the thyroid, and together with tyrosine, produces T4 and T3
- Zinc and selenium essential for the uptake of iodine



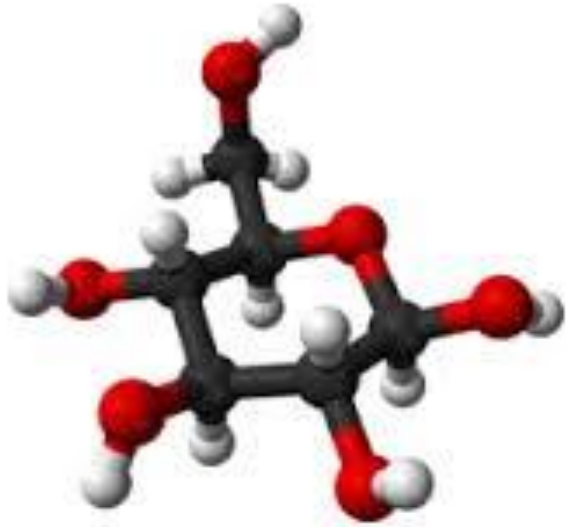
Functions Of The Thyroid

- Increases metabolic rate by increasing the mitochondrial activity (for energy production)
- The mitochondria uses oxygen and calories from foods to produce CO2, water, heat and energy
- Maintains body temperature
- Stimulates protein synthesis



Functions Of the Thyroid

- Increases the use of glucose and the breakdown of fats for energy production
- Enhances the conversion of cholesterol into bile acids
- Affects the growth of nerve tissue, which in turn can affect mood, memory and cognitive thinking
- Can affect stomach acid production, digestive and intestinal motility, and intestinal permeability



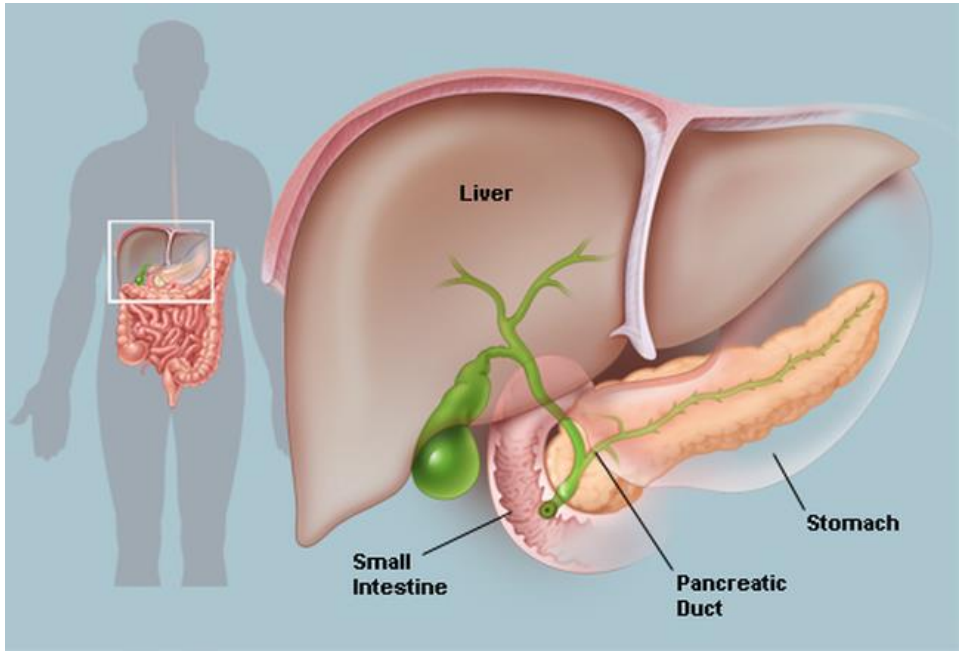
Pancreas

Has both exocrine and endocrine

Exocrine function – produces pancreatic enzymes

Essential for providing nutrients to make hormones – protein, fatty acids (energy to produce them)

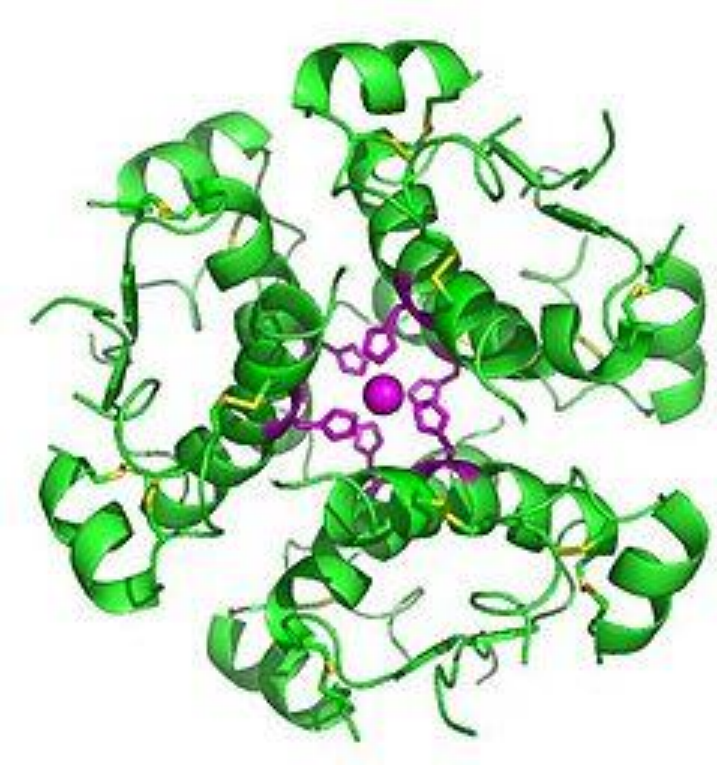
Produces bicarbonate to neutralize stomach acids in the duodenum



Pancreas

Endocrine – produces three hormones:

- Insulin - helps get glucose into the cells from the blood and lowers it in the blood
- Glucagon – raises blood sugar when it's low by working with the liver to convert glycogen to glucose
- Somatostatin –helps to control the release of other hormones

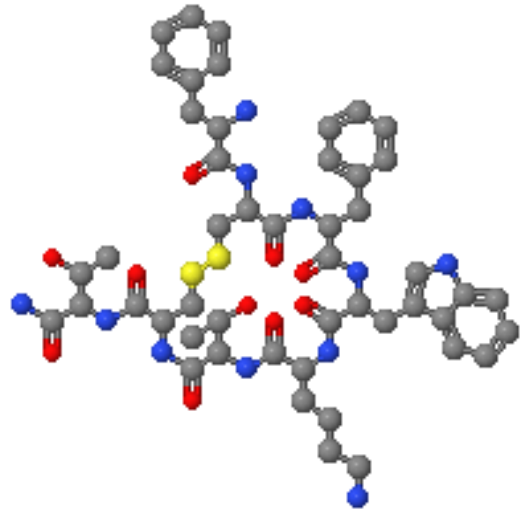


Somatostatin

Somatostatin – made in several areas of the body but primarily the digestive system and the nervous system

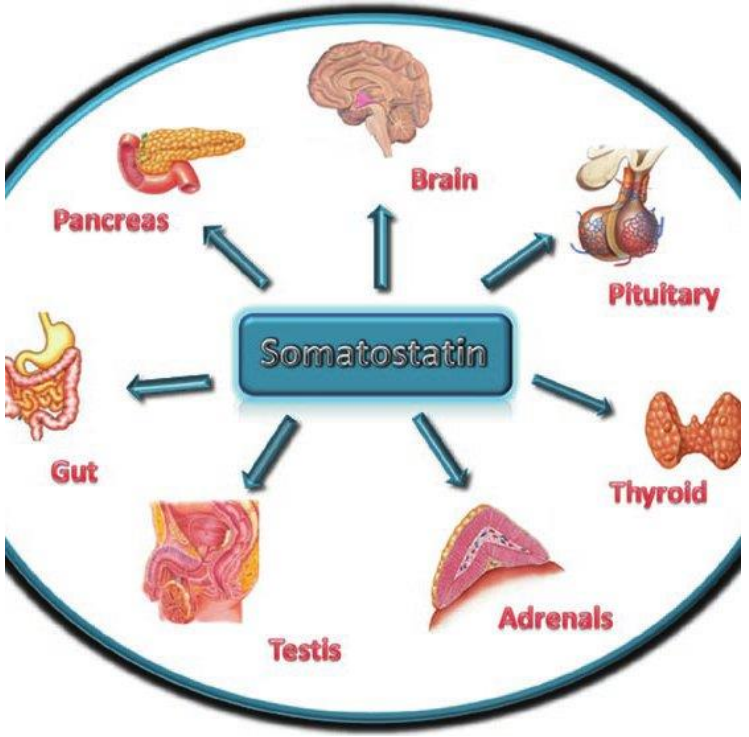
Also known as growth-hormone inhibitory hormone – regulates hormones in a number of areas in body by preventing the production of too many

- Pancreas prevents too much insulin and glucagon
- Regulates hypothalamus signaling and, in turn, pituitary function, including GH and TSH



Somatostatin

- GI tract – Reduces gastric secretion and the emission of gastrointestinal hormones such as secretin and gastrin
- Because it balances hormones, issue can cause other hormone problems
- Low levels can be associated with problems linked to high levels of other hormones like growth hormones (rare)
- High levels can be associated with a somatostatinoma tumor which will produce somatostatin independently causing the suppression of other hormones like insulin



Digestive System

Both the liver and pancreas are involved in digestion as are gut bacteria

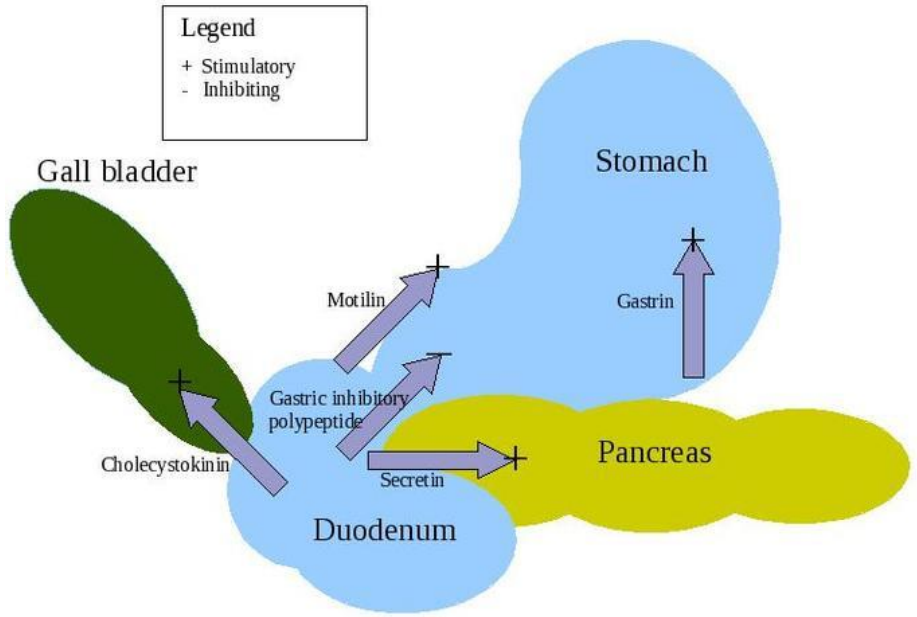
Digestion is critical to having healthy hormones as this allows the body to be supplied with the nutrients it needs

Digestive system has 5 hormones:

- Gastrin which stimulates the gastric glands to secrete pepsinogen and hydrochloric acid in the stomach. It is stimulated by the arrival of food in the stomach

Digestive Hormones

- Secretin signals the release of sodium bicarbonate in the pancreas and bile in the liver
- Cholecystokinin (CCK) signals the release of digestive enzymes in the pancreas and the release of bile from the gall bladder into the duodenum
- Gastric inhibitory peptide (GIP) decreases stomach churning to slow the emptying of the stomach



Digestive Hormones

- Motilin is involved with gastrointestinal motility and stimulates the production of pepsin

Two other important hormones:

- Ghrelin: Increases appetite – produced in cells that line the pancreas and stomach
- Leptin: Increases feelings of satiety – produced in fat cells and signals the hypothalamus

Leptin and ghrelin levels increase in the saliva with chewing

You may already be confused how you balance all these

Functional hormone balance involves fixing the function of the body parts involved with the production or regulation of the hormones

This makes for a simple protocol (still a lot of work) but easier to organize

Next video we will continue to talk about the players