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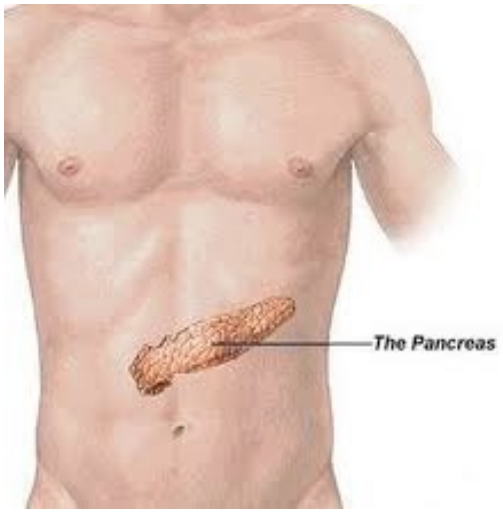
The Pancreas

Learning about your pancreas through Janu Sirsasana A B & C



The Janu Sirsasana series is about the pancreas. We use the Janu Sirsasana series to press on various nerves that stimulate certain reactions from the pancreas.

The Pancreas
The pancreas is a gland organ in the digestive and endocrine system. It is both an endocrine and exocrine gland.

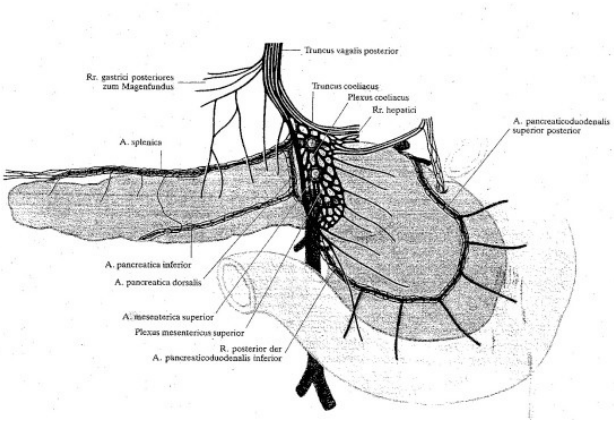
Endocrine means "in pouring" -- pouring hormones into our blood, producing several important hormones, including insulin, glucagon, and somatostatin.

Learning about your body.. definition quiz this week ;)

Glucagon is the opposite of **Insulin** (insulin lowers blood glucose and for storing it) -- Glucagon raises our blood glucose levels to feed our muscles energy if are being active — or when our blood sugars fall too low. Glucagon stimulates the liver to covert stored glycogen into glucose which is released into our blood stream for energy.

Remember as a child being told to wait to swim a half hour after eating? This is why; if you exercise after eating your energy is diverted from digestion to your working muscles; leaving your food to sit and slosh around in your stomach creating heartburn, and discomfort as it putrefies.

Somatostatin secreted by the pancreas acts as a hormone that inhibits the secretion of insulin and glucagon, and reduces the activity of the digestive system in general. This is done by the body if we are stressed mentally, emotionally, or physically. Our energy is diverted from digestion to where our body needs it to "save" us from the stressor. What makes the difference of when your body secretes Glucagon or Somatostatin to get energy to your muscles? Your nervous system! When you are operating in your sympathetic nervous system instead of your parasympathetic nervous system somatostatin is released as growth hormone-inhibiting hormone that also stops some of the work of the endocrine system as well as the digestive system so our body has all there reserves it needs to handle the "emergency" at hand. Remember even if the emergency is only in your thoughts, this process is still happening.



The pancreas is also an **exocrine gland (exocrine means out-pouring, -- pouring through a gland to something outside of the blood)**, secreting pancreatic juices containing digestive enzymes to the

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small intestines. These powerful enzymes help breakdown carbohydrates, protein, and fat, improving digestion.

The pancreas also creates a bicarbonate solution to buffer the food from the stomach to the duodenum on its way to the small intestine. The pancreas is capable of two (and many other) distinctly different processes. The pancreas likes oppositional tasks!

The pancreas has two main functional components:

- endocrine, to produce insulin, glucagon, and somatostatin
- exocrine, to produce pancreatic juices for digestion and their buffering solution.

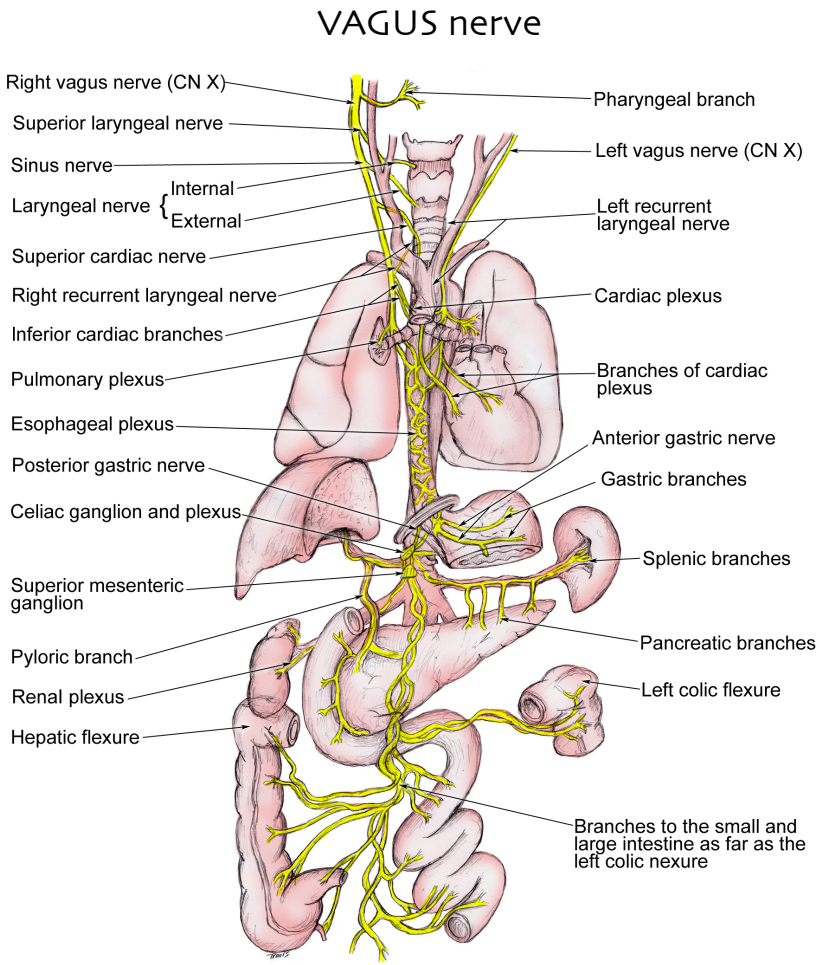
This is another example of why sugar substitutes are not effective . . . your body tastes sugar, thinks it's getting sugar so the pancreas prepares by sending out insulin (via communications through the vagus nerve), but then sugar does not come.
Because of the insulin release your blood sugar drops . . . Do you know what happens when your blood sugar drops? You get very hungry . . . suddenly you are craving sugar and heading for a snack . . . You can't fool the body.

The Pancreas has more nerves connected to it than any organ! Nerves connected to the pancreas tie both to the parasympathetic (calming) and sympathetic (stimulating) nervous system . . . remember the pancreas likes oppositional tasks . . .

The pancreas is in direct contact with the stomach, duodenum, spleen, vagus nerve, splanchnic nerve, and other major vessels of the abdomen.

The vagus nerve is an interesting connection to explore, the vagus nerve connects a lot in our body! The vagus nerve connects to all five senses and the pancreas. When we see or smell food it triggers the vagus nerve to send impulses to the pancreas to prepare for digestion, so the pancreas starts the process of releasing insulin into our blood stream before any food touches our lips — it's a very forward thinking organ ;) This is why you get hungry you see or smell food.

Understanding nutrition science; let's take a look at fake sugars — this knowledge means that fake sugars are not only useless - but harmful. Your senses have told your pancreas (through the vagus nerve) that sweet food is coming and to go ahead and release insulin. So your body has already lowered your blood sugars expecting sugar — it does not get it if you



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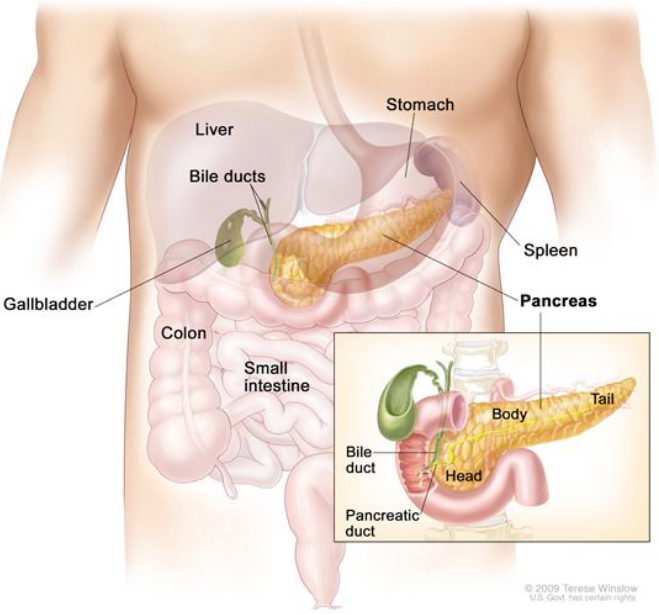
ate fake sugars so now your blood sugar is impaired leaving you even hungrier than before and craving sugar . . . which makes you go seek sugary foods. Furthermore, fake sugars are neurotoxins and best avoided.



Understanding how your body works can improve your health!

You don't want to be poking around on just any area of the pancreas.

We are not actually trying to press on the pancreas with our heel as we do the other organs — the pancreas handles several oppositional functions -- from the production and release of insulin and somatostatin (which are oppositional) to the production and release of strong enzymes for digestion to a bicarbonate solution that neutralizes the acid as it leaves the stomach -- the digestive enzymes it creates are so acidic that if the pancreas were to rupture the acid would burn surrounding tissues. (In one book I read it referred to the pancreas as the P-bomb.) Instead we use our heel to press on nerves innervating the pancreas — of which there are many.

Furthermore, the position of the pancreas in our abdomen is a sign we don't want to mess with it. The pancreas is located behind the stomach and in front of the kidneys -- deep in the center of our body where it is well protected.

How does Janu Sirsasana do all the "things" that the yoga texts say?
The yoga texts state that janu sirsasan can rebuild our seven tissues (more below).

Janu Sirsasana A - The A position is preparatory for the B & C positions. The A position does have an additional benefit (I am trying to stick with the science in this topic but can't help bringing a little pure yoga theory in here); Janu Sirsasana A is a mudra (a mudra is a body position that elicits energy movement) known as maha mudra. Maha mudra has your hands to your feet, your chin to your chest, strong lifting action of the bandhas with deep breathing -- this position is useful for moving energy in your spine. As is the entire Janu Sirsasana series-- if you round your back, tuck your chin, and put your head on your knee. For more information on performing the posture:http://www.befityoga.com/philosophy-lifestyle/ashtanga-yoga-poses/ and scroll down to janu sirsasana A.

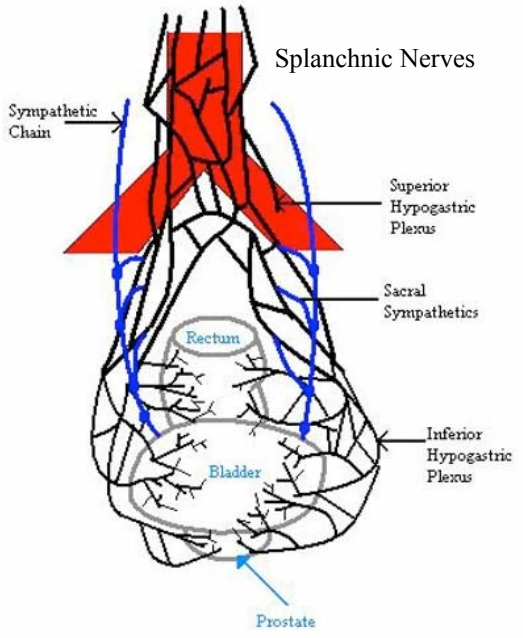
Janu Sirsasana B puts the heel in the perineum and the external anal sphincter
The perineum is given much attention in yogic texts as the seat of where our energy is stored and can either move or get stagnant -- the beauty of this English word (perineum) is probably derived from perennial, which means constant flow of energy, like a perennial stream or plant. This region is between the anus and genitals, or between the anus and vegetables as I like to say ;) For more

information on the posture: http://www.befityoga.com/philosophy-lifestyle/ashtanga-yoga-poses/ and scroll down to janu sirsasana B.

Janu sirsasana B puts pressure on our pelvic splanchnic nerve with is connected to the parasympathetic nervous system, which calms our body and allows healing to happen. This is why yoga texts give so much relevance to the perineal area of our body, with statements such as janu sirsasana helps in rebuilding all our tissues, or our 7 dhatus which means tissues.

- The 7 Dhatus - There are seven dhatu or tissues in the body known as sapta dhatu: blood, fat, flesh, bone, marrow, skin, semen/ova. To maintain these tissues, certain chemical hormones need to be produced, which the pancreas is involved in the production of — and can only happen when we are parasympathetic dominant. When these tissues are healthy, disease has a harder time taking hold of our body.

I discovered one of the many nerves to the pancreas is the pelvic splanchnic nerve (a splanchnic nerve is a nerve, parasympathetic OR sympathetic, that brings innervation to viscera; for example there is also a sacral splanchnic nerve that is connected to the sympathetic nervous system).



The pelvic splanchnic nerve has fibers from the rectum and bladder to the sacrum, the prostate, and to the pancreas. It regulates emptying the bladder and rectum, as well as sexual functions, remember the pelvic splanchnic nerves are connected to the parasympathetic nervous system. You can not do any of those above functions when you are stressed out . . .

It is important to relax, head to knee in Janu B!
We do this pose to help get parasympathetic dominant so our body can heal and rebuild. If we are trying to get our leg straight or our chin to shin or our torso flat on our leg we are pretty much making the pose null and void.

RELAX and enjoy the posture, its ok to not work so hard all the time!

Janu Sirsasana B stimulates the splanchnic nerve in lowering stress hormones, and regulating the bladder, rectum, and sexual functions, which is stated in Yoga Mala and other yogic texts such as Asana, Pranayama, Mudra, & Bandha by the Bihar School of Yoga.

Another tie to Janu Sirsasana B is through the pressure from the heel on prostate in men (which also effects sexual functions).
Latest research shows that gentle massage of the prostate [by a urologist] — maybe even just sitting on your heel — may be beneficial by:

- helping to drain painfully sequestered secretions in a chronically inflamed prostate gland or seminal vesicles;

by releasing the tension around nerve endings behind the prostate. This represents a form of "myofascial release".
http://www.chronicprostatitis.com/massage.html

Since the Splanchnic nerve is attached to the rectum, placing your heel closer to your rectum would seem to be more direct pressure on the specific nerve to stimulate it.

There seem to be varying opinions on how to place your foot and heel ("pointed" (plantar flexion) or flexed (dorsi flexion) . . . whichever position makes your heel press further into your perineum would be the best foot/heel position for you.

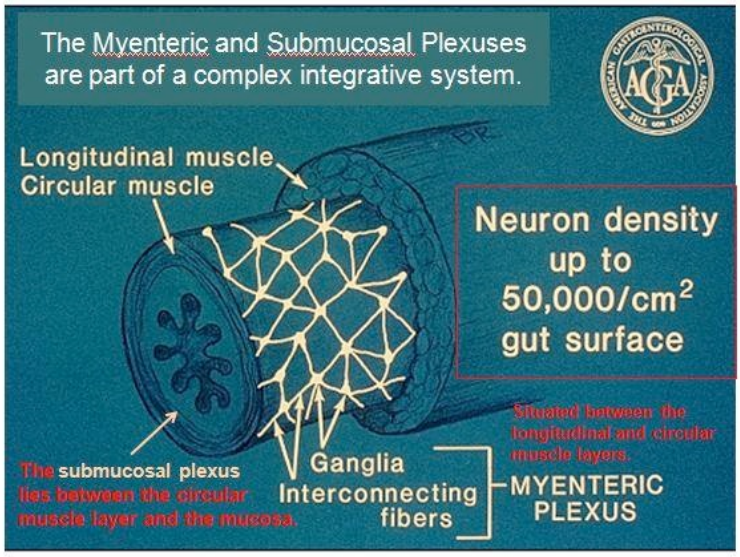
Peristalsis

Motility ="Motility" is a term used to describe the contraction of the muscles that mix and propel contents in the gastrointestinal tract. Organs and cells also have a motility function, for example the pancreas secreting insulin into the blood stream is a motility of the pancreas. Sperm has motility as it moves in the body. Cells have a motility in the form of tissue regeneration and embryological development. At a cellular level there are many types of motility; our bacteria — good or bad — is also a form of cellular motility, for example E.coli swims by rotating, amoebas crawl, and other bacteria swarm or glide inside us.

Keeping everything moving in the body is one of the many reasons we do this yoga; motility is an important function. So how does Janu Sirsasana C help with the body's motility?

Janu Sirsasana C also has connection to controlling the release of insulin from the pancreas -- this is through the gut-pancreas-vagus nerve connection which connects to our digestive nervous system called the enteric nervous system - which connects to the central nervous system — pretty much connecting our whole body.

We can stimulate this connection through the myenteric plexus to all the "tubes" in our digestive system.



The myenteric plexus is a network of unmyelinated nerve fibers and neuron cell bodies that are tucked in among the layers of our esophagus, stomach and intestines — or pretty much from mouth to anas. It tells the smooth muscles to contract to move matter along its path. Unmyelinated nerves moves slower than nerves that have a myelin sheath around them.

The myenteric plexus functions as part of the Enteric Nervous System or ENS (the nervous system of the intestines and digestion). The

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main "job" of the myenteric plexus is motor activity -- moving something along its path. The secondary function of the myenteric plexus neurons is controlling the secretion of enzymes. It receives its messages from the vagus nerve and responds by transmitting the message to muscle cells, which are thereby activated to contract.

The myenteric plexus controls secretion of hormones into the blood (ex. insulin), absorption, blood flow and the interactions between the organs (for example opening a sphincter so food can pass from one organ to the next). Making the gut-pancreas connection an important connection in how the body times digestion and absorption of nutrients.
The yoga text books give credit to the Janu Sirsasana series as helping to control diabetes

This plexus is an important component of the entire digestive tract. There is only one myenteric plexus by the way; since the neurons are present in the different organs I thought each organ had its own plexus . . . this is not the case they all connect through the ENS and are one plexus.

Janu Sirsasana C
Putting your heel in your gut as in Janu Sirsasana C position would put pressure on these nerves in the intestines stimulating their action throughout the entire digestive tract.

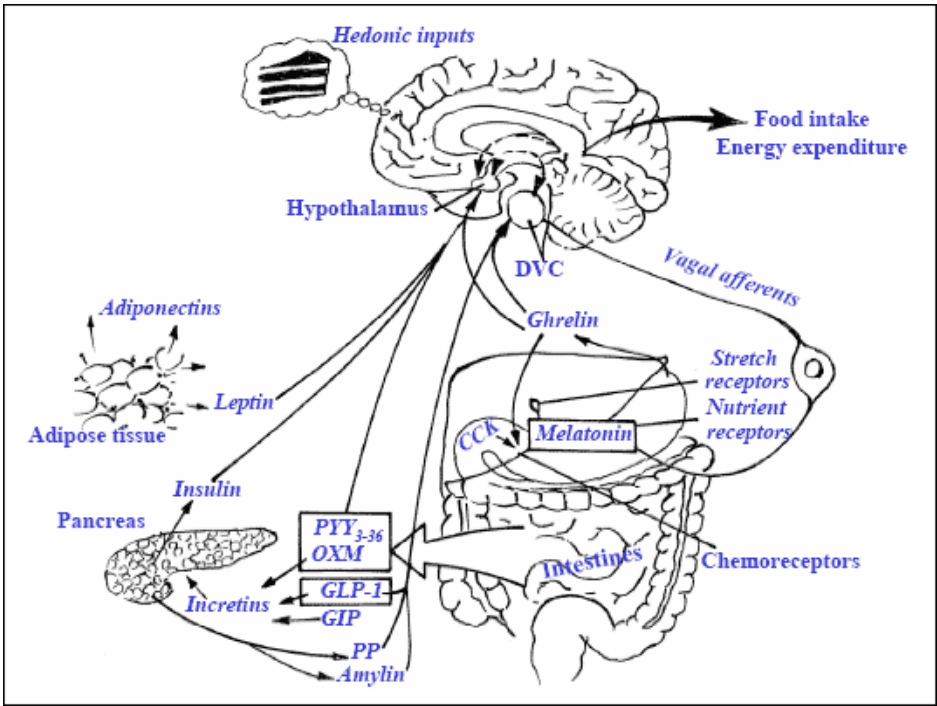
Janu Sirsasana C also presses on the uterus for women improving its tone and function.

In Janu Sirsasana C you want to guide your heel to press into your intestines, ideally below your navel. To do this safely be careful how you twist your foot -- its best to slide your arm under your calf and carefully pull back your toes, then let your knee relax down (do not push it). Place the ball of your foot on the floor if you can, then bend forward pressing your heel into your gut.

For more information on Janu Sirsasana C: http://www.befityoga.com/philosophy-lifestyle/ashtanga-yoga-poses/ and scroll down to Janu Sirsasana C.

Just for further verification, here is another study from the Journal of Neuroscience, (May 1990) that connected the gut-pancreas connection, I just copied the final summarizing paragraph, here is the link to the entire study Innervation of the Pancreas by Neurons in the Gut - ResearchGate

In summary, the current experiments demonstrate for the first time that the enteric nervous system can influence the activity of pancreas. Although both the exocrine and endocrine portions of the pancreas are affected by the gut, it seems likely that the activity of neither is influenced predominantly by enteric nerves that terminate directly on acinar or islet



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cells. Instead, the primary target of the entero-pancreatic innervation appears to be pancreatic ganglia, which transmit the signal to the effectors. The neural transmission of signals from gut to pancreas appears to be primarily cholinergic; however, the presence of substantial numbers of entero-pancreatic serotonergic axons indicates that a more complicated regulatory function also exists. It is thus clear that pancreatic activity can be influenced by the bowel through at least 3 different mechanisms. One is endocrine, depending on the release of hormones from the gastrointestinal mucosa. Another is neural, involving centrally processed reflexes with an efferent arm that encompasses the vagus and/or sympathetic nerves (Singer et al., 1989). The third is the currently demonstrated direct entero-pancreatic pathway. It remains for future experiments to determine which (or which combinations) of these possible mechanisms is utilized by particular stimuli and the physiological role played by each.
By A.L. Kirchgessner and M.D. Gershon

So an interesting fact here . . . some of this research on the myenteric plexus is "new research" (from the book "The Second Brain" by Michael D. Gershon, MD). . . and they still don't have all the answers and are "making guesses" about all the different ways the pancreas is effected (up to 3 now, see above paragraph in smaller print) — how was this information known in the 30s and 40s as yoga was becoming popular in India? And the Yogic texts even before that?

The Pancreas in the Emotional Body
The pancreas represents the sweetness of life. Diabetes may be a result of not having sweetness in your life — All work and no play.

Pancreatitis tends to be the result of someone who worries too much, having deep fear about losing control over your own or others well being.

The pancreas is the gland linked with the solar plexus chakra (3rd chakra) which deals with our emotions of self efficacy, personal desires, and intellectual activities. Diabetes or pancreatitis are signs that we are worrying too much -- losing the sweetness of life. Instead focus on what you do have in your life that is sweet. And do more of those things!

Remember to have a little vitamin P in your life, EVERYDAY. Vitamin P is Pleasure! We need to enjoy something in our life everyday.

Disorders of the small intestine, are linked with an inability to absorb or retain information and/or habits that are beneficial to us and our homeostasis. After all it is in our small intestine that we digest and absorb the nutrients from the foods we eat.

If you have digestive problems, many times it points to the tendency to get hung up on details missing the point of the situation. Don't hesitate to zoom out and look at the big picture and let the little things roll ....

The big topic around the Pancreas?

Diabetes … or more like Diabesity

The big topic around the pancreas is diabetes. I want to address diabetes from a lifestyle perspective. Diabetes is a lifestyle disease. And while allopathy tries to control it with meds, there is no pharmaceutical cure for diabetes — BUT THERE IS A LIFESTYLE CURE!

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First of all do not wait until you are diagnosed as diabetic before you take a look at your blood sugar or better yet, Insulin levels. In a typical doctors office, if your blood sugar or HbA1c is even just only one point below the diagnosis, you pretty much don't get any lifestyle advice … instead it's more of a wait until you do get to the number to be diagnosed, and then it is only addressed with a pill.

You want to know your Insulin sensitivity and your HbA1c. Insulin will be a better predictor of the direction you are headed — it is the first number to elevate, not blood sugar. After insulin has been elevated for a prolonged period of time, then your blood sugar will rise. An HbA1c test is a better snapshot of your overall blood sugar levels as it takes into consideration your blood sugar over a 6 week period, whereas a blood sugar test is only looking at your blood sugar at the moment. Think preventatively and have your insulin sensitivity checked. I attached a handout from Dr. Mark Hyman's webinar series called "Hacking your Healthcare".

Let's talk lifestyle and prevention.

1. Break the sugar taste

I know if you're reading this you probably knows this, but I'm going to state it anyway. **First of all get off the sugar roller coaster**. Most processed sugar and processed grains are highly inflammatory and something you want to rarely put in your body!

Think Savory not sweet.
Switch your taste to savory. I make savory oatmeal instead of sweet. And the same with smoothies, I don't do fruit and honey smoothies, I do savory smoothies with avocado and celery, etc.

It does not take long to break the sweet tooth, about two weeks and your body quickly realizes when you get that yucky sticky substance in your mouth again. I can't stand to eat anything that has added sugar in it. Even herbs and teas.

I know Ayurveda does use some sweet with their herbal preparations (this is how I know I don't like the taste of sugar in anything!), supposedly this is because sugar helps the herbs get into the cell. And maybe that's the case, but people in India and all their sweet foods are not dealing much better health wise when it comes to diabetes than Americans.

Don't substitute "clean" sweet foods for bad sweet foods (for example stevia, or overuse of honey or maple syrup — while honey and maple syrup do have nutrition and anti-microbial powers, they can still keep the sweet connection.

- Avoid Agave! It is akin to HFCS.
- I am not a fan of stevia, while it does appear to be a safer sweet, it is extremely sweet and keeps the sweet cycle going. If you do use stevia buy the whole leaf herb (you can grow it in your garden too). The white overly processed stevia that looks like sugar is very different nutritionally than use the dried stevia herbal leaves.
- Fruit can satisfy a sweet tooth, however fruit is best eaten alone or with a little fat and protein.
    - Fruit has a different digestive process and best to eat mostly alone — a little fat or protein is better with fruit though than carbs, grains, and sugars.

Side note — Don't eat grains or sugar with fruit. Your body will burn the grain or sugar for fuel right away and immediately tuck the fructose away into fat storage. If want to gain wait eat foods like banana cake, apple cake, and fruit bread.

Metabolic Flexibility - Eat 1-2 meals per day with no snacks
#2 Become a fat burner, not a sugar burner. This is a big step to regulating your blood sugar. Six meals or snacking throughout your day keeps sugar constantly in your blood stream, so your body constantly has the burden of trying to remove it — and your body will not burn your fat stores at all as it will just use up the sugar in your blood stream. Over time your body will lose its ability or desire to burn fat as fuel. This is what starts the cycle of insulin sensitivity.

Also when you eat six meals per day you are hopping on the blood sugar roller coaster. You eat you get energy, a couple hours later you crash … you get hangry, grumpy, shaky, irritable …. until you eat again. If you catch yourself on this cycle, you want to break it.

- Slowly extend time between meals / snacks. And make sure to have more protein and fat and less and less carbs. Start slowly by extending time between your meals or snacks by only 15 minutes to reduce your "suffering" until you get your metabolic flexibility back.

Instead get in the habit of eating 1-2 large meals per day, or as I like to do 1 big meal and two supplemental meals. Think of breakfast as something to just tide you over to your mid-day main meal. For me breakfast looks like a little in season, organic, local fruit, a small handful of nuts (maybe 10 nuts total), 2-4 squares of really good organic 75% dark chocolate, and green tea (and turmeric tea).

Then try to eat a big meal that will fuel your day — if you can do that mid-day even better. And try to get the bulk of your protein in your mid-day meal. This will better fuel you for your day. And it will be better digested which is a big concern as we age, as we get older we need more protein and we have a harder time digesting it. Making the shift to eating your main meal mid day will improve weight and energy levels.

In the evening, supper (which means supplemental meal — not main meal) should be light, soupy — like soup or cooked vegetables and easy to digest foods.

#3 **Eat no food at least 3-4 hours before bed**! This is important so your body can detox overnight and not digest. The same organs both digest and detox, and we have a major detox every when we sleep, if you are digesting when you go to bed you interfere with this important overnight "cleanse".

#4 **Intermittent fasting** - Have a 12-16 hour period from night until morning that you fast — about 5-6 days each week, so most days. This is one of the best ways to increase your metabolic flexibility — because you are not taking in any food your body has to burn fat for your fuel — and and your body can get in a little more detox time during your fasted state. That is why breakfast is called break-the-fast.

- AND DON'T MAKE THE OTHER MISTAKE … And that is to fast all day long and eat a big meal at night. This is very hard on your digestion and energy levels.

#5 **Limit carbs and grains and make then organic** (otherwise they are desiccated with roundup!). Slowly reduce your carbs and grains at each meal and quickly increase your vegetable consumption ;) Vegetables are your carbs!

- Eat only organic wheat, beans, oats, and other grassy grains such as bulgar, etc. All these foods are dessicated with roundup and then sent right to the mill. You are literally eating cancer causing roundup if you eat non organic grains.

Fat and Protein do stabilize your blood sugars nicely, however you still need to eat lots of vegetables. Too many people on Keto and Paleo diets are not getting enough fiber and eating way to much fat and protein.

A word on Paleo, Ketogenic, and high fat diets

Paleo can be good if you find clean sources of animal/fish products from animals that are not tortured or fed inhumane diets that make them sick. When you are paleo your plate is mostly vegetables with fat on them and a hunk of protein about the size of your palm.

Ketogenic is a prescription diet — it is not a long term way to eat. It is only for curing diseases. And it has been proven to help with seizures, alzheimers, certain cancers (but not all), some auto immune diseases like MS, and many different psychiatric diagnoses.

It is important to cycle in and out of a ketogenic diet, otherwise you end up with the opposite problem of only being a fat burner — unable to burn sugar which will in turn actually raise your blood sugar again in a very dangerous way called Diabetic ketoacidosis (DKA), which makes you blood very acidic.

A high fat diet is not for everyone!
While it is nice to see fat come back into favor as it is a very beneficial macronutrient, it can be overdone. Some do thrive on a high fat diet, especially those who's blood line comes from cold climates.
Some people don't digest fats very well — especially saturated fats. There is actually a genetic test you can take that can tell you if you have the SNPs that make it difficult for you to digest some fats. Keep in mind though, lifestyle can help mitigate some of that. Moderation is the key once again when it comes to high fat diets.

- Pay attention to how you feel after you eat a meal, if it was high fat and you feel nauseous or sleepy after eating this is a sign you are not digesting fats well
- If you experience heart burn 30-60 minutes after eating, this is a sign your body is not making enough bile or pancreatic enzymes.

Blip from upcoming workshop when we talk about the esophagus:

Bile and Pancreatic Enzymes
Aside from too little or too much stomach acid -- heartburn can be caused by other organs such as the pancreas or gall bladder -- **if you suffer from heartburn 30 - 60 minutes after a meal** it is your liver, gall bladder, or pancreas.

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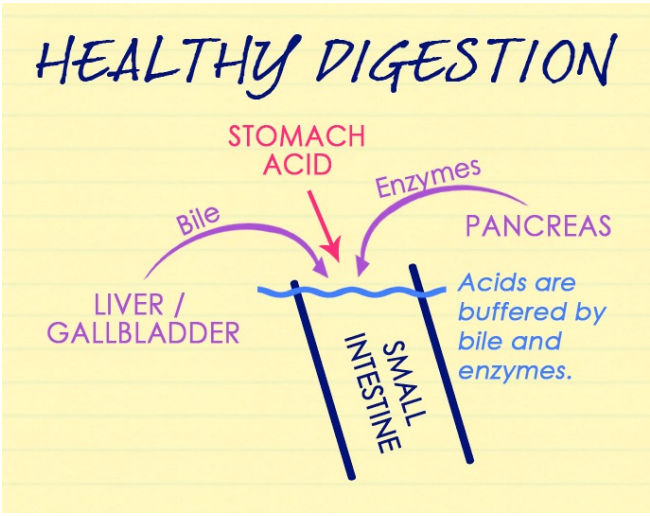
The **liver** and **gallbladder** make a significant amount of bile that buffers acid when it leaves the stomach as food passes through to your small intestine. The **pancreas** makes digestive enzymes that also buffer stomach acids. If the liver, gallbladder or pancreas is not producing adequate bile or enzymes, the stomach will simply not release its contents into the small intestine. The stomach triggers the release of the digestive enzymes only when enough buffers are present in the small intestine, ready to neutralize the acids. Instead, the stomach acids will build up in the stomach and potentially the esophagus and cause GERD or heartburn. **Low bile flow = low acid production.**

- **Bile Flow heartburn** is caused by eating heavy, rich, fatty or fried foods more so than spicy foods. This is because bile is responsible for the breakdown of fats. If there is inadequate bile flow, the fatty meal will sit in the stomach undigested and burn, cause burping or nausea.
- **Lacking Pancreatic Enzymes**
  Pancreatic enzymes are involved in digesting fats, proteins and carbs, making it difficult to distinguish a pancreatic flow issue by the foods eaten. The best way to find out is to take some over-the-counter digestive enzymes and, if you feel better, you are probably lacking in the production of your own digestive enzymes.



Strategies to Increase the Flow of Bile and Pancreatic Digestive Enzymes:

- Food-based remedy: Drink 1 tbsp olive oil mixed with 1 tsp lemon juice each day before bed for one month.

FOODS – Eat more of these foods:

- Beets
- Radishes
- Cinnamon (small amounts, 1/8 tsp)
- Leafy greens
- Fenugreek (add to food or as a tea)
- Fennel (add to food or as a tea)

HERBS:

- Shilajit – De-obstructing for bile and pancreatic ducts
- Turmeric – Support healthy bile and pancreatic enzyme flow
- Amalaki – Support healthy bile and pancreatic enzyme flow

Whew! This concludes my study on the Janu Sirsasana series (for now). I have put many many hours into this research -- more than any other organ at this time. I certainly wish I had this knowledge when I was learning the series in the 90s . . . I did not like Janu Sirsasana C . . . it was tight on my body so I skipped it for a couple years! Now I understand why we do these funky things with our heels . . . The Janu Sirsasana series is a powerful series that gets into the nervous system regulating many important functions in our body.

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Day 6: Diabesity and Prevention

Fasting blood sugar: This is a snapshot of your blood sugar in time. Like we said on Day 3, this is not the best measurement for metabolic disease. Instead we want to look at HbA1C and fasting insulin (see below) to gather more information about how you metabolize sugars.

- **Normal:** 65-99 mg/dL
- **Optimal:** 70-80 mg/dL

Fasting insulin: If someone is moving towards diabetes, then the first marker to elevate is insulin, not blood sugar. After insulin has been elevated for a prolonged period of time THEN we will see a rise in blood sugar levels. Thus, fasting insulin and an insulin response test is essential if you are concerned about preventing metabolic dysfunction. And given that 1 in 2 people have diabesity, this is something you should be concerned about.

- **Normal:** 2.6–24.9 µIU/mL
- **Optimal:** <5 µIU/mL
- **Optimal 1 hour and 2 hours post sugar challenge:** <30 µIU/mL

HbA1C: HbA1C is a measure that calculates your average blood sugar over the last 6 weeks. This is a better indicator of your body's metabolic health than a single measure of blood sugar because it gives us more data points. Your body should be able to regulate your blood sugar tightly—not allowing it to fall too low or go to high.

- **Normal:** 4.8% - 5.6%
- **Optimal:** 4.8% - 5.5 %

Apolipoprotein E (ApoE): ApoE is a genetic marker for metabolic disorders and Alzheimer's. ApoE is also a helpful marker if you are curious about a high fat ketogenic diet. This is because people with the ApoE4 allele do not always respond well to a high fat diet, and especially to saturated fat. This population also does not respond well to statin therapy. They typically respond better to a moderate or lower fat diet or other types of fats. But remember, genetics load the gun, environment always pulls the trigger.

- **ApoE2 =** protective allele
- **ApoE4 =** increased risk for alzheimer's
  - ApoE3/4 (2-3x risk) APOE4/4 (12x risk)

Additional resources

- Eat Fat, Get Thin by Dr. Mark Hyman, MD
- Food: What the Heck Should I Eat? by Dr. Mark Hyman, MD

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As I mentioned earlier, there are many more nerves in and out of the pancreas, below is an excerpt from some research I came across on the pancreatic nerves:

Nerves in the pancreas: what are they for? Dale E. Bockman, Ph.D.*
Department of Cellular Biology and Anatomy, Medical College of Georgia, 3303 Rae's Court, Augusta, GA 30909-3139, USA

The pancreas is richly supplied with nerves deriving from different locations, nerve fibers of different types intermingle as they enter or leave the pancreas, frequently closely adherent to pancreatic arteries [1,2]. Their connections include the brain, spinal cord, and enteric nervous system. The primary nerves supplying the pancreas are the vagus and splanchnic nerves, each one carrying both efferent and afferent components. In addition, nervous connections are present between the pancreas and the lower stomach and duodenum, establishing a direct connection from the enteric nervous system, which is a network of nerve fibers and nerve-cell bodies serving as a semiautonomous controller of alimentary tract motility and secretion [3]..
Reflex activity makes it possible for sensory nerves to affect responses, in either the endocrine or exocrine pancreas, for substances detected in areas both within and outside the pancreas. Thus, the sight, smell, and/or taste of food can produce cephalic phase responses by exocrine cells. Similarly, sensing a level of glucose someplace other than in the pancreas can lead to responses by endocrine cells.
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Nerves Are Important for the Secretion of Enzymes
The efferent limb of the vagus nerve seems to be especially important in humans for the secretion of pancreatic enzymes.

There Are Multiple Nerve Pathways to and from the Pancreas
Most of the nerves serving the pancreas pass through the celiac (solar) plexus. Parasympathetic fibers in the vagus nerve leave the brainstem and pass through the celiac plexus into the pancreas without synapse. They end on intrinsic ganglia. Postganglionic parasympathetic fibers extend from the intrinsic ganglia to end close to exocrine cells and islets. Sympathetic fibers originate from nerve cell bodies in the thoracic intermediolateral cell columns of the spinal cord. They exit to pass through sympathetic ganglia without synapse, form splanchnic nerves, and terminate on celiac ganglia that are part of the celiac plexus. Postganglionic sympathetic fibers enter the pancreas at the periphery of pancreatic arteries in company with vagal fibers. Sympathetic fibers end close to blood vessels, exocrine cells, and endocrine cells. Sensory fibers are contained within the vagus and splanchnic nerves. Their pathway is the same as sympathetic and parasympathetic fibers, but their action potentials are propagated from the pancreas to the central nervous system.

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Janu Sirsasana and your Pancreas Overview

Janu Sirsasana Series is about your pancreas. The pancreas is very amazing;
- It is part of both the Endocrine System and the Digestive System

As a gland in the endocrine system (endocrine means in-pouring to the blood) the pancreas is responsible for:
- Release of Insulin to help sugar get from your blood stream to your organs
- Release of glucagon to put sugar in your blood stream for use by your muscles
- Release of somatostatin which acts as a hormone that inhibits the secretion of insulin and glucagon, and reduces the activity of the digestive system in general -- this is done by the body during times of stress, blood is diverted from digestion to where our body needs it. What makes the difference of when your body secretes Glucagon or Somatostatin to get energy? Your nervous system — whether you are sympathetic or parasympathetic dominant.

As an exocrine gland in the digestive system (exocrine means pouring in to something outside of the blood):
- Your pancreas creates strong digestive enzymes to pour out to the small intestines to help digest and break down food and nutrients for use in your body.
- It is also responsible for the bicarbonate solution that buffers the digestive enzyme to your small intestines without burning surrounding tissues.

The digestive enzymes the pancreas creates are so acidic they will burn surrounding tissues; some of the research papers called the pancreas the P-bomb — if your pancreas ruptures during trauma the digestive enzymes will burn surrounding tissues.

The pancreas has more nerves in and out of it than any organ (one of the reasons pancreas diseases are so painful). As we learned above the pancreas is great at handling opposing activities; when it comes to our nervous system the pancreas continues to balance opposing activities . . . The pancreas connects to both the Parasympathetic (calming) and Sympathetic (stimulating) nervous system:
- The parasympathetic connection is through the vagus nerve. The vagus nerve which is connected to your senses (sight, smell, hearing, etc.) talks to your pancreas to prepare hormones for digestion (glucagon and insulin). This is why fake sugars are ineffective, your body releases insulin into your bloodstream before any food hits your mouth.
- You can not digest well if you are stressed out, so the pancreas talks to your parasympathetic nervous system calming down the body to prepare for good digestion.
- The sympathetic connection inhibits insulin secretion so somatostatin can be released to send energy to deal with stress.

Due to all these opposing activities you do not want to be poking around your pancreas — And the location of the pancreas also makes it very difficult to poke about.

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Your pancreas is located behind your stomach and in front of your kidneys deep in the middle of your body where it is well protected. So instead of wringing out the pancreas to get fresh blood supply in we press on nerves to and from the pancreas.

In the Janu Sirsasana B — Remember RELAX your head to your knee in Janu B :)

- the purpose of sitting on our heel is to stimulate the same response as mula bandha, putting pressure on the pelvic splanchnic nerve to stimulate parasympathetic dominance.