Your VAP = Brain Gut Axis Function

Reader Summary

1. What can we use a **VAP** test for? And WHY you should ask your doc for it instead of a regular lipid test?
2. Should our diet be static or dynamic endeavor?
3. How does the brain gut axis function and sustain health or promote disease?
4. How do hormones tie this all together?
5. How does HS CRP, thyroid and the brain all make love and not war?

When most people get a **VAP** they think heart and lipid study. I do not. I use this test to assess levee 5. Most people in the paleo world associate a leaky gut with a gluten problem. I do not. The VAP test is the best test to use to assess the function of our gut and how leaky it is based upon the fuels we are feeding it now. If you really dissect your VAP you can learn a lot about what you should be eating and you should not be eating based upon your current cellular homeostasis. Most people think a diet is static. I believe a diet must be dynamically altered based upon the testing feedback we receive from our body. As most of you know I use a quarterly lab draw system to assess my own health to make dynamic changes as I see fit. So today let’s talk about the uses of a VAP test.

The basis of the brain gut axis is the protective effects of great liver function. I think the real defender of “leaky gut” is not the brush border of the intestine but it is the liver. Why? All humans are subject to direct assault of inflammation via our intestines because it is the most common way the environment reacts with our body. This is also why the immune system is ready for defense right behind the brush border. We

already know that diseases like celiac destroy this first line immunity. Well, a good liver will protect a leaky gut and the brain. Most endotoxins gain access to our portal circulation but they rarely ever get to our general circulation to cause the real damage because our liver won't allow it to occur based upon its design. In fact, endotoxin binding in the liver is increased by exercise, testosterone, estrogen and even occasional alcohol use. These things all increase our HDL particles too. A high HDL is a sign of good liver function. Remember that HDL particles actually bind inflammatory endotoxin particles to increase our immunity from oxidation from many sources. This is why a high HDL level confers general health and well being across the board. Moreover, VLDL and chylomicrons also protect us from inflammatory damage as well. This biologic process is at the seat of why we see higher cholesterol levels in the face of cellular stress or infection.

Cholesterol production is the bodies natural response to clean up this kind of mess if the brush border is overwhelmed. We also need to be mindful that any stressor can increase the permeability of the gut to endotoxic damage. This includes cortisol, malabsorption, or frank infections. The liver is backed up in its protection by the action of thyroid hormone. If your thyroid is working well, when you get a serious gut insult that causes "leakage", your thyroid responds by increasing production of its own hormone to allow the the upregulation of cholesterol turnover. How it does this is by acting as a co-factor (thyroid hormone) with vitamin A to allow the conversion of cholesterol to pregnenlone. Remember that pregnenolone is the basic building block of all the steroid hormones that our brain uses to signal our 20 trillion cells of exactly what is going on in our bodies. You may begin to understand why I believe lowering your cholesterol makes zero sense from a biologic stand point. Its formation is critical to a positive response from our brain to a direct cellular stressor from many different insults.

If this system is not working properly we have a major communication breakdown between the brain and our cells. This is how I globally define Leptin Resistance. LR does not allow the brain to understand the current situation as it exists in the periphery or in the liver. In essence, it is blind to the bodies needs. It should be clear now, thyroid hormones help regulate the and control the inflammatory processes in our bodies. When we lose control of our thyroid hormone production (hypothyroidism by any cause) we effectively lose control of how the brain sends its message to our peripheral cells. We can no longer make steroid hormones effectively from pregnenolone. This is the basis of the pregnenolone steal syndrome. It also helps explain why we see a pandemic in low vitamin D levels and low testosterone and estrogen levels in people clinically today.

So we need to think about the thyroid some more. Here is another biochemical fact few of us talk about. 20% of the conversion of T4 to T3 occurs directly in the gut but outside the liver. Why is that? It is because the thyroid works in unison to also help protect our portal circulation from gut inflammation. This is a key point. Its stimulatory protein is TSH and it is released from the brain at the anterior pituitary site. In hypothyroidism, TSH is high because the brain is trying to nudge the thyroid gland to make more active hormone (T4). Remember that T4 has to be converted to the active form of thyroid hormone called T3, guess where? The answer is in the liver for the remainder of the 80%! So the liver and thyroid is critical to how this brain gut axis system works.

The increased secretion of TSH from the pituitary has a major effect on out liver too. It is pro inflammatory because it causes the liver to make HS-CRP. HS-CRP is what we used to measure baseline inflammation in patients. It is called an acute phase reactant protein. High CRP levels are known to walk hand and hand with the development of atherosclerosis.

The increased CRP produces multitudes or pro inflammatory chemicals body wide, because they activate immune cells like Mast cells. Mast cells and other immune cells, are the factories of pro inflammatory chemicals and they stimulate more inflammation in the plaques of atheromas in blood vessels to rupture and cause disease.

High TSH levels are not good signs. This is why hypothyroidism is correlated with heart disease and many autoimmune conditions. Hashimoto's thyroiditis is an epidemic in America and in my view is a sign of a constant assault of the intestinal brush border of our gut that eventually overwhelms it and then floods the portal circulation with inflammation. This results in a liver response that over time goes from favorable (particle A LDL size with high HDL) to a very unfavorable particle B size dominated by sdLDL and low HDL and a high HS CRP. This then sets the stage for disease propagation in many sites of the body.

This is how the physiology of the brain gut axis works from a biochemical standpoint. Once the inflammation markers are present in the general circulation they head to the two most prominent organs based upon blood flow . The brain and the heart are those targets. In the brain the first effect is to overwhelm the parts that are not protected by the brain blood barrier. These places are called the **circumventricular organs**. The most important of these is in hypothalamus where the leptin receptors are. The receptors become over whelmed with these inflammatory cytokines and lead to leptin resistance. Leptin resistance basically makes the brain completely blind to the energy needs and status of our 20 trillion cells. It also no longer allows us to have tight control over how calories are partitioned to our peripheries. Remember also, that the pituitary gland is where TSH is made. The portal circulation of the pituitary also has no brain blood barrier so it too is at the mercy of inflammation from the gut if it is leaky. This is another way your thyroid gland can be shut

down and cause a problem allowing the conversion of cholesterol to pregnenolone to help heal the body. This complex disorder results in multitudes of breakdowns of cellular homeostasis in many organs leading to disease development in many organ systems over the years it occurs. You can now begin to see how the brain is totally dependent upon leptin to make hormones that respond in kind based upon cellular homeostasis.

In the heart the HS CRP fosters the development of atheroma generation in the coronary arteries and stiffens the leaflets of our heart valves. Given longer time it also causes huge changes to the hearts electrical system leading to arrhythmia generation. This is why atrial fibrillation is so common in America today. Eventually the atheroma collects oxLDL and grows and when it is matched with a the persistently elevated HS CRP causes a plaque to explode and causes a heart attack or death. The plaque is the “dynamite” and the HS-CRP is the “lit match”. Neither one is dangerous unless they are present together.

The brain gut axis is vitally important to all of us. Understanding how it basically functions is really a study in how our liver protects us. Our liver is the last line of defense before the brain is assaulted. Once the brain is involved , hormonal disruption ensues first with leptin resistance and then cascades to every other hormone in some fashion. Once this occurs the brain loses its control over cellular homeostasis and neolithic diseases become prevalent. We can understand this process dynamically when we look out our VAP profiles. They really don’t measure lipids in my view. It is a test that tells us how good or bad our brain gut axis is functioning to protect the 20 trillion cells in our body from disease propagation.

For more information on what a VAP can do, click here.

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