Facebook: Brock Post – Post 6 Can My Lab Work Tell Me I Am Depressed? Part Two
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Can My Lab Work Tell Me I Am Depressed? Part Two

A few weeks ago, I wrote a paper on how glucose dysregulation can create inflammation in the brain and the body. Glucose is fuel for the brain and the brain is very dependent on a continuous, healthy supply from peripheral circulation. Remember, glucose, along with oxygen and stimulation are necessary for healthy neuronal survival. This week I want to talk about how identifying early patterns of blood glucose dysregulation on lab work can prevent the patient from suffering the effects of dysregulated blood sugar, one of them being depression (depression lives in the frontal lobes).

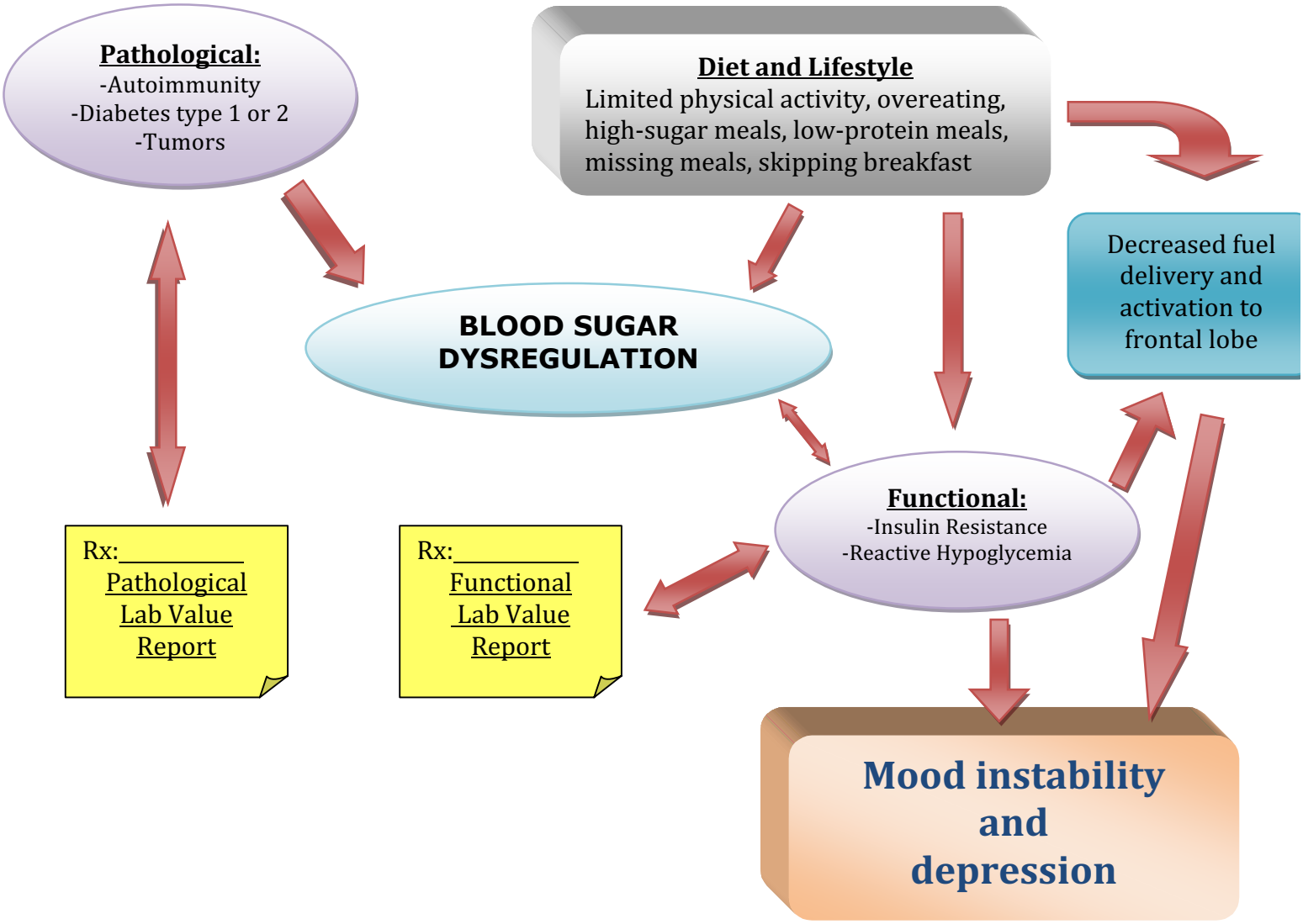
Remember, lab work can be evaluated by using pathological or functional ranges. When a patient goes to his or her doctor and has labs drawn, the results are usually assessed within the pathological range. The pathological range is used to assess disease. If the patient's numbers fall above or below the pathological range, the patient has illness or disease. If the patient is within the pathological range, they are considered healthy. The functional range can be thought of as a tighter range. The functional range is important in telling the practitioner if the patient is trending towards illness and disease.

Conditions associated with dysregulation of blood sugar can be pathologic or functional in nature. Pathologic issues related to dysregulation of blood sugar are tumors of the adrenal glands and pancreas, autoimmunity and diabetes. Functional issues related to blood sugar dysregulation are insulin resistance and reactive hypoglycemia. This is important. Routine blood work from a patient's primary care provider usually does not screen for patterns of reactive hypoglycemia or insulin resistance. This is why utilizing functional ranges and looking at patterns on blood work is important for the health of the patient, especially if they are suffering from mood disorders such as depression.

Diet and lifestyle play a large role in functional dysregulation of blood sugar. With insulin resistance, the patient may have higher than optimal blood glucose and suffer from spikes of blood glucose throughout the day. This usually occurs due to a lack of physical exercise, eating high-sugar and starch meals, not eating enough protein and indulging in comfort foods. On the other hand, people who suffer from reactive hypoglycemia usually have lower than optimal blood sugar and have drops in their blood sugar throughout the day. This is usually caused by skipping meals, suppressing

appetite with stimulants such as coffee or nicotine, and generally not eating enough to "fuel" the system. Below is a representation of the differences in pathological versus functional blood dysregulation issues:

Pathological Ranges vs. Functional Ranges



If a patient is suffering from mood disorders or depression, it is important to look at their blood work from a functional perspective. Remember, glucose is fuel for the brain. If the brain is not getting a consistent amount of healthy levels of glucose, it can not perform at an optimal level. If the brain can not perform at an optimal level, neurological exercises may exceed the patient's metabolic capacity to

create long term positive plasticity. Obviously, if the patient presents with labs that are outside the laboratory range, it warrants further investigation for the conditions mentioned above: tumors, autoimmunity and diabetes. If these are ruled out and the patient still is not doing well, then it is time to dig deeper from a functional point of view. Below is a basic blood sugar panel that can help get us started at looking at functional blood sugar issues:

Blood Sugar Functional Ranges vs. Pathological Ranges

Blood Sugar Marker	Functional Range	Pathological Range
Glucose (Fasting)	85-99 mg/dL	65-99mg/dL
Hemoglobin A1c	4.8-5.5 %	4.8-5.6 %
Cholesterol	150-199 mg/dL	100-199 mg/dL
Triglycerides	75-100 mg/dL	0-149 mg/dL
LDL	<99 mg/dL	0-99 mg/dL
HDL	55-100 mg/dL	>39 mg/dL
Chol/HDL Ratio	<3.1	0-5
LDH	140-180 U/L	0-225 U/L

When you compare the two ranges listed above, you can see that the numbers in the functional ranges are much closer together. This allows the practitioner and the patient to be able to identify blood sugar markers that are not necessarily pathological, but may be trending that way. Let's look first at two patients' lab results from a functional perspective:

John's Labs vs. Beth's Labs

Blood Sugar Marker	John's Lab Findings	Beth's Lab Findings
Glucose (Fasting)	101 mg/dL	80 mg/dL
Hemoglobin A1c	5.7 %	5.3 %
Cholesterol	206 mg/dL	192 mg/dL
Triglycerides	104 mg/dL	95 mg/dL
LDL	110 mg/dL	82 mg/dL
HDL	51 mg/dL	61 mg/dL
Chol/HDL Ratio	3.2	2.8
LDH	189 U/L	130 U/L

Let's take a look at John's labs first. From John's history and physical exam you already know that he has some blood sugar issues. John was diagnosed with depression from his primary care doctor over five years ago and is currently on an antidepressant. John is a computer programmer and spends most of his work day sitting in front of the screen. John is nearly eighty pounds over his ideal

body weight and states that the only form of exercise he gets is when he takes his Chihuahua, Brutus, for a short walk in the morning, while sipping down a sugary coffee drink. John also claims he has difficulty with his short term memory and it is frustrating him because he is only 37 and feels he is too young to be forgetful. Looking at his labs from a pathological point of view, everything looks pretty good. When you look at them from a functional point of view, you see some inconsistencies. Functionally, everything except his HDLs look elevated. This means John is trending towards an insulin resistant state.

Why is this important for his brain? John can continue to take the antidepressants all he wants, but as long as his blood sugar is not regulated, he is going to suffer from further brain-related issues. If you remember from my week two post, I wrote about how excessive insulin and glucose can create neurological problems. I also wrote about how taking specific antidepressants can eventually not help with mood, but become part of the problem. The longer John's blood sugar remains above the functional level, the more at risk he is for neurodegeneration. The cells become insulin resistant. This means that the cells get tired of insulin constantly knocking on their door and asking to allow glucose in. This leads to elevated levels of insulin and glucose in the blood which eventually creates inflammation, hormone dysregulation and neurotransmitter deficiencies.

The good news is that altering John's diet and lifestyle can have a tremendous impact on his health and reduce his symptoms. I do not want to go into too much detail on diet (because this is something that should be individualized based on the patient) but starting him on a higher protein, lower sugar/starch diet could make some major changes. Increasing John's physical exercise can help his blood sugar and also greatly help his brain.

Take Home Points:

-If your patient is suffering from chronic health conditions, run some labs on them.
-If their numbers are within the pathological range, compare them to the functional ranges.
-If the patient is trending towards or is insulin resistant, help them fix it.

Ok now let's take a look at Beth's labs. From Beth's history and physical, you already know that she too, has blood sugar issues. Beth has been taking antidepressants since her senior year in high school. She is young and thin, but looks fatigued. She states that she has trouble falling asleep at night and even more difficulty staying asleep at night. She never eats breakfast and only snacks on pre-packaged oatmeal bars during the day. She notices if she goes a long time without eating a snack she gets angry and irritable. She has difficulty concentrating in her new college classes and needs a lot of coffee to stay awake and focused. Her grades are dropping, making her more depressed and she does not know what to do because her medications aren't helping.

After reviewing her lab work, you see that from a pathological perspective, everything looks normal. Functionally, however, you notice her glucose and her Lactic Acid Dehydrogenase (LDH) are low. Beth is suffering from reactive hypoglycemia. We already know that when there are chronically low levels of glucose, the HPA axis can become overworked. Dysregulation of the HPA axis has been seen in patients suffering from depression. Also, when blood sugar is chronically low, the adrenal glands become overworked and underappreciated. You decide to run a salivary adrenal profile on Beth

and notice alterations in cortisol and her circadian rhythm. You help Beth by altering her diet and lifestyle. After addressing the blood sugar dysregulation and cortisol imbalances, Beth begins to feel a lot better.

Why is this important for Beth's brain? Well if Beth suffers from chronically low blood sugar, she has no fuel in her tank. Her brain is not able to function properly because it is not receiving adequate amounts of glucose throughout the day. She also has HPA axis dysregulation which eventually leads to inflammation. So by fixing her blood sugar, we fix the inflammatory state she is living in, fix her brain and fix her depression.

Take Home Points:

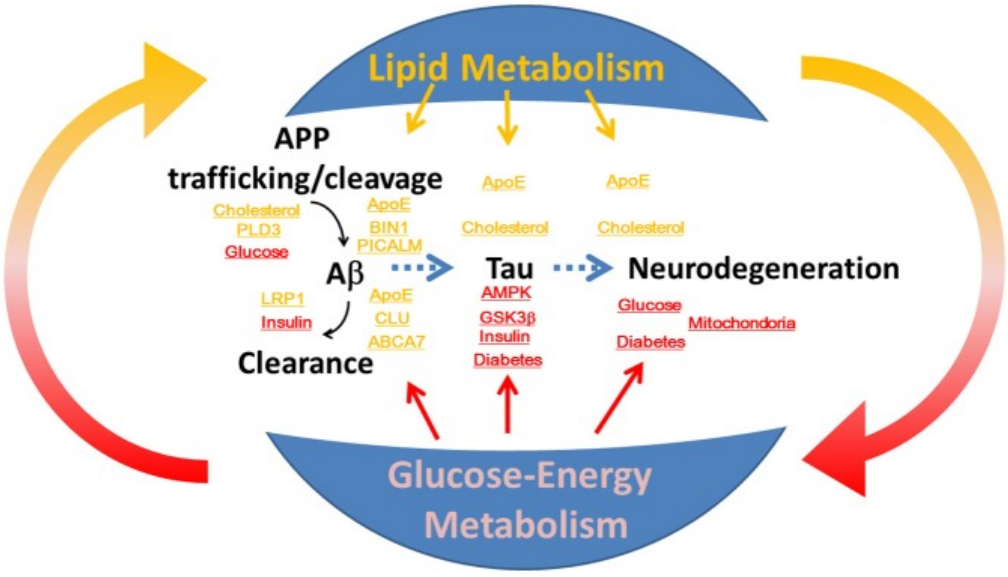
-Functionally low glucose and low LDH (below 140) can determine if the patient is suffering from reactive hypoglycemia.

-Low blood sugar creates a stress response that creates peripheral and central inflammation.

-Diet and lifestyle modifications can help a patient suffering from reactive hypoglycemia and depression.

Neurodegeneration

I very quickly just want to mention the consequences of long-term blood sugar issues. Blood sugar dysregulation is a known risk factor for Alzheimer's disease. In John's situation above, he was already beginning to have difficulty remembering things. Chronically elevated levels of blood sugar and insulin are not good for the brain. Insulin resistance is associated with neurodegeneration surrounding senile plaques. Insulin surges reduce the brain's ability to clear β-amyloid plaques. The accumulation of plaques decrease the ability of the brain to create synaptic plasticity by decreasing the frequency of firing of the areas of the brain affected. Structurally, diabetes and insulin resistance have been shown to create gray matter loss in the temporal, anterior cingulate and frontal lobes, which is no good for a depressed patient!



Blood sugar disorders are way more apparent then people may know. It is important that if a patient is complaining of neurologic symptoms and he or she has not had comprehensive blood work done and reviewed from both a pathologic and a functional perspective, his or her condition will persist until it eventually creates worsening symptoms that are more difficult to treat.

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