KRESSER INSTITUTE
FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Blood Chemistry Principles

Hi, everyone,

In this video I'm going to outline the basic principles of functional blood chemistry.

First, it's important to understand that patterns are typically much more important than individual markers. There are some individual markers that can be used to diagnose disease when analyzed independently. For example, a high TSH alone is indicative of hypothyroidism, and a high fasting glucose is indicative of hyperglycemia.

However, in most cases, you have to evaluate individual blood chemistry markers in the context of other markers in order to determine the presence of a functional imbalance, pathology, or disease.

By itself, elevated total bilirubin is not typically suggestive of a problem. It is caused by a genetic condition called Gilbert's syndrome which leads to slightly high bilirubin levels but rarely causes any symptoms or requires treatment. But if aminotransferases like ALT and AST and other markers like GGT are also elevated, a high total bilirubin result in this context is often a sign of liver disease.

In some cases, additional markers above and beyond the basic blood chemistry panel you start with will need to be ordered in order to clarify the pattern or diagnosis. For example, elevated ferritin can be caused both by excess iron storage and by inflammation. Even if you have other basic iron markers like iron saturation and UIBC, it's not always easy to determine the underlying cause of the ferritin elevation. In these cases, it may be necessary to order a marker called soluble transferrin receptor, which is a marker of iron status that is not affected by inflammation. If it is out of range, you can be more certain that the ferritin elevation is due to iron overload.

Of course, as you can imagine, I won't be able to cover every possible follow-up test you'd want to order in every situation, or else we'd have to spend a year talking about blood chemistry alone. But in most cases, I will be able to tell you at least which markers to order, some basics about how to interpret them, and where to find more info. You can also ask me questions about this in the monthly webinars or ask the Kresser Institute faculty in the weekly calls.

Mastering functional blood chemistry involves learning to differentiate when individual markers are important and when they are not (especially when they're only elevated out of the functional range), to identify patterns of imbalance and pathology from a collection of individual markers, and to know when and how to use additional testing to clarify your diagnosis.

This is why I've organized this unit according to patterns, rather than individual markers. I have included a blood chemistry reference manual that lists each individual marker and its potential

significance, but in the curriculum we are going to focus on looking for patterns and assessing probabilities because that is the best way to use blood chemistry in practice.

Second, blood chemistry should never be used in isolation. It should always be combined with a thorough medical history including current symptoms and health status, past and present illnesses, diet and lifestyle, medications and supplements, alcohol intake, and, if you do this in your practice, a physical examination.

For example, let's say you do a comprehensive blood panel and discover that your patient has elevated serum B12 levels. How you interpret this marker will depend entirely on whether they are supplementing with B12. If they are, the elevation is simply a sign of that and it's nothing to worry about. If they aren't, it can be a sign of impaired B12 metabolism and methylation, and you'd want to order additional testing to clarify that.

Third, the reference ranges that we use to interpret results in functional blood chemistry are often —but not always—different than the reference ranges that are used in conventional medicine and printed on the lab results.

I'm going to discuss this in a lot more detail in the next video, but in short, the conventional ranges are designed to diagnose disease. The functional ranges are designed to diagnose imbalances or pathologies before they progress to full-blown disease.

They're both important, of course, but they give you different information. If we only used the conventional range, we would miss many patients at an earlier stage in the disease process, and as we've discussed, intervening as early as possible is one of the key principles of functional medicine.

You'll find that some conventional healthcare professionals are skeptical of the functional ranges. This is in part because they were trained in medical school to only provide care when disease is present. In fact, in conventional medicine, the definition of health is simply "the absence of disease." In functional medicine, we define health differently. Our definition certainly starts with the absence of disease but also includes optimal energy levels, digestion, blood flow, hormone balance, detoxification, and more. The conventional lab ranges may detect the presence or absence of disease, but they won't tell us whether the patient is healthy.

Put another way, it's not truly possible to practice preventative medicine if you are only using the conventional lab ranges. That is why learning and applying the functional ranges is so important.

Fourth, it is important to re-test after you've addressed the imbalances or conditions you identified with the comprehensive screening panel. "Test, don't guess" is another important principle not only of blood chemistry, but of functional medicine in general. If you don't re-test your patients, you have no way of knowing if the treatment had the desired effect. Symptoms are not reliable indicators of progress in many situations, especially with conditions like dyslipidemia, which are often completely asymptomatic.

This is an important principle to explain to your patients up front, so you can manage their expectations. I've found that most patients don't resist re-testing; in fact, they welcome it. They want to see the confirmation that the treatment is working as much or more than you do. But as the clinician, one of your responsibilities is to determine when re-testing is appropriate and to remember to do it as part of your follow-up. We'll discuss this in more detail as we move through the training.

Okay, let's move on to the next section, which is a much more detailed look at the difference between functional and conventional lab reference ranges. See you soon!