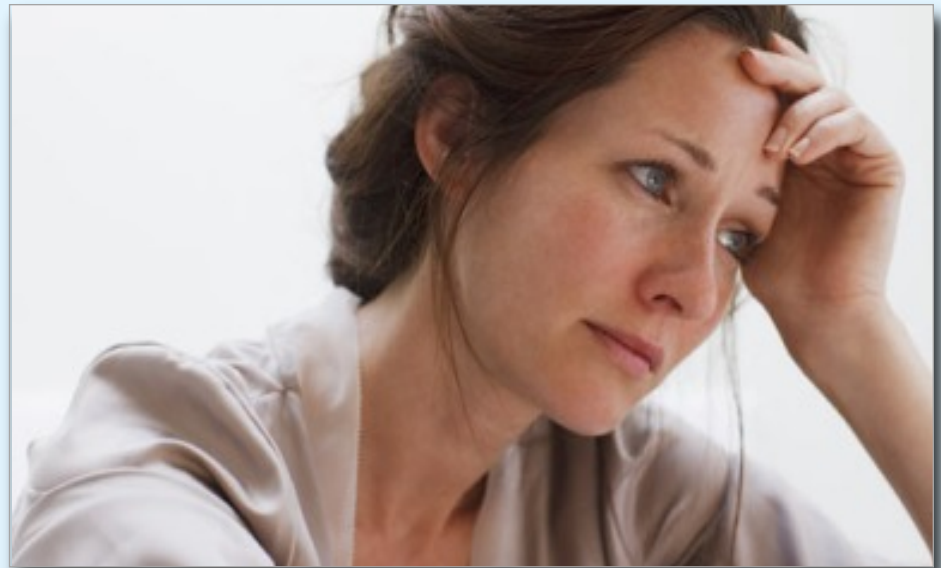


Depression or Anxiety? Check The Gut

" Stress causing gut problems is a familiar concept; the gut being an intricate player in the etiology of depression & anxiety is a new concept for many!"

The gut continues to gain more credibility as a source of inflammation and pain, however most people don't understand the direct relationship between how we think and feel and what lives in our gut. My thanks to Dr. Court Vreeland and the webinar called "The Gut-Brain Connection" for his very unique insights and clinical applications. Most of us are very familiar with stress or how the brain causes gut problems. Stress causes the pH to change in our gut and the flora are negatively affected. However the gut, being an intricate player in the etiology of depression and anxiety, that's a new concept for many clinicians.

The term microbiota refers to the bacteria and organisms that take up residence in the gut. It is so expansive that some researchers suggest that it should be considered "an inner organ" because it affects so many other systems in the body. Microbiota contain 1,800 genera, 40,000 species, weighs 1-2 kg and is 100 trillion in num-



bers. Microbiota contain 100 times the genes found in the human genome. Disruptions in this "organ" alter many systems including the function of the central nervous system.

Dr. Vreeland kindly provided the following diagram. Let's walk through it. Starting at the upper left hand corner and moving clockwise. Stress, dietary or environmental triggers cause microbiota changes; microbiota changes cause gut epithelial breakdown or each gut epithelial breakdown or leaky gut. Leaky gut causes

immune activation by endotoxins via lipopolysaccharide stimulation, which in turn causes inflammatory cytokine production, which accelerates blood brain barrier breakdown, which leads to alterations in neurotransmitter function, which leads to changes in synaptic plasticity, which results in neural, behavioral and mood changes. These changes lead to further stress which produces further changes in microbiota.

The cycle is continuous as you can see by the bi-directional arrows. For example,

on the right part of the diagram you see immune activation by endotoxins. Moving counterclockwise, the process of immune activation further disrupts the gut epithelial barrier.

Previously we've discussed lipopolysaccharides, abbreviated LPS, and their ability to cause inflammation and pain. LPS only come from the gut. So if we can protect the gut lining, we can prevent LPS from entering the blood stream ramping up inflammation. Even at low dosages, LPS have been shown to cause acute anxiety, depressive symptoms, cognitive deficits, and decreased visceral pain tolerance. LPS induced peripheral cytokine levels can also cause reductions in serotonin production.

I think you get the point. LPS leave the gut via leaky gut and cause immune activation and the release of cytokines which cause inflammation. The cytokines can cause changes in the blood brain barrier. The result is inflammation and immune activation inside the brain. So altered cytokines cause altered neurochemistry which causes altered mood, behavior and cognition. Let's discuss several treatment options.

Treatments have been discussed on other Tuesday Minutes, but here's an overview of Dr. Vreeland's protocol. First, look for food allergies that will contribute or even cause a leaky gut. Next assess and treat for gut dysbiosis. You can see an earlier Tuesday Minute on gut dysbiosis below. After the bad bugs are killed; always use a healthy prebiotic with probiotics to restore balance. Biodoph-7 Plus contains 20 billion healthy bacteria per capsule. Use 1 - 2 capsules, twice a day between meals. To heal the gut use IPS, short for intestinal permeability support. Use two capsules, twice a day on an empty stomach. IPS is designed to stimulate growth and repair of the intestinal mucosa as well as aid in gut detoxification.

The next step is cytokine and immune modulation. Although there are many nutrient choices, he focuses on four: vitamin D, omega-3s, lipoic acid and superoxide dismutase (SOD). Dr. Vreeland uses 10,000 IU or 5 drops of vitamin D as Bio-D-Mulsion Forte, 3,600 mg of EPA/DHA found in one tablespoon of the pleasant lemon flavored Biomega-3 Liquid. Lipoic Acid is necessary for a healthy blood brain barrier. He uses 2 capsules twice a day.

Dr. Vreeland also gave a webinar where he discussed the role of inflammation and depression. In that material he also discussed the use of superoxide dismutase, SOD for short. SOD is a very powerful antioxidant enzyme that is essential against reactive oxygen species (ROS). Reactive oxygen species also promote pro-inflammatory cytokine secretion.

There are three forms of SOD. SOD1 present in the cytoplasm, SOD2 present in the mitochondria, SOD3 present extra-cellularly. The body needs zinc, copper and manganese respectively to make them. SOD has very potent immunomodulatory effects. Biotics makes 3 SOD products, Dismuzyme Plus 5000, Dismuzyme Plus tablets and Dismuzyme Plus Granules. Dr. Vreeland recommends 1 tablespoon of Dismuzyme Plus Granules 2 - 3 times per day. Biotics Research Corporation is the only company I know that has proven its oral form of SOD raises intracellular levels of SOD.

Even though the gut-brain connection is well established, you can expect to see more research in the coming years. But currently, protocols like this and cleaning up a patient's diet can make a difference in their depression, anxiety levels, as well as the way they think and feel.

Thanks for reading this week's edition. I'll see you next Tuesday.