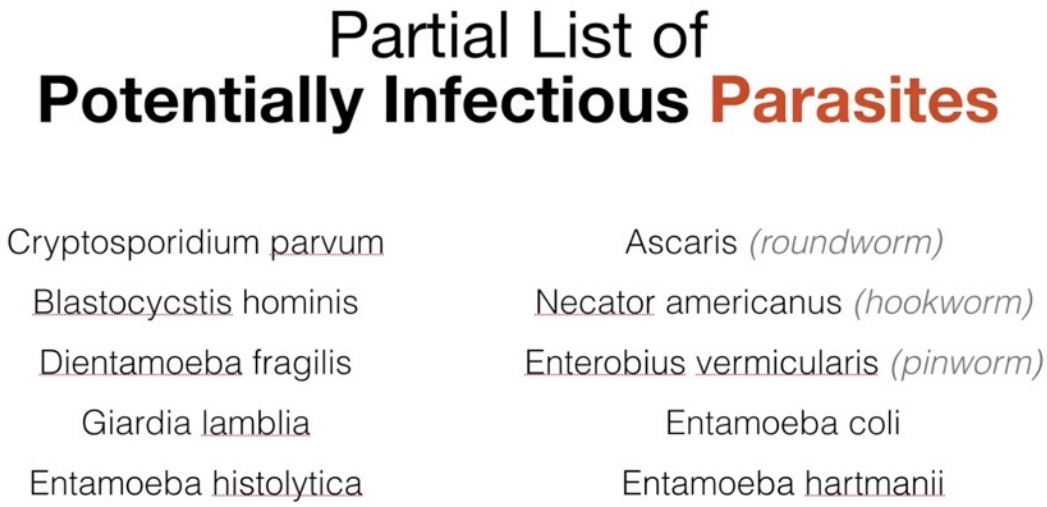
KRESSER INSTITUTE FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Gut Pathology - Part Four

So first let's talk a little bit about parasite infections. Common parasites include the ones I've listed here on this slide...



...like cryptosporidium, which we typically refer to as "crypto," Cryptosporidium parvum that is; Blastocystis hominis, which we call "blasto"; Dientameoba fragilis; Giardia lamblia; Entamoeba histolytica, or e-hystolytica; ascaris, which is roundworm; Necator americanus, which is hookworm; Enterobius vermicularis, which is pinworm; Entamoeba coli; and Entamoeba hartmanni. And some of these are considered by most researchers and physicians to be non-pathogenic commensals, meaning they can be normal residents of the digestive tract but can still be indicators that there's been some fecal-oral transmission, like someone has been exposed to some contaminated water or food that the microbe parasite, particularly Entamoeba coli and Entamoeba hartmanni that we've talked about here, are still considered to be non-pathogenic. Others are more controversial, like blastocystic hominis, and d-fragilis, blasto and d-fragilis, we're going to go into a lot of detail about these later, and then still others are pretty much unequivocally considered to be pathogenic, and these would include giardia and crypto, and then others are considered to be what we call "old friends," that may actually provide some benefit to the host, and Necator americanus, or hookworm, would definitely fall into this category. I've done a few podcasts, or I did an interview with Moises Velasquez-Manoff, who wrote a fascinating book called *The Epidemic of Absence* about this, we'll put it in the resources section for this week. If you want more info on the old friends hypothesis, it's really interesting, but it's not super-relevant to what we're talking about here, so I'm not going to go into a lot of detail.

Risk factors for parasite infection include consuming contaminated food and water, increased use of daycare centers, travel to developing countries, although I want to point out that that's not at all necessary to acquire parasite infection. A lot of patients may be surprised when you tell them they have a parasite or suggest testing for them because they'll tell you they haven't left the developed world, haven't done any third-world travel, but these parasites are extremely common and can be acquired in virtually any environment. Household pets increase the risk, consumption of uncooked foods, antibiotic use, which weakens host defenses, insect vectors, and sexual contact are all risk factors for parasite infection. The symptoms associated with parasitosis are often general and non-specific, so this is of course why the testing is so important. It's not possible to identify parasites just from symptoms, although there are some telltale symptoms, like if a patient presents with cyclical symptoms, because parasites have lifecycles that can influence their pathogenicity in the host, so if someone feels relatively normal and then they feel really kind of rotten and then they feel normal again, and that alternates in a consistent way, that's one red flag for considering parasite infection. But the symptoms can really vary from fatigue and malaise to GI distress and diarrhea, constipation, to things like brain fog or sleep disturbance or skin issues, and it's worth pointing out that a pretty surprising percentage of people with parasite infections don't actually have gut symptoms. I've had patients with even the parasites that are unequivocally considered to be pathogenic that didn't really have gut issues and their problems were mostly brain-related or skin-related, so keep that in mind when you're working up a new patient and considering what pathologies might be underlying, and when you're talking to your patients about the need to do this kind of testing, gut testing, even when they don't have symptoms.

Parasites can cause pathology in a number of ways depending on the organism, so let's use cryptosporidium as an example. It damages the topography of the small intestine by invading intestinal epithelial cells, it damages the microvilli, which hurts the absorption of nutrients and compromises the gut barrier integrity. It further weakens the body's defense against opportunistic infections, and in acute, severe cases, it can cause high fever, severe diarrhea, and even death in people that are malnourished, whereas in chronic cases it can cause fatigue, gas, bloating, changes in stool frequency, and all the other symptoms we just mentioned. Like some other parasites, crypto can migrate to extra-intestinal sites like the lungs and the conjunctiva of the eyes.

As far as diagnosis goes, parasites are notoriously difficult to detect. One reason is that they can assume different forms, like the cystic form that is dormant in tissue and not shed in the stool. So my story, that some of you know, is a really good example. I was exposed to parasites while traveling in Indonesia in my mid-twenties, and it took about eight different tests to finally detect them, and I ended up testing positive for blastocystis, giardia and Entamoeba histolytica, but I had to do it in a very specialized lab where they actually did a fecal swab in the office and put it under a slide right there. It was an infectious disease specialist in New York City, so it's really crucial to use labs that specialize in parasite detection, and it's preferable to use different methods like stool microscopy, proteomic analysis, and immunological essays like fecal antigen together because you increase the likelihood of catching something that you wouldn't necessarily catch if you're only using one methodology, and again, we'll discuss this in a lot more detail later.