The Issues with Cryptococcal Meningitis and Current Research

*Cryptococcus neoforman* infections are rare in the United States but the Center for Disease Control (CDC) states that “an estimated 220,000 cases of cryptococcal meningitis…result in nearly 181,000 deaths” in sub-Saharan Africa alone. This fungal pathogen is practically harmless to a healthy person, but to someone who is immunocompromised they are highly susceptible to this disease. People living with HIV/AIDS are most likely to be affected by cryptococcal meningitis. This is because they have little or no immune system to fight of the pathogen. A healthy person’s immune system will protect them from this pathogen and they will likely not suffer any symptoms of illness when they come into contact with it. This fungus can be found in soil and in contaminated bird droppings. A person can become infected by breathing in spores from the air or aerosols. It is not spread by person to person contact. According to Karen Wozniak, Ph.D. most people came into contact with *Cryptococcus neoforman* when they were children. If they were healthy, they likely showed no symptoms and have antibodies against it now. One of the reasons that this is such a serious illness, is because the fungal pathogen can lie dormant for years before it activates. According to Wozniak, it is still unclear whether a healthy person that has this fungus lying dormant inside them will activate and cause disease later if the person becomes immunocompromised. If so this is quite serious because of how horrible this infection can be. Symptoms of a *Cryptococcus neoforman* infection include: headache, fever, confusion, lethargy, blurry vision, stiff neck, light sensitivity, nausea and vomiting, seizures, and papilledema. If contaminated aerosols are breathed in, the infection begins in the lower part of the lungs. It can spread to other parts of the body eventually leading to meningitis. There are a few methods to detect *Cryptococcal Meningitis*. These methods include: India Ink, bacterial culture, Serological Testing, and Immuno-chromatography assay via a Lateral Flow Assay. The most common methods used are the serological testing and the lateral flow assay. The serological testing involves taking a blood sample and looking for specific proteins made by the body’s immune system. In addition to the serological testing, a sample of the cerebrospinal fluid is collected. The Immuno-chromatography assay is a new and better way to diagnose *Cryptococcal Meningitis.* This test is similar to a home pregnancy test in that it is a dipstick that just needs a bit of a liquid sample to activate. In this case blood is used instead of urine like in a pregnancy test. According to Wozniak, the immune-chromatography assay made a huge breakthrough in the diagnosis of this disease due to its lost cost and simplicity. It doesn’t require much more than a blood sample, so no major surgeries or procedures are needed for the test. *Cryptococcal Meningitis* is a serious life-threatening disease resulting in one million new cases each year according to the Centers for Disease Control (CDC). Unfortunately, there is not a vaccine for this disease and there are not many treatment available due to their harmful effects on the body. There is no vaccine because it is unclear what mechanism of the fungal pathogen needs to be targeted. According to Wozniak, this is because it is simply “hard to figure out what to target.” She also went on to say that there is an issue for “immunocompromised people” because “it has to protect the person if they lose their t-cells.” When asked about any progress in her research on *Cryptococcal Meningitis,* Wozniak stated that a breakthrough in the understanding of macrophages has aided her research. She said, “We think Cryptococcus can escape the lung and get to the brain because of macrophages. Some macrophages in humans have sub-macrophages that can either kill the pathogen or help it grow. If we can figure out which type help or make it worse, then we could stop it from spreading into meningitis.

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