Medical Xpress

Scientists discover how a killer fungus attacks HIV patients

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Researchers have discovered that a type of white blood cell carries a deadly fungus into the brains of HIV positive patients, causing meningitis which kills more than 600,000 people a year.

The discovery could lead to more effective ways of tackling the deadly fungus as it infects the human body.

Globally, 1.6 million people died of AIDS-related illnesses worldwide in 2012 according to the World Health Organisation.

Researchers at St George's, University of London and the University of Birmingham tested 65 strains of the fungus Cryptococcus which had been collected from HIV positive patients enrolled in clinical trials by the St George's group.

Their aim was to find out what leads certain patients to have higher amounts of the fungus in their spinal fluid – a key indicator of likelihood of death.

This new study shows that fungal strains that are more easily engulfed by white blood cells, called macrophages, go on to cause a higher fungal burden in patients.

Although macrophages are usually protective in the human immune response to infection, in this case the macrophages engulf but are unable to kill the fungus which is then trafficked within them to the brain.

The higher the level of fungus in the brain and spinal fluid in patients, the greater the risk of dying among HIV positive patients with meningitis.

The findings raise the possibility of developing brand new therapies for HIV positive patients that could target macrophages to prevent them transporting the fungus around the body.

Dr Tihana Bicanic, a Senior Lecturer and Clinical Specialist in Infectious Diseases in the Institute for Infection and Immunity at St George's, University of London, said: "Cryptococcal meningitis is the most common and deadly cause of meningitis in patients with suppressed immune systems, particularly in HIV/AIDS.

"We currently only have three antifungal drugs to deploy against this fungus. Studies such as this one improve our understanding of the clever strategies the fungus uses to hide from our immune system and pave the way for identifying potential targets for new antifungals."

Robin May, Professor of Infectious Diseases at the University of Birmingham, said: "This appears to be a remarkable case of a pathogen "hijacking" our own immune system in order to spread around the body.

"By understanding more about the way they do this, we hope to ultimately be able to develop therapies that will help patient immune systems to destroy, rather than protect, the fungus."

More information: "Estimation of the current global burden of cryptococcal meningitis among persons living with HIV/AIDS." Park BJ, et al. *AIDS*. 2009 Feb 20;23(4):525-30. DOI: 10.1097/QAD.0b013e328322ffac.

"Efficient phagocytosis and laccase activity affect the outcome of HIV-

associated cryptococcosis." Wilber Sabiiti, et al. *J Clin Invest*. DOI: 10.1172/JCI72950.

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