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Commentary

Prevalence of Microsporidia and their Molecular Characterization

Mahdi Forouzandeh*

Department of Microbiology, All India Institute of Medical Sciences, New Delhi, India

DESCRIPTION

Microsporidia are unicellular, obligate intracellular pathogens that can infect a variety of vertebrate and invertebrate hosts, including fish, insects, agricultural animals, and domestic pets. They are categorized as highly specialized fungi. The phylum Microsporidia currently includes 1300 species and more than 170 genera. Eight of these taxa, including *Enterocytozoon, Pleistophora, Encephalitozoon, Vittaforma, Trachipleistophora, Brachiola, Nosema*, and *Microsporidium*, have been linked to human infections. The four main *Encephalitozoon* species that infect people are *E. bieneusi* (*Enterocytozoon bieneusi*), *E. cuniculi, E. intestinalis*, and *E. hellem*. The most frequent diagnosis for microsporidiosis in humans is *E. bieneusi*, which causes more than 90% of cases. Because its spores are released into the environment *via* faeces, *E. bieneusi's* primary route of transmission as a zoonotic disease is the fecal-oral route or oral-oral route. Therefore, the primary method of *E. bieneusi* infection is through the intake of tainted food and water. Additionally, although cases in HIV-negative people, such as tourists and elderly people, are steadily rising, most microsporidial infections have been observed in highly immunocompromised people, primarily HIV patients. The most frequent clinical manifestation of these pathogens is chronic diarrhoea, which can result in a wide range of systemic and nonsystemic illnesses. The infection may cause life-threatening diarrhoea and weight loss in those with immunocompromised conditions like AIDS, organ transplant recipients, and cancer patients. These pathogens could result in self-limiting diarrhoea and malabsorption in healthy people. *Encephalitozoon* spp. was able to spread to numerous additional body organs and tissues in terms of extra-intestinal infections. It was determined that *E. biensusi* had the potential to cause infections like pneumonia, while keratoconjunctivitis was linked to *Encephalitozoon* species (*E. cuniculi*, *Encephalitozoon hellem*, and *Encephalitozoon intestinalis*), *Brachiola algerae, Nosema ocularum*, *Trachipleistophora hominis*, and *Nosema ocularum*. Albendazole is a treatment option that works well against *E. intestinalis* infections but not *E. bieneusi* infections. Although fumagillin has demonstrated a clinically significant therapeutic impact on *E. bieneusi*, its effectiveness is offset by its negative side effects. When describing the molecular epidemiology throughout the past ten years, sequence analysis of the Internal Transcribed Spacer (ITS) has been heavily exploited, PCR amplification and staining techniques have been the most popular ways for detection. The current work might be the first meta-analysis to offer overall findings using the molecular and staining techniques that are currently accessible. According to this, we will be able to adopt better prevention and treatment measures in addition to raising awareness about the frequency of microsporidia in various places.

An obligatory intracellular parasite, *Cryptosporidium* is related to Gregarines, the most common cause of enteritis in people today. The parasitophorous vacuole under the plasma membrane of the host intestinal epithelial cells is where *Cryptosporidium* lives in the intestinal lumen. With a widespread distribution, the parasite infects people *via* the faecal-oral pathway as well as through contaminated food and water. There are now 31 species of *Cryptosporidium* that are permitted in law. The majority of cryptosporidial infections in humans are caused by *C. parvum* and *C. hominis*, with *C. meleagridis* emerging as the third most frequent species to cause infection. The prevalence of infection is roughly 2% in those who are immunocompetent and have diarrhoea, while it is believed to be around 22% in those who have HIV infection. Diarrhea, vomiting, headaches, and abdominal pain are among the symptoms that affect people. Progressive gastroenteritis and chronic diarrhoea can develop in immunocompromised people, including AIDS patients, and can result in significant fluid loss and death.

Children, immunocompetent or immunocompromised persons might develop gastroenteritis from opportunistic pathogens like *Cryptosporidium* and Microsporidia. The many species of these parasites can be distinguished using reliable technologies from molecular genetics. Until recently, a number of molecular markers were used to distinguish between species of the genus *Cryptosporidium*. It has been discovered that nested PCR-RFLP for the 18S rRNA gene is useful for differentiating *Cryptosporidium* species. The species causing cryptosporidiosis in the two patients who tested positive was identified as C in the

Correspondence to: Mahdi Forouzandeh, Department of Microbiology, All India Institute of Medical Sciences, New Delhi, India, E-mail: forou@864mah.com

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current investigation. There is a 2% chance of infection in immunocompetent people who have diarrhoea, which is consistent with our findings. The parvum is consistent with other research on human cryptosporidiosis in other developing nations.

It is becoming increasingly obvious that microsporidia are significant pathogens in immunocompromised hosts and may perhaps be significant pathogens in immunocompetent hosts. Microsporidiosis epidemiology has not yet been established. We have established a link between microsporidiosis and diarrhoea in AIDS patients using primers targeting the SSU-rRNA genes of microsporidia. It could be possible to better understand the epidemiology of microsporidia by analyzing stool and environmental samples using these primers.