

Microsporidia species

Introduction

Microsporidia are spore forming, obligate eukaryotic intracellular protozoan parasites which have been previously recognised in a variety of animals especially invertebrates and lower vertebrates. They have recently come to medical attention as opportunistic pathogens in humans with Acquired Immune Deficiency Syndrome (AIDS) and have been implicated in conditions ranging from enteritis to keratoconjunctivitis.

Morphology and Life cycle

Microsporidia are primitive organisms. They possess no mitochondria and have prokaryotic like ribosomes. Classification is based on the ultrastructural features which include the number of coils in the polar tubes, the configuration of nuclei and the spore size. The spores are the infective stage of the organism. Infection occurs when the infective sporoplasm within the organism is injected into the host cell through the polar tube. Microsporidia multiply rapidly within the cytoplasm of the cell to produce sporoblasts (merogony), followed by sporogony which results in the production of infective, thick walled spores which are released into the intestinal lumen in the case of *Enterocytozoon* species and *Encephalitozoon* species.

Microsporidia found in humans

Microsporidia	Size	Associated disease
<i>Enterocytozoon bieneusi</i>	1µm by 1.5µm	Gastrointestinal and biliary tract infections
<i>Encephalitozoon intestinalis</i>	1.5µm by 2.5µm	Gastrointestinal tract and systemic infections
<i>Encephalitozoon hellem</i>	1.5µm by 1µm	Keratopathy, respiratory tract infection
<i>Encephalitozoon cuniculi</i>	1.5µm by 1µm	central nervous system disease
<i>Nosema connori</i>	2µm by 4µm	Systemic infections
<i>Nosema corneum</i>	2µm by 4µm	Keratopathy
<i>Pleistophora</i> species	2.8µm by 3.4µm	Myositis

Clinical disease

The most common microsporidia found in patients with AIDS are *Enterocytozoon bieneusi*, *Encephalitozoon intestinalis* and *Encephalitozoon hellem*. These patients tend to be severely immuno-deficient with a CD4 count less than 100 x10⁶/L.

Enterocytozoon bieneusi

Infections with *E. bieneusi* are restricted to the enterocytes of the small intestine, resulting in villous atrophy and malabsorption. Clinical symptoms include chronic watery, non-bloody diarrhoea, malaise and weight loss.

Encephalitozoon intestinalis

Infection with *Encephalitozoon intestinalis* occurs in the enterocytes of the small intestine but is more widely disseminated than *E. bieneusi* and has been found in the colon, liver and kidney.

Encephalitozoon hellem* and *Encephalitozoon cuniculi

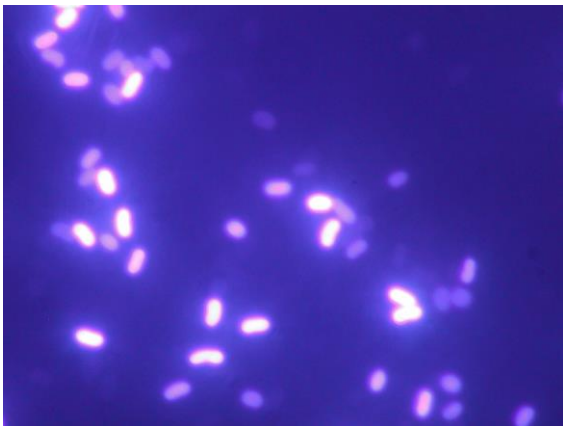
These organisms have also been found in disseminated microsporidiosis. Clinical symptoms may include sinusitis, nephritis, hepatitis, keratoconjunctivitis and peritonitis.

Nosema corneum

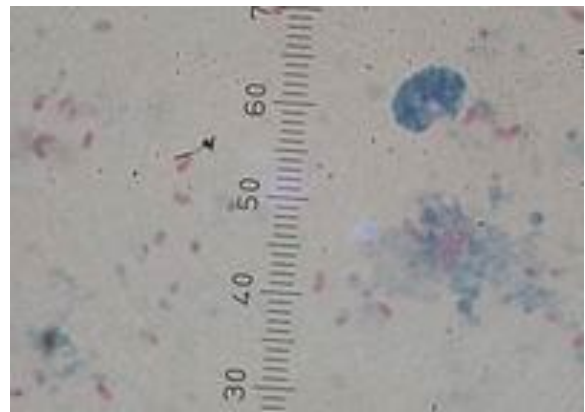
This organism has been detected in AIDS patients with keratoconjunctivitis.

Laboratory Diagnosis

Initially, the diagnosis of intestinal microsporidiosis depended on tissue biopsies which were stained with Gram's stain and examined by light microscopy. However, in order that ill patients were not subjected to unnecessary invasive procedures, non-invasive diagnostic procedures were developed. The modified Trichrome stain and the Fungigal fluorescent stain are the stains of choice.



Microsporidia stained with calcofluor



Microsporidia stained with modified Trichrome staine