

# The Science Weekly

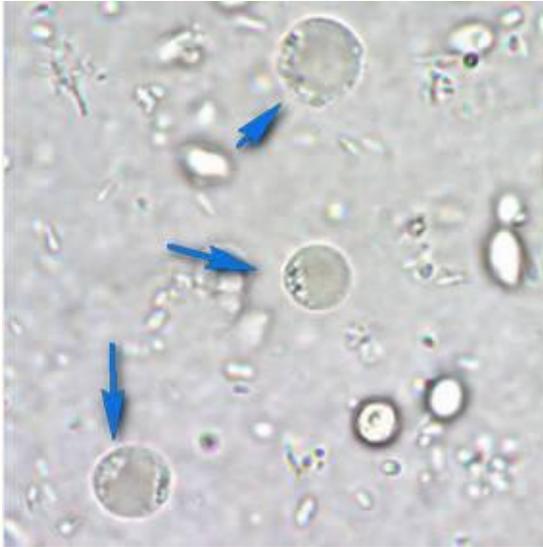
www.scienceweekly.com

Friday, 10 September 2014

- Since 1897

## Busting a gut to identify intestinal parasite

Local scientists discover virulent strains of intestinal parasite *Blastocystis*, paving the way for more effective diagnosis and treatment worldwide



*Blastocystis* viewed with a special microscope. One in 20 Singaporeans are infected by this intestinal parasite, according to A/P Tan. IMAGE: MEDICAL-LABS.NET

Imagine having a bad case of diarrhoea, vomiting and nausea. You take a trip to the doctor's office, only to have him prescribe you a myriad of drugs which do little to alleviate your pain.

Such a scenario is faced by people afflicted with *Blastocystis* infections globally. According to the World Health Organisation, prevalence rates of this intestinal parasite are between 2% and 50%, with higher rates observed in less developed countries with poor sanitation and hygiene. Even in Singapore, Associate Professor Kevin Tan Shyong Wei from the Yong Loo Lin School of Medicine in the National University of Singapore estimates that 1 in 20 Singaporeans are infected by *Blastocystis*.

Despite its pervasiveness, effective diagnosis and treatment of its symptoms are virtually non-existent. A/P Tan explains that most researchers and clinicians do not understand that *Blastocystis* is made up of different species comprising multiple subtypes or subgroups, of which there are strains with varying disease-causing abilities.

“Even when people are colonised with *Blastocystis*, some may display symptoms and some may not, for reasons that are not so clear,” adds A/P Tan.

Of all the Singaporeans who harbour the parasite, an even smaller percentage manifest symptoms, he says. This has prevented researchers and clinicians from reaching a consensus on whether and how *Blastocystis* causes disease, thereby making diagnosis and treatment difficult.

Nevertheless, all is not lost as A/P Tan has assembled a team of researchers in NUS to study *Blastocystis*' disease-causing abilities by identifying virulent strains. He has currently found such a strain in *Blastocystis* subtype 7, one of the parasite's subgroups. A/P Tan believes this strain is causing infections globally, including in Singapore, and that it manifests symptoms like diarrhoea and vomiting.

Previous research has generally not distinguished between the different strains of *Blastocystis*. If A/P Tan can convince other researchers that *Blastocystis* causes disease depending on which strain infects humans, his work could encourage researchers to identify other virulent strains. This could set the stage for more effective, strain-specific drug design in the future.

Attempts to show which strain of *Blastocystis* truly causes disease are fraught with technical problems. A/P Tan would ideally be able to isolate the strain from *Blastocystis* subtype 7 from diseased laboratory mice, infect healthy mice and confirm that it is the same strain causing the disease in both cases. Yet because *Blastocystis* can only be obtained from stool samples, other micro-organisms which are present could also be said to be causing the disease.

“When I infect another mouse with this strain of *Blastocystis*, I’m also introducing a lot of other things that may be the cause of its diarrhoea and not *Blastocystis*,” explains A/P Tan.

Indeed, current research and diagnosis strategies are largely limited to examining patients’ stool samples for the parasite or its eggs, which is unconvincing in showing that *Blastocystis* is the cause of disease in the presence of other micro-organisms. This has hampered clinical treatment.

A/P Tan has worked around this problem by injecting a diseased mouse’s fecal matter containing *Blastocystis* directly into a healthy mouse’s intestines. Even if the healthy mouse’s stool sample contains other micro-organisms, they are unlikely to be responsible for the disease since the mouse was healthy before the injection. “If the healthy mouse gets diarrhoea, then we can show that it is *Blastocystis* in the fecal matter from the diseased mouse that is causing the diarrhoea,” reasons A/P Tan.

Even then, A/P Tan doubts that the scientific and medical community will be readily convinced. “Science, by nature, is a very social endeavour. Even if I make this seminal discovery, the world would pay attention, but people wouldn’t be convinced until others have shown similar results.”

A/P Tan nevertheless believes “this project would definitely be a breakthrough” as it would be the first to pinpoint a virulent strain of *Blastocystis*.