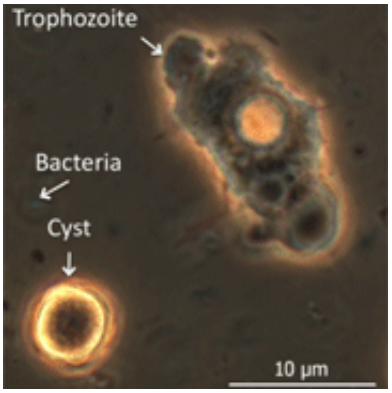
'Harmless' microbes may be water risk

February 22 2011



Microbes ... free-living amoebae (Acanthamoeba sp.) in dormant (cyst) and active (trophozoite) life cycle stages

(PhysOrg.com) -- Relatively harmless microbes which pass through water treatment systems could be allowing dangerous bacteria, such as Legionella, to reproduce in drinking water supplies, researchers have warned following an international study.

Jacquie Thomas, an environmental engineering PhD student in the University of New South Wales Water Research Centre, and Nicholas Ashbolt of the US Environmental Protection Agency's National Exposure Research Laboratory, found that the microbes, known as "free-living amoebae", regularly bypass treatment systems in municipal water supplies worldwide, and multiply at end-use points such as taps, shower heads and water tanks.

While some species of free-living amoebae can occasionally cause serious illnesses, of greater concern is the fact that amoebae can carry bacteria, such as Legionella and Mycobacterium, which can cause the potentially fatal respiratory illness known as community-acquired pneumonia (CAP). Young children and the elderly are most susceptible to CAP.

In a review of 26 Australian and international studies the researchers found free-living amoebae existed in about 45 per cent of post-treatment water samples reported.

"These amoebae are found in treated drinking water systems around the world and present an emerging health risk, although it is one that has not yet been quantified" Ms Thomas said.

The paper was published in the journal *Environmental Science and Technology*.

Amoebae and the bacteria they carry are able to cause infection through inhalation of aerosol water droplets and are of increasing concern to health authorities internationally, particularly in developed nations where populations are ageing. Legionella bacteria have been identified as the third most common cause of waterborne disease outbreaks in the United States since 2001.

Ms Thomas said free-living amoebae had been shown to be able to pass through water treatment systems and in the process protect any potential Legionella or Mycobacterium within them. These bacteria are then able to increase in both number and infectivity, posing an increased health risk for water users.

"The disease burden caused by exposure to drinking water carrying these amoebae and bacteria could be much larger than we realise, as sources of

community-acquired pneumonia infections are rarely identified," Ms Thomas said.

"More research is urgently required before accurate risks assessments can be undertaken to assess the impacts on human health – in households and institutions – of exposure to these amoebae that carry bacteria.

"The study also raises the question over where treatment of water supplies should be focused – at the start of the distribution systems or in premises."

Interestingly, a sample of desalinated water showed no sign of amoebae, suggesting desalination may have a role in future treatments.

More information: pubs.acs.org/doi/abs/10.1021/es102876y

Provided by University of New South Wales