Regulating the infective phase of Legionella bacterial lifecycle

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(PhysOrg.com) -- New research by UCD researchers led by Conway Fellow, Brendan Loftus gives an insight into the infective cycle of the bacteria responsible for Legionnaires disease and Pontiac fever.

In collaboration with scientists at the MRC Human Genetics Unit in Edinburgh, the team analysed all the genes expressed by Legionella pneumophila bacteria under growth and infective conditions. The findings of the Science Foundation Ireland funded research project have been published this month in the online scientific journal, *PLoS One*.

The team identified 70 new non-coding RNA (ncRNA) molecules, whose nature, extent and expression patterns suggest that they may play central roles in the regulation of Legionella infection.

Increasing evidence suggests that the majority of eukaryotic genomes are composed of non protein coding RNA (ncRNA), which gives provides an additional layer of regulation and context to the actions of proteins - akin to playing General to the protein foot soldiers. Sequencing studies now increasingly show that bacteria also participate significantly in producing a regulatory RNAome that controls everything from growth to virulence.

Commenting on the study, Professor Brendan Loftus said, “Of the 70 ncRNA we uncovered, many appear to be specific to a particular strain of bacteria. One particular sub-grouping of 20 members was preferentially expressed during infection conditions, which suggests a

key role in regulating the infective phase in the lifecycle of the bacteria".

About 20 people each year in Ireland are diagnosed with Legionnaires disease, which is a type of pneumonia that presents with fever, headache, tiredness and muscle pain. Pontiac fever is a milder form of the disease that displays flu-like symptoms but without pneumonia.
Health professionals believe that the disease may be under reported however as it must be specifically tested for and the antibiotics typically prescribed for pneumonia would effectively treat the illness.

The L. pneumophila bacteria lives and replicates in protozoa and biofilms found in aquatic habitats. There is no person-to-person transmission but it spreads from water sources such as spa pools, showers or air conditioning towers.

More information: Weissenmayer BA, et al. (2011) Sequencing Illustrates the Transcriptional Response of Legionella pneumophila during Infection and Identifies Seventy Novel Small Non-Coding RNAs. *PLoS ONE* 6(3): e17570. doi:10.1371/journal.pone.0017570

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