MONASH University

Media Release

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Genes reveal deadly bacterium is losing its strength

Monash researchers have identified a weakness in the genes of the deadly bacterium *Leptospira* that reveals a reduced potential for its transmission between animals and humans.

The research shows the strain of the *Leptospira* bacterium that can kill or cause organ failure in humans and cattle has evolved to the point where it struggles to survive outside of a mammalian host.

The findings, published this week in the *Proceedings of the National Academy of Sciences, USA*, were revealed after the team successfully mapped the *Leptospira* Hardjo strain genome, in what was Australia's first bacterial genome project, funded by the National Health and Medical Research Council.

The *Leptospira* bacterium causes leptospirosis – one of the world's most common diseases transmitted to humans by animals. It causes influenza-like symptoms and high fever in humans and wreaks most havoc in farming communities and in developing countries where mortality rates can be as high as 20 per cent. In cattle, it causes stillbirths and a drop in milk production.

In Australia, leptospirosis is most common among dairy and pig farmers and in banana plantation workers who are infected via contact with rodent urine.

But the findings show that unlike the *Leptospira* strain found in rodents and prevalent in northern Australia and worldwide, the strain that affects livestock is much more difficult for humans to contract.

Project leader Professor Ben Adler from Monash's Department of Microbiology, said it was only after the *Leptospira* genome was mapped and the genes annotated that such secrets of the bacterium could be revealed.

"It has lost or mutated a lot of the genes it would need to survive in the environment," Professor Adler said. "You're basically only going to contract it through contact with animal urine, rather than indirectly through contaminated water and that sort of thing."

Based on the mapped genome, the Australian Research Council Centre of Excellence in Structural and Functional Microbial Genomics at Monash University, in collaboration with Pfizer Animal Health, is now conducting a project to develop a cattle vaccine against *Leptospira*. Benefits for human vaccine development are expected to flow from the project.

Professor Adler worked with Dr Dieter Bulach and others at Monash University along with Dr Rich Zuerner at the US Department of Agriculture and a team led by Dr Elizabeth Kuczek at the Australian Genome Research Facility.

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