# Researchers find pathway and enzyme unique to tularemia organism

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Researchers are closer to developing therapies to combat the deadly tularemia infection, according to a study published this week in the *Proceedings of the National Academy of Sciences*' online Early Edition.

Karl Klose, director of the South Texas Center for Emerging Infectious Diseases (STCEID) at The University of Texas at San Antonio (UTSA), says his lab collaborated with researchers at the Burnham Institute for Medical Research, The University of Texas Southwestern Medical Center at Dallas and Thomas Jefferson University in a study that discovered that *Francisella tularensis* makes an essential metabolic molecule, nicotinamide adenine dinucleotide (NAD), using a different process and different enzyme from all other living organisms.

*F. tularensis* is a highly infectious organism that causes morbidity and mortality in humans. Very little is known about its molecular mechanisms of pathogenesis, and no vaccine is available for protection against tularemia, the disease it causes. Consequently, there is great concern about its role as a potential bioweapon.

However, the researchers' findings are promising. Because *F. tularensis* makes NAD using a unique pathway that is not used by humans, that pathway can be targeted to destroy the tularemia organism without doing damage to the human host.

"There is a 'conventional' way to make NAD, nicotinamide adenine dinucleotide, in all living organisms studied thus far, ranging from

bacteria to humans," said Klose, whose lab studies the genetics behind the virulence of *F. tularensis*. "Our study uncovered that *Francisella* makes NAD in a very unique way, using the enzyme nicotinamide mononucleotide synthetase, or NMS. The findings offer us a possible target for the development of therapeutics against tularemia."

Source: University of Texas at San Antonio