



Battling a silent menace

A UVic researcher leads the way in unravelling the molecular mysteries of syphilis

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EDGEwise

Syphilis is often called “the great imitator” because many of its symptoms are similar to those of other diseases.

Many historical figures had syphilis, including Ludwig van Beethoven and Al Capone, and it may have infected others, such as Henry VIII and Adolf Hitler. It has been around for at least 700 years, and possibly as long as 1,600 years. There was no effective treatment for syphilis until 1943, when penicillin came into regular use.

Every year, 12 million people worldwide are infected with syphilis, usually in the developing world but also in developed countries. From the early 1980s to the late '90s, syphilis had been declining in Canada and was nearly eliminated. Since then, the rate of infection has steadily increased in men and women.

For more information about syphilis, visit www.bccdc.org or www.phac-aspc.gc.ca.

UVic researchers were awarded more than \$71 million in external research grants and contracts in 2006/07, doubling the research support of the previous five-year period.


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by Jessica Gillies

Sexually transmitted infections aren't something most of us like to talk or even think about. But when we do, syphilis doesn't immediately spring to mind. After all, it's a disease of the past, right?

Wrong. Syphilis rates are rising in BC and in the rest of Canada. The latest statistics reveal that BC has the highest reported rate of syphilis in Canada, with 6.9 cases per 100,000 people—more than double the rate of 10 years ago.

Dr. Caroline Cameron, a University of Victoria microbiologist and the Canada Research Chair in Molecular Pathogenesis, is one of a handful of researchers in the world who studies this deadly disease and the only one in Canada examining it at a basic science level.

Cameron is trying to understand how the syphilis bacterium, *Treponema pallidum*, attaches to the tissues of its host, how it passes through the tissue barrier and how it spreads to distant tissue sites.

“This bacterium is one of the most invasive organisms there is, and that's partially because it's corkscrew-shaped,” says Cameron. “It bores into

tissues and is able to spread through the bloodstream to virtually every tissue and organ. That's unusual, because most pathogens usually have one target organ. Syphilis goes everywhere, including the brain.”

The bacterium enters the body through a mucous membrane or a break in the skin. From there, it moves to the bloodstream and then to the rest of the body. It's this movement into and out of the bloodstream that is the focus of Cameron's work.

The bacterium attaches to specialized tissue, called the “basement membrane,” that lines blood vessels. A key component of this basement membrane is a substance called laminin.

“I have identified a protein from the bacterium that binds to laminin, so we now know how it is attaching,” she says. “Our goal is to prevent that binding by coming up with inhibitors or even a vaccine to stop it from getting into the bloodstream.”

There are three stages of syphilis. The primary stage appears as painless open lesions at the site of infection. These lesions may go unnoticed, especially if they occur internally, and therefore the disease goes untreated. In the secondary stage, an infectious rash appears, possibly with other symptoms.

Cameron, reflected in a computer screen showing detail of the syphilis bacterium.

In the third, or latent, stage the primary and secondary symptoms disappear. For 70 per cent of those infected, the disease will stay latent for the rest of their lives. But for the other 30 per cent, the disease enters the late stage and can lead to tissue destruction, insanity and death. This stage can occur at anywhere between two to 50 years after infection.

In its early stages, syphilis is easily treatable with antibiotics. “In theory, we should be able to eradicate this disease from the globe, but that's not happening,” says Cameron. In the developing world, lack of access to antibiotics is a big factor.

In developed nations, the continued prevalence of syphilis is more complex, she says.

“The fact that syphilis is still here demonstrates that current public health measures are not sufficient to eliminate this disease.”

And it clearly shows the need for new ways to combat the disease. “The best way to accomplish this is through a greater understanding of the mechanisms of infection,” she says. “Research will enable us to conquer this pathogen and develop new methods for diagnosis and prevention.”



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