

Vancouver researchers discover missing link between TB bacteria and humans

Researchers at the University of British Columbia and Vancouver Coastal Health Research Institute have discovered how tuberculosis (TB) bacteria hide and multiply in the human body and are working toward a treatment to block this mechanism of infection.

This discovery, published today in the journal *Cell Host and Microbe*, describes the missing link between a TB protein and its newly discovered counterpart protein in the human body's white blood cells (macrophages).

TB causes disease by infecting the body's macrophages. Normally, macrophages engulf bacteria and then release powerful digestive enzymes that destroy the bacteria. The researchers found that a protein secreted by TB targets a protein in the macrophage. In doing so, TB disrupts this process, allowing it to hide and multiply within the macrophage.

The research, lead by Dr. Yossi Av-Gay, research scientist with the Immunity and Infection Research Centre at the Vancouver Coastal Research Institute and associate professor with UBC's Faculty of Medicine, suggests that therapies that block the activity of the TB protein in macrophages would allow the body to identify TB bacteria more easily. This would prevent the establishment of active and latent tuberculosis and will lead to a new and more effective treatment for TB.

"Once inside the human macrophage, TB acts as a Trojan Horse," says Dr. Horacio Bach, the primary author of the paper and research scientist with the Immunity and Infection Research Centre at the Vancouver Coastal Research Institute. "TB multiplies inside the macrophage and when released attack the human body. By identifying this protein we are now able to expose the hiding bacteria, which will allow the macrophages to destroy them."

The Av-Gay lab has already taken the next step.

"Excitingly, we have also been able to engineer a specific antibody that blocks this newly discovered TB protein," says Av-Gay. "We are now looking to collaborate with the pharmaceutical industry to come up with a therapy that can be used to block this particular mechanism, which will be an important tool in weakening TB."

TB is called the ultimate killer. It is the leading cause of death among infectious diseases in the world today and is responsible for one in four adult preventable deaths, according to the World Health Organization (WHO). Ten million new cases of TB arise every year, killing close to two million people worldwide annually. Every 20 seconds TB kills someone and approximately 4,400 people die every day. The WHO estimates that one-third of the world's population is infected. The current treatment regime involves taking multiple medications over an extended period of time.

Source: University of British Columbia

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