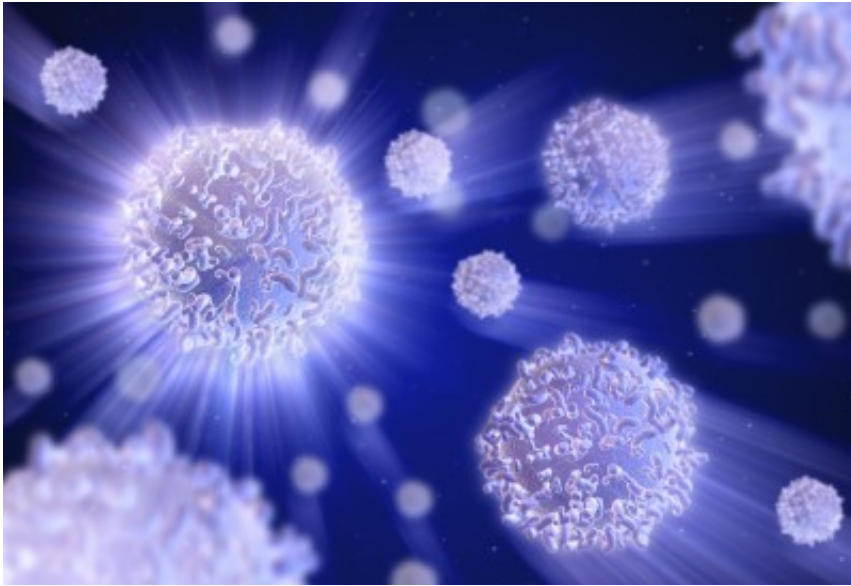


Major breakthrough in fighting antibiotic resistance

February 29 2016



In what is being heralded as a groundbreaking discovery, scientists led by Monash and Walter and Eliza Hall Institute researcher, Thomas Naderer and James Vince, have shown that drugs, originally developed to kill cancer cells, can also prevent infectious diseases that are difficult to treat with common antibiotics.

The team led by Dr Thomas Naderer, from the Monash University Biomedicine Discovery Institute and Dr James Vince from the Walter and Eliza Hall Institute, used imaging technology to watch, in real time,

how pathogens (in this case the Legionella bacteria) infect the [cells](#) of the immune system.

In 2014 the World Health Organization released its first global report on antibiotic resistance to common bacteria, calling [antibiotic resistance](#) a major threat to public health.

Bacteria often evade killing by antibiotics by "hiding" within the patient's own cells, most often in macrophages – the [immune cells](#) that are actually programmed to fight bacterial infections.

Most research aimed at antibiotic resistant bacteria has focused on attacking the bacteria, developing new antibiotics. Dr Naderer and Dr Vince, together with their colleagues from the Walter and Eliza Hall Institute and The University of Melbourne, instead have come at the problem from the host, looking at ways the patient's immune system can be rejigged to prevent vulnerability to infection.

The research team revealed that two host proteins, MCL-1 and BCL-XL, are critical to keep infected macrophage alive, which in turn enables bacteria within it to grow, spreading the infection.

The team has now shown that Legionella disarm the macrophage, but by doing so one of the two crucial proteins, MCL-1, is lost. This means that the other protein, BCL-XL, is now the Achilles' heel, keeping the host cell alive and thus enabling bacterial growth.

The Walter and Eliza Hall Institute has world leading expertise in how cell death is controlled by proteins such as MCL-1 and BCL-XL and how they can be targeted with new drugs.

Importantly the researchers now used these insights possible to kill infected macrophages and its pathogen by utilising the very same drugs.

According to Dr Naderer, these drugs developed to kill [cancer cells](#) could be used to prevent bacterial infections such as Legionnaires' disease, as they only induce death of infected cells, but leave uninfected immune cells alive.

Provided by Monash University

Citation: Major breakthrough in fighting antibiotic resistance (2016, February 29) retrieved 10 April 2024 from <https://phys.org/news/2016-02-major-breakthrough-antibiotic-resistance.html>

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