Chemistry trick renews hope against killer diseases

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Now a Danish chemist has pioneered a novel way to battle multidrug resistant bacteria. By tweaking a well known psychoactive drug he revitalizes worn-out drugs like sulpha and penicillin.

Chemist Jorn Bolstad Christensen of the University of Copenhagen has

just patented the use of schizophrenia medication Thioridazin in boosting the effect of antibiotics. Christensen is an associate professor at the Department of Chemistry, University of Copenhagen, and in the lab he started investigating how the schizophrenia drug might bother bacteria but not humans.

"Thioridazin blocks the capacity of bacteria to cleanse themselves of antibiotics. We knew that before starting. But I wanted to remove the action of the drug in the brain so that mortally ill tuberculosis patients wouldn't have to contend with psychoactive effects as a part of their cure," explains Christensen, who none the less had to come to terms with a much bigger threat as well.

Bacteria such as those responsible for tuberculosis, staphylococcus and enterococcus get rid of antibiotics using their so called efflux-pump. A mechanism which simply pumps the active substance out of the cell before it has an opportunity to do harm. A substance which blocks the pump should ensure that any antibiotic stays inside the bacteria long enough to kill it. There's just one tiny problem. Human cells have efflux pumps as well. And we wouldn't want these blocked.

"The task was to find a substance that will kill bacteria, but not the patients taking the cure. Thioridazin was a good candidate because it's been in use for decades. We could be pretty certain that it wouldn't have any serious side effects," says professor Christensen, who predicts testing the new drug in humans within just a year, as it's already been approved for other medical uses.

Though the risk of blocking the efflux pump of human cells appeared minimal Professor Christensen still needed to minimize the psychoactive effects of the drug. This was where his chemical expertise became indispensable. Chemically Thioridazin consists of two half molecules which are perfect mirror images. One of these mirror- or isomeric forms

affects the brain less than the other, so the question was whether bacteria would know the difference.

Doctors and researchers Jette Kristiansen and Oliver Hendricks of Southern University Denmark who are co-holders of the patent have conducted microbiological trials proving that the efflux pump of bacteria stayed blocked regardless of which isomer was used. These results open up a brand new method for combating problems of multidrug resistance.

Provided by University of Copenhagen