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Existing gold-based drug is toxic to 'Baghdad boil' infection

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A protozoan parasite that causes unhealing, potentially disfiguring skin sores appears to have a weakness for gold.

A University of Virginia-led research team has discovered that an existing gold-based drug is toxic to the microscopic parasite that causes the disease known as cutaneous leishmaniasis, a condition that affects millions worldwide, including U.S. troops. The discovery is notable because there is no reliable treatment for the disease, as existing treatments are inconsistently effective or act by a mechanism that is poorly understood. These treatments can be extremely painful, as they are usually injected directly into an open sore, and sometimes can prove fatal.

"There are neglected diseases, and this is one of the most neglected of the neglected diseases," said Elizabeth R. Sharlow of the U.Va. School of Medicine, the lead author of a new paper outlining the leishmaniasis discovery.

"Neglected disease drug discovery is a niche that academic health systems have, and it's an important one," said collaborator John S. Lazo, also of the School of Medicine.

It's estimated that approximately 1.5 million people in 98 countries are stricken with cutaneous leishmaniasis each year, primarily in the Middle East, tropical Africa and parts of Asia. U.S. troops stationed in Iraq and Afghanistan have contracted the disease, dubbing it the "Baghdad boil."

Mexico and parts of South America are affected as well, as are several regions in the U.S. The disease is transmitted to humans by the bite of sandflies.

U.Va.'s research was done in collaboration with the Walter Reed Army Institute of Research. By screening a relatively small library of existing drugs – a few thousand, rather than tens or hundreds of thousands – the researchers determined that the drug auranofin and potentially its derivatives are effective against leishmaniasis.

"This screening process greatly shortens the discovery and development time required," Sharlow said. "Taking a drug that's already been carefully looked at and repurposing it for something else is quite attractive for these types of diseases."

Auranofin is based on gold, but the researchers believe it would not be that expensive to produce for leishmaniasis treatment. And that's an important consideration for a new treatment for the disease.

"Leishmaniasis occurs in a lot of countries where people are quite poor, so an inexpensive drug is paramount," Lazo said.

The research has shown the arthritis drug to be effective against the cutaneous form of leishmaniasis, which affects the skin, and the researchers hope it will prove effective against the potentially deadly visceral form that affects internal organs.

While more research needs to be done before auranofin can be used as a treatment for leishmaniasis, U.Va.'s Dr. Richard Pearson, one of the nation's top experts on the disease, hailed the findings as a major breakthrough.

"The problem has been that we've not had a very good arsenal of drugs,"

he said. "For cutaneous disease, standard treatments are very expensive and you have to put an IV in and give it multiple times. That's why the work is so significant here. We really need a safe, oral drug that's well tolerated. … This discovery is monumental. It's cutting-edge and provides great hope for the future."

Provided by University of Virginia