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Drug Compound Wipes Out Multiple Viral Infections

Jessica Berman

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Photo: AP

A nurse, wearing protective mask and gloves reads to a HIV/AIDS patient at the Phra Baht Nam Phu AIDS hospice near Lopburi, Thailand (File)

disease in the process.

DRACO takes advantage of the fact that when viruses infect animal cells, they insert pieces of their genetic core - complex strands of nucleic acids called RNA that regulate cell function by switching genes on or off. This viral RNA wraps itself around the single-strand RNA in the animal cell to form a unique molecule called double-stranded RNA.

By recognizing these double-stranded RNA molecules, DRACO can hone in on virus-infected cells, explains Todd Rider, a senior scientist at MIT's Lincoln Laboratory where the compound was developed.

Rider says that when DRACO detects a cell with double-stranded RNA, it activates a so-called cellular "suicide switch," in much the same way that human cells are programmed to self-destruct if they begin to grow out of control.

"If a cell thinks it's becoming a cancer cell, it will try to kill itself for the

Imagine taking a single pill that could cure almost any viral infection.

Researchers at the Massachusetts Institute of Technology in the United States say they have developed a drug that, so far, has killed every virus it's been tested on in the laboratory.

The drug - known by the acronym DRACO - works by chemically targeting viral-infected cells and prompting them to self-destruct, eliminating the

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greater good," said Rider. "So in this case, the DRACO treatment is activating the suicide switch in the presence of any double-stranded RNA. So, it will kill any virus-infected cell."

Rider says DRACO has been successfully tested in petri dishes against 15 viruses that cause everything from the sniffles to life-threatening diseases.

"So far we've cured the common cold, four different strains of the rhinovirus," he said. "We've cured H1N1 influenza, two different strains. We've cured a stomach virus; we've cured the polio virus, various DNA adenoviruses, dengue hemorrhagic fever and several examples of arenavirus and bunyavirus."

The last two viral infections can cause inflammation of the brain.

Rider says there are many more viruses he wants to test DRACO on, including the virus that causes AIDS. A broad spectrum antiviral drug that works against HIV could be especially useful since some people can develop resistance to anti-retroviral drugs.

Anthony Fauci, director of the U.S. Institute of Allergy and Infectious Diseases, agrees that DRACO could potentially work against the human immunodeficiency virus. But Fauci says a variety of effective drugs are already available to treat HIV.

"So, there isn't a compelling need to have a drug like this for HIV," said Fauci. "It's more relevant for those viruses for which we don't have any good drugs, and there are plenty of those around."

Fauci says there is a trend in microbial research now to develop catch-all drugs like a universal flu vaccine that would protect against all strains of influenza, and DRACO, with its potential to target and eliminate all types of viral infections.

"The more we learn about the fundamental basics of viral biology and bacterial biology and other microbial biologies, the more opportunities we have to develop interventions such as this particular apparently broad-spectrum antiviral," he said.

MIT's Todd Rider predicts it could be another decade before DRACO is ready for general use.

An article describing DRACO's antiviral properties is published in the journal *PLoS One*.

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