DRACO: A Broad-Spectrum Therapy Against Multiple Viruses

August 12, 2011

Researchers at the Massachusetts Institute of Technology's Lincoln Laboratory have developed and demonstrated a novel broad-spectrum antiviral approach, called DRACO—which stands for double-stranded RNA activated caspase oligomerizer—that may prove to be effective against virtually all viruses, including HIV and hepatitis, according to a report published online by PLoS One. DRACOs selectively induce apoptosis, or cell suicide, in cells containing any viral double-stranded RNA, rapidly killing infected cells without harming uninfected cells.

Viruses pose serious health threats worldwide. For viruses such as HIV or hepatitis, emerging viruses such as avian or swine influenza, and highly lethal viruses such as Ebola or smallpox that might be used in bioterrorist attacks, relatively few therapeutics exist. Most medications that do exist are highly specific for one virus, are ineffective against virus strains that become resistant to them, or are associated with side effects.

According to the PLoS One report, authored by Todd Rider, PhD, and his colleagues, DRACOs were shown to be effective against all 15 viruses that the team has so far tested in cells, including cold viruses (rhinoviruses), H1N1 influenza strains, adenoviruses, a stomach virus (reovirus), a polio virus, dengue fever virus, and several members of hemorrhagic fever virus families. DRACOs were also demonstrated to be nontoxic in 11 different cell types representing various species, notably humans, monkeys and mice, and organ types (for example, heart, lung, liver and kidney).

Experiments also demonstrated that one DRACO prevented the deaths of mice infected with a lethal dose of H1N1 influenza. Currently, the team is testing additional viruses in mice and beginning to get promising results with those as well.

No data from research involving HIV or hepatitis have yet been reported by the scientists and additional testing against other viruses is needed. Yet, Rider and his colleagues suggest that DRACOs have the potential to revolutionize the treatment and prevention of virtually all viral diseases. They also hope that the DRACOs' broad-spectrum activity will render them useful against new or mutated viruses, such as the 2003 SARS outbreak.