New Medication Targets Deadly Viruses

Worldwide seasonal influenza epidemics occur every year, infecting millions of people and causing up to 500,000 deaths. Current therapies are only modestly effective, and their use can be limited by side effects and the presence of drug-resistant strains of influenza.

The Solution

University of Michigan researchers, David Markovitz, M.D., and Steven King, Ph.D., are developing a new medication to prevent and treat viral infections using a protein called banana lectin (BanLec) that “reads” the sugars on the outside of both viruses and cells. Early versions of BanLec drugs targeted viruses, but also caused unwanted inflammation.

Markovitz and his former graduate student, Michael Swanson, Ph.D., pinpointed the tiny part of the molecule that triggered these side effects and molecularly engineered a new version of BanLec, called H84T BanLec, by slightly changing the gene that acts as the instruction manual for building it. H84T BanLec works against the viruses that cause Influenza, SARS, MERS, HIV, Ebola, and Hepatitis C in tissue culture and animal models—without triggering irritation and inflammation.

This groundbreaking work opens doors for more innovations that target cell-surface sugars as new ways to fight disease.
Drug engineered from bananas shows promise in fighting viruses.

Significant Need
Currently, there are no broad-spectrum antiviral agents that are effective in the prevention and treatment of influenza.

Compelling Science
H84T BanLec is a molecularly engineered version of the protein BanLec that was created by slightly changing the gene that encodes for the protein.

Competitive Advantage
H84T BanLec is effective against viruses that cause Influenza, SARS, MERS, HIV, Ebola, and Hepatitis C in tissue culture and animal models—without triggering inflammation. It can also be used as a preventative treatment. There is the potential for it to develop into a broad-spectrum antiviral agent, something that is currently clinically unavailable to physicians and patients.

MTRAC Project Key Milestones

- Determine the anti-influenza mechanism of action of H84T BanLec
- Further use the mouse model of influenza to assess optimal dosing, duration of action, and toxicity of purified H84T BanLec

Overall Commercialization

Commercialization Strategy
Form company and license the technology from U-M. Explore opportunities for licensing to third-party pharmaceutical companies.

Regulatory Pathway
Approval will require clinical testing and New Drug Application (NDA) with the FDA. Pre-Investigational New Drug (IND) meeting is planned for late 2016.

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David Markovitz, M.D.
Steven King, Ph.D.

MTRAC funding enables us to continue studying the clinical and commercial potential of modified BanLec, and helps us move this novel science forward. The feedback we’ve received helped us focus our efforts and improve the project.

SBIR application has been submitted with industry partner.

The modified BanLec is protected by a robust patent portfolio. U-M has been granted patents on the molecularly modified lectin in the United States, Europe, and China. Two provisional patents have also been filed, one with an industrial partner.

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