Scientists develop a new HIV microbicide -- and a way to mass produce it in plants

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In what could be a major pharmaceutical breakthrough, research published online in The *FASEB Journal* describes how scientists from St George's, University of London have devised a one-two punch to stop HIV. First the report describes a new protein that can kill the virus when used as a microbicide. Then the report shows how it might be possible to manufacture this protein in quantities large enough to make it affordable for people in developing countries.

"We desperately need to control the spread of HIV, particularly in developing countries," said Julian Ma of the Department of Cellular and Molecular Medicine at St. George's and the senior researcher involved in the work. "A vaccine is still some way off, but microbicides could provide a more immediate solution, provided we can overcome major hurdles of high efficacy, low cost, and wide availability—all of which we address in this study."

In the research paper, Ma and colleagues describe how they combined two protein microbicides (b12 monoclonal antibody and cyanovirin-N) into a single "fusion" molecule and showed that this molecule is more active against HIV than either of its individual components. They designed synthetic DNA for producing this molecule and introduced this DNA into plant cells. After regenerating transgenic plants that produce the fusion molecule, they prepared the microbicide from a plant extract made by grinding the leaves.

"This study is nothing short of a breakthrough—not only does it yield a

new drug to fight the spread of HIV, but it also shows us how we can produce it on the scale necessary to get it into the hands of those who need it most," said Gerald Weissmann, M.D., Editor-in-Chief of The *FASEB Journal*. "Unlike their unregulated counterparts in the dietary supplement industry, these scientists are using the engines of nature to manufacture pharmaceuticals that must undergo extensive safety and efficacy testing long before the first gel or cream is administered."

More information: Amy Sexton, Sarah Harman, Robin J. Shattock, and Julian K.-C. Ma, Design, expression, and characterization of a multivalent, combination HIV microbicide. doi:10.1096/fj.09-131995. www.fasebj.org/cgi/content/abstract/fj.09-131995v1

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