New HIV Vaccine Prompts Powerful Antibody Response in Animals

Researchers have found a way of stabilizing a shape-shifting viral protein so as to promote a greater antibody response.

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Researchers have apparently solved a major technical difficulty that has long impeded efforts to develop a highly effective HIV vaccine, finding that their strategy led to a powerful antibody response in animals.

Publishing their findings in Science Advances, researchers grappled with the fact that the so-called envelope protein on HIV's surface, known as Env, is highly complex and shape-shifting. Because copies of this protein would likely be effective at prompting an antibody response to HIV, researchers have sought to use them in vaccine candidates. But they have not been able to find a way to stabilize these proteins.

In its natural state, Env appears in clusters of three, known as trimers. The authors of the new study found that modifying a short and springy section of Env known as HR1 caused the trimers to remain folded up into a stabilized closed shape that they could produce efficiently.

The researchers have been working with Envs taken from some three dozen HIV strains. They gave their vaccine more heft by attaching up to 60 copies of Env trimers to individual nanoparticles that mimic the shape of HIV.

Eight weeks after receiving such a vaccine, mice developed antibodies that in laboratory tests neutralized a strain of HIV against which other vaccine candidates have failed. Such an antibody response, the study authors reported, is unprecedented in mice. Previously unheard-ofresults have also been seen in rabbits, indicating that the use of the multi-trimer-covered nanoparticles clearly provides a superior antibody response compared with individual Env proteins.

Additional research of this vaccine method is already under way in 24 monkeys.

To read a press release about the study, click here.

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