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Visterra Makes Debut at ICAAC With Flu Antibody, Partnership

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The typical way to identify a broadly neutralizing antibody is to screen B cells for one, and then look for an epitope that can induce its production.

Cambridge, Mass.-based start-up Visterra Inc. used a very different approach to come up with its VIS410, an antibody that is capable of neutralizing all strains of influenza A that the company has tested.

In its presentation on VIS410 at the 2012 Interscience Conference on Antimicrobials and Chemotherapy (ICAAC) on Monday, the company showed that in mice, "we were able to get a 100 percent protection in a prevention model, and we were able to get 100 percent treatment in a treatment model" when the antibody was administered by 48 hours after the onset of symptoms, Chief Medical Officer Donna Ambrosino explained at a press conference.

Visterra was founded in 2008 by the same team that started Momenta Pharmaceuticals Inc., and its lab space became operational in 2009. To date, the company has raised $19 million from venture firms Polaris Ventures, Flagship Ventures and Lux Capital.

Visterra is largely mum on the details of its technology. The basic idea, CEO Steven Brugger told *BioWorld Today*, is that the company conceptualizes proteins in a new way, namely as "a network of amino acids." The approach considers a protein's amino acid sequence and shape, but also incorporates other protein characteristics and considers proteins as a "network" of amino acids. With their technology platform, Brugger said, the company is "able to quantify the connectivity of each amino acid," – how strongly it is related to, or networked with each other amino acid in the protein.

The more networked an amino acid is, the more critical it is to protein structure and function. And so epitopes with such amino acids are "less likely to mutate under any kind of therapeutic or evolutionary pressure," Brugger said.

Because of Visterra's reticence about the details of its approach, Brugger said, the company has been largely operating in stealth mode despite the fact that it has been operating for several years, and managed to attract respectable amounts of funding. "We wanted to come out when we had product validation," Brugger explained.

This week, the validation came in the form of its VIS410 data, as well as a partnership with Pfizer Inc. that the company announced on Tuesday.

The company also was mum on the details of that partnership. But it does not include VIS410, which the company plans to develop by itself.

Visterra also announced the hiring of Ambrosino as chief medical officer. Ambrosino, who joined the company from MassBiologics, "has taken four antibodies through Phase II trials," Brugger said. "We feel we're nicely positioned to take this lead asset through clinical proof of concept and get that value step up for the company."

Using their method, the Visterra team identified a highly networked epitope on the hemagglutinin protein of the influenza A virus, and designed an antibody against that epitope. When mice were injected with VIS409, a precursor to VIS410 that has been further optimized since the ICAAC abstract data were submitted, from 24 hours before to 72 hours after infection, the animals were broadly protected against disease due to influenza A infection. The company noted that just how long prophylactic protection would last cannot be predicted, since human antibodies are cleared very quickly in mice.

The scientists pointed out in their abstract that "antibodies designed by this approach also demonstrate significant protection in a mouse viral/bacterial co-infection model; a single dose of antibody is sufficient to mitigate viral challenge and prevent opportunistic bacterial infection, leading to 100 percent survival of mice." VIS410 appears to work by blocking hemagglutinin binding to host cells.

VIS410 is not a vaccine, though it can be given preventively. The company expects that such preventive effects might be useful in a pandemic situation, where such prophylaxis could be administered to high-risk individuals such as medical personnel and hospitalized patients as part of a containment strategy.

But Visterra's technology could be used to identify vaccine targets, as well, though the company is not planning to do so at this point. The part of hemagglutinin targeted by VIS410 is in a somewhat hidden place, which is probably one reason why flu infections do not usually trigger its production. ■