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Emerging Company Profile

Hookipa: Next wave vector

By Jon Wolleben
Staff Writer

Hookipa Biotech AG is using its Vaxwave technology to discover and develop viral vectors designed to elicit B cell and CD8+ T cell immune responses without concurrent induction of antibodies that block vector re-administration.

A number of companies have developed vaccine vectors based on viruses, but the method has several challenges, including high seroprevalence rates of the viruses from which the vectors are derived and vector-specific antibody immunity. The former can interfere with the efficacy of the initial vaccine administration while the latter can prevent effective boosting.

"Adenovirus-based vectors encounter highly varying seroprevalence depending on the serotype and the geographic region. Adenovirus serotype 5, for example, can have 90% seroprevalence in sub-Saharan Africa," CEO Katherine Cohen told BioCentury.

Later, when the body has developed antibodies against a vector following initial administration, a different vector product is needed for an effective boost. "In reality, no matter how powerful that first shot is, you need a boost at some point," said Cohen, former SVP of corporate and business development at **Intercell AG.**

Hookipa Biotech AG

Vienna, Austria

Technology: Viral vector platform to develop prophylactic and therapeutic vaccines

Disease focus: Infectious

Clinical status: Preclinical

Founded: 2011 by Rolf Zinkernagel and his former research group from the University of Zurich

University collaborators: Not disclosed

Corporate partners: Not disclosed

Number of employees: 16

Funds raised: €7 million ($9.7 million)

Investors: Sofinnova Partners; Forbion Capital Partners

CEO: Katherine Cohen

Patents: Not disclosed

Vaxwave vectors have a seroprevalence rate <5% because humans are not a natural reservoir for the undisclosed vector from which Vaxwave molecules are derived, according to Cohen.

The company's vectors also have been shown not to elicit vector-neutralizing antibodies. Cohen said unpublished data on their mechanism indicate that the carbohydrate surface structure plays a role.

She added that Vaxwave vectors do not require adjuvants, thus reducing development and regulatory complexity. The vectors contain their own genetic materials that can stimulate the host innate immune response, for example through toll-like receptors (TLRs), according to Cohen.

Hookipa produces a replication-incompetent and non-pathogenic vector by deleting the viral envelope protein and replacing it with the vaccine antigen gene of interest.

Data published in *Nature Medicine* in 2010 by researchers from the **University of Geneva** and **University of Zurich** showed that the Vaxwave technology produced vectors that triggered higher antigen-specific CD8+ T cell responses when injected in mice compared to injection of recombinant adenovirus 5 expressing the same antigen.

Use of a Vaxwave vector also resulted in a greater reduction in tumor mass in a mouse melanoma model compared to adenovirus 5 or vaccinia virus vectors *(see SciBX: Science-Business eXchange, Feb. 25, 2010).*

Cohen hopes to reach clinical proof of

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concept in three to four years.

Hookipa's lead candidate, HB101, is in preclinical testing to prevent and treat cytomegalovirus (CMV) infection. The company has tested the vaccine in murine immunogenicity models with "very promising results," Cohen said, with data available this year.

Cohen said positive Phase I data might be sufficient to attract potential partners, but the company might decide to raise capital to conduct a Phase II trial to prevent CMV infection in transplant patients.

Cohen said it would be difficult for Hookipa to pursue congenital CMV infection without a partner, but she believes HB101 would be a good candidate for the indication, where B cell and T cell immune responses are needed, and because the vaccine would be safe for pregnant women and children.

At least six companies are developing vaccines for CMV infection, including CMV gB/MF59 from **Sanofi** and Transvax from partners **Vical Inc.** and **Astellas Pharma Inc.**

gB/MF59, which consists of recombinant human CMV glycoprotein B with MF59 adjuvant, is in Phase II testing.

Transvax, a DNA vaccine encoding phosphoprotein 65 and glycoprotein B, is in Phase III testing and has Orphan Drug designation in the U.S. to prevent CMV infection in hematopoietic stem cell transplant and solid organ transplant recipients.

In October 2011, Hookipa raised €7 million ($9.7 million) in a series A round led by Sofinnova Partners. Forbion Capital Partners also participated. Last year, the company received €2 million ($2.5 million) in non-dilutive funding from the Austrian and EU governments.

Cohen anticipates Hookipa will have to raise additional money prior to starting Phase I testing, which is slated for 2015 with data also expected that year.

COMPANIES AND INSTITUTIONS MENTIONED

Astellas Pharma Inc. (Tokyo:4503), Tokyo, Japan
Hookipa Biotech AG, Vienna, Austria
Intercell AG (VSE:ICLL; OTCQX:INRLY), Vienna, Austria
Sanofi (Euronext:SAN; NYSE:SNY), Paris, France.
Vical Inc. (NASDAQ:VICL), San Diego, Calif.
University of Geneva, Geneva, Switzerland
University of Zurich, Zurich, Switzerland