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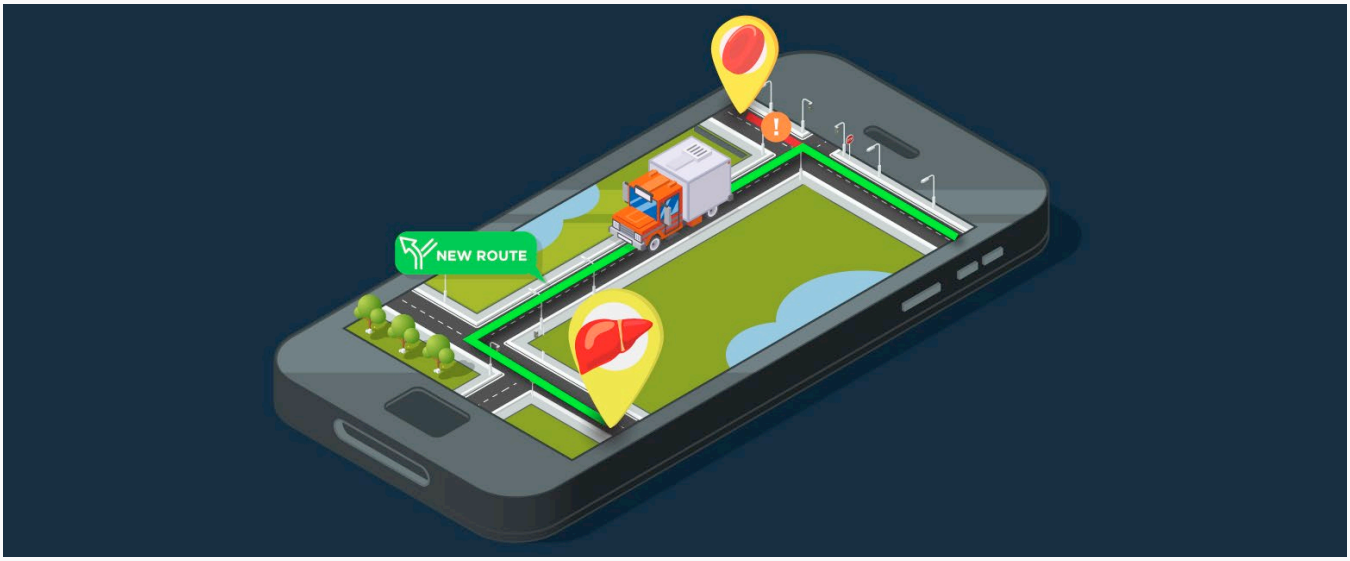

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PRODUCT DEVELOPMENT

Anokion's autoimmunity platform evolution

BY ALLISON JOHNSON, SENIOR WRITER

When the science suggested the liver, and not the blood, could be the better target tissue for tolerance-inducing autoantigens, Anokion devised a platform around the former. About 18 months after its pivot, the company is poised to bring its first therapy into the clinic before the end of the year, with another one to follow within 12 months.

In the last week, Anokion S.A. closed a $40 million series B round and presented preclinical data for one of its lead programs at European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) meeting in Stockholm. Versant Ventures, Novartis Venture Fund, Novo Ventures, Celgene Corp. (NASDAQ:CELG) and select Swiss-based private investors participated in the B round (see "Anokion Puts Liver to the Test").

Anokion, a spinout of the Ecole Polytechnique Federale de Lausanne (EPFL), was founded in 2012 to develop therapies that enable the immune system to recognize proteins expressed by its own cells as self, rather than as foreign. The latter occurs in autoimmune disease and leads to the destruction of tissues expressing those antigens.

Anokion's goal is to selectively turn off and destroy only the subset of immune cells that recognize autoantigens, and thereby avoid broad immunosuppression, which leaves patients open to infection.

"The only T cells that respond to our therapy are those that are the drivers of the disease," Anokion co-founder and CSO Stephan Kontos told BioCentury.

Anokion's founding platform used red blood cells as Trojan horses for delivering autoantigens to immune cells in a way that induced tolerance. Engineered autoantigens were delivered IV and inserted into RBCs; when the RBCs died, the body's immune system would be exposed to the antigens they carried and recognize them as self.

But Kontos said while it was known RBCs die in the liver and spleen, Anokion discovered that the process of clearing the cells from the liver is what induces immune tolerance.

"That started a line of questioning within our team: instead of relying on the red blood cells to deliver the antigen to the liver to induce tolerance, might we be able to skip that step and just directly target the liver?" said Kontos.

In early 2018, the company decided to focus its resources on the liver-targeting platform it had begun building in parallel with its RBC technology.

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Leading with the liver

Anokion's liver-targeting platform was enabled via its identification of an undisclosed novel receptor in the liver that acts in the immune tolerance induction pathway.

The platform attaches autoantigens to a glycosylation signature specific to the liver receptor. After binding the receptor, the autoantigen is endocytosed, processed and presented to immune cells.

Kontos said one advantage of liver-targeted delivery is speed — induction of immune tolerance begins within hours of targeting the liver, while eliciting an immune response by targeting RBCs depends on the age of the cells themselves. Old red blood cells may reach the liver for clearance within days, but young ones won't do so for months.

A second advantage is the relative confidence in translatability from preclinical studies to humans. "What we've found is that there are substantial similarities across species in the immunobiology of the liver," whereas that's less true for red blood cells, said Kontos.

Anokion plans to be in the clinic by year end with its celiac disease therapy, KAN-101 which delivers a single undisclosed disease-driving antigen to the liver.

In 2020, it will bring multiple sclerosis therapy ANK-780 into Phase I testing. ANK-780, which comprises an undisclosed set of liver-targeted autoantigens, is being developed in partnership with Celgene under a 2016 deal that also gave the company an exclusive option to acquire Anokion.

Anokion also has a preclinical Type I diabetes therapy and two undisclosed earlier stage programs.

At least two other companies have platforms to deliver autoantigens to the liver: Topas Therapeutics GmbH and Cour Pharmaceutical Development Co. Inc.

Both companies use nanoparticles as delivery vehicles for autoimmune disease.

Topas' lead program is in preclinical development for the autoimmune disease pemphigus vulgaris, and it also has preclinical celiac disease, Type I diabetes and MS programs.

Cour has lead candidate TIMP-Glia in Phase II testing for celiac disease.

According to Kontos, Anokion believes it can generate a more potent response than other delivery mechanisms by targeting its autoantigens directly to a liver receptor that may enhance immune tolerance induction.

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NEWSROOM
pressreleases@biocentury.com

SAN CARLOS, CA
+1 650-595-5333; Fax: +1 650-595-5589

CHICAGO
+1 312-755-0798; Fax: +1 650-595-5589

WASHINGTON, DC
+1 202-462-9582; Fax: +1 202-667-2922

UNITED KINGDOM
+44 (0)1865-512184; Fax: +1 650-595-5589