What Promising U Of M Biotech Research Is Nearing Commercialization?

A look at MN-REACH grant winners can provide some future market insight.

by Don Jacobson
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The University of Minnesota’s East Bank campus in Minneapolis

Who are the life sciences researchers at the University of Minnesota carrying out the most commercially promising work? There’s probably no single way to answer that question, but one place to look is a program run by the U of M and the U.S. National Institutes of Health called MN-REACH.

MN-REACH, supported by a $3 million NIH grant and $3 million in matching university funds, is based out of the school’s Office for Technology Commercialization. It is one of three “research evaluation and commercialization hubs” established by the federal agency around the country, whose missions are to distribute grants of up to $150,000 for health care technologies that both address unmet medical needs and are within “a few actionable steps” of commercialization.

Some examples of this might include cancer therapies which can be brought rapidly into clinical trials; medical devices related to treatments of brain conditions; or therapeutics which are closer to commercialization. So in that regard, looking at MN-REACH grant recipients can be a good way to gain insights into what new biotech from U of M scientists may be soon be placed before investors.

Program leaders last week issued a call for proposals launching its fourth funding cycle – the winners of its third cycle are to be announced later this month. It seemed to TCB like a good time to take a look at some of the previous winners of MN-REACH grants, tapped during its first two funding cycles conducted last year.

After all, there’s a chance these U of M researchers and their technologies might become the next homegrown movers and shakers of the health care market.

Gut bacteria to the rescue of chemotherapy patients
The teeming microorganisms of the human gut get a bad rap – rather than merely performing the unsavory duties of breaking down food and creating waste, researchers and now investors have realized the bacteria actually play a key role in human health.

Research by Dan Knights, as assistant professor in the U of M’s computer science and engineering department
as well as its Biotechnology Institute, is looking at how the makeup of the gut microbiome can be used to predict whether cancer patients will be susceptible to bloodstream infections due to chemotherapy.

The risk of sepsis is a serious side effect of chemotherapy, especially in high doses. It can lead to death when bacteria enter the bloodstream, likely through intestinal lesions produced when the treatment inflames the digestive tract. The only recourse is to administer antibiotics, which may or may not save the patient.

There are currently no good ways to predict which chemo patients will acquire a bloodstream infection, but studies in Knights’ lab, using tools from machine learning, has resulted in the creation of an algorithm that promises to help.

The algorithm can “learn” which bacteria are good and bad vis-a-vis the risk of sepsis from studying one set of patients, then predicting with around 85-percent accuracy whether a new patient it has not yet seen will get an infection. Knights’ research found that patients who contracted infections had significantly different mixtures of gut bacteria than those who did not.

Tackling diabetes with stem cells
Researcher Meri Firpo, an assistant medical professor at the U of M’s Stem Cell Institute, is zeroing in on a method of producing large numbers of insulin-producing pancreas cells for transplantation into diabetic patients.

A MN-REACH commercialization grant was awarded last year for her efforts, in which she is working on a way to convert undifferentiated stem cells into pancreatic islet cells on a large-scale basis, thus addressing a shortage of human donors.

Such donations are now the only way introduce new “islets of Langerhans” into diabetes sufferers. This type of islet secretes insulin, the hormone released after we eat that signals our body to take up glucose from the blood to use as energy or store as fat. In Type 1 diabetes, the immune system attacks those islets so the body can’t produce insulin; thus glucose reaches toxic levels in the blood.

Firpo’s project is aimed at generating islets from various human stem cell sources, but particularly from lab-induced pluripotent cells. She and research associate Zhaohui Geng are the inventors of a patent-pending method of doing just that — a unique process of producing pancreatic progenitor cells through exposing them to various types of small proteins.

A functional cure for HIV through immunotherapy?

Another exciting U of M research field deemed close to commercialization is being carried out by Pamela Skinner, an associate professor in the College of Veterinary Medicine. Her MN-REACH award is in connection with her work toward developing an immunotherapy for HIV.

Her research is centered around a discovery made in collaboration with Dr. Liz Connick, a fellow AIDS investigator at the University of Colorado.

One of the hallmarks of AIDS is the impairment and ultimate destruction of the specific “helper T-cell” antibodies produced by the body to battle HIV. After initially appearing and making a stand against the infection, they gradually are depleted, leaving the body without an adequate immune response.

Skinner and Connick recently found that the T-cells specific to battling HIV -- CD4+ -- are mostly absent from follicles of lymphoid B-cells. That also happens to be where HIV-infected cells are the most concentrated, meaning the follicles essentially provide what amounts to a privileged sanctuary site for the virus.

Thus their work is geared toward developing a cellular immunotherapy that would point the helper T-cells directly into the B-cell follicles -- which if successful would functionally cure HIV.

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