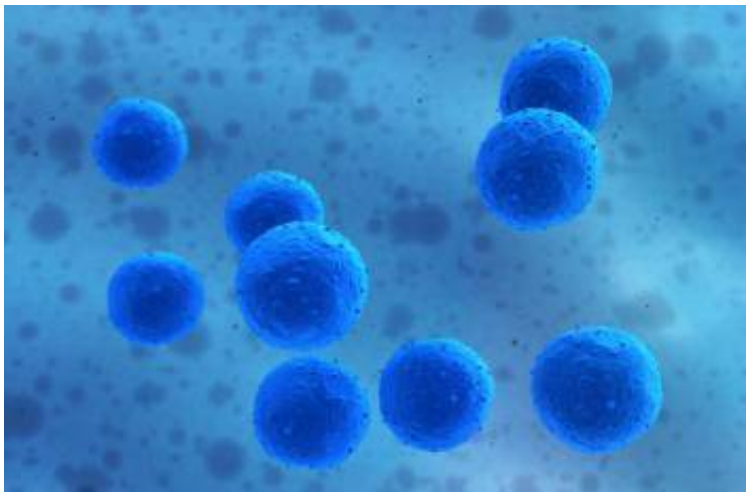
STEM CELL BREAKTHROUGH: PATIENT-SPECIFIC THERAPIES FOR TYPE 1 DIABETES

A team of scientists from the New York Stem Cell Foundation Research Institute and Columbia University Medical Center, also in New York, claim to have created the first disease-specific embryonic stem cell line with two sets of chromosomes.

- The research began in 2006 as part of an effort to make patient-specific embryonic stem cell lines from people who have type 1 diabetes.
- The process behind this innovation is called somatic cell nuclear transfer (SCNT). It involves taking unfertilized donor oocytes - the immature egg cells used in reproduction - and adding to them the nuclei of adult skin cells taken from the patient.
- Stem cell experiments for this project initially took place at Harvard University in Cambridge, MA, with skin biopsies from the patients being performed at Columbia University Medical Center.
- However, isolating cell nuclei from skin biopsies was not possible in the federally funded Columbia labs. As a solution, the New York Stem Cell Foundation Research Institute (NYSCF) opened its own privately-funded laboratory to complete the research - now the largest independent stem cell laboratory in the US.
- By 2008, all of the research had been moved to the NYSCF lab, as Massachusetts restrictions prevented Harvard from obtaining oocytes.
- In an associated news release, the NYSCF say that "the reprogramming of skin cells from a type 1 diabetes patient by SCNT has long been sought," but that progress within this field has been stymied by difficulties in obtaining oocytes for research, as well as an incomplete understanding of the biology of human oocytes.



SCNT progress has been stymied by difficulties in obtaining oocytes for research, as well as an incomplete understanding of their biology.

Lab-created insulin-producing beta cells could offer a cure for type 1 diabetes

People with type 1 diabetes are deficient in insulin and have high blood sugar levels because they lack insulin-producing beta cells. Therefore, if beta cells can be successfully produced from stem cells, they could be transplanted into diabetic patients as a treatment and potential cure. As the stem cells are made from the patient's own skin cells, they would all match the patient's DNA.

In 2011, the scientists reported that they had created the first embryonic stem cell line from human skin using nuclear transfer. However, the stem cells produced had three sets of chromosomes and could not be used as a treatment. But the scientists have now been able to create a patient-specific embryonic stem cell line that has two sets of chromosomes, which is the normal number in human cells.

Dr. Dieter Egli, the NYSCF scientist who led the research, says:
"From the start, the goal of this work has been to make patient-specific stem cells from an adult human subject with type 1 diabetes that can give rise to the cells lost in the disease. By reprogramming cells to a pluripotent state and making beta cells, we are now one step closer to being able to treat diabetic patients with their own insulin-producing cells."

However, this is not the end of this research; the success in producing the patient-specific cells only marks the completion of the first phase of the project. The next step is to develop strategies that prevent the immune systems of type 1 diabetes patients from attacking their own beta cells.

Co-author, Dr. Rudolph Leibel, says:
"This accomplishment is the product of an ongoing inter-institutional collaboration across scientific and clinical disciplines, supported by thoughtful philanthropy. The resulting technical and scientific insights bring closer the promise of cell replacement for a wide range of human disease."

In 2012, Medical News Today reported on research published in PLOS One that discovered stem cells in the pancreas can be turned into insulin-producing cells. The researchers behind that study claimed that the potential to regenerate insulin-producing cells is present in all of us, and suggested that further research along these lines may provide a cure for type 1 diabetes.

Are Seniors With Diabetes Overtreated?
Very tight blood sugar control can pose problems without benefits, study says

WebMD News from HealthDay
By Dennis Thompson
HealthDay Reporter

MONDAY, Jan. 12, 2015 (HealthDay News) -- Many older people with diabetes may be exposed to potential harm because doctors are trying to keep overly tight control of their blood sugar levels, a new study argues.

Researchers found that nearly two-thirds of older diabetics who are in poor health have been placed on a diabetes management regimen that strictly controls their blood sugar, aiming at a targeted hemoglobin A1C level of less than 7 percent. But these patients are achieving that goal through the use of medications that place them at greater risk of hypoglycemia, a reaction to overly low blood sugar that can cause abnormal heart rhythms, and dizziness or loss of consciousness, the researchers said.

Further, tight diabetes control did not appear to benefit the patients, the researchers report Jan. 12 in JAMA Internal Medicine. The percentage of seniors with diabetes in poor health did not change in more than a decade, even though many had undergone years of aggressive blood sugar treatment. "There is increasing evidence that tight blood sugar control can cause harm in older people, and older people are more susceptible to hypoglycemia," said lead author Dr. Kasia Lipska, an assistant professor of endocrinology at Yale University School of Medicine. "More than half of these patients were being treated with medications that are unlikely to benefit them and can cause problems."

Diabetes is common among people 65 and older. But doctors have struggled to come up with the best way to manage diabetes in seniors alongside the other health problems they typically have, researchers said in background information with the study. For younger and healthier adults, the American Diabetes Association has recommended therapy that aims at a hemoglobin A1C level of lower than 7 percent, while the American Association of Clinical Endocrinologists recommends a target of lower than 6.5 percent, the authors noted. The A1C test provides a picture of your average blood sugar levels for the past two to three months.

By tightly controlling blood sugar levels, doctors hope to stave off the complications of diabetes, including organ damage, blindness, and amputations due to nerve damage in the limbs.

SWINE FLU OUTBREAK IN INDIA RAISES CONCERN

MIT study finds evidence that a new strain of H1N1 may carry dangerous mutations

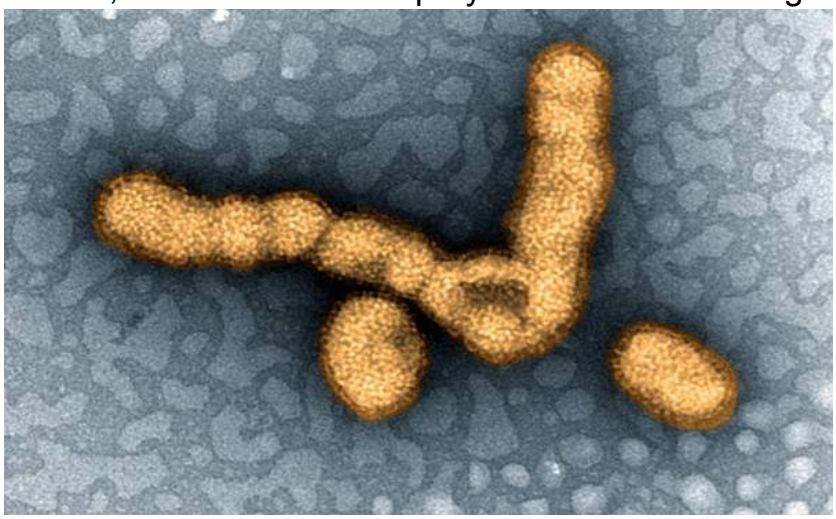
Anne Trafton
MIT News Office March 11, 2015

Since December, an outbreak of swine flu in India has killed more than 1,200 people, and a new MIT study suggests that the strain has acquired mutations that make it more dangerous than previously circulating strains of H1N1 influenza.

The findings, which appear in the March 11 issue of Cell Host & Microbe, contradict previous reports from Indian health officials that the strain has not changed from the version of H1N1 that emerged in 2009 and has been circulating around the world ever since.

With very little scientific data available about the new strain, the MIT researchers stress the need for better surveillance to track the outbreak and to help scientists to determine how to respond to this influenza variant.

"We're really caught between a rock and a hard place, with little information and a lot of misinformation," says Ram Sasisekharan, the Alfred H. Caspary Professor of Biological Engineering at MIT and the paper's senior author. "When you do real-time surveillance, get organized, and deposit these sequences, then you can come up with a better strategy to respond to the virus."



In the past two years, genetic sequence information of the flu-virus protein hemagglutinin from only two influenza strains from India has been deposited into publicly available influenza databases, making it difficult to determine exactly which strain is causing the new outbreak, and how it differs from previous strains. However, those two strains yielded enough information to warrant concern, says Sasisekharan, who is also a member of MIT's Koch Institute for Integrative Cancer Research.

He and Kannan Tharakaraman, a research scientist in MIT's Department of Biological Engineering, compared the genetic sequences of those two strains to the strain of H1N1 that emerged in 2009 and killed more than 18,000 people worldwide between 2009 and 2012.

The researchers found that the recent Indian strains carry new mutations in the hemagglutinin protein that are known to make the virus more virulent. Hemagglutinin binds to glycan receptors found on the surface of respiratory cells, and the strength of that binding determines how effectively the virus can infect those cells.

One of the new mutations is in an amino acid position called D225, which has been linked with increased disease severity. Another mutation, in the T200A position, allows hemagglutinin to bind more strongly to glycan receptors, making the virus more infectious.

"Aggressive surveillance"

Sasisekharan points out that more surveillance is needed to determine whether these mutations are present in the strain that is causing the current outbreak, which is most prevalent in the Indian states of Gujarat and Rajasthan and has infected more than 20,000 people so far.

"The point we're trying to make is that there is a real need for aggressive surveillance to ensure that the anxiety and hysteria are brought down and people are able to focus on what they really need to worry about," Sasisekharan says. "We need to understand the pathology and the severity, rather than simply relying on anecdotal information."

Learning more about the new strains could help public health officials to determine which drugs might be effective and to design new vaccines for the next flu season, which will likely include strains that are now circulating.

"The goal is to get a clearer picture of the strains that are circulating and therefore anticipate the right kind of a vaccine strategy for 2016," Sasisekharan says.

David Topham, a professor of microbiology and immunology at the University of Rochester, agrees there is a strong need for more influenza surveillance.

"Western scientists are just not paying enough attention to what's going on in such a large country as India. If anybody is collecting viruses and sequencing them, they're not being entered into one of the more common databases where people can look at them," says Topham, who was not involved in the research. "We're missing a big piece of the puzzle."

The research was funded by the National Institutes of Health, the National Research Foundation through the Singapore-MIT Alliance for Research and Technology, and the Skolkovo Foundation.