

From VOA Learning English, this is **Science in the News**. I'm Kelly Jean Kelly.

And I'm Avi Arditti. Researchers are reporting progress in treating Type 1 diabetes. Today we will tell you about their findings. We also have a report about the Kepler Space Telescope. American scientists are turning their attention to all the information it has gathered over the past four years. And researchers say extreme weather could be coming our way – from the sun. We will have more about their prediction.

Researchers have come closer to improving treatment for people with Type 1 diabetes. They have successfully placed insulin-producing islet cells from one animal species into another without using anti-rejection medicines. In the future, the transplant operation could provide an unlimited supply of tissue to treat people whose bodies cannot produce insulin.

Insulin is a hormone produced naturally by the pancreas. The hormone carries glucose, a kind of sugar, to the cells for energy.

Type 1 diabetes is a disorder of the body's immune system for fighting disease. In most patients, the immune system attacks and destroys the islet cells that produce insulin. Many patients must inject themselves with insulin, simply to survive.

For a long time, scientists have sought to take islet cells from people or even from pigs and place them inside another person. Insulin exchanges from human remains have proved difficult, while animal-to-human transplants have been almost impossible.

Now, that is starting to change. Researchers at Northwestern University have carried out an islet cell transplant from rats to mice without the use of anti-rejection medicines. Xunrong Luo is the head of the Northwestern medical school's human islet cell transplantation program. She says the transplanted rat cells produced insulin in mice for more than 300 days.

"They survived essentially indefinitely. So they continued to produce insulin without the need of any immunosuppression and they just continued to maintain normal glucose levels in these diabetic mice."

The mice were given white blood cells from a rat's spleen, which is part of the immune system. They were bathed in chemicals that put the cells into a sleeping condition known as programmed cell death.

The changed cells were injected into mice. They entered the spleen and liver of the mice, but soon after, they were destroyed by cells called macrophages.

Researchers say the macrophages recognized the sleeping rat cells as waste. In that process, small pieces of the rat spleen cell ended up on the surface of the macrophages. This taught the mouse's immune-system T cells to accept islet cells, which researchers transplanted seven days later.

"So we are pretty excited about that because next step is to see if we can translate this into larger scales, into larger animals."

Xunrong Luo says her team will now try to transplant pig cells into monkeys. She also wants to use what is almost an unlimited supply of pig islet cells for transplants into patients with type 1 diabetes.

New Work May Be Ahead for the Kepler Telescope

The American space agency NASA recently said it has ended efforts to return the Kepler Space Telescope to full working order. NASA scientists are instead studying all the information collected over the past four years during the life of the telescope.

The space agency launched the Kepler spacecraft in 2009. Their goal was to have Kepler find Earth-sized planets in or near a sun-like star where liquid water exists on the surface of the planet.

William Borucki is the chief investigator for the Kepler mission. He says the project has been extremely successful.

“At the beginning of the mission, no one knew whether Earth-sized planets were abundant or rare in our galaxy. Now at the completion of the Kepler observations, we know that our galaxy is filled to the brim with planets. It’s likely that when you look up at the sky at night and see the sky covered with stars, most of the stars have planets.”

The Kepler Space Telescope discovered 135 planets and over 3,500 possible planets of different sizes and orbital distances. Most of these planets are small like the Earth. The four-year project was extended in 2012. But it came to an end in August after engineers failed to repair two broken reaction wheels. The reaction wheels are extremely important in keeping the spaceship pointed in the right direction.

Deputy project manager Charles Sobeck says the decision was the right one.

“The results of that show what we expected to see, which is that the wheels are sufficiently damaged that they cannot sustain spacecraft pointing control for any extended period of time.”

The Kepler team is now looking into whether the space telescope could be used in a different kind of project. This could include an exoplanet search -- that is, a search for a planet that turns around a star other than the sun. William Borucki says NASA has called on the science community for ideas.

“They are not proposals. They are not asking for funds. They are suggesting ideas and we look at which of these could we do for a reasonable cost?”

He says Kepler’s scientific mission has yet to end. The team is now working on information collected by the spaceship over the past four years. He expects the search will produce hundreds, if not thousands, of new discoveries.

“And so basically, in the next few years, when we complete this analysis, we will be able to answer the question that inspired the Kepler mission: Are Earths common or rare in our galaxy?”

William Borucki says Kepler's work is an important first step in the exploration of our galaxy. NASA is preparing for another mission in 2017. The Transiting Exoplanet Survey Satellite will look for larger and brighter planets closer to our solar system than Kepler did. It will put its observational instruments on an area 3,000 light years away.

Finally, American scientists are warning that a powerful storm on the sun may create problems on Earth. Researchers say our planet could be a target of a strong solar storm. They note that in 1859, such a storm caused telegraph communications around the world to fail.

Scientists and the insurance company Lloyds of London recently warned that another big storm could cause even more damage. They say it could destroy modern communications and electric power supply grids.

Michael Wiltberger is a scientist with the National Center for Climate Research in Boulder, Colorado. He is developing a computer model to show the effects on Earth's atmosphere as the solar wind changes in shape and intensity. He says strong winds in space can change the direction of the Earth's magnetic field and let more energy enter the upper atmosphere.

Mr. Wiltberger says people have been observing dark areas on the sun, known as sun spots, for a long time. He says these observations have led to an understanding of the solar cycle.

"When Galileo pointed his telescope at the sun, he saw spots on the surface of the sun. And they've been keeping track of the number of spots and the location of the spots since roughly that period of time. So we've got about a couple of hundred years' record of sun spots."

Computer models of the solar cycle are meant to better predict severe weather in space. The geomagnetic solar storm that hit Earth in 1859 was the worst known solar storm.

Astronomer Richard Carrington saw it and made pictures. That storm is now known as the Carrington Event.

Since then, less powerful storms have cut electricity and affected telephone service, radio stations and satellites in Earth's orbit.

Lloyds of London has released a report on the expected harm in the event of a severe solar storm. Neil Smith helped write the report. He says the next major storm could be very destructive because the world now depends so much on power supply grids.

"We are estimating that 20-40 million people might be without power from anywhere up to one, even two years."

He also says the number of people without power could result in an economic cost of between \$500 million and \$2.6 trillion.

The report mainly deals with the effect of a solar storm on North America. But Mr. Smith says that if a storm destroyed electrical transformers in other areas, the loss of electricity would also harm those economies.

Energy released by solar activity races through space at speeds of three million to five million kilometers an hour. These coronal mass ejections reach Earth in less than two days. Scientists like Michael Wiltberger can watch them at the speed of light, less than eight minutes after the sun releases energy into the atmosphere. This observation gives space scientists some time to predict the effects of solar activity.

But Mr. Wiltberger says predicting exactly when and where a storm will hit is much more difficult. He says the computer models help weather scientists watch a storm and improve predictions. He hopes that system can be operating within five years.

In Britain, Neil Smith is calling for greater cooperation before the next big solar storm. He says Lloyds of London needs to work with governments and the power industry to prepare.

“It’s not something that any one party could actually solve on their own.”

He says such cooperation is extremely important to avoid social and economic disasters if Earth experiences a storm like the Carrington Event.

This Science in the News was written by Milagros Ardin, Onka Dekker and Kim Varzi. Our producer was June Simms. I’m Kelly Jean Kelly.

And I’m Avi Arditti. Join us again next week for more news about science on the Voice of America.

