

## HEALTH

### GM pigs take step to being organ donors



The most genetically modified animals in existence have been created to help end a shortage of organs for transplant, say US researchers. The scientists successfully rid 37 pigs of viruses hiding in their DNA, overcoming one of the big barriers to transplanting pig organs to people. The team at eGenesis admits preventing pig organs from being rejected by the human body remains a huge challenge. But experts said it was a promising and exciting first step. The study, published in the journal

Science, started with skin cells from a pig. Tests identified 25 Pervs - porcine endogenous retroviruses - hidden in the pig's genetic code. Experiments mixing human and pig cells together showed those viruses could escape to infect human tissues. But the researchers then used the game-changing gene-editing technology Crispr to delete the 25 Pervs. **Human embryos edited to stop disease** It then took cloning technology, the same used to create Dolly the sheep, to place the genetic material from those cells into a pig's egg and create embryos. The complex process is inefficient, but 37 healthy piglets have been born. "These are the first Perv-free pigs," Dr Luhan Yang, one of the researchers from Harvard University and the spinout company eGenesis, told the BBC News website. They were also "the most genetically modified [animals] in terms of the number of modifications", he said. If xenotransplantation - using organs from other species - works, then it has the potential to alleviate long waits for a transplant. More than 100,000 people need an organ transplant in the US. There are about 6,500 people on the UK waiting list. Dr Yang told the BBC: "We recognise we are still at the early stages of research and development. "We know we have an audacious vision of a world with no shortage of organs, that is very challenging, but that is also our motivation to remove mountains." Pigs are particularly promising for xenotransplantation as their organs are a similar size to humans', and the animals can be bred in large numbers. But removing the viruses is only half the challenge, even organs donated from other people can cause a strong immune reaction that leads to the transplant being rejected. The US team is investigating further genetic modifications to make pig organs more acceptable to the human immune system. First step Darren Griffin, a genetics professor at the University of Kent, said: "This represents a significant step forward towards the possibility of making xenotransplantation a reality. "However, there are so many variables, including ethical issues, to resolve before xenotransplantation can take place." Prof Ian McConnell, from the University of Cambridge, said: "This work provides a promising first step in the development of genetic strategies for creating strains of pigs where the risk of transmission of retroviruses has been eliminated. "It remains to be seen whether these results can be translated into a fully safe strategy in organ transplantation." The researchers had to overcome unexpected challenges from performing so much gene-editing in one go. The Crispr technology works like a combination of a sat-nav and a pair of scissors. The sat-nav finds the right spot in the genetic code, and then the scissors perform the cut. But making 25 cuts throughout the pig's genome led to DNA instability and the loss of genetic information. **BBC**

### Pioneering type 1 diabetes therapy safe

The first trial of a pioneering therapy to retrain the immune system and slow the advance of type 1 diabetes has shown it is safe. The disease is caused by the body destroying cells in the pancreas that control blood sugar levels. The immunotherapy - tested on 27 people in the UK - also showed signs of slowing the disease, but this needs confirming in larger trials. Experts said the advance could one day free people from daily injections. Aleix Rowlandson, from Lancashire, was diagnosed in 2015 aged 18. "Your blood sugars affect how much energy you have," she told the BBC. "If they're high, they can make you feel tired. If they're low, you can feel shaky. "I'm more optimistic knowing that the study has gone well and they can use that to find further treatments. "Even if it doesn't help me, myself, and it might help other people in the future, I'm very happy." Aleix's immune system is attacking her beta cells, which release the hormone insulin to keep blood sugar levels stable. As a result, she has to inject insulin several times a day. Balance Aleix is taking part in the trials of immunotherapy at the National Institute for Health Research Biomedical Research Centre at Guy's and St Thomas'. It is an attempt to stop her diabetes by tapping into the immune system's natural checks and balances. The body's defence system is primed to attack hostile invaders. But it also has "regulatory T cells", which calm the immune response and prevent it attacking the body's own tissues. Immunotherapies try to get regulatory T cells on-side by exposing them to fragments of proteins found in beta cells. Prof Mark Peakman, from King's College London, told the BBC News website: "This is a landmark in the sense it's the first time it has been done. "Importantly, [the trial] shows the overall safety is good and there is some evidence we're restoring the balance and getting some regulatory T cells activated." Patients given the therapy did not need to increase their dose of insulin during the trial. However, it is too soon to say this therapy stops type 1 diabetes and larger clinical trials will be needed. And further types of immunotherapy that should deliver an even stronger reaction are already underway. Beta cell saver The trial focused on patients newly diagnosed with type 1 as they still have about a fifth of their beta cells left. Even retaining these cells would make it easier to manage the condition, but the ultimate goal is to intervene even earlier to hopefully prevent the disease starting. However, it is not likely to help people diagnosed with type 1 years ago. Prof Peakman added: "At that stage, most of the beta cells have gone and we don't find, with any therapies tried, any evidence of regeneration so it seems unlikely to help someone who has had the disease for a while." All the volunteers were injected either every two or four weeks for six months. Karen Addington, the UK chief executive of the type 1 diabetes charity JDRF, said: "Exciting immunotherapy research like this increases the likelihood that one day insulin-producing cells can be protected and preserved. "That would mean people at risk of type 1 diabetes might one day need to take less insulin, and perhaps see a future where no-one would ever face daily injections to stay alive." **BBC**



### From the "TRIVIA BOOK"

Icebergs are not salty - they are comprised of pure fresh water. There may be some dust embedded in the ice and salt water may cover the surface, but it does not penetrate the ice. Iceberg are quite safe to consume. When an iceberg melts, it makes a fizzing sound. The sound comes from the popping of compressed air bubbles which are in the ice. The bubbles form when air is trapped in the snow layers which are compressed to form glacial ice. The released air is as old as the ice - thousands of years old! Iceberg appear mostly white because of the air bubbles in the ice. The bubble surfaces reflect white light giving the iceberg an overall white appearance. Ice that is bubble-free has a blue tint which is due to the same light phenomenon that tints the sky. In Newfoundland, iceberg ice is 'harvested' for bottled water and vodka production. More products should be expected as iceberg ice business booms.

## THE ULTIMATE EXPERIENCE - from a talk by Prem Rawat [Part 2 of 3]

### HAVE YOU SEEN IT?

What is the consequence of unconsciousness? Pain and suffering. If you have ever suffered, you know how much energy it takes. First, you can't sleep. And then it costs a tremendous amount of money. You have to buy tissues; you have to buy books; you have to make phone calls. You have to try to find some relief from this stupid, agonizing suffering. And any relief will do. That's the consequence of unconsciousness.

It might seem like consciousness would take more energy, but it actually doesn't. It saves you on tissues, on books, on all those phone calls—because you're happy. Happiness doesn't cost anything. Everything about happiness is free. When you're happy, you don't think: "Do I have to call somebody? Do I have to do this? Do I have to do that? Do I have to cry? Do I have to read a book about it?" No, you just relax. Everything is wonderful. Unconsciousness is not economical at all. It costs you time, and it costs you money. You have to go on vacations to try to get away from where you are. Your body is telling you: "This doesn't feel right. What you are doing is not right." It screams. It's called stress. And what are the consequences of stress? Ask a doctor. And what does society say?

"Let's teach you how to handle stress." These, by the way, are the same kind of people who would teach you how to walk on coals. Back in the '90s, this was big. People used to have seminars where you learned how to control all these things, and as the last step, you would walk on coals. Now, where would you need to walk on coals? The only place where this could be even remotely useful is in Argentina, where they have huge barbecue pits. They're on the ground, and people have long paddles to handle the food. So if these guys could walk on coals, I guess it could make their job easier. This is what reasoning does. It tells you that you have conquered something, because you have walked on coals. And if you look back at the whole chain of unconsciousness that led you to walk on coals, how many reasoning links will you find? This is not a small chain. You have believed and believed.

And believed some more. And reasoned. And reasoned some more. Till you reached the point where, even if you wanted to get rid of this chain, it is so wrapped around you that your hands literally aren't free to start cutting the links. And to make matters worse, you want to be free, but you have forgotten what it feels like to be free. You want to understand, but you have forgotten how to understand. So what happens? Confusion. There is no confusion in knowing. I started speaking to people publicly when I was very young. A man who was in the army heard about me somehow, and he wanted to come and see me, but he was still wondering: "What is a little kid going to teach me? Maybe I will teach him a thing or two."

So he came to my house in India. I was doing homework, and some other people were sitting on the veranda with him. I could hear everybody talking from where I was. The man from the army was having a great time arguing with them, because they were all, in their own way, intellectuals who had abandoned know-how for reasoning. When you know something, there is no argument. But when there is reasoning and belief, there's plenty of room for argument. After they argued for a while, someone came to me and said: "There's someone here who came to see you." So I got permission to stop doing my homework, and I went into the living room. The veranda was right outside the living room, which had two sets of doors—one glass and one screen. I opened the glass doors, and as I was listening through the screen, I heard the man saying:

"You know, every day I pray to the light." And all this argument was going on, so I sneaked out and sat down quietly. He looked at me, and I looked at him. And I said: "So, what do you do?" "Oh, I pray. I pray to the light." I said: "Oh, that's good. I'm sure that there's no harm in praying to the light, but surely there is no harm in seeing it, either—is there? Have you seen it, too? Or do you just keep praying?" That changed his life. "Praying to the light" is like knocking on a door. It's not opening, but you keep knocking. The knocking becomes a ritual. What will you do if somebody actually opens the door? You won't know what to do with yourself, because nobody has told you about anything besides the door. You are stuck in the realm of knocking.

Information provided by: McIlraith / The Prem Rawat Foundation

## ENTERTAINMENT

### Carrie Fisher given 'amazing' send-off in Star Wars: The Last Jedi



Carrie Fisher is given an "amazing" send-off in her final Star Wars film, according to co-star John Boyega. The London-born actor said he shares "many scenes" with the late actress in Star Wars: The Last Jedi and that the sci-fi franchise "keeps her alive". Fisher, who played the part of Princess - later General - Leia, died last December aged 60. Her final film performance will be seen when the latest Star Wars blockbuster is released at the end of the year. Boyega, who played

stormtrooper Finn in 2015's Star Wars: The Force Awakens, told US broadcaster ABC: "It sends her off in a very amazing way. "She is still kept alive in this franchise and that's the beauty of it - she lives forever in a sense." Boyega was with family in Nigeria when he found out about Fisher's death, which came four days after she was taken ill on a flight from London to Los Angeles. "It was a strange, strange feeling," said the 25-year-old, currently promoting his role in race drama Detroit. "I felt like everybody in the cast and obviously around the world [and] went silent for a bit." His comments came as Fisher's actress daughter, Billie Lourd, spoke about the last time she saw her mother. "The last time I saw her in person, this episode of *Scream Queens* was on, and it was a big episode for me," she told fellow actress Sarah Paulson in *Town & Country* magazine. "I had tons of scenes, and I was so hard on myself about it - I hated how I looked, hated my performance. I was really frustrated. "She told me, 'Come over right now. I want to watch this with you.' And she made me sit down and watch it, and she forced me to see the good parts. "She was incredible like that. But she was really hard on me, saying, 'Shut up, you're great in this. Have faith in yourself. Be more confident.'" Lourd lost her grandmother Debbie Reynolds the day after her mother's death and admitted she had always "lived in their shadows". "I love being my mother's daughter, and it's something I always will be, but now I get to be just Billie," she added. Elsewhere in the Star Wars universe, it has been revealed that the next film in the series - Star Wars: Episode IX - is to be rewritten by British writer Jack Thorne. According to The Hollywood Reporter, the writer of Harry Potter and the Cursed Child is working on the ninth instalment, to be directed by Jurassic World's Colin Trevorrow. Meanwhile, director Ron Howard has told the same publication the Han Solo stand-alone film is "coming along great". "It's a fantastic script, a great cast and I am having a fantastic creative experience with it," he is quoted as saying. Howard took over the film from Christopher Miller and Phil Lord after they left the project, citing "creative differences" with producers. **BBC**