

## Could pigs solve our shortage of organ donors?

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It is becoming even easier to leave a little something behind after you bow out. England is starting to follow Wales in introducing an 'opt out' system for organ donations. This is one way to curb the huge disparity between those needing transplants and those who ever receive one. But this is not likely to go far enough.

Families frequently block the donation, regardless of whether their relative had expressed a wish to leave their organs for transplants. Even if all parties consent, it may not be possible to take the organs at all. Only around one per cent of deaths occur in situations in which organs from the deceased can be used. Over 6000 people in the UK are currently on the waiting list for transplants and the



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need for donations from those of black and Asian backgrounds is particularly urgent. In the US, the waiting list exceeds 100 000.

Demand is far outstripping supply. Heads are turning to science for help but their offered solution may not be palatable to all as the scientific community are turning to pigs. On the face of it, pigs are ideal candidates. Organs will be in plentiful supply and they are of similar size to their human equivalents. Research has been stalled however by pig-to monkey transplants being rejected. This occurs because the receiver's immune system mounts a powerful response against the foreign organ.

A revolutionary gene editing technique, CRISPR, might just be able to solve this issue and bring the concept, accompanied by its ethical baggage, to the foreground sooner than many had anticipated. CRISPR stands for Clustered Regularly Interspersed Short Palindromic Repeats and is basically just that; stretches of DNA found in bacteria. CRISPR is a bacterial defence mechanism against parasitic DNA.

The CRISPR genes are flanked by CRISPR-associated (cas) genes and they are always found together. The Cas proteins have the ability to cut DNA at very specific points, using the CRISPR sequences as a guide. Cas9 is particularly important. The beauty of CRISPR-Cas9 is that it is relatively cheap, simple and quick: three very important qualities. It is also very precise. Using this technique, scientists can remove proteins found on the surface of pig organs that identify them as foreign.

This effectively allows the organ to hide in its new body, avoiding detection by the immune system.

Objections to this come from all angles. Many with religious views believe it is unnatural, especially as pigs are considered sacred to some. Vegetarians and vegans are among those likely to find it distasteful.

CRISPR is also a new technology and there is concern among leading scientists that it is speeding ahead without enough regulation. But with a huge number of people requiring urgent transplants, can we afford to not consider it as a viable option?

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