

# Genetically engineered cows are resistant to tuberculosis

Tom Whipple Science Editor

Cows have been genetically engineered to be more resistant to tuberculosis, according to research published yesterday. Scientists were able to produce cows with a gene that conferred protection against TB, but which also seemed to have no other side-effects.

They said that in theory the work could lead to herds of transgenic animals that are less susceptible to one

of the most common diseases in cattle.

At present, TB is considered a significant threat in the dairy industry and is the reason why badger culls are being trialled — the animals are believed to act as a reservoir for the disease. A relatively recent breakthrough has allowed scientists to use a gene editing tool called Crispr Cas9 to remove and replace pieces of the genetic code, opening up the prospect of a future where culls may not be necessary. For

the latest research, published in the journal *Genome Biology*, scientists used the tool to insert a tuberculosis resistance gene. They said the hard part was working out where to put it.

“When you want to insert a new gene into a mammalian genome, the difficulty can be finding the best place in the genome to insert the gene,” said Yong Zhang, from the College of Veterinary Medicine, Northwest A&F University in Shaanxi, China. “You have to hunt

through the genome, looking for a region that you think will have the least impact on other genes that are in close proximity.

“We used a meticulous and methodological approach to identify the best suited region for gene insertion, which we show has no detectable off-target effects on the bovine genome”.

When calves that were modified were tested, they showed an increased resistance to the TB bacterium.

However, other scientists were cautious when interpreting the results. Ian McConnell, from the University of Cambridge, said he thought this particular gene may not confer enough protection to have a significant effect.

He said: “TB in cattle is a bacterial infectious disease affecting many different organ systems. Infection and disease is a complex process involving different components of the immune system in immunity and resistance.”