

Picture: CLARE ARRON



THESE nine-month-old Welsh mountain sheep are living proof that life can be created without the need for sperm, writes Roger Highfield, Science Editor.

Megan and Morag are clones, each made by scientists in Edinburgh from a cell grown in the laboratory and fused with an empty sheep egg by a spark of electricity.

The achievement could have major implications for humans. In theory, it is now feasible to clone human offspring without the participation of a man.

The two sheep are identical to each other and to the animal from which the cells were taken. Originally five clones were produced but three have died — two within minutes of birth and the third within 10 days.

Megan and Morag are too young for scientists to know for certain if they are fertile, but there are no technical reasons why they should not be able to breed.

The next step — within two years — will be to "design" a sheep by adding new genes to a cell before fusion, guaranteeing desirable character-

Where sheep are sheep and men are uneasy

istics, such as an ability to grow quickly, or to produce human proteins for use in drugs. The breakthrough is described today in the journal *Nature* by a team at the Roslin Institute.

The new method can produce an animal by combining one cell taken from a lab-grown line of millions with an empty unfertilised egg that could be harvested from slaughterhouse sheep.

It will thus be easy to genetically engineer huge numbers of animals more precisely than before, said Dr Keith Campbell, of the Edinburgh team.

"It is a major advance in the efforts to make genetically engineered species," said Dr Wilmut. "It does seem to open up a completely new principle." The production of cloned off-



spring in farm animal species, he said, could provide enormous benefits in research, agriculture and

biotechnology. The technique would have to be customised to work in other species. For example, the ability to grow primate embryonic cells in the laboratory makes it possible to use it to clone apes and monkeys.

However, there is no intention, let alone reason, to apply this to humans.

"I hope that no scientist would even consider doing such things," said Dr Bill Colledge of Cambridge University. "It is totally unethical."

Lord Winston, professor of fertility studies at Hammersmith Hospital, London, and Britain's leading expert on test-tube babies, said: "The current 1990 legislation would forbid this being used in the human. There are no plans anywhere in the world

to consider this, so far as I know."

Prof Davor Solter of the Max Planck Institute for Immunobiology in Freiburg, Germany, said producing humans without men is "conceivably possible, technically," but added that some sperm would be required to create the original laboratory-grown cells.

To apply the technique to people would require further advances. Even when used on sheep, the method had a low success rate. And scientists are not yet able to grow the early human embryo cells required for the transfer.

A recent Medical Research Council study published in the *British Medical Journal* suggested that men would be infertile by the middle of the next century. If such a thing came to pass, cloning may one day prove to be mankind's salvation.

Lord Winston added: "I don't think the human male is redundant. I think the human male is unnecessary."

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