Egg-free surrogate chickens produced in bid to save rare breeds

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Hens that do not produce their own chicks have been developed for use as surrogates to lay eggs from rare breeds. The advance -- using gene-editing techniques -- could help to boost breeding of endangered birds, as well as improving production of commercial hens, researchers say. The team at the University of Edinburgh's Roslin Institute targeted a gene called DDX4, which is crucial for fertility. Credit: Norrie Russell, The Roslin Institute

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A team led by the University of Edinburgh's Roslin Institute used a genetic tool called TALEN to delete a section of chicken DNA.

They targeted part of a gene called DDX4, which is crucial for bird fertility.

Hens with the genetic modification were unable to produce eggs but were otherwise healthy, the team found.

DDX4 plays an essential role in the generation of specialised cells—called primordial germ cells—which give rise to eggs.

Researchers say that donor primordial germ cells from other breeds could be implanted into the gene-edited chickens as they are developing inside an egg. The surrogate hens would then grow up to produce eggs containing all of the genetic information from the donor breeds.

The surrogate chickens are the first gene-edited birds to be produced in Europe. Scientists from the US biotechnology company Recombinetics also worked on the project.

The study is published in the journal *Development* and was funded by strategic investment from the Biotechnology and Biological Sciences Research Council.

Lead researcher Dr Mike McGrew, of the University of Edinburgh's

Roslin Institute, said: "These chickens are a first step in saving and protecting rare poultry breeds from loss in order to preserve future biodiversity of our poultry from both economic and climate stresses."

More information: Lorna Taylor et al, Efficient TALEN-mediated gene targeting of chicken primordial germ cells, *Development* (2017). DOI: 10.1242/dev.145367

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