

Surrogacy advance could aid rare chicken breeds

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Hens that cannot produce their own chicks have successfully acted as surrogates for rare chicken breeds.

The advance—using gene-editing techniques—could help to boost breeding of endangered birds and improve production of commercial hens, researchers say.

Scientists injected specialized [stem cells](#)—called primordial germ cells—from another chicken breed into the eggs from the surrogate chickens.

The adult hens then produced eggs containing all of the [genetic information](#) from the other chicken breed.

Genetic tool

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

The researchers 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.

Bird breeds

DDX4 plays an essential role in the generation of primordial germ cells, which gives rise to eggs. The surrogate chickens were the first gene-edited birds to be produced in Europe.

Experts say the cells could potentially be used to help breed birds of other closely [related species](#), as long as a supply of [primordial germ cells](#) is available from a donor bird.

The study, which involved scientists from poultry genetics company

Cobb-Vantress, is published in the journal *Proceedings of the National Academy of Sciences*. It was funded by the Biotechnology and Biological Sciences Research Council, Innovate UK, Horizon 2020 and Cobb-Vantress.

"New ideas are needed if we are to save many of our bird species. These chickens are a first step in saving and protecting rare poultry breeds from loss and preserving future biodiversity of our poultry from environmental and climate changes," says Dr. Mike McGrew, University of Edinburgh's Roslin Institute.

More information: Mark E. Woodcock et al., "Reviving rare chicken breeds using genetically engineered sterility in surrogate host birds," *PNAS* (2019). www.pnas.org/cgi/doi/10.1073/pnas.1906316116

Provided by University of Edinburgh

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