

# Establishment of the immortalized cell line derived from endangered Okinawa rail

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Okinawa rail. Credit: NIES

As part of the cellular conservation of endangered species, a research group initiated a primary cell culture project aimed at preserving endangered avian species in Japan, such as the Okinawa rail. However,

primary cells cannot be cultured indefinitely because of cellular senescence and stresses caused by cell culture. To overcome these cell culture limitations, primary cells must be immortalized. As a result, the researchers obtained the immortalized avian cells with cell cycle regulation gene expression.

The number of critically endangered animals has been increasing in recent years. According to data from the International Union for the Conservation of Nature (IUCN), 1375 avian species are categorized as being [endangered animals](#), and around 12 percent of the endangered species are avian. The conservation of endangered species is an important task for our next generation in order to maintain genetic diversity. The Okinawa rail, which is a species endemic to northern Okinawa Island, is an example of an endangered (EN) avian species. The Okinawa rail is categorized EN on the IUCN red list, because its individual numbers are estimated to be approximately 1500.

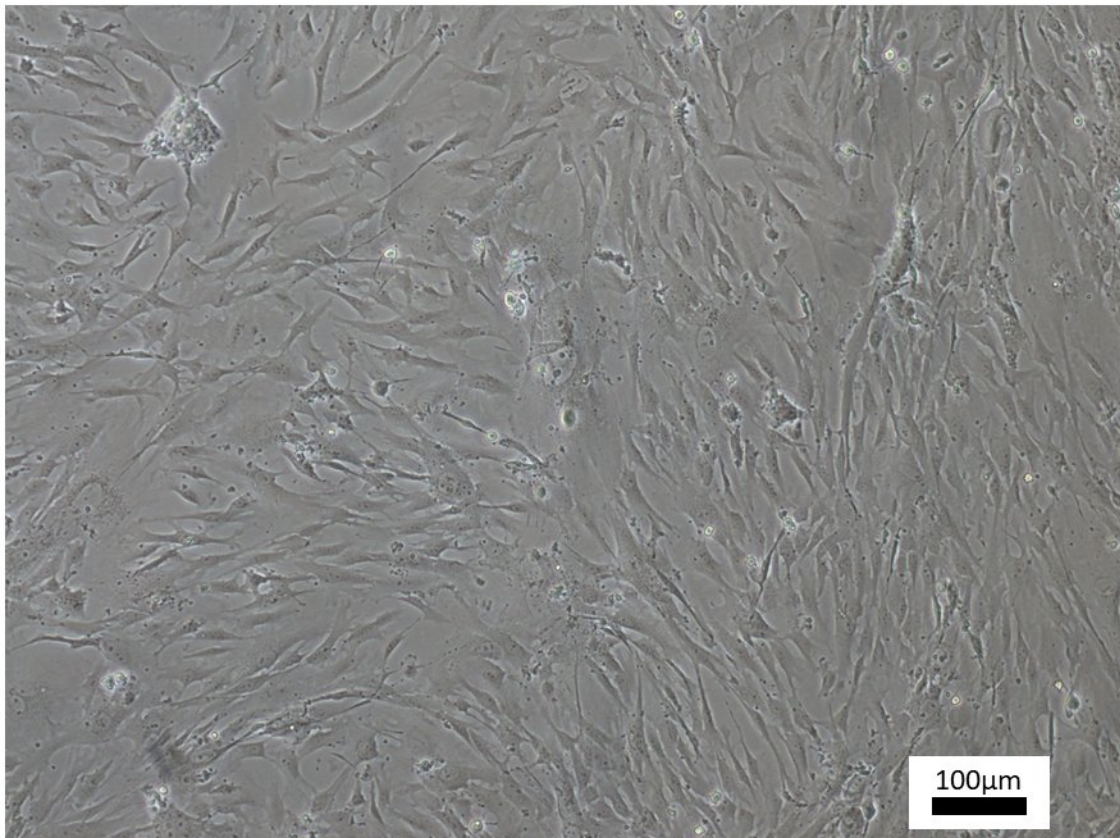
As part of the cellular conservation of endangered avian species, the researchers initiated a primary cell culture project aimed at preserving endangered avian [species](#) in Japan, such as the Okinawa rail. However, [primary cells](#) cannot be cultured indefinitely because of [cellular senescence](#) and stresses caused by cell culture. To overcome these cell culture limitations, primary cells have to be immortalized.

Although immortalized cultured cells are useful for various functional assays or transcriptome analysis, highly efficient and reproducible immortalization methods have not been developed in avian-derived cells. The researchers introduced the simian virus 40T antigen (SV40T) and human papillomavirus (HPV)-E6E7 to chick and Okinawa rail ([endangered species](#)) derived fibroblast. However, neither the SV40T nor E6E7 genes could induce avian cell immortality. Accordingly, the researchers attempted to use a recently developed immortalization method involving the co-expression of mutant CDK4, Cyclin D and

TERT (K4DT method) in the avian cells. Cellular division until senescence was significantly extended by K4DT, although the K4DT method could not induce the efficient immortalization in mass cell population. As a result, the researchers obtained the immortalized avian cells with K4DT expression. They conclude that the K4DT method is useful to extend the cell division and immortalization of avian-derived cells.

The research is published on November 11, 2018 in *Journal of Cellular Physiology*.

The immortalized cell line derived from Okinawa rail (endangered avian species)



*photo by NIES*

The immortalized cell line derived from Okinawa rail (endangered avian

species). Credit: NIES

**More information:** Masafumi Katayama et al, Extended proliferation of chicken- and Okinawa rail-derived fibroblasts by expression of cell cycle regulators, *Journal of Cellular Physiology* (2018). [DOI: 10.1002/jcp.27417](https://doi.org/10.1002/jcp.27417)

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