SEEDS
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Characterization of Two Avian Cell Lines for Use in Studies of Avian Influenza Virus

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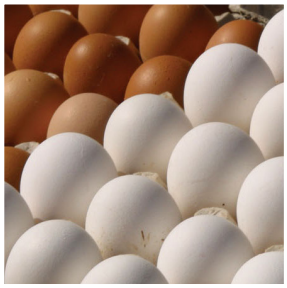
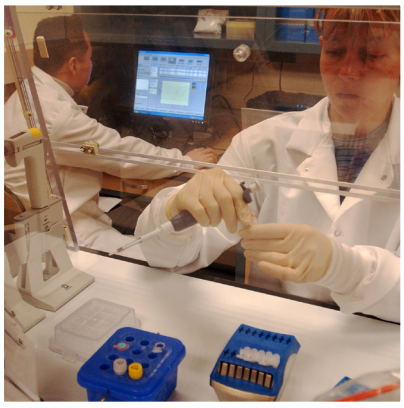


Background

According to the USDA, avian influenza—the bird flu—is caused by type A influenza virus that infects wild birds (such as ducks, gulls, and shorebirds) and domestic poultry (such as chickens, turkeys, ducks, and geese). There is a certain flu virus for birds just as there is for humans. As with people, some forms of the flu are worse than others. Avian influenza is primarily spread by direct contact between healthy and infected birds, and by indirect contact with contaminated equipment and materials. The virus is excreted through the feces of infected birds and through secretions from the nose and mouth.

Isolation of bird flu viruses in specific, pathogen-free, embryonating chicken eggs or cell culture is critical for epidemiologic investigation of outbreaks and for several other purposes including vaccine production. Although embryonating eggs can support the growth of a broad range of influenza viruses, many field viruses do not readily grow in eggs; therefore, obtaining a sufficient number of reliable, high-quality eggs is a considerable limitation in their use. Evidence also shows that the growth of influenza viruses in eggs can lead to the selection of variants that contain antigenic and structural changes in the hemagglutinin (the red blood cell agent) molecule. Many attempts have been made to find suitable alternatives to the use of eggs for virus isolation and research purposes.

However, all the previously studied cell lines are mammalian in origin, and limitations (including the restricted host specificity of the cell and a possible change in receptor specificity) arise when using a mammalian cell line for avian influenza virus study. Thus, it would be ideal to use a well-established avian-origin cell line for avian influenza virus study.



Objectives

This study was conducted primarily to evaluate the characteristics of two avian cell lines and their abilities to support the growth of avian influenza viruses (AIVs) from different species in order to identify a cell substrate with a broad viral susceptibility range for use as an alternative to embryonating eggs.

Impacts

Scientists evaluated the characteristics of two avian fibroblast cell lines, one of chicken origin and one of quail origin, and their ability to support the growth of AIVs obtained from a variety of avian species. The replication efficiency of the AIVs in chicken and quail was comparable to those in primary chicken embryo fibroblast. The study indicates that the chicken and the quail cell lines may be useful for avian influenza virus research in the areas of in vitro host range, molecular pathobiology, and molecular genetics.

In the future, scientists will expand their research scope to further validate the usefulness of these cell lines by testing large numbers of samples from different sources. These avian cell lines will be used to create influenza virus by reverse genetics. Selected influenza isolates will also be studied, both in these cells and in animals, to validate whether the cells can be used in lieu of animals. More research on this worldwide pandemic can potentially curtail avian influenza, saving lives and millions of dollars on every continent.

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