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STUDY ON THE HOST FACTORS INVOLVED IN PATHOGENICITY
OF FOWL PLAGUE VIRUS

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It has been established that proteolytic cleavage activation of the surface glycoproteins of orthomyxo- and paramyxoviruses is a prerequisite for their pathogenicity. On the other hand, the pathogenicity of viruses is based on the host response to virus infection. However, little is known about host factors involved in pathogenicity. To provide information on the pathogenicity of virulent influenza virus, fowl plague virus, host factors are analyzed in the present study.

To define whether the virus itself exhibits toxic effects on chickens, different doses of a virulent strain of influenza virus A/chicken/Pennsylvania/1370/83 (H5N2) were intravenously injected into chickens. All the chickens inoculated with the virus, irrespective of dose, died 3 days post injection. On the other hand, chickens injected with a large dose of inactivated virus survived without showing any signs of disease. These results indicate that the virus itself does not directly act as a toxin and that virus replication is required to cause the death of the chicken. What does virus replication induce in the host cells? Intravenous injection into chickens with the virus-free extract from the chick embryos and the chorioallantoic membranes infected with A/chicken/Pennsylvania/1370/83 (H5N2) resulted in sudden death due to blood coagulation in the vessels. The chickens injected intravenously with heparin prior to intravenous injection with the extract survived without showing any signs of disease. These findings suggest that some coagulation factors exist in the tissues where virus replication occurred and that they resulted the toxic effects. It was noted that the toxicity of the extract was correlated with the virulence of the virus strain used for inoculation. Even in the extract from non-infected chorioallantoic membranes, toxicity was found. Monoclonal antibodies to either structural or nonstructural viral proteins did not neutralize the toxicity. The factors that coagulate the blood, causing sudden death in chickens are likely to be produced in the chorioallantoic cells and released by cell injury due to virus replication.

These results indicate that the coagulation factors may be involved in the pathogenicity of fowl plague virus as 'host factors'.