Studies on the P-Q Variation of Influenza A2 Viruses

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(Received for publication, September 14, 1960)

A variety of markers to differentiate the P phase virus from the Q phase virus among the population of A2 viruses have been proposed from this laboratory, from 1957 to 1958. They are as follows:

1) P virus is more avid to immune sera than Q virus, particularly in hemagglutination inhibition test by using chicken red cells.
2) P virus is more sensitive to α-inhibitors detectable in human plasma or in normal guinea pig serum.
3) Heat stability of hemagglutinins is higher with Q virus than P virus.
4) Bovine red cell agglutinins are detectable only with Q virus but not with P virus.

In this article, the fact that the activity of receptor destroying enzyme is higher with Q virus than when P virus was added as the fifth marker.

In the second place, higher avidity of P virus than Q virus to immune sera was studied further in a critical manner. The result revealed the fact that in hemagglutination inhibition test with human convalescent sera, when human red cells were used instead of chicken red cells, hemagglutinin inhibitory antibody was detectable even with Q virus as an antigen. Secondly, in the complement fixation test with both viral antigens, there was no difference between P and Q in the avidity to fix the antibody contained in human convalescent sera. Thus the idea to assume P virus as the one in an indicator state of Q virus was proposed. In fact, KIO₄ treatment of various Q viruses gave rise to the virus which was susceptible to human antibody and various inhibitors in hemagglutination inhibition test. Treatment of Q virus with formalin or urea did not change the characteristics of Q virus as KIO₄ did. Trypsin treatment of both P and Q virus revealed the fact that they are both fairly resistant to this enzymatic action.

Bovine red cell agglutinin found with Q virus was assumed to be the marker associated to the virus particle, as a whole. Because it was easily lost with ether treatment and was not detectable with the small hemagglutinins derived from Q virus.