The Role of Cholesterol in Hantavirus Entry and Infection of Host Cells

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Hantavirus pulmonary syndrome (HPS) is an infectious disease characterized by flu-like symptoms that can progress rapidly to a fatal respiratory disease. HPS is caused by Sin Nombre Virus (SNV) in North America. Hantavirus infections in humans are not too common, with about 30 known human cases reported in the US annually. However, this virus is among the 5 most deadly viruses in the world, with a mortality rate of 30-40% in those diagnosed. The purpose of this experiment is to determine whether a relationship between cholesterol in the viral membrane and viral infection exists, as cholesterol has been linked to other viral infection processes. Pseudovirions (crippled forms of the viruses) were first engineered due to the danger of the pathogen. The experiment was then performed by using a drug to deplete cholesterol from SNV pseudovirions and analyzing the resulting infection of Vero E6 cells (a cell line commonly used in cell cultures). Infectivity of the cholesterol-depleted viruses was compared with several controls, including cholesterol-depleted cells and bald pseudovirion particles. Data indicated that the lowest concentration of cholesterol-depleting drug applied resulted in an extremely low level of infectivity. The controls confirmed this result. This research showed that cholesterol in the SNV membrane assists in its virulence. This conclusion is vital to understanding how Sin Nombre Virus infects humans, and could be useful in further research. Research of viruses such as HIV, Hepatitis B, and Hepatitis C has shown that drugs targeting viral cholesterol may be useful in treating these viral infections.

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