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The influence of trypsin-like proteinase on the cleavage of hemagglutinin of influenza virus

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Introduction: The current approaches and methods of prevention, control and management of influenza viral infections are based on investigating the virus biology and its interaction with the cell of a susceptible organism. Influenza virions are polymorphic, coated with superficial cover formed by a double layer of lipids, in which glycoproteins are immersed in. Superficial glycoproteins are of two types: Trimers (hemagglutinin HA) and tetrameters (neuraminidase NA). The hemagglutinin carries out the most important for a virus a role of recognition of cellular receptors and virus affixion to a cell with the further infiltration into a cell.

Aim: The main objective of this research was studying the influence of isoforms of a trypsin-like proteinase on the influenza hemagglutinin cleavage.

Materials & Methods: We used the influenza A virus (X-31) and A/Aichi2/68, a single-layer intertwined culture of MDCK cells, radiolabeled ^{14}*C-Chlorella* hydrolyzate (20 μCi/ml), crystalline trypsin 10 μg/ml and seven isoforms isolated from lungs of healthy mice and mice infested with influenza virus. The acid-insoluble radioactivity was measured in aliquots by the Packard Tri-Carb liquid scintillation counter as well as hemagglutinating activity.

Results: Radioactivity of stably bounding influenza virus was registered to be the highest in the A strain (X-31 Extra). Hemagglutinating activity in the strains studied was not high. Trypsin in a dose of 10 μg/ml cleaved hemagglutinin in two subunits HA-1 and HA-2. The isoforms of a trypsin-like proteinase isolated from the lungs of mice infested with influenza virus A/Aichi, in 72 hours after infestation, did not cleave hemagglutinin of influenza virus. Apparently, the isoform, responsible for cleavage of hemagglutinin, was in the insufficient amount that did not provide cleavage of hemagglutinin of the virus or the contact of a virus with ferment was insufficient. The six out of the seven isoforms of a trypsin-like proteinase isolated from treated healthy mice also did not cleave hemagglutinin of influenza virus. The sixth isoform cleaved hemagglutinin of influenza virus into two subunits HA-1 and HA-2, and, moreover, it also cleaved neuraminidase (NA).

Conclusions: Only one isoform (VI-th) of trypsin-like proteinase, isolated from the lungs of healthy mice, possessed ability to cleave the hemagglutinin. Isoforms of trypsin-like proteinase, isolated from the lungs of infested mice did not possess this ability.

Biography

Divocha V A is associated with SE Ukrainian Research Institute for Medicine of Transport, Ukraine. Divocha has published several papers in reputed journals. Divocha is committed to highest standards of excellence and it proves through the authorship of many books. Divocha research interests includes Systems Microbiology, Molecular Biology and Biotechnology.

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