

Abstract

Replication cycles of most DNA and some RNA viruses require translocation of these viruses into the host cell nucleus. In this step viruses must cross the nuclear membrane. In the cell cycle interphase, it can be exceeded only by passing through nuclear pores. Individual virus families have developed different strategies to efficiently translocate through the nuclear pore. In this paper, summarizing the knowledge of viral penetration through the nuclear pore, it is shown that in addition to the interaction with transport receptors, viral particles interact directly with some proteins of the nuclear pore complex, called nucleoporins (NUPs). Especially, one group of nucleoporins, so-called FG NUPs, interacts with viral particles. Their sequence contains naturally disordered domains rich in phenylalanine-glycine (FG) repeats which create selective barrier of the nuclear pore complex. These are mainly nucleoporins NUP153, NUP214 and NUP358. Interaction of viral particles with these nucleoporins allow them to cross this barrier and deliver their viral genome to the host cell nucleus. It is therefore an essential step in the early phase of the viral infection cycle.

Keywords: cell nucleus, nuclear transport, nuclear pore complex, nucleoporins, virus nuclear entry, NUP153, NUP214, NUP358