

Rhinovirus

Rhinoviruses are a genus of viruses which belong to the Picornaviridae family, along with the enterovirus, cardiovirus, aphthovirus and hepatovirus genera. They cause the common cold syndrome.

Morphology

Rhinovirus, like other genera of the Picornaviridae family, are small, non-enveloped, icosahedral viruses. They contain a single-stranded, non-segmented RNA genome and four structural proteins.

Characteristics

Unlike enteroviruses, rhinoviruses are acid-labile, which means they cannot survive in the acidic environment of the stomach and GIT. Furthermore, their optimal temperature of replication is lower than that of body temperature. These two important characteristics allow the rhinoviruses to replicate in the nasal passages.

Replication

Replication of rhinoviruses is similar to that of poliovirus. The incoming parental RNA serves as a template for the creation of a genome-size, negative strand RNA (recall that rhinoviruses contain a single positive strand of RNA), which in turn serves as a template from multiple progeny of positively stranded RNA. This is also referred to as Type I viral replication.

Translation

The rhinovirus genome, like that of the enterovirus, contains a single, long open reading frame, with a highly structured internal ribosome entry site (IRES) on the 5' end directing translation of the viral DNA. Translation results in the formation of a long polypeptide which is then autocleaved into 10 structural and non-structural proteins by viral proteases. The end product also includes the viral RNA polymerase needed to synthesize additional copies of the virus.

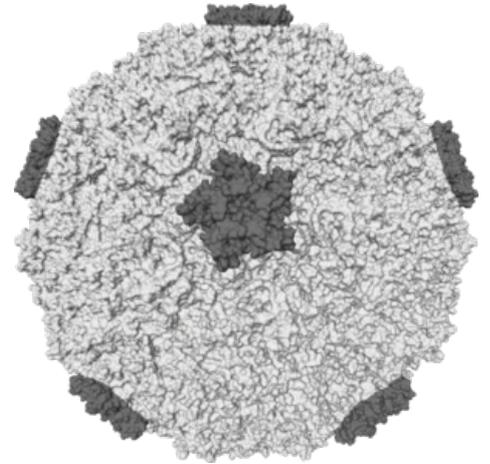
Prevention

The rhinovirus genus has more than 100 serotypes, so, unlike poliovirus which only has 3, it is impractical to create a vaccination against it. In addition, studies have shown that in addition to the rhinovirus' spread by respiratory droplets, it can also spread by hand-to-hand contact. Therefore, pro-active hand washing can be the most useful preventative measure.

Links

Bibliography

HARVEY, Richard A. *Lippincott's Illustrated Reviews: Microbiology*. 2nd edition. 2007. ISBN 0-7817-8215-5.



Molecular surface of the capsid of human rhinovirus 16, one of the viruses which cause the common cold. Protein spikes are coloured grey for visual clarity. The resemblance to a football (soccer ball) is due to the fact that both possess icosahedral symmetry.