How picornaviruses enter the host cell

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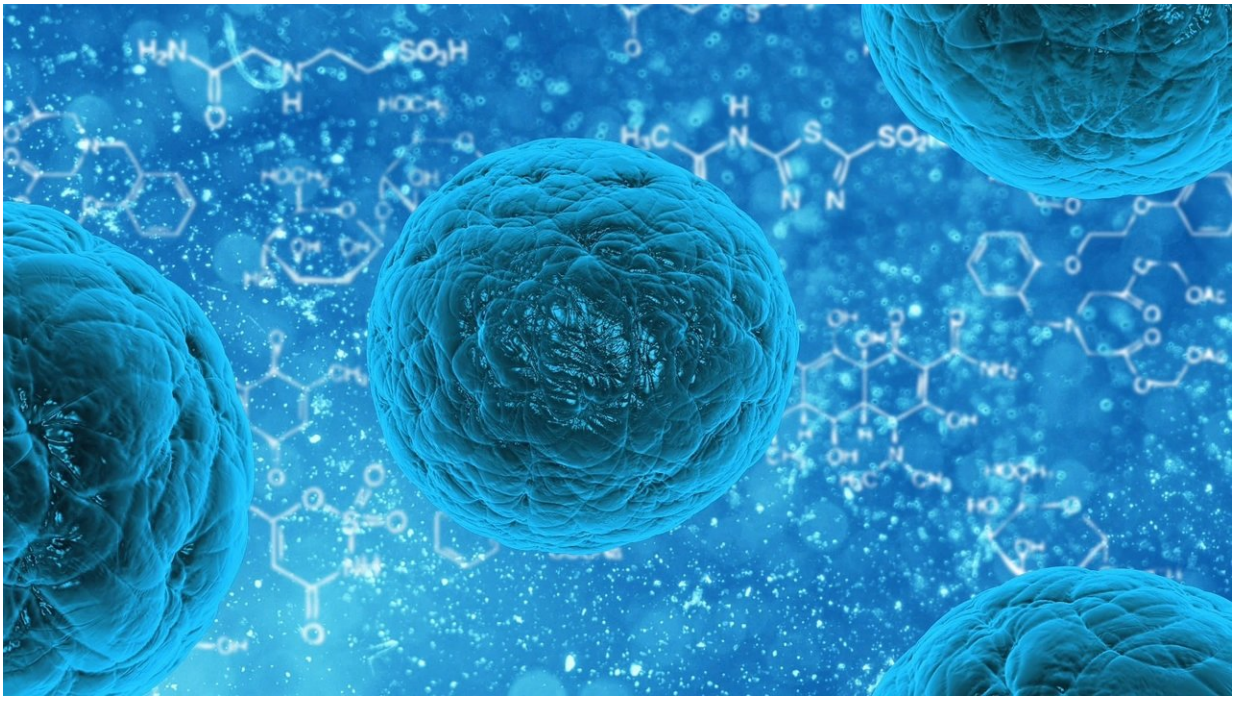

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Picornaviruses comprise a family of viruses that can cause a number of diseases, including polio, meningitis, and in rare cases, myocarditis, encephalitis and paralysis. In a new biomedical science dissertation from Linnaeus University, Helena Vandesande has studied, among other things, how picornaviruses infect the host cell and take over its machinery to replicate more virus particles.

Although the family of picornaviruses has been named after their smallness, they include a large and varied selection of viruses. Perhaps the most notorious of the viruses is the polio virus, which can be traced all the way back to ancient Egypt's lists of epidemics. Unfortunately, the picornaviruses are just as topical today and cause a number of more or less serious diseases, and have a large medical and socioeconomic impact on society. In the dissertation "Infection, early entry events and replication processes of picornaviruses," Helena Vandesande studies how different types of viruses in the picorna family spread, how easily they are transmitted, and how they interact with the cells in the human body.

Her dissertation comprises studies in four projects, each contributing to a better understanding of how picornaviruses replicate in their host cells. These studies also contain information on how picornaviruses spread in society and their propensity for causing disease. Specific pathogens in the virus family that are studied include echovirus 30, coxsackievirus B5, rhinovirus C34, and saffold virus.

Echovirus 30, a picornavirus in the group enteroviruses, is a virus that, despite its role as the primary cause of viral meningitis, has not previously been studied.

"In the dissertation, we have studied how echovirus 30 enters and takes over the metabolism of the infected target cell and we have seen that echovirus 30, at infection, acts in a similar way to other types of enteroviruses," says Helena Vandesande.

In addition to echovirus 30, she has studied coxsackievirus B that can cause everything from digestive problems to pericarditis; rhinovirus C which is the type of virus most frequently responsible for the common cold, though it can also lead to pneumonia and asthma; and saffold virus, which was discovered as recently as 2007 and affects the gastrointestinal tract and respiratory organs.

"At infection with coxsackievirus B, specific proteins determine the relationship between active virus particles and inactive 'empty' virus particles, which affects how effectively the virus can replicate. Furthermore, we demonstrate in the dissertation that rhinovirus C34 shows a limited growth potential in cell cultures. Finally, we have also verified the occurrence of saffold virus in Sweden and show, for the first time, that this virus occurs in some elderly patients with diarrhea," Vandesande explains.

In conclusion, Helena Vandesande's dissertation contributes to a better understanding of how different picornaviruses kidnap the host cell and how changes in the genetic material can affect the virus infection potential. It also contributes to the general knowledge on picornavirus biology and makes it possible to take the first careful steps towards better treatment and care.

More information: Infection, early entry events and replication processes of picornaviruses. lnu.diva-portal.org/smash/record.jsf?pid=diva2%3A1436204&dswid=3461

Provided by Linnaeus University