Investigation of capsid determinants involved in nepovirus transmission : a hybrid structural approach

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Résumé

Arabis mosaic virus (ArMV) and Grapevine fanleaf virus (GFLV) are two picorna-like viruses from the genus Nepovirus, consisting in a bipartite RNA genome encapsidated into a 30 nm icosahedral viral particle formed by 60 copies of a single capsid protein (CP). They are responsible for a severe degeneration of grapevines that occurs in most vineyards worldwide. Although sharing a high level of sequence identity between their CP, ArMV is transmitted exclusively by the ectoparasitic nematode Xiphinema diversicaudatum whereas GFLV is specifically transmitted by the nematode X. index. The structural determinants involved in the transmission specificity of both viruses map solely to their respective CP. We present here a structural study that allowed us to identify a charged pocket involved in specificity of transmission of Nepovirus by hybrid approach combining X-ray crystallography, cryo-electron microscopy, single particle analysis and molecular dynamics methods.

Mots-Clés: structure, transmission, hybrid method, plant virus, crystallography, electron microscopy

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