

MS08-P05 | ATOMIC STRUCTURE OF POTATO VIRUS X, THE PROTOTYPE OF THE ALPHAFLEXVIRIDAE VIRUS FAMILY

Grinzato, Alessandro (University of Padua, Padova, ITA); Kandiah, Eaashisai (ESRF, Grenoble, FRA); Lico, Chiara (ENEA C.R Casaccia, Rome, ITA); Betti, Camilla (ENEA C.R Casaccia, Rome, ITA); Baschieri, Selene (ENEA C.R Casaccia, Rome, ITA); Zanotti, Giuseppe (University of Padua, Padova, ITA)

Potato virus X (PVX) is a ss(+)-ssRNA filamentous plant virus belonging to the *Alphaflexviridae* family. In recent years, PVX has been considered as a tool for nanotechnology applications, in particular in the biomedical field. Here, we present the cryo-electron microscopy structure of the PVX particle at a resolution of 2.2 Å, the highest currently obtained for a flexible filamentous virus. The density of the coat proteins and of the genomic RNA is particularly well-defined and has allowed a detailed analysis of protein-RNA interactions, including those mediated by solvent molecules, within the virion. The PVX particle itself is formed by repeats of segments made of 8.8 coat protein protomers, arranged to form a left-handed helical structure. The viral RNA is inserted in an internal crevice running along the virus length of the particle, packaged in 5-nucleotide repeats in which the first four bases are stacked in the classical way, while the fifth is rotated such that it is nearly perpendicular. The atomic resolution structure of PVX suggests a mechanism for the virion assembly and potentially provides a platform both for the rational design of antiviral compounds working as agonists of the viral genomic RNA to block infection and the use of PVX as a carrier of foreign RNA sequences or polypeptides/chemicals.