Human Parainfluenza Virus Type 3 induces incomplete autophagy for extracellular virion production

With the support by the National Natural Science Foundation of China (Grant No. 81271816) and the Ministry of Science and Technology of China (Grant No. 2012CB518906), Prof. Chen Mingzhou's team at the State Key Laboratory of Virology and Modern Virology Research Center, College of Life Sciences, Wuhan University, reported the Phosphoprotein of Human Parainfluenza Virus Type 3 (HPIV3) blocks autophagosome-lysosome fusion to increase virus production, which was published in *Cell Host & Microbe* (2014, 15(5): 564—577).

HPIV3 is an enveloped virus with a nonsegmented negative-strand (NNS) RNA genome, which is classified in the Paramyxoviridae family, in the order Mononegavirales. Autophagy is a multistep process in which cytoplasmic components, including invading pathogens, are captured by autophagosomes that subsequently fuse with degradative lysosomes. Here, HPIV3 induces incomplete autophagy for extracellular virion production. One viral protein, phosphoprotein (P), is necessary and sufficient for this inhibition of autophagosome degradation and accumulation of autophagosomes in cells, which facilitates extracellular viral production through increasing the ability of virions binding to membranes, but does not influence viral protein synthesis. Furthermore, P hijacks SNAP29, a SNARE protein that was recently described as the key adaptor protein in the process of autophagosome fusion with lysosome, via inhibiting the interaction of SNAP29 with syntaxin17 via two SNARE motifs of SNAP29, but not VAMP8 for the accumulation of autophagosomes. This study introduces a mechanism by which viruses interfere with the function of the SNARE protein to disrupt autophagy maturation.

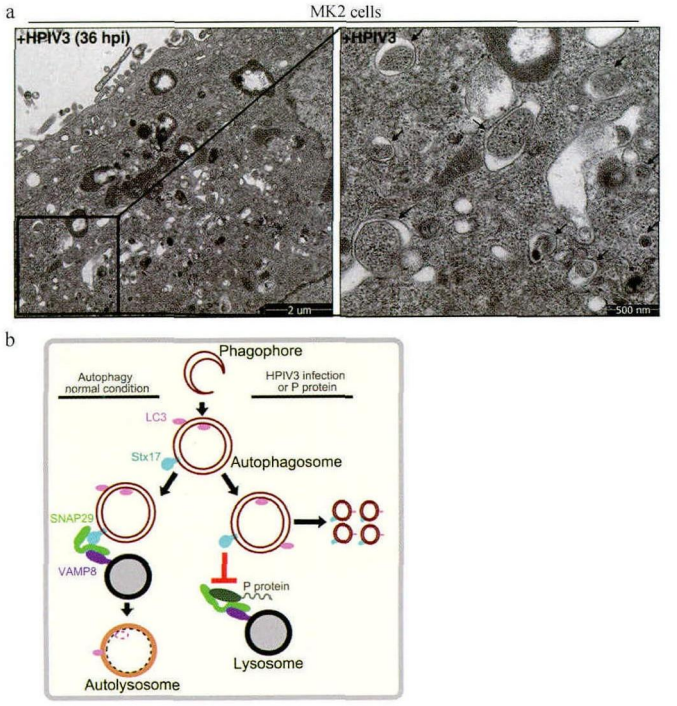

Figure HPIV3 induces incomplete autophagy. a, HPIV3-infected MK2 cells were processed and analyzed for the accumulation of autophagosome via electron microscopy. Black arrows indicate autophagic vacuoles. b, Model of HPIV3 infection or P induced-incomplete autophagy.