Biology of a small RNA virus that infects *Drosophila melanogaster*

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Abstract
Drosophila melanogaster has been extensively used as a model organism to study diverse facets of biology, including host-pathogen interactions and the basic biology of its pathogens. I have used the fruit fly as a model to study elementary aspects of Nora virus biology, such as the role of the different proteins encoded by the virus genome. Nora virus, an enteric virus transmitted via the fecal-oral route, does not cause any obvious pathology in the fly, although the infection is persistent. Nora virus genome consists of a positive strand RNA that is translated in four open reading frames (ORF). Since sequence homology studies did not yield much information about the different Nora virus proteins, I have used the cDNA clone of the virus to construct mutants to identify the specific function of each protein. My results have shown that,

1) The protein(s) encoded by ORF 1 are crucial for the replication of the virus genome.
2) The C-terminus of the ORF 1-encoded protein (VP1), is an inhibitor to the RNAi pathway.
3) The transmembrane domain in the N-terminus of the ORF2-encoded protein (VP2) is important for the formation of Nora virus virions.
4) The ORF 3-encoded protein (VP3) forms α-helical trimers and this protein is essential for the stability of Nora virus capsid.

I have also performed RNA sequencing to investigate the transcriptional response of *Drosophila melanogaster* in response to Nora virus infection and my results indicate that,

5) The upregulation of genes related to cellular stress and protein synthesis and the donwregulation of basal digestive machinery, together with the induction of *upd3*, implies major gut epithelium damage and subsequent regeneration.

Keywords: Nora virus, *Drosophila melanogaster*, virus biology, host-pathogen interaction

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