BIOSYNTHESIS AND CHARACTERIZATION OF RECOMBINANT VIRUS-LIKE PARTICLES OF *TORULASPORA DELBRUECKII* VIRUS TDV-1

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Yeast are widely used model microorganism for virus research. Yeast harbour double-stranded RNA viruses that are considered as non-infectious since no naturally occurring extracellular route of transmission has been identified [1]. Yeast are also an attractive platform to synthesize virus-like particles due to numerous advantages such as capability for post-translational modifications, easy cultivation procedure and high yield of recombinant protein.

In these studies, the dsRNA virus TdV-1 of the *Partitiviridae* virus family was identified in nonconventional yeast *Torulaspora delbrueckii*. *Partitiviridae* virus hosts include filamentous fungi, plants, and protozoa [2]. Therefore, TdV-1 is the first virus to be discovered in non-filamentous fungi, belonging to the *Partitiviridae* family. The aim of the study was to characterize the properties of the capsid encoded by TdV-1 virus. Viral particles of 30 nm in diameter were purified from the wild-type yeast strain of *Torulaspora delbrueckii*. Plasmids encoding recombinant capsid protein were constructed and protein biosynthesis induction in *S. cerevisiae* has been performed. Microscopic analysis of TEM revealed that the recombinant capsid protein is capable of forming virus-like particles of the same size as produced by the wild-type virus. Further studies sought to evaluate the structure of the capsid protein influence on VLPs assembly and cellular localization of the virus. To accomplish these goals, the recombinant capsid protein was fused with the fluorescent protein mCherry and biosynthesis of modified VLPs in *S. cerevisiae* yeast was performed. According to TEM microscopy results, mCherry does not interfere with virus-like particle assembly. Fluorescence microscopy analysis revealed that the capsid protein does not exhibit specific cellular localization.

Results of this study provide the first glimpse on the TdV-1 virus structure so facilitating it‘s applicability in future biotechnologic applications.

[1] R. B. Wickner et al., Viruses and Prions of Saccharomyces cerevisiae, Advances in Virus Research 86, 1–36 (2013).
[2] E. J. Vainio et al., ICTV virus taxonomy profile: Partitiviridae, Journal of General Virology 99, 17-18 (2018).