Role of TIP47 in the interaction between the dengue virus capsid protein and the lipid droplets in liver cells


1 Instituto de Bioquímica Médica Leopoldo de Meis, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brasil.

Dengue is one of the most diffuse arboviroses that represents a public health problem worldwide. The etiologic agent is a flavivirus, dengue virus (DenV). Numerous works showed the association between the replication of DenV and lipid biosynthesis. In a previous study, our group showed that hepatic cell infection by DenV increases the number of lipid droplets (LDs) after 48h and the capsid protein of DenV (PtnC) accumulates on the surface of these organelles, representing a critical step to virus replication. We also showed that the interaction between PtnC and LDs may be mediated by perilipin 3 (TIP47), a protein on LD surface. So, this study aims to analyze LD biogenesis along the infection in Huh7 cells and the participation of TIP47 in this process. Huh7 cells were infected and fixed at 0, 1, 6, 16, 24 and 48 hours post infection (hpi) and labeled with Bodipy® to analyze LDs, and with an antibody against PtnC to verify its location by microscopy. Gene and protein expression of TIP47 was assessed by qPCR and Western blotting, respectively, in cell extracts collected at 6, 16 and 24 hpi. We observed an increase in the formation of LDs from 6h until 48 hpi. Furthermore, the immunofluorescence analysis for PtnC showed this protein dispersed in cytoplasm at early times of infection followed by accumulation on the surface of LDs, more evident 24 hpi. We also observed an increase in TIP47 as well as their gene expression by 1.5 fold 24 hpi. These results show that LD biogenesis during infection may be a connected to the accumulation of PtnC and TIP47 on these organelles, suggesting that these events may be associated. Further experiments will be conducted to better understand the relationship among PtnC, LDs and TIP47 and the control of virus replication.

Keywords: dengue virus; lipid droplets; Tip47