Morphological and molecular studies of murine model tissues experimentally infected with dengue virus serotype 3

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Dengue (DEN) is an acute infectious disease caused by dengue virus (DENV), the most medically important arthropod-borne virus worldwide and a major public health challenge. In this context, the development of animal models for studies of infection and disease caused by DENV is of most importance for many areas of research in DEN, including pathogenesis, immunity, drug and vaccines development. In this study, BALB/c mice were infected with DENV-3 non-neuroadapted for susceptibility, molecular and morphological analysis. Groups of 2 months old male BALB/c mice were infected with DENV-3 by the intravenous route and euthanized 72 hour post-infection. Brain, heart, kidney, lung, spleen and liver were harvested. Part of the tissues was processed by transmission electronic microscope techniques for morphological analysis and part for RNA extraction and viral detection and quantification using real time RT-PCR assay. Our preliminary results, with lung tissue, demonstrated interstitial pneumonia, focus of hemorrhage, oedema, inflammatory infiltrate in the peribronchiolar space and presence of platelets, mononuclear and polymorphonuclear inflammatory cells inside blood vessels. Presence of phyllopodia in endothelial cells, platelets and polymorphonuclear cells could be also observed. Morphological analysis of heart tissue demonstrated platelets and mononuclear inflammatory cells in tissue interstice, focus of hemorrhaghy and disorganization of cardiac muscle fibers. Swelling of cytoplasm and citoplasmic membrane extensions were observed in endothelial cells and mononuclear inflammatory cells, respectively. The viral genome was detected in brain, lung, liver and spleen tissues, and a title suggestive of viral replication was observed in spleen tissue. These results demonstrated the susceptibility of BALB/c mice to the DENV-3. Moreover, we observed, in the lung, morphological alterations similar to the ones reported in human cases of DEN.

Keywords: dengue virus, morphological studies, BALB/c mice.

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