

IL-8 as a potential in-vitro severity biomarker for dengue disease

ABSTRACT

Dengue is a common infection, caused by dengue virus. There are four different dengue serotypes, with different capacity to cause severe dengue infections. Besides, secondary infections with heterologous serotypes, concurrent infections of multiple dengue serotypes may alter the severity of dengue infection. This study aims to compare the severity of single infection and concurrent infections of different combinations of dengue serotypes in-vitro. Human mast cells (HMC)-1.1 were infected with single and concurrent infections of multiple dengue serotypes. The infected HMC-1.1 supernatant was then added to human umbilical cord vascular endothelial cells (HUVEC) and severity of dengue infections was measured by the percentage of transendothelial electrical resistance (TEER). Levels of IL- 10, CXCL10 and sTRAIL in HMC-1.1 and IL-8, IL-10 and CXCL10 in HUVEC culture supernatants were measured by the ELISA assays. The result showed that the percentage of TEER values were significantly lower in single infections ($p < 0.05$), compared to concurrent infections on day 2 and 3, indicating that single infection increase endothelial permeability greater than concurrent infections. IL-8 showed moderate correlation with endothelial permeability ($r > 0.4$), indicating that IL-8 may be suitable as an in-vitro severity biomarker. In conclusion, this in-vitro model presented few similarities with regards to the conditions in dengue patients, suggesting that it could serve as a severity model to test for severity and levels of severity biomarkers upon different dengue virus infections.