

Dengue and COVID-19: two sides of the same coin

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Abstract: Many countries in Asia and Latin America are currently facing a double burden of outbreaks due to dengue and COVID-19. Here we discuss the similarities and differences between the two infections so that lessons learnt so far from studying both infections will be helpful in further understanding their immunopathogenesis and to develop therapeutic interventions. Although the entry routes of the SARS-CoV-2 and the dengue virus (DENV) are different, both infections result in a systemic infection, with some similar clinical presentations such as fever, headache, myalgia and gastrointestinal symptoms. However, while dengue is usually associated with a tendency to bleed, development of micro and macrothrombi is a hallmark of severe COVID-19. Apart from the initial similarities in the clinical presentation, there are further similarities between such as risk factors for development of severe illness, cytokine storms, endothelial dysfunction and multi-organ failure. Both infections are characterised by a delayed and impaired type I IFN response and a proinflammatory immune response. Furthermore, while high levels of potent neutralising antibodies are associated with protection, poorly neutralising and cross-reactive antibodies have been proposed to lead to immunopathology by different mechanisms, associated with an exaggerated plasmablast response. While there are many similarities between dengue and SARS-CoV-2 infection, there are also key differences especially in long-term disease sequelae. Therefore, it would be important to study the parallels between the immunopathogenesis of both infections for development of more effective vaccines and therapeutic interventions. Although SARS-CoV-2 is reported to have infected over 500 million individuals with at least 6.2 million individuals succumbing to COVID-19 by April 2022 [90], the true direct and indirect death toll due to COVID-19 is estimated to be much higher [126]. Despite the availability of several safe and effective vaccines for COVID-19, the emergence of SARS-CoV-2 variants that evade immunity has posed challenges in controlling outbreaks.

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