Dengue – Updates and prevention strategies

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ABSTRACT

Dengue disease has become a significant and growing global public health concern, particularly in tropical and subtropical regions of the world. The disease is estimated to cause around 56 million cases and up to 40,000 deaths annually. The primary vectors responsible for dengue transmission are Aedes mosquitoes, which thrive in urban centers, leading to widespread transmission. This situation has been further exacerbated by the impacts of climate change, which have contributed to increased mosquito survival, reproduction, and biting rates, ultimately resulting in longer dengue transmission seasons.

The severity of dengue disease is influenced by interacting factors such as the specific dengue virus strain, the age of the patient, the immune status of the host, as well as host genetic variability. A phenomenon known as antibody-dependent enhancement best explains the correlation between the vascular permeability syndrome and second heterotypic dengue virus infections, as well as infections in the presence of passively acquired antibodies. Growing evidence from in vivo and in vitro studies indicates that the dengue viral non-structural protein 1 (NS1), plays a key role in the pathogenesis of severe dengue disease, triggering endothelial dysfunction, platelet abnormalities, and vascular leakage.

With no effective vaccine or antiviral treatment currently available, the primary focus for addressing the dengue burden has been on implementing preventive strategies. These strategies aim to combat the disease-carrying mosquitoes and reduce human-mosquito interactions. This topic provides a comprehensive summary of the latest developments in dengue research, including updates on epidemiology, pathogenesis, vaccine development, progress in antiviral medication development, novel therapeutic approaches, and advancements in vector control methods.