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A Brief on Exploring Knowledge about Vaccine Generation from Snake Venom

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Abstract: *As expected, several new variants of Severe Acute Respiratory Syndrome-CoronaVirus-2 (SARS-CoV-2) emerged and have been detected around the world throughout this Coronavirus Disease of 2019 (COVID-19) pandemic. Currently, there is no specific developed drug against COVID-19 and the challenge of developing effective antiviral strategies based on natural agents with different mechanisms of action becomes an urgent need and requires identification of genetic differences among variants. Such data is used to improve therapeutics to combat SARS-CoV-2 variants. Nature is known to offer many bio therapeutics from animal venoms, algae and plant that have been historically used in traditional medicine. Among these bio resources, snake venom displays many bioactivities of interest such as antiviral, antiplatelet, antithrombotic, anti-inflammatory, antimicrobial and antitumor. COVID-19 is a viral respiratory sickness due to SARS-CoV-2 which induces thrombotic disorders due to cytokine storm, platelet hyper activation and endothelial dysfunction. Wnt dependency and Lgr5 expression define multiple mammalian epithelial stem cell types. Under defined growth factor conditions, such adult stem cells (ASCs) grow as 3D organoids that recapitulate essential features of the pertinent epithelium. Here, we establish long-term expanding venom gland organoids from several snake species. The newly assembled transcriptome of the Cape coral snake reveals that organoids express high levels of toxin transcripts. Single-cell RNA sequencing of both organoids and primary tissue identifies distinct venom-expressing cell types as well as proliferative cells expressing homologs of known mammalian stem cell markers. A hard-wired regional heterogeneity in the expression of individual venom components is maintained in organoid cultures. Harvested venom peptides reflect crude venom composition and display biological activity. This study extends organoid technology to reptilian tissues and describes an experimentally tractable model system representing the snake venom gland*

This review aims to:
(1) present an overview on the infection, the developed thrombi-inflammatory responses and mechanisms of induced thrombosis of COVID-19 compared to other similar pathogenesis; (2) underline the role of natural compounds such as anticoagulant, antiplatelet and thrombolytic agents; (3) investigate the management of coagulopathy related to COVID-19 and provide insight on therapeutic such as venom compounds. We also summarize the updated advances on antiviral proteins and peptides derived from snake venoms that could weaken coagulopathy characterizing COVID-19.

Keywords: SARS-CoV-2 variants, COVID-19, Snake venoms, Coagulopathy, Antiplatelet peptides, Antithrombotic compounds.

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