Mechanistic Similarity of Immunomodulatory and Antiviral Effects of Chloroquine and Quercetin (The Naturally Occurring Flavonoid)

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Abstract

In the Pandemic of COVID-19 infection by SARS-CoV-2, no longer the age and preliminary health status are barriers against this disease associated morbidity and mortality. A dysregulated immune response and an exaggerated cytokines release are reported to be in the background of the disease. Although the loss of taste and smell has been reported in post-viral infection complications, in COVID-19 are the early alarming symptoms in which the disease begins with in its pathogenesis. This manifestation is in line with the clinical presentation of acute zinc deficiency. In COVID-19, the pathogenesis can be possibly explained as zinc ion redistribution and acute immune cellular dysfunction due to serum zinc deficiency as reported in various studies on sepsis. Studies reported that zinc deficiency results in multiple immunological changes with a shift towards a predominantly innate immune response, which is not as effective in viral immune clearance as the adaptive immune response. Notably, micronutrients homeostasis play a key role in maintaining a healthy immune response especially vitamin C , vitamin D , Zinc and magnesium. Zinc is considered as the gatekeeper of the immune system. Current studies on zinc ionophores especially, chloroquine (CQ) and quercetin (QC), reported an effectiveness in COVID-19 morbidity and mortality with an early administration. These Zinc-ionophores are able to concentrate zinc intracellularly. Concerns about CQ safety, response polymorphism, pH-dependent efficacy and CQ resistance were studied in malaria treatment. Quercetin is a lipid- soluble, naturally occurring flavonoid, available as a safe supplement with chloroquine-like actions. It is postulated that zinc supplementation combined with zinc-ionophores may offer dual antiviral and immune modulatory effects in favor of both the maintenance and the resetting of an effective cell-mediated immune response.

Key words: Zinc , Zinc-ionophores , Chloroquine , Quercetin , COVID-19 , dysregulated immune responses.