Applied Cell Biology

ISSN : 2320-1991 Online
ISSN : 2320-1983 Print
Volume 8 Issue 3

Letter to the Editor
Appl Cell Biol, 8(3), 2020 [49-49]

Letter to the editor: Selenium supplementation in the prevention of coronavirus infections (COVID-19)

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It was recently reported by Zhang et.al. [1] that selenium (Se) status is associated with the outcome of COVID-19 in China. In 2002 Margaret Rayman argued for the increased Se status, but did not provide a possible mechanism for this association [2]. In this Letter I suggest that one form of Se, specifically sodium selenite oxidizes sulfhydryl groups (-SH) in the active site of the viral protein disulfide isomerase (PDI) according to the following formula:

$PDI\text{-}(SH)_2 + Se^{+4} \rightarrow PDI\text{-}SS\text{-}PDI + Se^{+2}$.

In this way PDI loses its capacity to enter and consequently infect healthy cells. It should be, however, strongly emphasized that only sodium selenite with four-valent cation (Se+4) acts as an oxidant by accepting two electrons. It is of interest to note that six-valent selenium (Se+6) is devoid of this property. The same mechanism was argued to be operative in the inactivation of Ebola virus infections [3]. That the oxidation mechanism is essential for the inactivation of viral virulence is best exemplified by the composition of surface disinfection agents containing powerful oxidants such as hydrogen peroxide, hypochlorite, and phenol [4].

Thus, sodium selenite can be an inexpensive and practically non-toxic chemical substance for the prevention of COVID-19 infections. Potential toxicity and oral doses are similar to those suggested for the treatment of cancers, ranging from 500 ugm to 1,000 ugm per day [5].

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Citation: Lipinski B (2020) Letter to the editor: Selenium supplementation in the prevention of coronavirus infections (COVID-19). Appl Cell Biol, 8(3), 2020 [49-49]