



Could silver nano-particles control the 2019-nCoV virus?; An urgent glance to the past

Seyyed Amir Siadati,^{a,*} Mohsen afzali,^b and Mehdi Sayadi^b

^a Department of Chemistry, Qaemshahr Branch, Islamic Azad University, Qaemshahr, Iran

^b No.702, Navab st, Azadi st, Tehran, (P.O.BOX: 14195-371) Iran

Corresponding Author Email: Chemistry_2021@yahoo.com (Siadati)

ARTICLE INFO

Article history:

Received 20 March 2020

Received in revised form 25 March 2020

Accepted 27 March 2020

Available online 27 March 2020

Keywords:

2019-nCoV

corona virus

outbreak

nano-silver

virus inhibition

ABSTRACT

2019-nCoV, this tiny crowned virus, which was first spread from Wuhan, China, killed thousands of peoples in China, Italy, Iran, and Spain, in a very short period of time. Now, it reaches to most countries all around the world, and thus, it becomes one of the most important threats against all human race. The fact is, the outbreak of this virus showed us, how much our science about the new viruses is weak and insufficient. In the near future, we have to revolutionary increase our knowledge about viruses and controlling those species.

Due to the recent reports about the effect of silver nanoparticles (AgNPs) (in vitro and in vivo) on corona virus family especially influenzas, in this study, we have made attempts to take a glance on the effect of AgNPs on the viruses, and ask ourselves "may nano particles inhibit the 2019-nCoV?".

1. Introduction

Scientific researches reveal about the unique nature of nanoparticles in developing novel diagnostic and antimicrobial agents by these tiny materials [1,2]. As the amazing effects of nanoparticles in a wide range of applications like using in biosensors, bio-labels, and cancer treatment are recognized, the attention of scientists for potential use of those nano-scale materials for other medicinal operations increases [3].

The antimicrobial properties of metal nanoparticles especially for the case of silver element, have received a considerable attention due to the physicochemical properties of those in bioactivities [4]. As described in following, the silver nano particles (AgNPs) have shown significant antimicrobial effects and were also considered as an option for antiviral activations [5].

Despite the fact that the amount of investigations on the interaction between different types of AgNPs with viruses is limited, a number of reports revealed about this important issue. For example, the Interaction of AgNPs with HIV-1 was investigated as the AgNPs inhibit the virus from binding to host cells, demonstrated in vitro [6]. Another report claimed that AgNPs show

anti-HIV activities at an early stage of viral replication; via binding to gp120, somehow it prevents CD4-dependent virion binding, fusion, and infectivity. It results in acting as an effective virucidal agent against both cell-free and cell-associated viruses. On the other hand, the report says, AgNPs would inhibit the post-entry stages of the HIV-1 life cycle [7]. Also, the in vitro and in vivo study for potential application of AgNPs in controlling the infectivity of Rift Valley fever virus (RVFV) was performed by Borrego and colleagues [8].

A report revealed that respiratory syncytial virus could be interacted by a modified AgNPs 44% efficiency [9] which leads that to be a candidate for further studies as a candidate to be used against the mentioned virus. In another report, Lu, and co-workers discovered that AgNPs are able to inhibit the formation of intracellular HBV RNA. The AgNPs with mean diameters of approximately 10 nm and 50 nm were synthesized by from AgNO₃ in HEPES buffer. The in vitro anti-HBV activities of those particles were determined using the HepAD38 cell line as the infection model [10]. In addition, a report describes that AgNPs capped with