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Hot Topic

Chloroquine for the 2019 novel coronavirus SARS-CoV-2

A movement to reposition drugs has been initiated in recent years [1]. In this strategy, it is important to use drugs that have been proven to be harmless and whose pharmacokinetics and optimal dosage are well known. In the current episode of novel coronavirus (SARS-CoV-2) emergence [2], we find a spectacular example of possible repositioning of drugs, particularly chloroquine. We had 20 years ago proposed to systematically test chloroquine in viral infections because it had been shown to be effective *in vitro* against a broad range of viruses [3,4]. This drug has multiple activities, one of which is to alkalise the phagolysosome, which hampers the low-pH-dependent steps of viral replication, including fusion and uncoating [4]. Other mechanisms of antiviral activity are poorly explained [5].

At the time of the severe acute respiratory syndrome (SARS)-associated coronavirus epidemic [6] in 2003, several molecules were tested to assess their effectiveness against this virus. Among these, teicoplanin [7], an antistaphylococcal agent, had proven efficacy *in vitro*, and this was also the case for chloroquine, at a 50% effective concentration (EC_{50}) of approximately 8 µM, and when added to the cell culture either before of after exposure to the virus [5,8–10]. These findings ended up being forgotten because of the disappearance of SARS for reasons that are neither clear nor explained [11]. The novel coronavirus currently isolated in China has been, with staggering speed, evaluated regarding its sensitivity to already used drugs [12]. Thus, the new antiviral drug remdesivir [13] as well as chloroquine, at an EC_{50} of 1.1 µM, were found to be effective in preventing replication of this virus [12]. Chloroquine is perhaps one of the most prescribed drugs in the world [14,15]. As a matter of fact, all Europeans visiting malaria-endemic geographic areas for decades received chloroquine prophylaxis and continued it for 2 months after their return. In addition, local residents took chloroquine continuously, and treatment of malaria has long been based on this drug. In addition, hydroxychloroquine has been used for decades at much higher doses (up to 600 mg/day) to treat autoimmune diseases [16]. It is difficult to find a product that currently has a better established safety profile than chloroquine. Furthermore, its cost is negligible. Hence, its possible use both in prophylaxis in people exposed to the novel coronavirus and as a curative treatment will probably be promptly evaluated by our Chinese colleagues. If clinical data confirm the biological results, the novel coronavirus-associated disease will have become one of the simplest and cheapest to treat and prevent among infectious respiratory diseases.

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