



# Protection of Parasites Against COVID-19 and Other Viruses

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Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This disease started in China in December 2019 (1). However, the spread of the virus is slower than expected in Africa. A new study was conducted by researchers at Makerere University and the London School of Hygiene and Tropical Medicine and published in *medRxiv* in May 2019 which focused on finding any possible link between the low risk of infection and parasitic infections (1,2).

## Immunomodulators in Parasitic Infestation

Parasitic infestations are widespread in Africa. Many parasites live for years in their hosts, without producing significant symptoms. This is due to the interplay of immunity and tolerance. In other words, sterilizing immunity, or developing an immune response strong enough to eliminate the pathogen, is rarely achieved. However, the count and distribution of the parasites are kept in check, allowing the host to live a more healthy life. Therefore, it may be inferred that parasites are excellent immunomodulators. This knowledge has been used to treat inflammatory conditions such as multiple sclerosis and inflammatory bowel disease, where the parasite excreta is modified to act as an immune-tolerogenic substance. This led to the hypothesis that parasitic incidence could be responsible for the low number of cases and a reduced number of deaths in Africa (3).

## The Current Study

The current study aimed to examine the possible link between endemic parasitic infections and the number of COVID-19 cases and fatalities in each of the six WHO regions. The researchers collected data on the number of cases and deaths from the WHO. They compared it to the data from the 2019 report on world malaria cases and deaths and the 2018 data for schistosomiasis and helminthic infestations. After collecting the country-specific and regional data on COVID-19 cases and

## Biosketch

Assistant Professor Dr. Yagoob Garedaghi was born in 1970 in Tabriz, Iran. In 1995, he graduated from Tabriz Branch, Islamic Azad University, Iran. He completed his specialty in Parasitology (PhD) at Islamic Azad University Tehran Science and Research Branch, Tehran, Iran between 2002 and 2007. In 1997, he was employed and started to work at the Department of Parasitology, Faculty of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran. At the national and international level, he has published 90 scientific papers, has written 3 books, and has received over 300 citations for his articles. His main research interest is Medical and Veterinary Parasitology and Epidemiology Sciences. He is already Head of the Department of Parasitology in Tabriz Branch, Islamic Azad University, Tabriz, Iran and active member of the Iranian Society of Parasitology (ISP). At present, he is a member of the Editorial Board of Crescent Journal of Medical and Biological Sciences and Chief Editor of the International Journal of Medical Parasitology and Epidemiology Sciences.



deaths, the incidence and deaths of malaria, as well as the prevalence and endemicity of schistosomiasis and helminth, they carried out an ecological analysis (4). They found that 42% of countries had endemic malaria, 33% had endemic schistosomiasis, and 50% had endemic helminthiasis.

## The Inverse Relationship Between COVID-19 Incidence and Endemic Parasitoses

The researchers found that the incidence of COVID-19 was inversely related to that of malaria and soil helminths. In other words, countries with a high incidence of malaria had a low risk of COVID-19. At the same time, those with endemic helminth infestation transmitted through soil or schistosomiasis were at a lower risk for COVID-19. Africa represented less than 1% of all cases and 0.4% of deaths, though it had 17% of the world's population. In contrast, Europe, with its relatively sparse population, had 46% of COVID-19 cases and almost 60% of global deaths. However, Africa had 93% of the world's malaria cases, almost 90% of *Schistosoma* infestations, and a quarter of all soil-transmitted helminths. Europe had only 0.55% of helminth infections and zero malaria or schistosomiasis cases in 2018. The United States of America had about

42% of COVID-19 cases and 33% of deaths, but it had only 0.4% of malaria cases, 0.7% of schistosomiasis cases, and 5% of helminthiasis worldwide in 2018. The mean number of COVID-19 cases ranged from 192 to 315 in countries endemic for malaria, schistosomiasis, and helminthiasis. A telling comparison was made based on the mean number of COVID-19 cases between the WHO African regions and the Eastern Mediterranean and Europe (153 vs. 2344 and 2127 cases, respectively). The inverse correlation indicates that countries with endemic malaria, schistosomiasis, and helminthiasis would be unlikely to have 600 or more cases of COVID-19. However, if adjusted for multiple factors, this correlation disappears (5) (Figure 1).

### The Hypothesis

An earlier theory was that the molecular and genetic variation in host cells as a result of endemic malaria reduces the susceptibility of the host to COVID-19. The current study extends this protection to schistosomiasis and helminthiasis as well. Similarly, other research suggests that BCG vaccination also negatively correlates with COVID-19 cases and deaths.

### Conflict of Interests

None.

### Ethical Issues

Not applicable.

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**Figure 1.** Eggs and Larva of Some Parasitic Helminthes.

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