Old vaccines can fight new pandemics like COVID-19

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Vaccines against polio, TB and measles can serve as protection against COVID-19, according to a new study. Credit: Torstensimon (https://pixabay.com/users/torstensimon-5039407/) from Pixabay (https://pixabay.com/photos/5895477/)

Inoculation with live attenuated vaccines (LAV) such as those used against TB, polio or measles can stimulate the immune system to provide protection against other infectious diseases, including COVID-19, says a new study.

People who have been inoculated with one or more LAVs but have no access to the new, specific vaccines against COVID-19—typically because they are expensive or in short supply—may have some protection during the current pandemic, according to the study.

LAVs use a weakened (or attenuated) form of the pathogen or germ that causes a disease. These vaccines are similar to the natural infection they help prevent, and create a strong and long-lasting immune response, often over a lifetime, according to the World Health Organization (WHO).

According to the authors of the study published in *PNAS*, older live attenuated vaccines could also afford protection from other emerging viruses.

Attenuated viruses or other pathogens will grow in a vaccinated person, and stimulate an immune response, but are too weak to cause disease.

Robert Gallo, an author of the study, says it is important to bring up this topic now to raise awareness of the entire field. "The practicality is to make people think about the potential for these broad vaccines to be able to be used at the start of a pandemic and to fill in the gap before specific vaccines are available—and be considered in those regions of the world where getting the specific vaccines may be too costly or delayed.

"There is no disadvantage to LAVs, or broad vaccines, as they only last a few months. But we think there is a great chance of saving many lives.LAVs are inexpensive, readily available, and not harmful."

According to Gallo, whose team of scientists helped discover the HIV virus, it has been shown in medical literature as far back as 1972 that LAVs can play a role in limiting an epidemic or pandemic. "For example, during a big Russian study of influenza, researchers observed that people vaccinated with oral polio vaccine had far less influenza."

Gallo believes that in the future, many people who face a new epidemic or pandemic for which there is no vaccine or therapy, will benefit from the research. This also could be the case if current vaccines are not effective with any new SARS-CoV-2 variants, he says, stressing that LAVs do not interfere with specific vaccines for a disease but are likely to improve response to those vaccines.

Stanley Plotkin, emeritus professor at the University of Pennsylvania, says there should be a push for older vaccines in addition to making certain COVID-19 vaccines available in the developing world.

Plotkin, who developed the rubella vaccine and has worked on vaccines for anthrax, polio, rabies, and rotavirus, says because COVID-19 vaccines will not be widely available for populations in developing countries for many months, "a degree of resistance to the coronavirus could be induced in a significant part of the population by giving vaccines against other diseases like BCG and the vaccine against TB, which will stimulate the immune system and give partial protection.

"The non-specific protective effects of certain vaccines have been demonstrated by many studies, and until there is enough vaccine against COVID-19 to immunize everyone in the world, taking advantage of non-specific immunity could save lives," says Plotkin.

Gallo says non-specific protection from vaccines is a field that has been underappreciated. "It needs funding and visibility," he adds. "You should know that this is how bats handle coronaviruses without getting ill—through innate immune mechanisms that are present all the time in contrast to many other mammals."

More information: Konstantin Chumakov et al, Old vaccines for new infections: Exploiting innate immunity to control COVID-19 and prevent future pandemics, *Proceedings of the National Academy of Sciences* (2021). DOI: 10.1073/pnas.2101718118