

Immune system response to the Covid 19 virus and 3rd boosters

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Abstract

A recent finding that the two-dose vaccination for the Covid-19 virus leads to a rapid loss of protection in many patients within 6 months. Thus the need for a 3rd injection has been found to be mandatory for continuing protection, as well as to highlight the need to monitor immune compromised patients and those with comorbidities particularly in indigenous populations where co-morbidities may be present preventing an adequate response to the initial vaccination. This has also highlighted the problem of lack of vaccines in the less developed parts of the world that requires urgent attention, as this is where new variants arise. The virus must be contained in these countries before we run out of letters in the Greek alphabet.

Key words: Covid 19, virus, vaccines, 3rd injection, immunity, mutations, WHO

Summary

The immune system is unique to each individual depending on the stimuli received during a person's life. It is well accepted that the immune system responses does diminish in the elderly but at a variable rate. It is known that Covid19 antibody levels after infection and/or vaccination will vary according to age and gender (1). Israel as the first country to mass vaccinate its population for Covid-19, in an arrangement with Pfizer Inc, where it agreed to share all details of the result with Pfizer and hence the general community. Thus, its early papers and subsequent results should be regarded seriously as they would be a forewarning of things to come in countries that are only now reaching high levels of vaccination.

Recently the Israeli press reported that Covid-19 cases in Israel have been rising sharply since July despite the high vaccination rate achieved by February 2021. New daily cases there reached an all-time high of 12,113 on August 24 2021, surpassing the January peak of 11,934.

What is now known to be a 4th wave of infection sparked by the Delta mutation Covid-19 cases in Israel were reported as rising sharply since July despite the high vaccination rate achieved by February 2021. The Israel Center for Disease Control – ICDC noted that the number of new confirmed patients of COVID-19 in Israel between 2/5/21 and 3/8/21 went from low double figures to almost 4000 (2)

New daily cases in the country reached an all-time high of 12,113 on August 31st, surpassing the January peak of 11,934 (3).

It had been noted in a study conducted at 17-hospital study, that many older patients with other pathologies and immunosuppression are more prone to severe Corona-19 virus infection and even after being fully vaccinated (4). Importantly as reported in a paper in the New England Journal of Medicine (5) number of patients vaccinated against the virus can have a much lower level of antibodies than other inoculated individuals and are therefore more at risk to get infected, They report that 39 breakthrough cases of Covid-19 were detected through RT-PCR testing of 1,497 of their vaccinated workers between January 20 and April 28. In 37 of these cases, the suspected source was an unvaccinated person. None of the infected workers required hospitalization. However, at six weeks after their diagnosis, 19% reported having long Covid symptoms including a prolonged loss of smell, persistent cough, fatigue, weakness, dyspnea, or myalgia.

As a result of these studies and a reported rising infection in fully vaccinated patients, The Israeli Department of Health recommended a 3rd booster vaccine to all its eligible citizens. This was based on the information in the medical records of tens of thousands of members of Israeli HMO Leumit Health Funds, that suggested that people vaccinated before late February 2021 were currently twice as likely to experience a breakthrough SARS-CoV-2 infection than are people vaccinated since late February. It is uncertain whether this is because most early vaccinators were elderly and/have waned waning over time.

Initial reports in Israel following the 3rd booster suggested that antibody titers in the patients receiving a third booster rose by a factor of 10-20 times(6). Subsequently it has been reported in the press that this was successful with cases and hospitalisation were falling dramatically.

Following this, much of Europe, the UK and the USA confirmed that they intend to commence a 3rd booster vaccination project.

A trial of 4868 vaccinated hospital workers in a 6-month longitudinal prospective study who were tested monthly for the presence of anti-spike IgG and neutralizing antibodies after vaccination. This showed how the fall in IgG antibodies decreased and varied as depending on age, immunosuppression and gender they noted obesity as being a further important factor(7). Even in a group that had participants who were still working and thus did not include the very sick elderly who would be most susceptible to a fall in the level of antibodies and thus most likely require a booster earlier the age related fall in immunity levels was significant. Further transplant patients appear to have developed enhanced immunity following a 3rd injection (8)

On the 4th August 2021 the Director of the World Health Organization noted after the announcement of the 3rd dose of vaccine being recommended. "And yet even while hundreds of millions of people are still waiting for their first dose, some rich countries are moving towards booster doses." Noting that in the poorer countries' vaccines were very hard to obtain as the richer countries had pre bought a majority of the vaccine production (9). He asked the "rich world" not to pursue COVID-19 vaccine boosters, citing lack of evidence of need and asking such nations to wait until the poorer nations had been able to vaccinate their citizens. He asserted that the rich countries appear to have bought the vast majority of vaccines for their populations, leaving poorer countries unable to effectively vaccinate their citizens.

These so-called rich countries are in the main democratic with an elected parliament and an active opposition. This intervention shows a complete lack of understanding by the Director-General of how democracies function. No leader of a democratic country with a proper opposition would survive the voter's wrath by stating in these current pandemic vaccines that would protect the citizens from illness and death should be sent to a third world country.

Yet this is exactly what must happen as the more the virus that is allowed to circulate the more variants will spring up. We are in the midst of the Delta (Indian) variant that is causing havoc in the vaccinated rich countries and prompted the need for the 3rd injection. Other variants have come to notice recently including the Lambda variant in South America and as this paper was being written the most mutated variant yet is reported by the National Institute for Communicable Diseases in South Africa issued an alert about the "C.1.2 lineage"(10). We have yet to learn how infectious and deadly these and future variants are going to be.

The continuing rise of variants may well undo the efforts of rich countries to protect their citizens. It is in the rich world's interest to make sure enough vaccines are produced to ensure a worldwide coverage as quickly as possible. What is urgently required is increased vaccine production; the rich world should create a fund to fund new vaccine production facilities as a matter of urgency and purchase the vaccines thus produced for free distribution to the poorer countries. This may require a multibillion dollar investment, yet it will be a cheap investment, failure to do so will not only allow variants to develop some even more deadly than those now present that will cause great health and economic disruption in countries ravaged by the rampant virus. Otherwise already precarious health systems are liable to collapse, requiring significant financial assistance and waves of refugees fleeing from countries where the health system has collapsed and the economy has failed, potential resulting in significant civil unrest and the need for significant UN support and call upon the rich world to finance any rescue. It will be in the rich world's interest to make sure enough vaccines to ensure a rapid worldwide coverage.

Conclusion

1. Being aware of the variable response to vaccination among the immunocompromised, elderly and those with co-morbidities that may prevent a full response to vaccination, the response to vaccination should be checked say 8-12 weeks after the second dose to make sure there has been an effective and in some cases a 3rd dose may need be given much earlier than the 6 months currently being considered in other countries.
2. Rather than have a blanket population 3rd vaccination drive before giving a 3rd injection the response to the initial vaccination should be checked to make certain a third injection is required.
3. Similarly in the case of the indigenous populations in view of the fact that in many cases they have health conditions and comorbidities that may prevent the immune system from responding fully to the Covid immunization, we should check their response shortly say 8 weeks after the second injection to check if the immune response is below acceptable levels.
4. The WHO fund if it is well funded will be able to order from commercial companies the billions of vaccines required and the companies with an assured sale will I believe ramp up production quite rapidly. The vaccine thus ordered but be ones that fit the health systems and economies of the underdeveloped countries. Whilst the two dose vaccines such as Pfizer and Astra -Zeneca can be used in larger centers with good medical facilities. In poorer and distant areas they may be difficult to administer. In reality the WHO should concentrate on one dose vaccines such as the Johnson & Johnson vaccine as use of this will require less use of scarce medical resources and lead to for quicker "herd Immunity" in those countries.
5. Similarly, an oral vaccine reported as now in trials in Israel should be looked at and encouraged, as this would be the best vaccine in poorer countries with stained medical facilities.

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