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COVID-19 Daily Briefing: May 21st

DISCLAIMER: Scientists for Labour are a voluntary organisation, and collating this research takes a significant amount of time. We cannot claim that this document is comprehensive, necessarily accurate in all regards, or that it covers all developments. Expert fact checking has been performed by the Boyd Orr Centre for Population and Ecosystem Health at the University of Glasgow.

1. Summary

IMMUNITY

- **ANTIBODY KINETICS AND RNA SHEDDING:** A review of 22 studies on antibody response to COVID-19 found that the mean time for development of specific antibodies to the virus was 12–13 days after symptom onset. IgG and IgM antibodies were detected in 98% –100% of all individuals 2 – 23 days after onset of symptoms, and IgG remained detectable for the remainder of the 60-day timeframe. However, it is not yet known whether IgG or IgM correlate to immunity.
- **IMMUNE MODULATED THERAPY POSSIBILITIES:** A review outlining the effects of COVID-19 on the immune system, including hyperactivation of CD4/CD8 cells resulting in a cytokine storm and severe collateral damage to the lungs. The authors summarise potential drug treatments (including thalidomide, hydroxychloroquine and baricitinib) and stress the importance of early administration of treatment and consideration of drug-patient compatibility for the prevention of hyperinflammation and reduction of viral load.

VACCINE

- **DNA VACCINE INDUCES IMMUNITY IN MACAQUES:** A series of 11 DNA vaccine candidates, expressing different forms of the SARS-CoV-2 spike protein, were developed and tested in rhesus macaques. The vaccinated animals developed immune responses comparable to those in humans and macaques infected with SARS-CoV-2. Vaccination with the full-length spike protein DNA resulted in substantial reductions in viral load when compared with controls, demonstrating protection against SARS-CoV-2 in nonhuman primates. Neutralising antibodies are found to be driving the protection. Further test needed to test the durability of the immunity.
- **IMMUNITY IN MACAQUES:** Another study examining the results of re-infection with SARS-CoV-2 in rhesus macaques. After the macaques were initially infected, developed an immune response, and recovered, they were re-infected with the virus and had substantial reductions in viral loads when compared to the primary infection. *This is a similar result to the paper above but deals with re-infection rather than vaccination.*

ANTIVIRALS AND PHARMACEUTICAL INTERVENTIONS

- **ANTIVIRAL REVIEW:** A review of 17 studies for antivirals tested as potential SARS-CoV-2 treatments found no significant effect on viral clearance rates. No significant clinical improvements were shown in lopinavir/ritonavir, hydroxychloroquine, arbidol and remdesivir. Favipiravir suppressed symptoms better than the other reviewed antivirals, and heparin improved severe COVID-19 cases. In all studies, reported effects of treatment were weak if even detected.
- **OSELTAMIVIR:** Review of the influenza antiviral oseltamivir (available over the counter) for COVID-19 treatment. Experiments and computer modelling found it was ineffective against SARS-CoV-2, failing to slow down its progression or improve patient symptoms.
- **CLINICAL TRIALS:** A peer reviewed editorial providing an overview of clinical trials exploring candidate drugs for potential treatment of COVID-19. The authors note that protocols and standardisation vary widely between studies. The authors call for mandatory randomisation, larger multi-armed clinical trials for more reliable results and more data sharing for secondary analyses.

3. Quick Summaries

Artificial Intelligence during a pandemic: The COVID-19 example

- **AI DURING COVID-19:** *Letter.* Describes the role of artificial intelligence (AI) in healthcare, including in managing the current pandemic. Discussed potential uses include early warning and alerts, prediction of survival rates, detection of cases for timely treatment, real-time worldwide disease monitoring, analysis and visualisation of infection trends, studying the features of the virus, prediction of the infection rate, rapid decision making to identify treatments, drug discovery, assisting healthcare workers in delivering food and medicines; and entertaining patients during quarantine.

How to discover antiviral drugs quickly

- **COMPUTATIONAL DRUG SCREENING:** *Comment article.* An introduction to how new drugs are screened using two approaches: testing drugs that have worked on other viruses, or specifically targeting SARS-CoV-2 proteins to interrupt the viral replication cycle. Structure-based drug discovery using computational modelling of drugs binding to proteins has benefitted from the rise of supercomputers and is outstripping experimental methods of screening potential drugs.

Vitamin-D and COVID-19: do deficient risk a poorer outcome?

- **VITAMIN-D:** *Focus article*. A 2017 meta-analysis of patient data showed evidence to suggest that low Vitamin D levels lead to increased susceptibility to upper respiratory tract infections. A cross-sectional study in Europe also found that COVID-19 mortality is significantly associated with vitamin D status in different populations. This finding suggests one explanation for why dark-skinned ethnic minorities are considerably more likely to have worse outcomes. A study from Ireland strongly recommends taking vitamin D supplements during the pandemic, including throughout summer.

4. Longer Reading

Chemistry and biology of SARS-CoV-2

- **VIRUS CHEMISTRY:** *Perspective article.* An overview on the molecular biology of SARS-CoV-2 and the cell-entry mechanisms of importance for possible antiviral drugs. The authors discuss several possible targets for cell entry and hence for antiviral activity.

Do we need a Contact Tracing App?

- **PRIVACY** *Preprint journal article*. Evidence for the benefits of a contact tracing app is lacking. There are challenges in the fact that privacy preservation is best handled with a decentralised system but that targeting testing at individuals most likely to be infected is best managed in a centralised system. In addition, studies suggest that bluetooth-based proximity detection lacks sensitivity, and that the large number of false positives could result in people ignoring genuine messages.