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immunology
Insights into immunity in health and disease

EDITORIAL

COVID-19 vaccination and treatment in vulnerable populations

As the COVID-19 pandemic continues to roll on, it has been an interesting time to be an immunologist. Variants of concern raise questions about the efficacy of vaccines or monoclonal antibodies, and testing availability, cost and speed remain critical barriers to our understanding of how to tackle this pandemic. COVID-19 has a broad set of symptoms that can seriously affect even young, healthy individuals, but those who are immunosuppressed carry a much greater risk of severe disease after SARS-CoV-2 infection.

Cancer patients are a major constituent of immunosuppressed individuals that are of particularly high risk in the current pandemic. Patients with cancer often have systemically repressed immune systems, due to a number of factors including potentially immunosuppressive treatment regimens as well as immune system-intrinsic effects. How do we protect these most vulnerable populations, and how can we tell if we've achieved a protective threshold? Arguably more so than the healthy population, cancer patients and other immunosuppressed need effective vaccination strategies and accurate readouts of immunological protection. In this issue of *Immunology*, we share a report detailing measurement of T-cell responses to vaccination. While virus-specific antibodies are the assumed primary goal of vaccination, T cells, being long-lived and capable of rapidly identifying and removing infected cells, are attractive soldiers to enlist. Further, increases in virus-specific T-cell function suggest a broader immune response to the vaccine. In this report by Scurr et al., consistent with work from other groups [1,2], vaccination in healthy individuals elicited a robust T-cell response to SARS-CoV-2-derived antigens in nearly all who were vaccinated. However, this response was severely attenuated in patients with solid tumours [3]. While mechanisms of systemic immune suppression and vaccine efficacy are clearer in haematological malignancies, how solid tumours or their treatment affect the sensitivity of individuals to vaccinations remain critical lines of inquiry as this ongoing pandemic continues and the need to vaccinate more and more individuals remains of top priority. These studies are not only important during the ongoing COVID-19 pandemic but also reveal much about immune regulation in cancer, which remains a high priority in the era of cancer immunotherapy.

We also share in this issue an intriguing look into a potential cellular therapy of COVID-19. The pandemic has accelerated the need for not only preventative measures but also safe and effective treatments of severe COVID-19. Infected individuals have been treated with an entire array of drugs with potential antiviral function, with an even wider array of efficacy. While monoclonal antibodies and novel antiviral drugs may have benefit, there have been several other proposed treatments with no appreciable efficacy (ivermectin, hydroxychloroquine, etc.). The use of convalescent plasma from recovered individuals was authorized for emergency use, although efficacy data remain unclear. Cellular therapies for COVID-19, however, remain untested although several potential avenues have been raised [4]. In this issue, Herrerra et al describe how natural killer (NK) cells with potential antiviral activity could be identified from the PBMCs of convalescent donors [5]. Given the importance of cellular immunity to SARS-CoV-2 in both protection and recovery from COVID-19, the use of off-the-shelf NK cells as a therapy to bolster antiviral cellular immunity could be of critical importance, as this virus can infect many different tissue types, especially in individuals with suppressed immune systems.

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