

Urgent research into how aging immune system responds to COVID-19 needed

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Professor Deborah Dunn-Walters, from the University of Surrey and Chair of the British Society for Immunology COVID-19 and Immunology taskforce, has led an expert taskforce calling for urgent research into how age affects the immune system's response to COVID-19. Research in this area is crucial to improve patient care and

help develop more effective treatments and vaccines.

Previous findings in this area has shown that the ability of the immune system to respond appropriately to infections decreases as people get older. From the start of the COVID-19 pandemic, it has been clear that older people have significantly worse outcomes following SARS-CoV-2 [infection](#)—the older a person is, the more likely it is that they will be hospitalized due to COVID-19 and have a higher chance of dying because of the disease.

Publishing their report, the [task force](#) analyzed what we currently do and don't understand about the science behind these statistics, examining why the immune systems of older people react differently to SARS-CoV-2 infection. The report also outlines five research recommendations to increase understanding of how the older immune system responds to the virus, with a particular focus on issues around co-infections and multi morbidity, both of which are common in older adults. A better understanding of the immunological response in older people to COVID-19 infection will help improve patient care and have implications for treatment and vaccine approaches.

Future research recommendations:

1. To establish detailed studies of the symptoms and clinical progression of COVID-19 infection in non-hospitalized individuals which are large enough to determine ages at which critical changes occur. Studies should identify factors (such as co-morbidities, more common in older adults) that affect initial infection, progression to severe disease, recovery and re-infection. This information will be essential to enable targeting of interventions to specific groups.

1. To identify how much the reaction of the immune system itself contributes to the symptoms and disease course of COVID-19 in

older people. The older you are, the more likely you are to get seriously ill from COVID-19 infection. However, we don't yet understand how much of the more serious symptoms experienced by older people is due to the virus itself and how much is due to their immune systems not responding appropriately and making them ill. Understanding this will help us to target therapeutic approaches without compromising anti-infection activity.

2. To establish reliable methods to measure immune responses in patients following COVID-19 infection or vaccination with a specific focus on different age groups. Understanding what constitutes 'effective immunity' is important for all age groups, with special consideration given to older people because of the differences observed in their immune system functioning. This should include specific community studies of COVID-19 immunity in older people, including what we can learn from the immune responses of older people who did not experience serious symptoms following COVID-19 infection. We need to ensure that current studies are extended into the convalescent period and beyond to establish the duration of effective immunity.
3. To determine the effect of other challenges to the immune system during COVID-19 infection. Studies of co-infection (where an individual is infected with another bacteria or virus as well as SARS-CoV-2) are particularly important because many older people often live with chronic infections, e.g. bacterial urinary tract infections. The consequences of acute co-infections with other respiratory viruses, such as influenza, on COVID-19 disease severity needs also to be studied.
4. To prioritize research into optimizing protocols for any future COVID-19 vaccine that may be given to older adults. As the immune systems of [older adults](#) often produce a reduced response to vaccination compared with younger people, this means scientists need to research how to ensure maximum

effectiveness of any future COVID-19 vaccine in older people by investigating dosing schedule, formulation, boosting and vaccination routes. Different groups of people, by age or by comorbidity, may also require different types of vaccine or vaccine formulations.

Professor Deborah Dunn-Walters, Chair of the British Society for Immunology COVID-19 and Immunology task force, and Professor of Immunology at University of Surrey, said:

"Our immune systems change as we get older, which results in a reduced ability to fight infections. Older people are also much more likely to have other chronic health conditions, which also affects the ability of their immune systems to fight infections. We have seen unfortunately this play out through the COVID-19 pandemic, with older people more at risk of becoming seriously ill and dying from the disease. Given the higher risk to older people from COVID-19, it is crucial that we conduct research targeted at understanding exactly how the immune systems of older people respond to SARS-CoV-2 infection. The research recommendations in this British Society for Immunology report provide a clear road map to focus our efforts and bridge this knowledge gap. Increasing our knowledge of how and why the immune response of older people differs will be crucial in allowing us to improve [patient care](#), develop new therapeutic options and inform vaccine research."

Professor Arne Akbar FMedSci, President of the British Society for Immunology and Professor of Immunology at University College London, said: "Immunology research is at the forefront of effects to bring about the end of the COVID-19 pandemic. The British Society for Immunology expert task force was formed to identify key research priorities to help us understand how our immune system responds to SARS-CoV-2 so our efforts to tackle the disease can have the highest benefits for public health. Age is a crucial factor that predicts outcomes

for COVID-19. We know that older you are, the more likely you are to get very sick from COVID-19. While we have already made giant steps forward in our knowledge of how the immune system responds to COVID-19, there are still lots of things we don't understand, particularly when it comes to how age has such a detrimental effect on COVID-19 outcomes. Now is the time to focus our research efforts to improve care and treatment options for older people most at risk of serious outcomes from COVID-19."

More information: Dunn-Walters et al., The aging immune system and COVID-19. *British Society for Immunology* (2020).

www.immunology.org/sites/default/files/2020-11/rt_Nov2020_FINAL.pdf

Provided by University of Surrey

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