

# Older Western Europeans could already have systemic 'profile' that makes them susceptible to severe COVID-19

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New research presented at the ESCMID Conference on Coronavirus Disease (ECCVID, online 23-25 September) shows that the severe COVID-19 immunological profile, represented by changes in cell populations and circulating inflammatory proteins, is already partly present in older healthy individuals.

"Some of these dysregulations might not be a direct result of the infection but rather an underlying profile that is permissive to a more severe form of the disease," explains co-author Ozlem Bulut, Radboud University Medical Center, Nijmegen, Netherlands.

The majority of individuals who experience COVID-19 caused by severe acute respiratory syndrome [coronavirus-2](#) (SARS-CoV-2), present a mild, self-limiting respiratory infection and recover in a few days. However, the disease can also progress and cause a severe acute respiratory distress syndrome (ARDS) in around 10-15% of the patients.

The fatality rate of COVID-19 increases with age,

reaching more than 20% in patients over 80 years of age. A hyperinflammatory profile and various dysregulated immunological processes are linked to disease severity, however, whether these are caused by the disease or play an underlying role in disease pathogenesis is not yet clear.

In this study, the authors investigated a series of immune [cell populations](#) and 28 circulating [inflammatory markers](#) previously linked with COVID-19 severity in two cohorts of healthy Western European individuals: the first one including 324 people with an age range of 18-71, and the second one including 452 people with an age range of 18-75.

"After correcting the data for the sex of the participants, we observed that many inflammatory markers and changes in cell populations linked with severe COVID-19 correlate with age in healthy individuals," explains senior co-author Professor Mihai Netea, also of Radboud University Medical Center, Nijmegen, Netherlands.

These parameters include changes to [white blood cells](#) including increased non-classical monocyte numbers, a critical decrease in T lymphocytes, particularly some types of CD8+ and CD4+ lymphocytes and naïve regulatory T cells, elevated circulating levels of monocyte chemoattractant protein 1 (MCP1) that induces immune cell accumulation in organs, osteoprotegerin (OPG) that may increase survival of certain cell populations, [hepatocyte growth factor](#) (HGF) that activates both immune and epithelial [cells](#), and declined concentrations of receptor activator of nuclear factor kappa- $\beta$  ligand (RANKL/TRANSC). Interleukin-6, a marker of inflammation and one of the major biomarkers of COVID-19 severity, also increases with age in both cohorts.

The authors conclude: "Age is one of the biggest risk factors of COVID-19 severity and fatality. Our results suggest that the severe COVID-19 immunological profile, represented by changes in cell populations and circulating [inflammatory proteins](#), is already partly present in aged healthy individuals. Therefore, some of these dysregulations might not be a direct result of the infection but rather an underlying profile that is permissive to a more severe form of the disease. In conclusion, the identified markers might explain the high susceptibility of older individuals to severe COVID-19 and inform efforts to prevent and treat the [disease](#)."

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