

Overlap between immunology of COVID and obesity could explain the increased risk of death in people living with obesity

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Data presented in a special COVID-19 session at the European and International Congress on Obesity (ECOICO 2020) suggests that there are overlaps between the immunological disturbances found in both COVID-19 disease and patients with obesity, which could explain the increased disease severity and mortality risk faced by patients with obesity and COVID-19. Since fat mass generally increases with ageing, this might also partly explain the increased death risk in older patients.

The presentation is by Associate Professor Gijs Goossens, NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht University Medical Centre, Netherlands. Further details are provided in a Position Paper by Goossens and colleagues published in the journal *Obesity Facts*, the official journal of the European Association for the Study of Obesity (EASO) that organises the congress.

Adipose tissue is an active metabolic organ with a role in many processes, including immunity and inflammation. In people with a healthy weight, adipose (fat) tissue functions normally. However, fat cells accumulate fat and become larger during weight gain, resulting in chronic low-grade inflammation in obesity that is associated with various complications, including type 2 diabetes, cardiovascular disease, respiratory diseases and some cancers. This inflammation causes a release of molecules called cytokines that trigger a response from the body's immune system.

The metabolic changes and sustained low-grade inflammation in people

with obesity leave them with an impaired immune response to infections and increased viral loads when infected by viruses, resulting in poorer outcomes and recovery from infections. Studies have also shown people with obesity respond less well to antiviral medication and vaccinations.

In COVID-19, the attempts of the [immune system](#) to eliminate the virus produce a constant stream of these cytokines, which can lead to an effect known as the 'cytokine storm', which can cause organ damage (e.g. lung injury), leading to poor outcomes and death.

Various research around COVID-19 is focusing on the renin-angiotensin-aldosterone system (RAAS) in the body, since SARS-CoV-2 enters the host cells through the angiotensin-converting enzyme-2 (ACE-2), which is part of the RAAS system. The RAAS, among other things, increases blood pressure and inflammation. In obesity, the RAAS system is overactivated and may play a critical role in the increased susceptibility and worse clinical outcomes of COVID-19 in people with obesity.

In this presentation (and the linked Position Paper), Dr. Goossens says: "We suggest that the increased [fat mass](#) may contribute to increased RAAS activity and inflammation in obesity, thereby providing a critical link between obesity and the increased COVID-19 susceptibility and poorer disease outcomes."

Furthermore, it is also well documented that increased age is a major determinant of severe disease and COVID-19-related mortality. Dr. Goossens says: "Since ageing is accompanied by changes in body composition, namely reduced muscle mass and increased fat mass, it is tempting to postulate that this may at least partly contribute to the poorer outcomes in older individuals infected by SARS-CoV-2."

Along with the authors of the Position Paper, Dr. Goossens says: "The collision of the obesity and COVID-19 pandemics highlights the

importance of understanding shared disease pathophysiology, which may steer therapeutic choices to prevent or dampen the complications of COVID-19, especially in vulnerable populations such as people living with obesity and related chronic diseases."

He concludes: "Detailed analysis of patients with COVID-19 is essential to identify individuals or subgroups at increased risk of developing this disease, and better predict [disease](#) progression and outcomes. In particular, the potential role of (abdominal) adipose tissue in the development of COVID-19 warrants further investigation. Clearly, obesity prevention and continuous [obesity](#) management are crucial during the COVID-19 pandemic."

Provided by European Association for the Study of Obesity

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