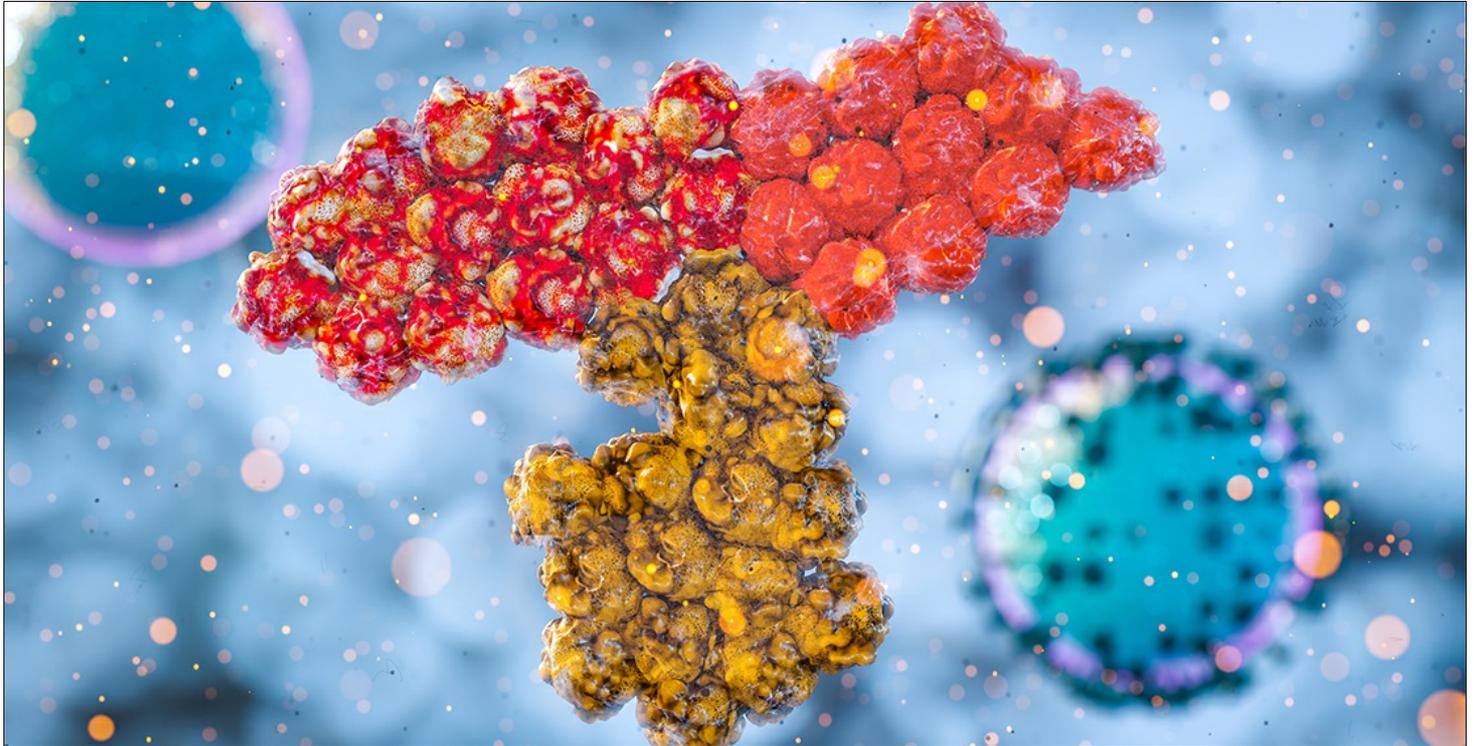# ITM, UAntwerp and UZA map immune response to COVID-19

Research into acquired immunity in COVID-19 patients should improve insight into the effects of current and potential future outbreaks on the immune system.

27-05-20

Dit is de omschrijving

Researchers from ITM, the Antwerp University Hospital (UZA) and the University of Antwerp (UAntwerp) are collaborating in a study on the immune response in COVID-19 patients. Using samples from infected COVID-19 patients, they will analyse white blood cells and cast them into high-end computer models. With this detailed information, the researchers want to better understand the levels of disease severity and, in case of a new outbreak in the future, to find the 'right' immune response for a vaccine more quickly.

The study will look at blood samples from hospitalised COVID-19 patients and non-hospitalised cases that tested positive for the virus. Wim Adriaensen, one of the ITM researchers involved in this research, explains: "By working with different types of infected patients, we get a wide spectrum of blood samples, covering severe to mild cases. We use these samples to map the entire repertoire of unique receptors on the white blood cells and compare them between patients.. We subsequently create computer models to detect the cells that boost the immune system response to COVID-19. Studying these receptor patterns in a group of patients helps us to better understand and even possibly predict the severity of the disease in individual patients."

The computer models continue to build on UAntwerp research into the impact of vaccines and viral infections on the immune system. Data scientist Pieter Meysman (UAntwerp), co-developer of these models explains: "Each individual has his own unique set of white blood cells. That is the reason why each of us reacts differently to a disease, as is demonstrated by this outbreak. We need these models to translate the knowledge derived from these unique cells into an immune response. Furthermore, these models are based on new developments in artificial intelligence that can recognise patterns in the DNA of the white blood cells. Our aim is to extrapolate the findings in the study target group to the Belgian and potentially the global population."

ITM Professor Koen Vercauteren, principal researcher, stresses that these COVID-19 computer models are relevant to future outbreaks worldwide: "There is a lot of vaccine research, but it almost always requires extensive knowledge of the structure of the virus itself. This can be a lengthy process, whereas an outbreak needs a fast response. That is why this research starts from the human body itself. The computer models are based on the unique receptors on the white blood cells and allow us to more quickly predict which cluster of white blood cells is fighting against the new pathogen without the need for prior knowledge of the specific pathogen. With the hope of speeding up vaccine development, this information can be compared with the immunity built up during the evaluation of experimental vaccines"

ITM has decades of experience in fighting infectious diseases and is familiar with supporting and coordinating complex clinical trials in difficult settings, including in developing countries. AUDACIS, the interdisciplinary UAntwerp consortium (led by Prof Benson Ogunjimi and Prof Kris Laukens) unravels the complexity of the immune response through DNA technology and data sciences.