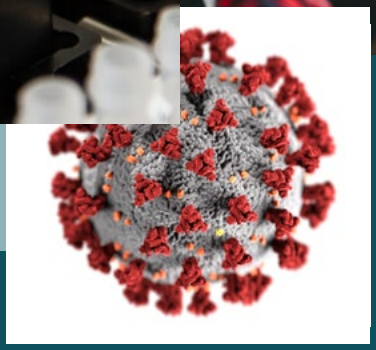
OUTLOOK

A scientific way forward

by Christine Ritter



This current pandemic has caught most of us by surprise and has once again shown us how vulnerable life is.

The Nordic countries have acted fast and were able to mostly contain the spread of COVID-19. Consequently, our countries are slowly starting to open up again and looking forward to a more "normal" life.

But with festivals and bigger gatherings banned at least until fall, big networking events like NLSDays being postponed and with the call to keep up social distancing until further notice, how will this new normal look like?

SARS-CoV-2 was first detected in Wuhan, China, in late 2019 and has since then spread to 188 countries or regions and infected slmost six million people, according to the COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. With the successful measures in the Nordics to flatten the curve and stop the outbreak, these countries are looking at a slow re-opening of the economy. But with a potential re-occurrence of the outbreak looming over us by the time winter comes around again, the current lack of knowledge around immunity from the disease and the total number of infected people, many are worried that these measures will have to be put in place once again soon. Many believe that we will only be able to go back to our normal, pre-pandemic lives with extensive testing and a vaccine for SARS-CoV-2.

A BOOST IN SCIENTIFIC COLLABORATIONS

The pandemic has costs us much, but it has also managed to ignite a research fire. Despite research being collaborative by nature, it is just as competitive and secretive, holding data, knowledge, and knowhow close to heart. There is a constant race in the scientific community to be the first to publish, to publish in the highest impact journals, to outperform other researchers, and be the first to succeed. In addition, a lot of research is hidden behind the paywall of traditional journals, thereby limiting access to certain research. Over the years, there has been a tendency toward open access publishing of scientific papers and results, allowing for better visibility of research. With a looming global public health crisis and countries racing to rally their public health institutions, the scientific community is coming together and sharing information and data on a global scale that has perhaps never been seen before. We can see country specific health organizations sharing their practical experiences treating COVID-19 patients, Chinese scientists releasing the data from their SARS-CoV-2 gene sequencing, the EU and individual countries pouring money into SARS-CoV-2 research, and the emer-

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gence of organizations like the COVID-19 Clinical Research Coalition (covid19crc.org), an organization aiming at facilitating COVID-19 related research and the sharing of relevant research findings.

NOME ALUMNI IMMUNITRACK SUPPORTING VACCINE RESEARCH

NOME alumni Immunitrack, a Danish biotech startup and one of the first ten companies joining the NOME mentoring program, is in the unique position of having developed a platform that can predict the response of the immune system. For a vaccine to be successful, the vaccine needs to be strongly recognized by immune system of the patient receiving the shot. Immunitrack's NeoScreen™ platform can identify the epitopes of viruses most likely to stimulate the adaptive immune response, thereby allowing the development of a vaccine that will maximize the immune response. Currently, vaccines are dependent on topological antibody binding sites that can change with every virus mutation, which is why there is no universal flu vaccine for example. "If we are able to pinpoint the epitopes that are not affected by mutations, we have the possibility to develop universal vaccines," Stephan Thorgrimsen, CEO of Immunitrack, points out.

Immunitrack's NeoScreen™ platform can identify the epitopes of viruses most likely to stimulate the adaptive immune response

In collaboration with researchers from the University of Copenhagen and Intavis, Immunitrack has been able to find several SARS-CoV-2 epitopes very likely to stimulate the adaptive immune response. "We initially applied a software solution, that allows us to predict epitopes that may generate a T-cell response, in order to find relevant epitopes from SARS-CoV-2. But we didn't just stop there, we validated the results by running them through our in vitro platform to confirm epitopes that stably interact with 10 MHC I alleles and one MHC II. This data provides epitopes very likely to stimulate a T-cell response. What came out of this project clearly demonstrated that computational prediction methods are imprecise and over-predictive." Stephan Thorgrimsen explains.

The findings of the collaboration with Intavis and the University of Copenhagen have been made publicly available to support the effort of finding an effect vaccine for COVID-19 and within a month of publishing, the article has already been viewed 8000 times and the data has been downloaded by 4000 research groups worldwide. "Traditional vaccine programs make use of surface antigens to induce an immune response and the production of antibodies. Our approach does not fall into this traditional vaccine development and therefore collaborating with big pharma to develop a vaccine will be difficult. We also don't have the resources to take our findings a step forward and develop a vaccine ourselves. However, there are researchers out there, who have both the resources and the capabilities, and we hope that they will be able use our results to support their own research," says Stephan Thorgrimsen.

The company has not stopped their research efforts into COVID-19 there. Immunitrack together with researchers from Johns Hopkins University School of Medicine and a group at the University of Southern Denmark are in the process of starting two studies that aim at looking at the difference of the

Stephan Thorgrimsen
CEO and Co-Founder
of Immunitrack

IMMUNITRACK

Since its founding in 2013, Immunitrack has developed its unique NeoScreen® platform, providing researchers with a better tool for assessing the immunogenicity of epitopes.

Leona Gilbert
CEO and Co-Founder
of Te?ted Oy

Te?ted
www.teznted.com

Te?ted Oy delivers value to clinical laboratories by providing industry-leading solutions for detecting complex diseases that focus on the patient's needs.

T-cell response of COVID-19 patients with severe disease symptoms and patients with mild symptoms. The studies are still in preparation but will include patients from hospitals in both the US and Denmark. "From these studies, we firstly hope to confirm the epitopes from our previous research. Secondly, we aim at elucidating the differences in T-cell response between patients with mild and severe symptoms. This information may prove very valuable in understanding how a vaccine needs to stimulate a strong adaptive immune response for effective clearance of SARS-CoV-2," Stephan Thorgrimsen explains.

Eight vaccine candidates are already in clinical trials and many more in pre-clinical or early research stages. The hope for finding a successful vaccine soon is alive. If Immunitrack's research was effectively used for the development of one of these vaccine candidates or not, just as many small biotech companies, Immunitrack is doing their part utilizing their expertise to help us return to "normality".

THE ADVANTAGE OF SMALL BIOTECH

The EU and many individual countries made vast amounts of money available for research into COVID-19. Many small biotech companies, such as Immunitrack, with platform technologies have the possibility to quickly pivot and put focus on helping to find potential vaccines or treatments and on developing better tests for the disease.

Even though there are several vaccine candidates undergoing clinical trials, the way to a working vaccine that can be deployed widely into the population is still long. Until we have a vaccine available, testing the population for the disease should be a big focus in order to safely open the economies and for people to feel more secure when leaving their own homes. Both testing for people currently infected with the SARS-CoV-2 virus but also for people, who have already recovered from COVID-19 especially those who did not display symptoms, will be essential. The WHO has encouraged widespread testing since the outbreak of the disease and countries are working towards increasing their testing capabilities. However, shortages of test kits and resources necessary to perform the tests have slowed down testing in many countries. NOME company Te?ted Oy, a Finnish diagnostic startup, did not shy away from the work of developing a new SARS-CoV-2 antibody test.

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The Nordic Mentor Network for Entrepreneurship (NOME) is a pan-Nordic and Transatlantic mentoring program that aims to improve the success rate of life science startup companies located in the Nordic countries. The mentor network consists of high profile life science executives that mentor best in class startups. NOME aims to position the Nordic region in a leading position in commercializing promising startup companies in the life sciences.

NOME currently has 65 mentors and 17 enrolled startups. NOME is operated by Accelerace and funded by the Novo Nordisk Foundation. The initiative is represented in the Nordic region through partnerships in Sweden, Norway and Finland.

Read more on **www.nome.nu**