



FONDS NATIONAL SUISSE
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FONDO NAZIONALE SVIZZERO
SWISS NATIONAL SCIENCE FOUNDATION

www.snf.ch
Wildhainweg 3, P.O. Box 8232, CH-3001 Bern

Abteilung Kommunikation

+41 31 308 22 22

com@snf.ch

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Press release

Innovative research into new vaccines

Projects taking part in the National Research Programme “Covid-19” (NRP 78) of the Swiss National Science Foundation (SNSF) are pursuing highly promising approaches in a drive to develop new vaccines.

Three research groups have adopted interesting approaches to the highly topical issue of vaccines. The team led by Steve Pascolo is investigating ways of improving functionality and stability of mRNA vaccines, Cornel Fraefel and his researchers are aiming to produce a bacterial spore-based oral vaccine, and Volker Thiel’s team are developing a vaccine that can be administered as a nasal spray.

A broad range of vaccines is an advantage in combating the virus: for example, it increases the likelihood that we will be better prepared for new variants of the virus and makes vaccines more accessible the world over. Innovative methods such as oral vaccination or nasal sprays could make it even easier to get vaccinated. “The projects in NRP 78 are all taking place in a highly dynamic environment,” says Marcel Salathé, President of the NRP 78 Steering Committee. “The results show that this is another area where Swiss researchers are blazing a trail and continuing to develop solutions to help end the crisis”.

Optimised mRNA vaccine

mRNA-based vaccines present a number of challenges in terms of manufacture and storage as well as transport within the body. The research team led by Steve Pascolo, an immunologist at University Hospital Zurich, has developed a promising vaccine carrier that is not only economical to manufacture and particularly stable, but also has improved properties in terms of transporting the mRNA into the cell. While looking for an improved carrier, Pascolo, who is a pioneer in mRNA research, is also continuing his work on an even more effective form of the mRNA vaccine.

Bacillus subtilis as a vaccine platform

Cornel Fraefel, a virologist at Zurich University, is following a similarly simple, yet no less operationally complex and novel approach. His vaccine technology is based on genetically modified bacterial spores containing SARS-CoV-2 genes capable of inducing antigens in the human body. The spores have the advantage of being very heat-stable and resistant to environmental factors, and they could be easily administered as an oral vaccine. The next step will be to administer the already produced bacterial spores to transgenic mice in order to observe how a mammal's immune system responds to it.

Vaccine by nasal spray

Volker Thiel, a virologist at the Institute of Virology and Immunology, is following a different approach. He and his international team, consisting of researchers from the Freie Universität Berlin, the Friedrich Loeffler Institute and the Universities of Bern and Geneva are developing a live-attenuated vaccine, i.e. a vaccine containing a weakened form of the virus that does not make the recipient ill, but still provokes an immune response. This technique has proven successful in other vaccines, such as the measles vaccine. The particular potential of live vaccines lies in the better protection that they confer against new and dangerous variants of the virus. The research group is working hard to get two candidate vaccines through the preclinical phase and ultimately pave the way to a further vaccine that is both safe and affordable. The new vaccine is planned as a nasal spray, which will strengthen the immune response in the mucous membranes, the place where the virus enters the body and first replicates.

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Contacts

Prof. Marcel Salathé
EPFL SV GHI UPSALATHE1
Campus Biotech
Bâtiment B1.01
Ch. des Mines 9
CH-1202 Genève
Phone: +41 21 693 09 91
E-mail: marcel.salathe@epfl.ch

Prof. Steve Pascolo
Dermatologische Klinik
Universitätsspital Zürich
Gloriastrasse 31
CH-8091 Zürich
Phone: +41 44 634 28 77
E-mail: steve.pascolo@usz.ch

Prof. Volker Thiel
Institut für Virologie und Immunologie
Universität Bern
Länggassstrasse 122
CH-3012 Bern
Phone: +41 31 631 24 13
E-mail: volker.thiel@vetsuisse.unibe.ch

Prof. Cornel Fraefel
Virologisches Institut

Universität Zürich
Winterthurerstrasse 266a
CH-8057 Zürich
Phone: +41 44 635 8713
E-mail: cornel.fraefel@uzh.ch

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The National Research Programme "Covid-19" (NRP 78)

Funded and coordinated by the Swiss National Science Foundation (SNSF), NRP 78 aims to advance understanding of Covid-19 and the ongoing development of the pandemic, to develop recommendations for clinical management and public health response, and to support the development of vaccines, therapeutics and diagnostics.

Its four modules are investigating the basic aspects of SARS-CoV-2 biology, pathogenicity and immunogenicity; new approaches in Covid-19 epidemiology and disease prevention; vaccine, drug and diagnostics development; and innovative clinical approaches and therapeutic interventions for treating cases of Covid-19.

Research in connection with NRP 78 started in autumn 2020 and will continue for two years. The NRP has a budget of 20 million Swiss francs. In July 2020, the SNSF selected 28 research projects from the 190 proposals submitted. Their results will be published as quickly as possible as well as communicated and discussed with policy-makers and within society.

[NRP 78](#)

The major impact of Covid-19 on people's lives and on society as a whole is expected to continue. With this in mind, the Swiss National Science Foundation launched the National Research Programme "Covid-19 in Society" (NRP 80) on 1 November 2021. The research projects participating in this new programme will start at the end of 2022.

[NRP 80](#)

Links

- [Project Pascolo](#)
- [Project Thiel](#)
- [Project Fraefel](#)
- [SNSF Twitter feed](#)
- [NRP 78 on Twitter](#)

The text of this press release, a downloadable image and further information are available on the website of the Swiss National Science Foundation:

www.snsf.ch > Research in Focus > Media > Press releases