Longevity of specific and cross-reactive cellular responses to coronaviruses in comparison to serology in COVID-19 convalescent individuals

No registrations found.

Ethical review	Positive opinion
Status	Recruitment stopped
Health condition type	-
Study type	Observational non invasive

Summary

ID

NL-OMON25158

Source
NTR

Brief title
CoviCross

Health condition

COVID-19

Sponsors and support

Primary sponsor: Department of Viroscience, Erasmus MC; Innatoss Laboratories B.V.; TKI Life Sciences & Health, Health~Holland
Source(s) of monetary or material Support: TKI Life Sciences & Health, Health~Holland

Intervention

Outcome measures

Primary outcome

To test the hypothesis that T-cell responses are more long-lived than antibody responses, we will compare the proportion of COVID-19 convalescent individuals with detectable T-cell and antibody responses to different SARS-CoV-2 proteins. The responses will be treated as a categorical variable (positive or negative). Cut-offs for positivity of T-cell responses to the various antigens will be established based on pre-pandemic samples in a different part of the overarching CoviCross project.

We will perform a multivariate analysis of variance (MANOVA). MANOVA compares groups on a set of dependent variables simultaneously. Rather than test group differences using several separate ANOVAs and run the risk of increased familywise error (probability of one or more Type I errors), the MANOVA approach makes a single comparison and the analysis therefore does not have to be adjusted for multiple hypothesis testing.

Secondary outcome

As secondary parameters in this study the quantity, phenotype and activation profile of T-cells specific for SARS-CoV-2 and HCoV will be studied at different times post SARS-CoV-2 infection and vaccination. These exploratory analyses will focus on parameters such as the effect of additional exposure/re-infection with SARS-CoV-2 (only expected incidentally), T-cell activation signatures and phenotypes and potentially assessed cytokine secretion profiles and will largely be described in a qualitative (not quantitative and statistical) manner.

Study description

Background summary

Rationale: SARS-CoV-2 is the causative agent of a pandemic of respiratory tract disease, referred to as coronavirus disease 2019 (COVID-19). Now that several vaccines have become available, we are entering a phase in which it is crucial to understand SARS-CoV-2-specific immunity on the individual and population level. Detection of SARS-CoV-2-specific immune responses relies mostly on antibody testing. However, asymptomatic and mild cases do not always develop detectable antibody levels and specific antibodies may not be long-lived. At the same time, virus-specific T-cell responses appear long-lived, and detectable after asymptomatic infection as well as after recovery from disease. Therefore, detection of SARS-CoV-2-specific T-cells could be a valuable diagnostic marker.

Objective: SARS-CoV-2 is related to seasonal coronaviruses that have been endemic in humans for decades and usually cause “common cold” symptoms (HCoVs). Several studies have shown that SARS-CoV-2-specific T-cells can be detected in individuals never exposed to SARS-CoV-2. This likely reflects the presence of cross-reactive T-cells, i.e. T-cells induced by HCoVs that cross-recognize SARS-CoV-2. To study SARS-CoV-2-specific immunity on the individual and population level, it is of paramount importance that we are able to discriminate between T-cell responses that recognize SARS-CoV-2, HCoVs or both. To this end, we will generate and validate unique discriminatory peptide pools. Using these, we will

study the longevity of T-cell responses in comparison to antibody responses in a well-defined cohort of convalescent COVID-19 patients from the first wave of the COVID-19 pandemic.

Study design: Observational cohort study

Study population: Observational cohort study

Intervention (if applicable): Not applicable

Main study parameters/endpoints: The cohort was previously established by Innatoss Laboratories, based on diagnostic studies. The main study parameters of the proposed study are quantification and characterization of SARS-CoV-2-specific T-cells and antibody responses post-infection and/or vaccination. COVID-19 vaccination is not part of this study, volunteers will be offered vaccination through the ongoing national vaccination programs.

Nature and extent of the burden and risks associated with participation, benefit and group relatedness: The study participants will be asked to provide three blood samples in a period of 12 months (in total 165ml). Venepunctures will be performed by trained phlebotomists and pose a minimal risk. Participation will require three visits of max. 20 minutes each. In addition, individuals will be asked prior to each blood collection time point to answer a short list of questions to capture relevant clinical details on SARS-CoV-2 re-infections and/or vaccination. The study does not result in benefits to the participating volunteers.

Study objective

Virus-specific T-cell responses are more long-lived than antibody responses

Study design

3 timepoints in total: The study participants will be asked to provide three blood samples in a period of 12 months. First timepoint was a 1 year post SARS-CoV-2 infection but pre-vaccinaton timepoint, second timepoint is a post-vaccination follow-up, third timepoint is a one year later longevity sample.

The main study parameter in this study is the proportion of COVID-19 convalescent individuals with a detectable SARS-CoV-2-specific adaptive immune response (T-cell and antibody responses for various antigens) at different timepoints between year one and two post initial infection (irrespective of vaccination).

As secondary parameters in this study the quantity, phenotype and activation profile of T-cells specific for SARS-CoV-2 and HCoV will be compared at different times post SARS-CoV-2 infection and vaccination.

Contacts

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Eligibility criteria

Inclusion criteria

In order to be eligible to participate in this study, a subject must meet all of the following criteria:

• Aged at least 18 years old
• Self-reported clinical history consistent with COVID-19
• Laboratory-confirmed history of SARS-CoV-2 infection (seroconversion)

Exclusion criteria

There are no specific criteria for subjects to be excluded from participation in this study, as long as they adhere to the inclusion criteria mentioned above.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non controlled trial
Masking:	Open (masking not used)
Control:	N/A , unknown

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-06-2021
Enrollment:	100
Type:	Actual

IPD sharing statement

Plan to share IPD: Yes

Ethics review

Positive opinion

Date:	09-07-2021
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

ID: 57260
Bron: ToetsingOnline
Titel:

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
NTR-new	NL9590
CCMO	NL77472.078.21
OMON	NL-OMON57260

Study results