# **Proteomics Investigation of Diverse COVID-19 serology**

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Spea Corr.

8.0

0.6 0.4

0.2

0

-0.2

-0.4

-0.6

-0.8

#### Introduction

Our body relies heavily on serum antibodies to defend against SARS-CoV-2 attacks. Patients with unexpected serological patterns are often reported, such as negative antibody expression throughout COVID-19, and exceptionally high expression of IgM or IgG at their plateau. These observations suggest diverse host responses during COVID-19, which have yet to be assessed.

In this study, we applied two-year clinical manifestation and longitudinal serum proteomics to understand the serology in a cohort of 144 COVID-19 patients.



### Longitudinal serum proteomics

1600 proteins identified from 111 serum samples derived from 4 × 4 COVID-19 patients (Method: TMTpro; 26 fractions per batch and 8 batches in total).



CD4 (#)

\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

CD8 (#)

875 800

1123

- associated with complement cascades. The main host response differences during the late stage of COVID-19 relate to the leukocyte activities.
- DEPs that were correlated with antibody expression during weeks 1-4 (|Spearman correlation coefficient| > 0.5)

IgG correlated	IgM correlated
a <sup>N</sup> - ●	<u>a</u> k - ●

Q86VB7\_CD163

Correlation scatterplot: **MERTK~HDL** 



• Possible lipid involvement in the

immunological activities during

COVID-19.



CD3 (#)

2041 2000

- Severity and inflammation status on admission were positively correlated with antibody titers.
- Patients who remained both IgM and IgG seronegative had enhanced cellular immune responses, whereas less perturbation of lipid metabolism, compared to the other patients.

#### Affiliations

Interleukin-6

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Interleukin-10

Interferon-y

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• A more activated macrophage polarization in G+M++ patients during COVID-19.

## **Putative working model**



• For G-M- patients, prior cellular immune responses may efficiently confront the invasion of SARS-CoV-2 upon COVID-19 onset.

• For G+M++ patients, high expression of inflammatory factors and rapidly ascending IgM titers might be a complementary process to defend against viral attacks.