New method to assess severity risk of COVID-19 infection

Contribute to both prevention of the spread of infection and economic activities

Overview

In the COVID-19 pandemic, which has been raging since 2020, the health care crisis and economic stagnation have become major problems. We must solve these challenges and prepare for other pandemics by emerging or re-emerging infectious diseases in the future.

Although neutralizing antibodies are protective against viral challenge, the adaptive T cell immune response is a major determinant of the clinical outcome after viral infection.

In this study, the inventor aims the establishment of the technique that predicts disease severity by means of specific or cross-reactive mobilization of T cell immunity to four subtypes of human common cold coronavirus (HCoVs-229E, -OC43, -NL63, and -HKU1) and SARS-CoV-2 from convalescent COVID-19 patients and SARS-CoV-2–unexposed donors. Using ELISPOT technology, this study succeeded in developing a prediction equation for severe disease, thus establishing a prediction method (see figure).

In addition, the data accumulated and the knowledge obtained in this study are very useful for the countermeasures against emerging and re-emerging infectious diseases of concern in the future. We believe this novel technique is able to release many people from excess behavioral restrictions or a deterioration in the economy.
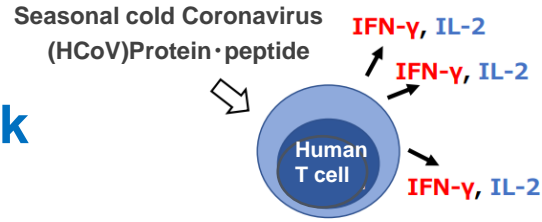
Product Application

- ☐ Method for evaluating risk of severity of Coronavirus infection
- ☐ Determination kit for risk of severe Coronavirus infection
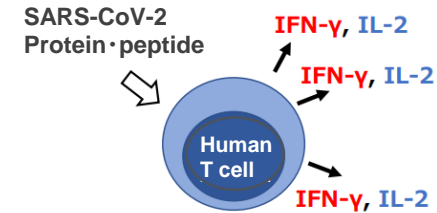 ※Coronavirus is not limited to SARS-CoV-2

IP Data

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HCoV-229E, -NL63, -OC43, -HKU1

Seasonal cold Coronavirus (HCoV)Protein・peptide

IFN-γ, IL-2
IFN-γ, IL-2
IFN-γ, IL-2

Human T cell

SARS-CoV-2

SARS-CoV-2 Protein・peptide

IFN-γ, IL-2
IFN-γ, IL-2
IFN-γ, IL-2

Human T cell

【 Hypothesis 】
T cell responses to multiple HCoVs prevent SARS-CoV-2 from developing severe diseases.

T cell Responses to HCoVs Predicts COVID-19 Severity

Based on T cell response to HCoV (-229E, -OC43, -NL63, -HKU1), Y was calculated using a proprietary calculation method to investigate the relationship with the severity of COVID-19

$p = 0.0019$

Y value vs Healthy N=37, Mild N=8, Moderate or higher N=19
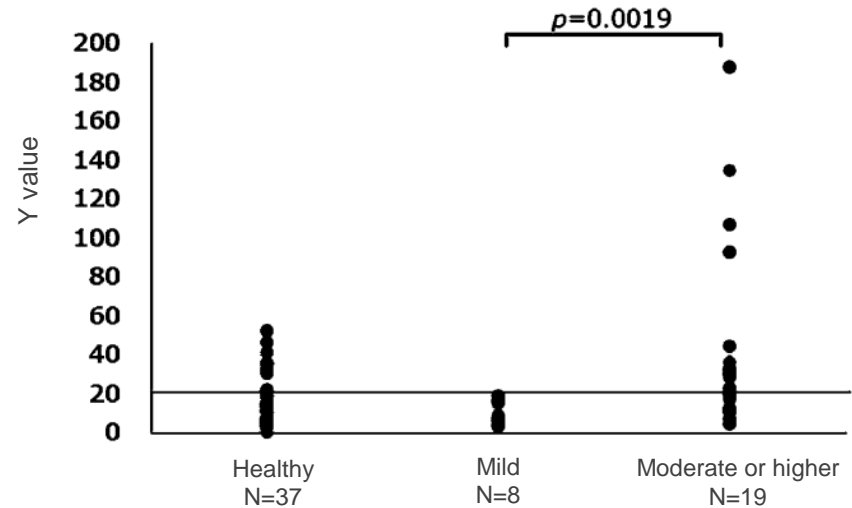
$Y > 20 \Rightarrow$ **100% chance of moderate or worse**
$Y \leqq 20 \Rightarrow$ **8/15 (53%) chance of mild**
※As of 2023, a more accurate calculation method has been developed.

Contact

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