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Editorial

T-Cell Immunity against Coronaviruses is Possible in Stem Cell

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EDITORIAL NOTE

Accumulation of effective immunity against SARS-CoV2 contagion and non-SARS human coronaviruses (hCoVs) is likely possible in patients with hematologic malignancies who have experienced a hematopoietic stem cell transplantation (HSCT). These findings from a study of patients with hematologic malignancies versus healthy volunteers were presented at the 2021 transplantation and cellular therapy meetings of CIBMTR and ASTCT.

Findings have insinuations for the rational use of the upcoming vaccines and for development of broader cross-reactive anti-hCoV T-cell based immunotherapy methods for this highly vulnerable group of patients, the agents wrote in their poster performance.

The coronavirus disease 2019 (COVID-19) has affected individuals with comorbidities including those with cancer, in particular and causes severe respiratory infections among immunocompromised patients and HSCT recipients. As a result, closely related non-SARS hCoVs 229E, NL63, OC43, and HKU1 may also central to alike complications.

Emerging evidence opinions to the central role of T cells in post-infection protection against SARS-CoV2 that might be on-going, unlike relatively brief humoral responses. It is unclear if patients with immune deficiency can brand passable immunological memory letting for future protection.

Therefore, From Columbia University Irving Medical Center in New York City aimed to understand the development of T-cell responses against SARS-CoV2 in HSCT recipients and patients with hematological malignancies who survived COVID-19; explored T-cell immunity against hCoVs that usually affect HSCT recipients; and demonstrated the potential of developing universal, cross-reactive immunotherapies for coronaviruses including SARS-CoV2 and hCoVs.

They conducted a comprehensive analysis of T-cell responses against SARS CoV2 and hCoVs in peripheral blood samples from 12 patients after HSCT or with a blood cancer and documented COVID-19 history (COVID-positive, n = 8; COVID-negative, n = 4) as likened with 33 healthy donors with and without documented history of infection (COVID-positive, n = 11; COVID-negative, n = 22).

Of the 12 patients who were immunocompromised, 1 underwent chemotherapy for multiple myeloma, 1 for prostate cancer, and 10 patients had allogenic HSCT. To device the microculture priming and immunocompetence 14-day expansion strategy was used to stimulate peripheral blood mononuclear cells (PBMC) with overlapping peptide libraries (pepmixes) derived from spike 1 and 2, membrane and nucleocapsid from SARS-CoV2 and their counterparts from all 4 hCoVs. Expanded T cells were re-challenged with the pepmixes and tested for specific cytokine announcement by FACS. The investigators saw discernable T-cell activity against SARS CoV2 antigens in healthy COVID-19 survivors, predominantly within the CD4-positive T-cell compartment. On the other hand, unexposed subjects who displayed good reactivity against hCoVs had significantly lower, more variable responses. Of note, in the vulnerable population of patients, the investigators saw the same T-cell activity against the majority of SARS CoV2 antigens, indicating that those subjects were highly capable of generating T-cell memory, the investigators wrote. Also, all tested patients also displayed potent responses against multiple antigens from common hCoVs. Cross-reactivity between hCoV antigens and their counterparts from SARS CoV2 was seen, especially [versus] previously unexplored membrane and nucleocapsid hCoV antigens.

Moreover, COVID-19–positive persons established a higher frequency of polyfunctional CD4-positive T cells and a advanced presence of CD4-positive T-effector memory, or TEM, cells which also supports the ability to generate T-cell memory. Lastly, hCoV-specific CD4-positive T-cells from both COVID-negative and -positive individuals responded against antigens from other hCoVs, and SARS CoV2, signifying that the generation of polyreactive CD4 [-positive] T cells might be possible, the researchers said.

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