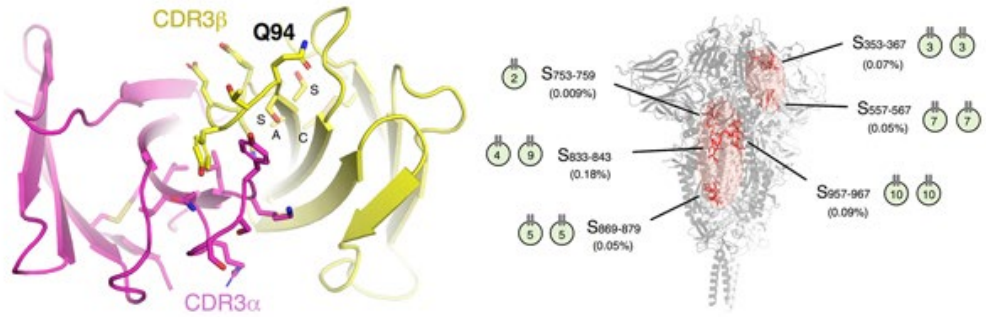
Identification of conserved SARS-CoV-2 spike epitopes that expand public cTfh clonotypes in mild COVID-19 patients

Keywords: novel coronavirus infection, severe disease, vaccine, cellular immunity, T cells

Adaptive immunity is a fundamental component in controlling COVID-19. In this process, follicular helper T (Tfh) cells are a subset of CD4+ T cells that mediate the production of protective antibodies; however, the SARS-CoV-2 epitopes activating Tfh cells are not well characterized. Sho Yamasaki (IFReC/RIMD, Osaka University) and the research group identified and crystallized TCRs of public circulating Tfh (cTfh) clonotypes that are expanded in patients who have recovered from mild symptoms. These public clonotypes recognized the SARS-CoV-2 spike (S) epitopes conserved across emerging variants. The epitope of the most prevalent cTfh clonotype, S864–882, was presented by multiple HLAs and activated T cells in most healthy donors, suggesting that this S region is a universal T cell epitope useful for booster antigen. SARS-CoV-2–specific public cTfh clonotypes also cross-reacted with specific commensal bacteria. The group identified conserved SARS-CoV-2 S epitopes that activate public cTfh clonotypes associated with mild symptoms.



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Authors: Xiuyuan Lu, Yuki Hosono, Masamichi Nagae, Shigenari Ishizuka, Eri Ishikawa, Daisuke Motooka, Yuki Ozaki, Nicolas Sax , Yuichi Maeda , Yasuhiro Kato , Takayoshi Morita , Ryo Shinnakasu , Takeshi Inoue , Taishi Onodera , Takayuki Matsumura , Masaharu Shinkai, Takashi Sato, Shota Nakamura, Shunsuke Mori, Teru Kanda, Emi E. Nakayama, Tatsuo Shioda , Tomohiro Kurosaki , Kiyoshi Takeda , Atsushi Kumanogoh, Hisashi Arase, Hironori Nakagami, Kazuo Yamashita, Yoshimasa Takahashi, Sho Yamasaki

<Message from Prof. Yamasaki>

Under the pandemic, many research institutes collaborated and quickly identified the T cell clone that involves the immune function and its antigen. This method may become a universal platform that can be used for unknown infectious diseases and T cell related diseases.