Structural and functional characterization of a humanized neutralizing antibody targeting the SARS-CoV-2 Spike RBD

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Abstract

SARS-CoV-2 continues to spread and cause illness globally. The spike protein, located on the surface of the virus, is crucial for the interaction between the virion and host cell receptors, facilitating viral infection. Since 2020, a significant number of SARS-CoV-2 variants have been identified. This study aims to functionally and structurally characterize a humanized neutralizing antibody (NAb) that recognizes the RBD of the wild type as well as the Alpha, Beta, Gamma, and Delta variants.

The project leveraged the expertise of Takis srl and Sapienza University of Rome. Takis srl employed hybridoma technology to generate a large library of murine antibodies, from which they developed corresponding humanized NAbs. The structure of the most effective humanized NAb in complex with the Spike protein was solved using single-particle cryo-electron microscopy (Cryo-EM), a structural biology technique in which the research groups at Sapienza are highly proficient.

This collaboration between Takis srl and Sapienza enabled the identification of a broadly neutralizing humanized antibody and clarified the structural basis of antigen-antibody interaction.