CROSS-IMMUNOREACTIVITY IN CORONAVIRUS IN THE CONTEXT OF THE COVID-19 PANDEMIC: WHAT WE KNOW AND WHAT WE PREDICT

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Although the pandemic caused by SARS-CoV-2 has become the focus of important media and scientific interest, members of the Coronaviridae family have affected the global population globally in the past. The most common agents of seasonal colds are human coronaviruses of the species HCoV-229E and HCoV-OC43, discovered in 1960. More recently, HCoV-HKU1 and HCoV-NL63 have caused 15-30% of all detected cases of common colds on a global scale.

Against the background of a significant pool of coronaviruses already circulating among the human population and the large number of asymptomatic cases of COVID-19, especially in children, the question arises as to the presence of cross-immunity to SARS-CoV-2 due to past coronavirus infection, and its importance for achieving collective immunity against the current infection.

The key to humoral and cellular cross-immunity to coronaviruses lies in the similar structure and mechanisms of infection. The important structural similarity as well as the common receptor mediating viral entry (ACE2) identifies SARS-CoV-1 as a potential candidate for cross-reactive antibody development. Interestingly, antibodies to HCoV-NL63 were also detected in patients infected with SARS-CoV-1, suggesting potential cross-immunoreactivity with endemic coronaviruses. In healthy donors without evidence of previous SARS-CoV-2 infection, significant CD4+ T cell reactivity to the following SARS-CoV-2 peptides has been demonstrated: Spike (23%), nsp14 (25%), nsp4 (15%) and nsp6 (14%). At the same time, unlike in COVID-19 patients, no reactivity to N and M viral proteins has been detected. Studies on HCoV-OC43 and HCoV-NL63 seropositive donors from the period 2015 - 2018, confirmed the presence of CD4 T-cell cross-reactivity against SARS-CoV-2. SARS-CoV-2-reactive CD8+ T cells have been also identified in healthy, uninfected donors, though without clear-cut specificity for the target SARS-CoV-2 proteins. CD8+ T cell cross-reactivity seems not as widespread as that of CD4 + T cells.

In conclusion, the presence of immune cross-reactivity to human coronaviruses at the humoral and cellular level has been unequivocally demonstrated. More information is needed on its protective effects against SARS-CoV-2 infection. Establishing a link between seasonal colds and the asymptomatic course of COVID-19 would change the epidemiological prognosis for the future development of the pandemic, justifying more optimistic models of morbidity.