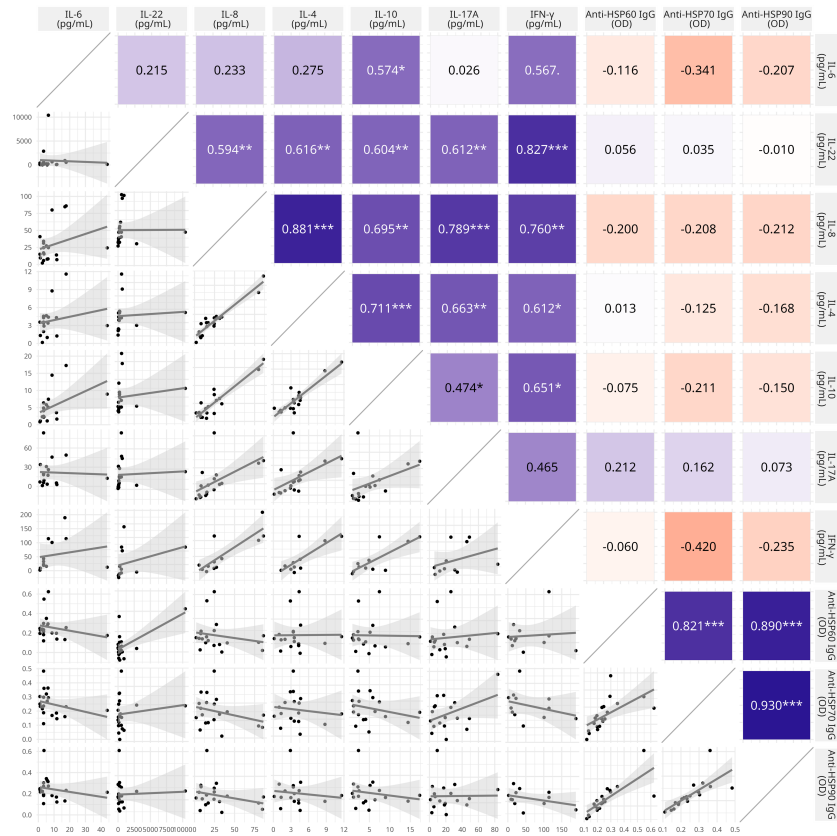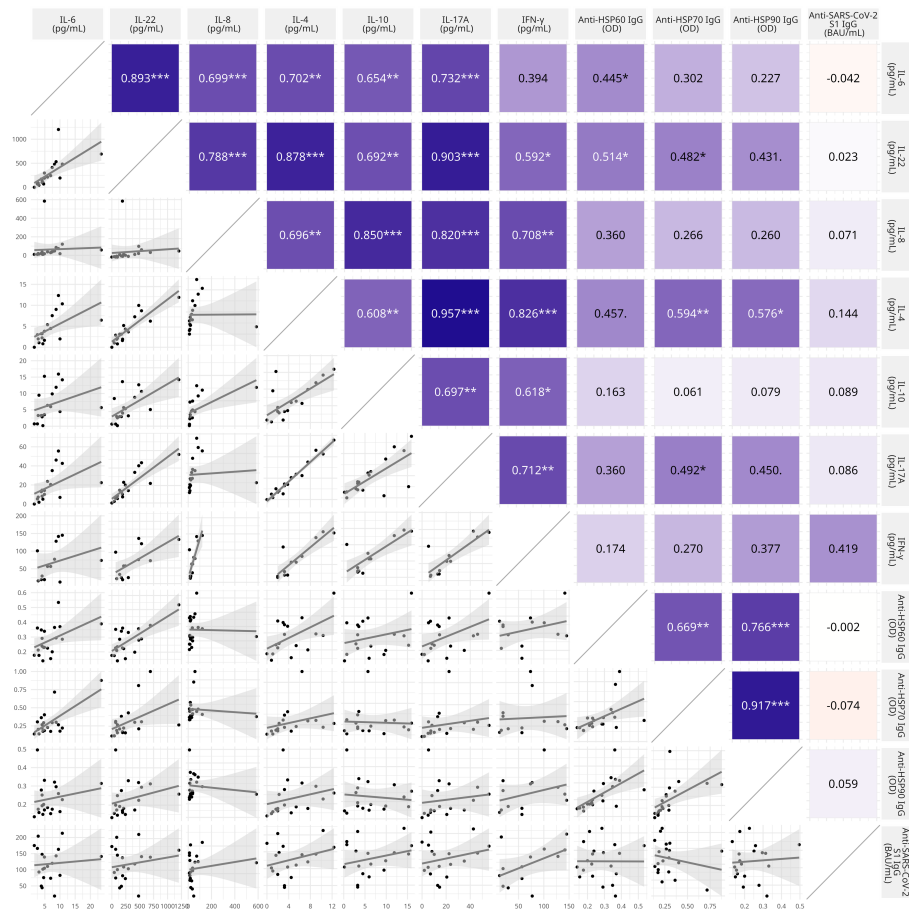**Supplementary Data 1.** Scatter plots and correlation analyses illustrating the relationships between serum levels of IL-6, IL-22, IL-4, IL-8, IL-10, IL-17A, IFN-γ, and circulating anti-Hsp IgGs or anti-SARS-CoV-2 IgG S1, presented as Spearman's rank correlation coefficients. Comparisons were conducted within the groups: (A) anti-SARS-CoV-2 IgG-negative (Unvaccinated) and (B) anti-SARS-CoV-2 IgG-positive (Vaccinated). Correlation coefficients (r values) are shown within the heatmap boxes, with statistically significant correlations marked with asterisks (*P < 0.05, **P < 0.01, ***P < 0.001).