

Association of Ferritin and Plasma Iron Levels at Time of Vaccination with The Immune Response To SARS-CoV-2 Vaccination in the Zurich Sars-CoV-2 Vaccine Cohort

Project: 592

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Background: Iron status may affect the immune response following vaccination. Our aim was to investigate whether ferritin and plasma iron concentrations at time of vaccination were associated with the development and temporal decay of immune response to SARS-CoV-2 vaccination over 26 weeks in the population-based Zurich SARS-CoV-2 Vaccine cohort.

Methods: Participants (n=572) were randomly recruited stratifying by age groups (18-64 years, >65 years) and vaccine types (Pfizer-BioNTech BNT162b2, Moderna mRNA-1273, Johnson & Johnson JNJ-78436735). Blood samples and self-administered questionnaires were collected at baseline and 4, 6, 13, and 26 weeks. Iron status was measured at baseline, whereas immunity markers at each time point. The association between iron parameters and immunity markers was investigated using linear mixed-effect models. Half-life was estimated using $\log(0.5)/\text{model-coefficient}$.

Results: Mean age (\pm SD) was 56.0 \pm 18.1 years. Seropositivity at baseline was 11.5%. Geometric mean ferritin was 88.1 mg/L and mean plasma iron 0.82 mg/mL. Iron deficiency was generally low, with prevalence higher in females. In the longitudinal analysis, ferritin at time of vaccination was positively associated with Anti-S IgG antibodies (b=0.004, 95% CI 0.002;0.007), and Anti-wildtype (b=0.011, 95% CI 0.001;0.021), Anti-delta (b=0.016, 95% CI 0.006;0.026), and Anti-omicron neutralizing antibodies (b=0.013, 95% CI 0.003;0.024). Plasma iron results were generally not significant. Significantly lower half-life was observed in participants in the highest quartiles of ferritin concentrations, while no clear trend was observed for plasma iron.

Conclusion: In this mostly iron replete cohort, ferritin at time of vaccination was marginally associated with the vaccination-induced development of immune markers to SARS-CoV-2.

