The prevalence of adaptive immunity to COVID-19 and reinfection after recovery – a comprehensive systematic review and meta-analysis of 12 011 447 individuals.

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Objectives

- Estimate the prevalence and longevity of detectable SARS-CoV-2 specific IgM, IgG, and CD4+ and CD8+ T cells in individuals with and without COVID-19 from 2020 and 2021.
- Evaluate the protective efficacy of previous SARS-CoV-2 infection.
- Review the key markers of immunological memory and humoral immunity associated with COVID-19.

Methods

- Systematic review and meta-analysis for primary studies with the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) guidelines.
- Searches were conducted on PubMed, Scopus, and the Cochrane Library.
- Exclusion criteria included studies from non-English languages.

Results

A) Prevalence of SARS-CoV-2 specific IgG, IgM, CD4+ and CD8+ cells after recovery from COVID-19.

- The pooled prevalence of detectable IgM remained steadily elevated for months post recovery, where it was 89.0% within 1 month, 92.6% within 1-3 months, 91.4% within 3-6 months and 90.4% after 6 months.
- The pooled prevalence of detectable IgG showed a downward trend with time, where it was 84.3% within 1 month, 31.9% within 1-3 months and around 51.6%-61.4% in 3-6 months.
- The prevalence of IgG was 63.4%-3 months post recovery.
- The prevalence of detectable CD4+ T cells remained high even months post recovery, with levels being 100% within one month, 93.3% within 1-2 months (11), 78.8% within 4.5 months (7) and 91.7% at 6-8 months (10).
- CD8+ T cells levels declined steadily from 70% at one month to 50% at 6-8 months post recovery.
- The memory of B cells was 92.9% at 2-3 months post recovery (6) and 80.6% at 4.5 months post recovery (12).

B) Reversionality and reinfection after recovery from COVID-19.

- The pooled prevalence of reversionality within one month was 2.0%, whereas the pooled prevalence of reinfection at 2-3 months after recovery was 0.2%.
- The prevalence of reinfection ≥3 months after recovery from SARS-CoV-2 was 0.2%.

Conclusion

- Around 90% of people previously infected with SARS-CoV-2 had evidence of immunological memory, which was sustained for at least 8 months after recovery, and seemed to have a low risk of reinfection.

References