

Cytokine Storm in COVID-19



Immune Response to SARS-CoV-2

- Significant elevation of TNF- α , IL-1 β , IL-6, GCSF, IFN- γ , MCP-1, and MIP-1- α ¹
- Cytokine inhibition has been tried in COVID-19 despite its lack of efficacy in other severe infections



Physiology

- The kinetics of cytokine activation during SARS-CoV-2 infection are still unclear¹
- Direct viral invasion and immune-mediated inflammation both contribute to host tissue damage



ARDS

- IL-6 plays a key role in viral pathogenesis and host defense²
- Median levels of IL-6 in COVID-19 ARDS are elevated but lower than seen in typical ARDS³



Tocilizumab (IL-6 Receptor Blocker)

- Did not prevent death or intubation in moderate COVID-19 (RCT vs placebo)⁴
- Did not prevent clinical worsening in patients needing supplemental O₂ (RCT vs placebo)⁵



Practical Applications

- IL-6 is elevated in COVID-19, but its role in the pathophysiology may be limited
- Tocilizumab was not effective in preventing clinical worsening, intubation, or death

¹Li H, et al. *The Lancet*. 2020.

²Wang W. *Clin Infect Dis*. 2004.

³Sinha P, et al. *JAMA Intern Med*. 2020.

⁴Stone J, et al. *NEJM*. 2020.

⁵Salvarani C, et al. *JAMA Intern Med*. 2020.