

In the name of God

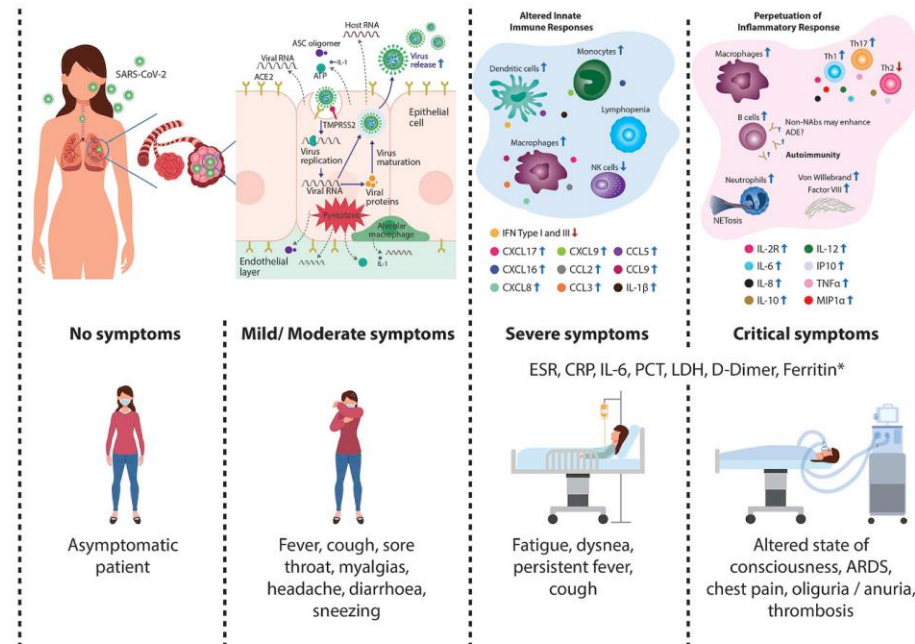
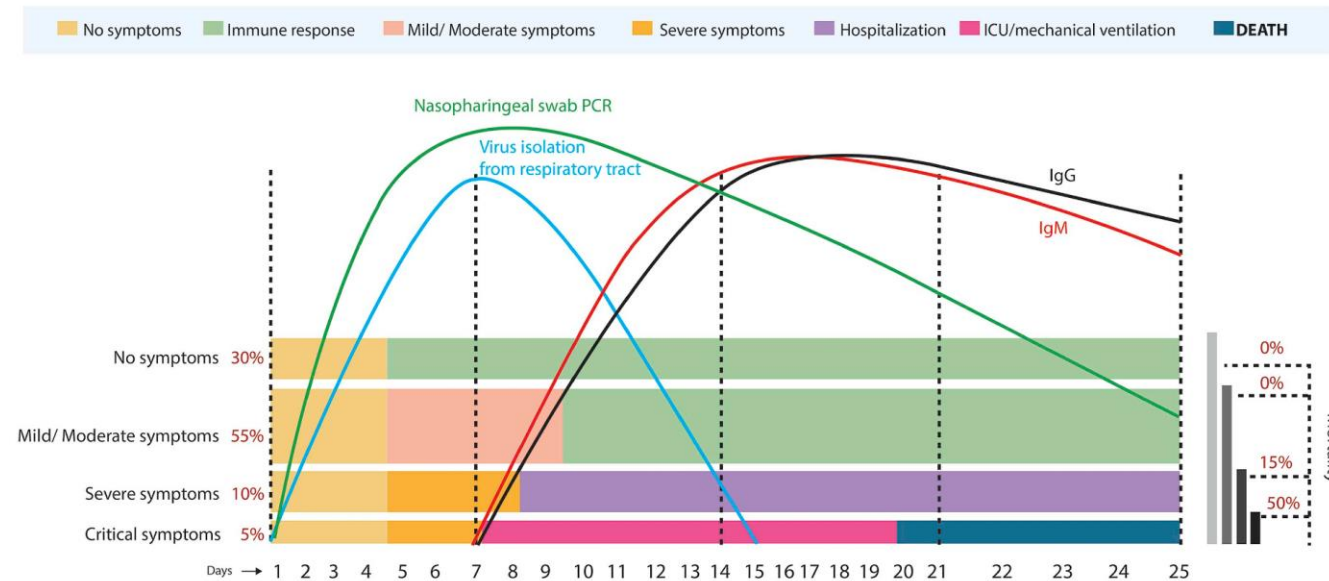


Immune responses during COVID-19 infection

Dr. Hamed Mohammadi

Alborz University of Medical Sciences, Karaj, Iran

Translational overview of COVID-19

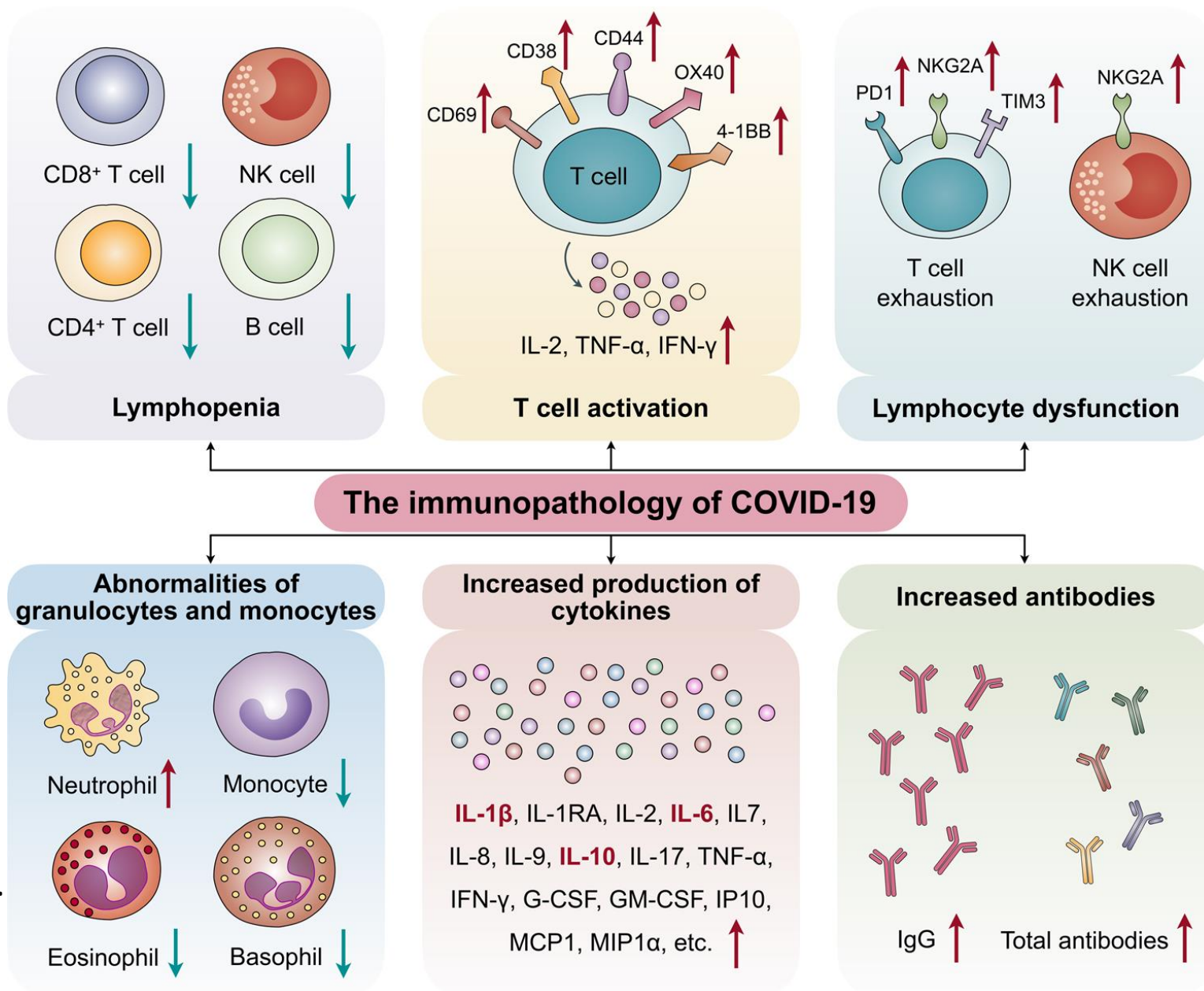


Rodríguez, Y, J Autoimmun.
2020 Nov;114:102506

The immunopathology of COVID-19

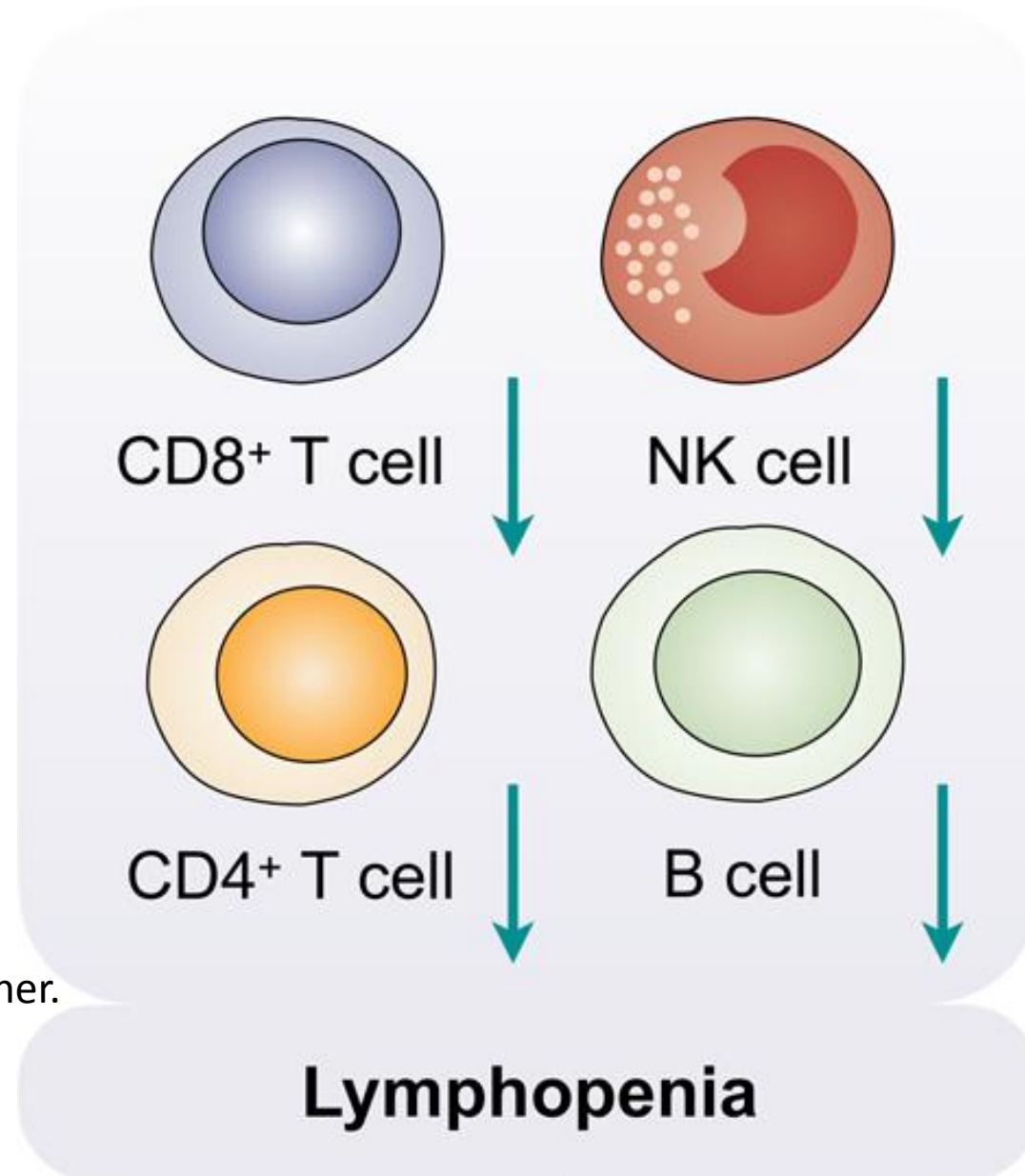


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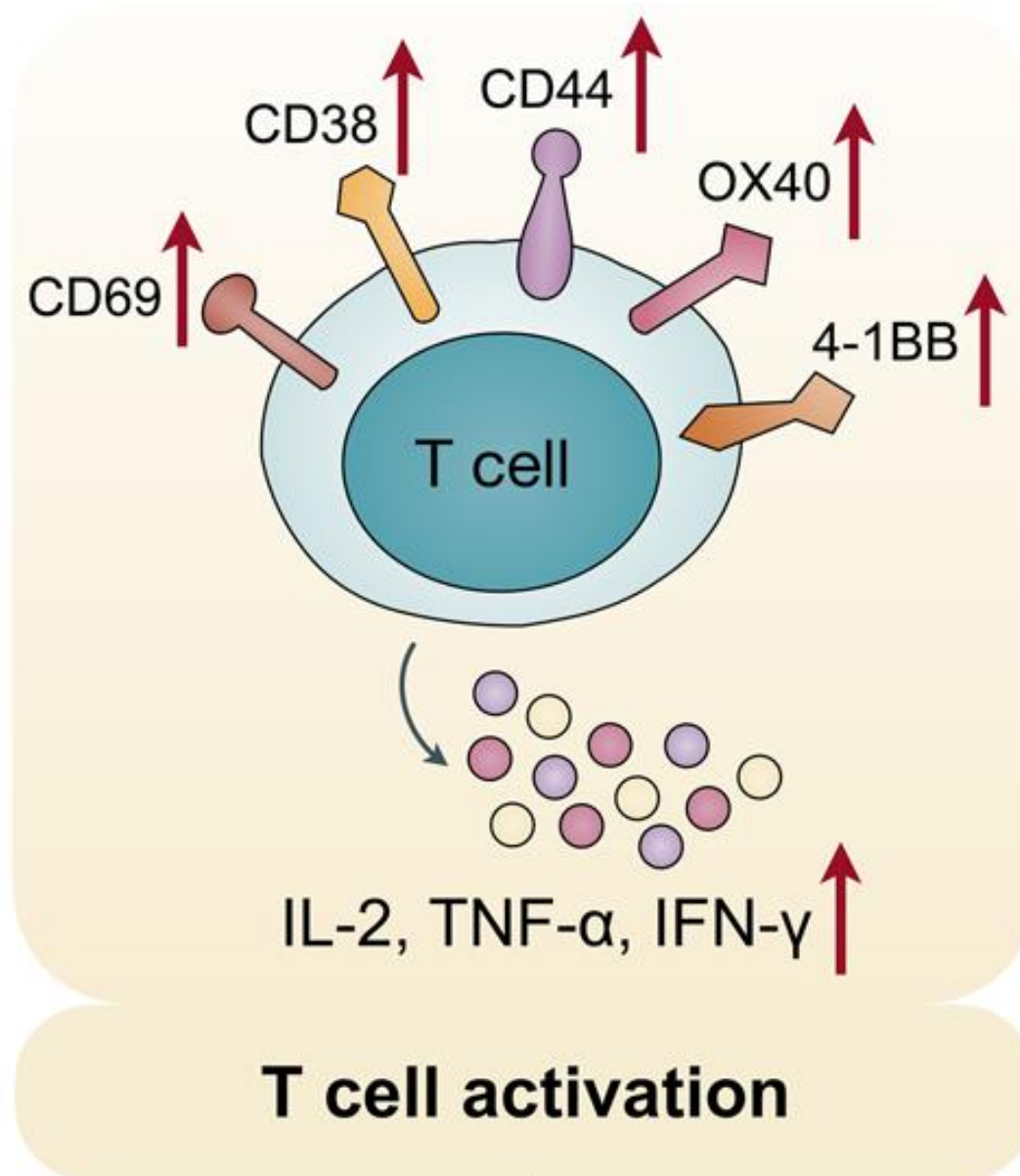
Yang, L, Signal
Transduct Target Ther.
2020 Jul 25;5(1):128

A. Lymphopenia

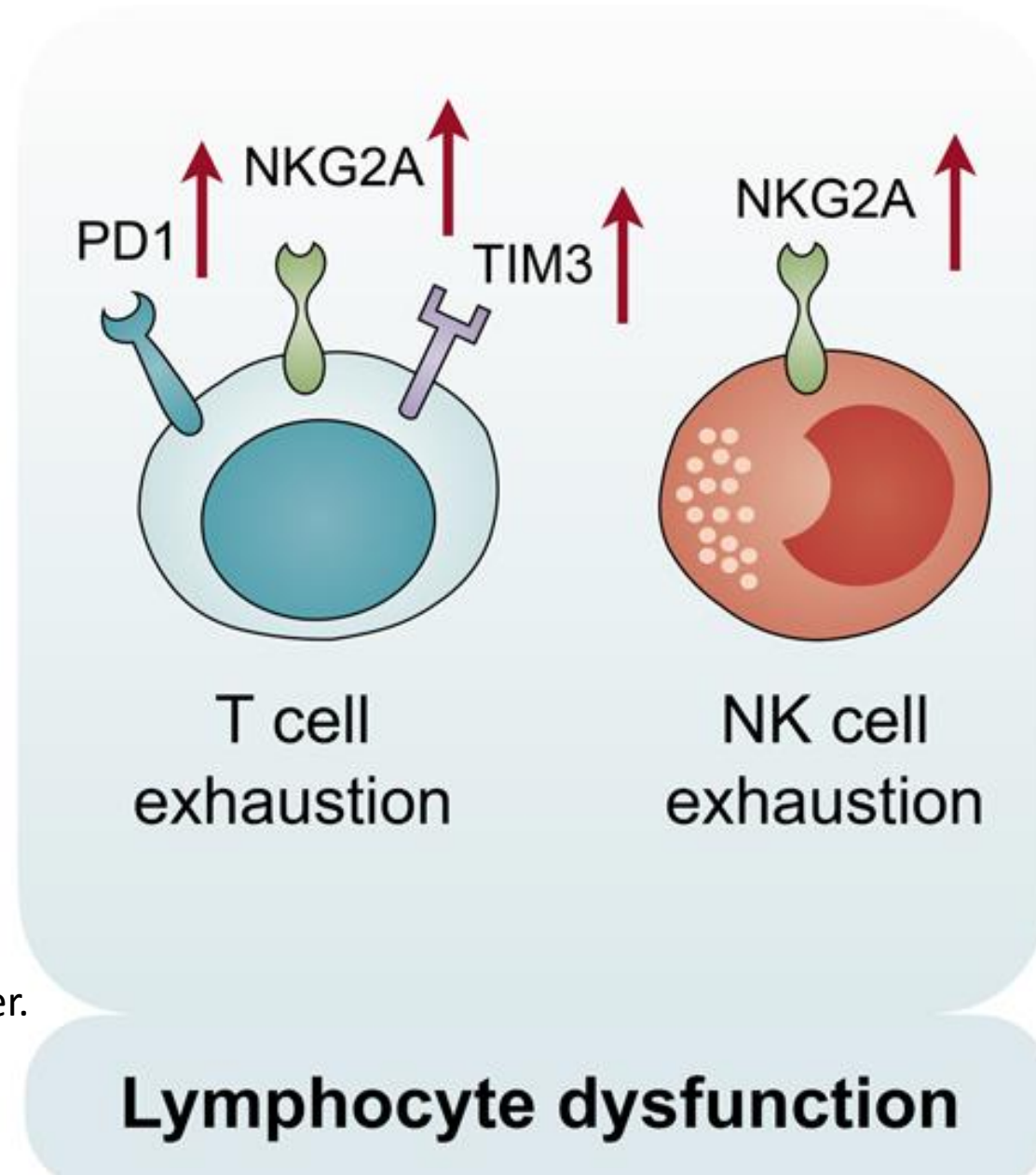


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B. T cell activation

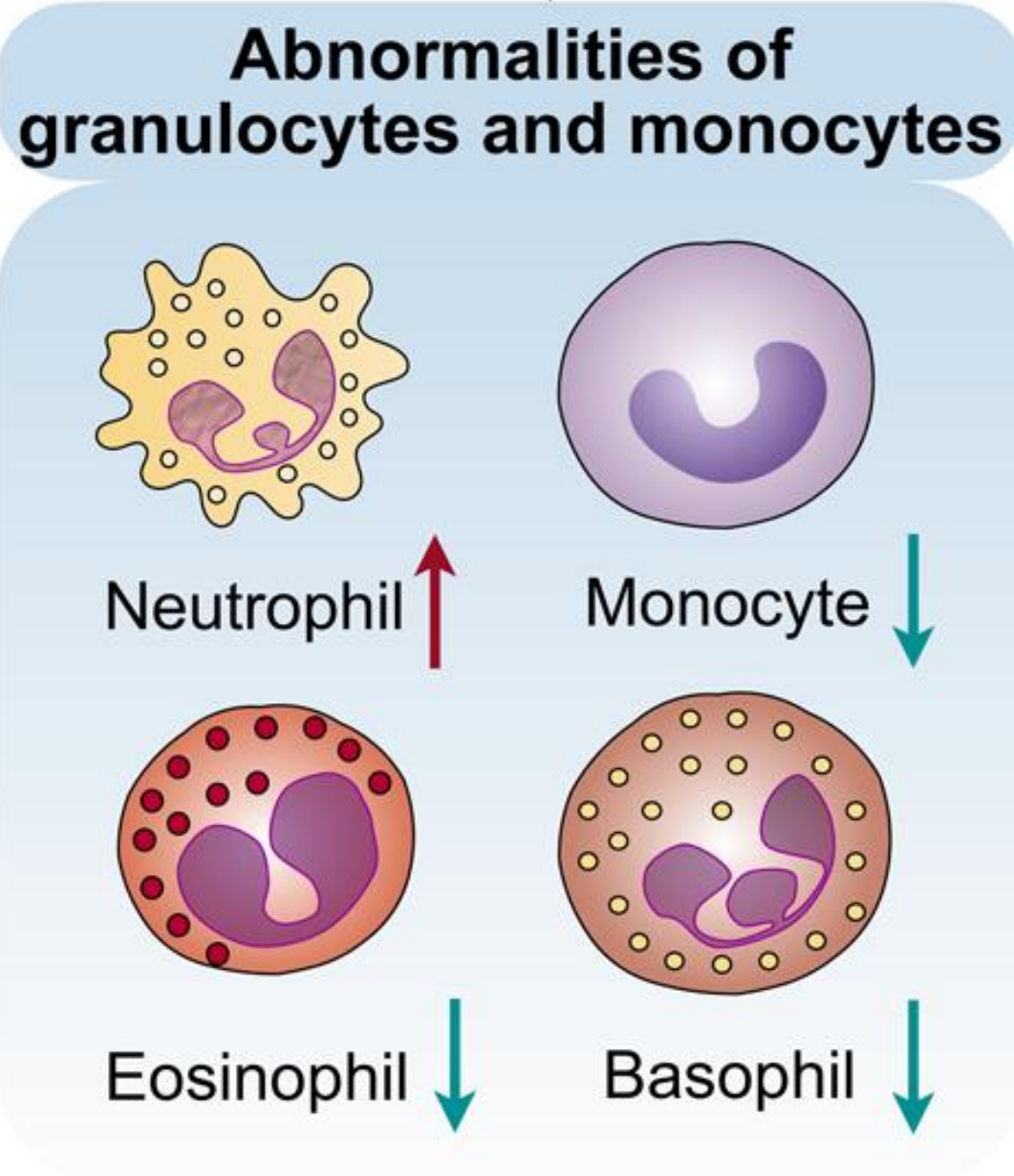


C. Lymphocyte dysfunction



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D. Abnormalities of granulocytes and monocytes

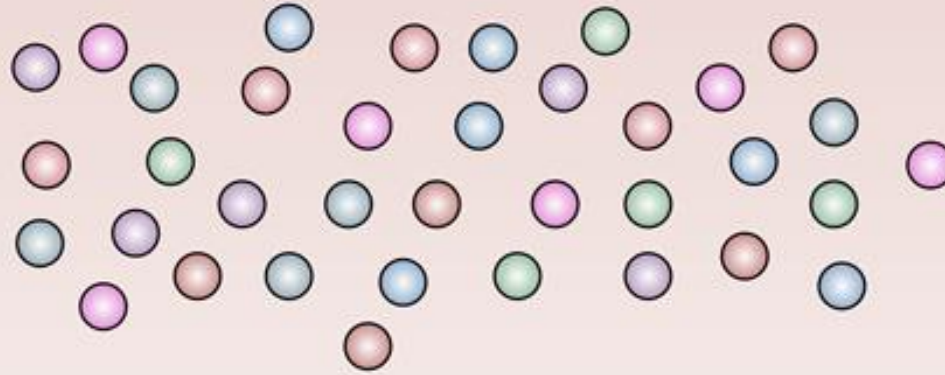


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E. Increased production of cytokines



Increased production of cytokines

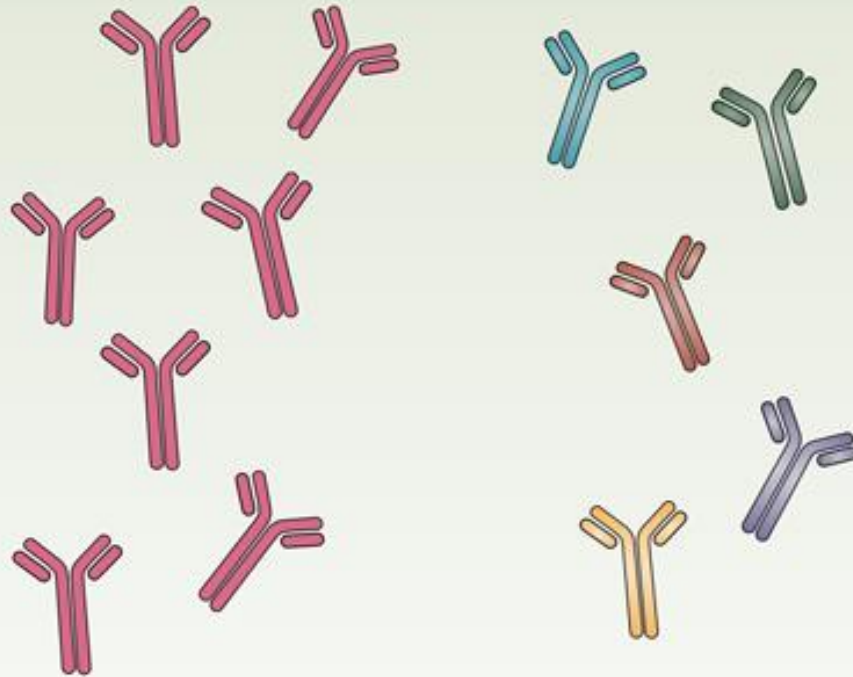


IL-1 β , IL-1RA, IL-2, **IL-6**, IL7,
IL-8, IL-9, **IL-10**, IL-17, TNF- α ,
IFN- γ , G-CSF, GM-CSF, IP10,
MCP1, MIP1 α , etc. 

F. Increased antibodies

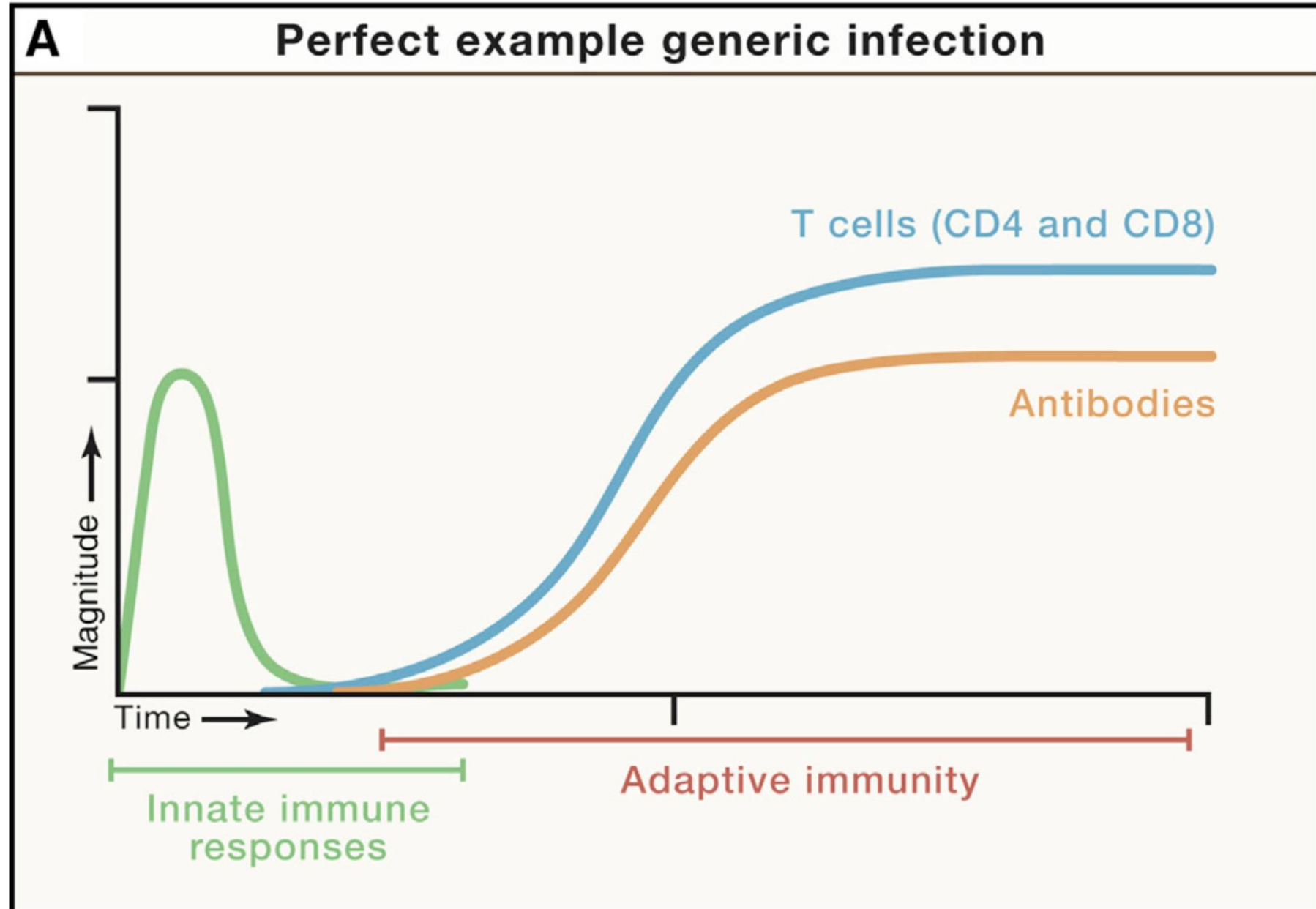


Increased antibodies



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An integrated working model of COVID-19 immunology and disease severity

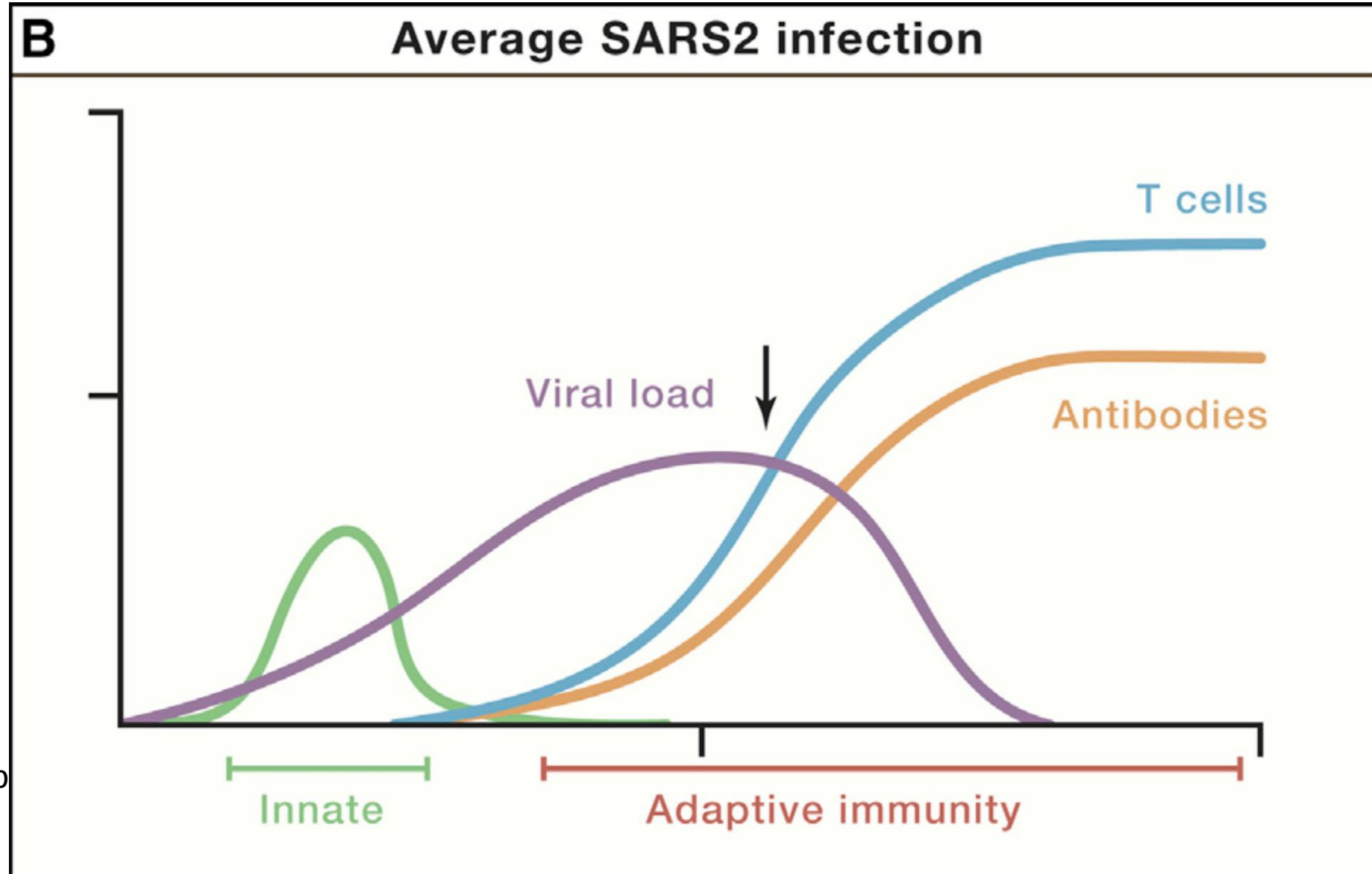


Sette, A, Cell. 2021 Feb
18;184(4):861-880

An integrated working model of COVID-19 immunology and disease severity

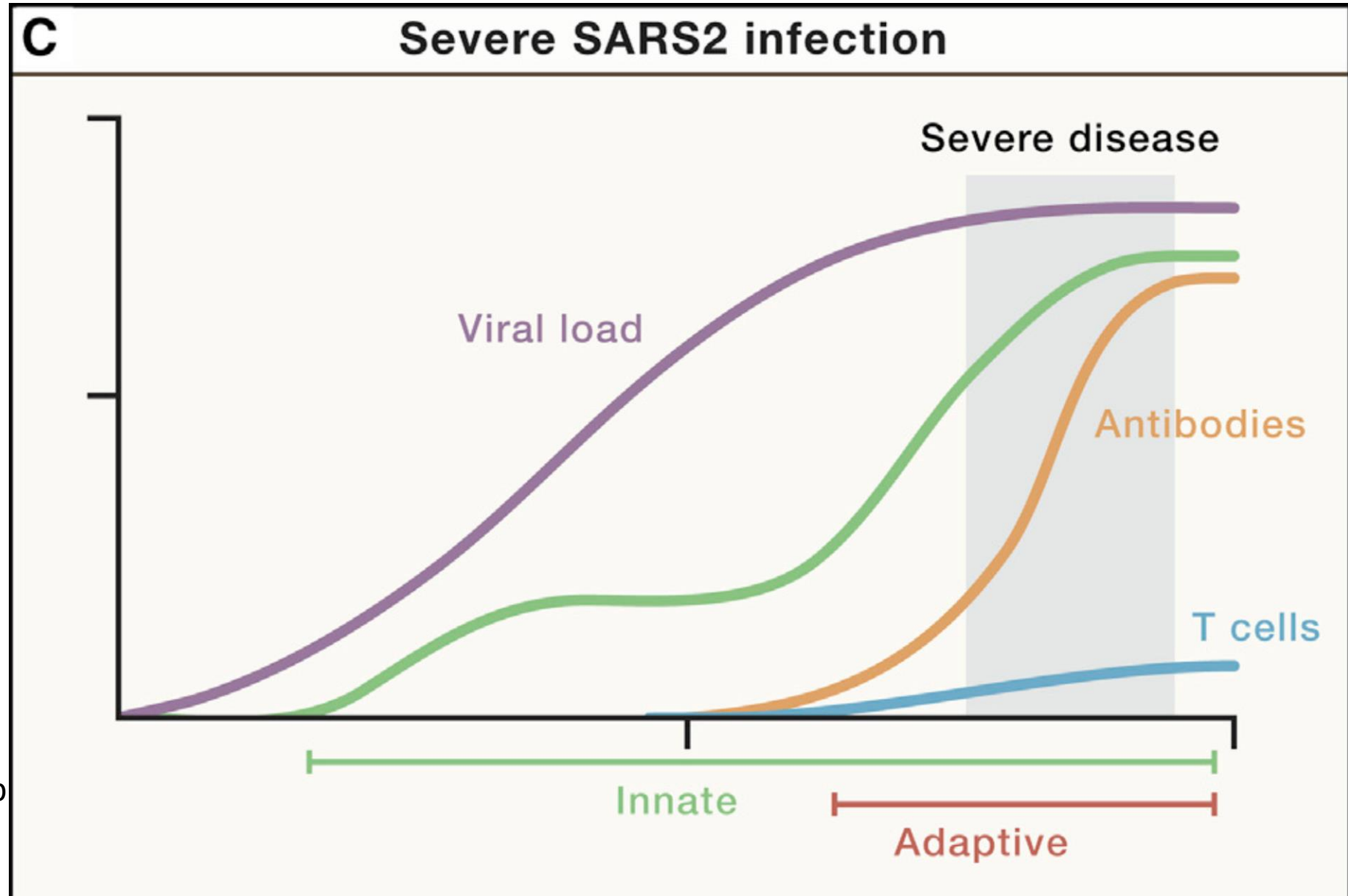


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An integrated working model of COVID-19 immunology and disease severity

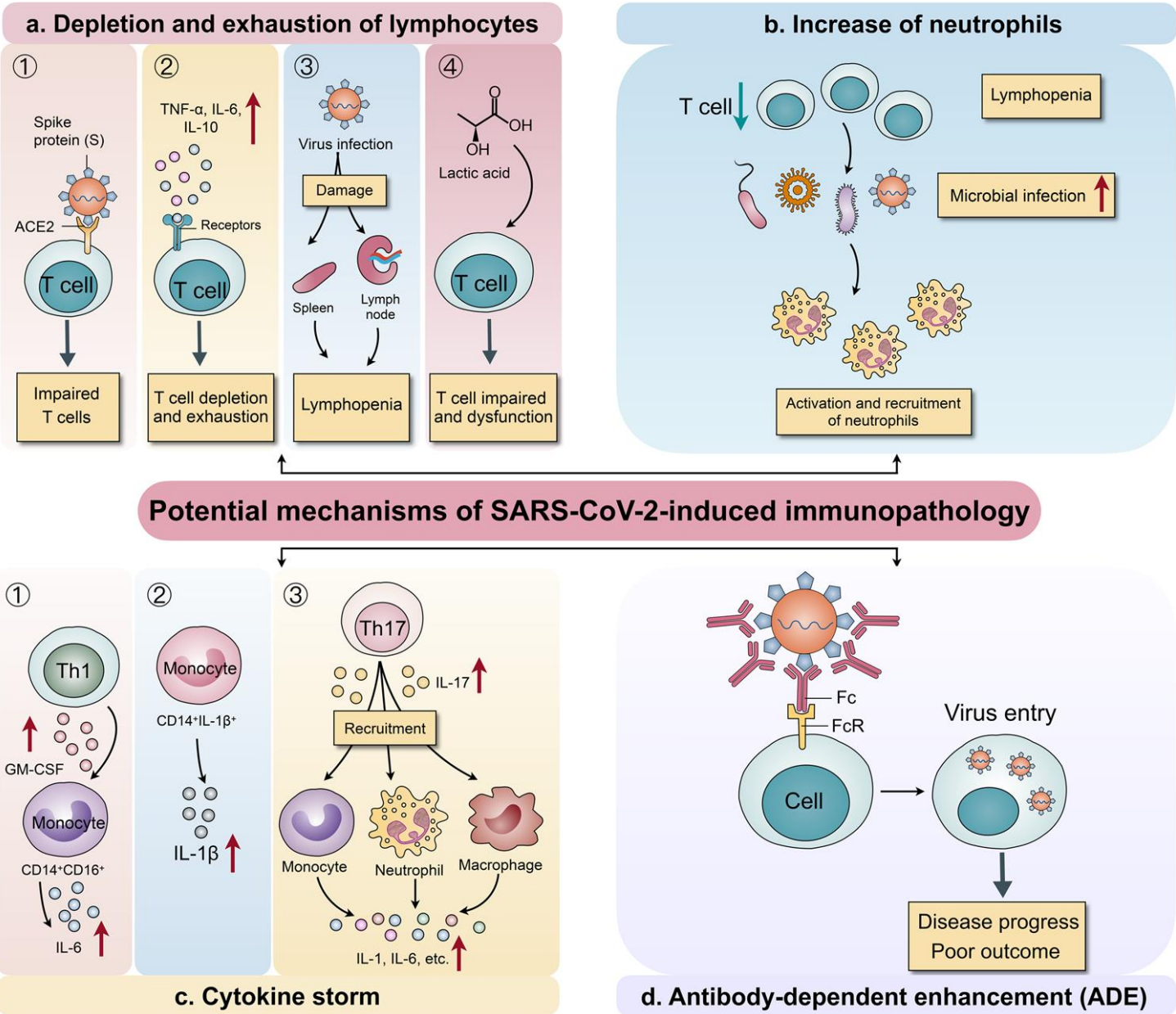


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Potential mechanisms of SARS-CoV-2-induced immunopathology



دانشگاه علوم پزشکی و خدمات بهداشتی درمانی همدان

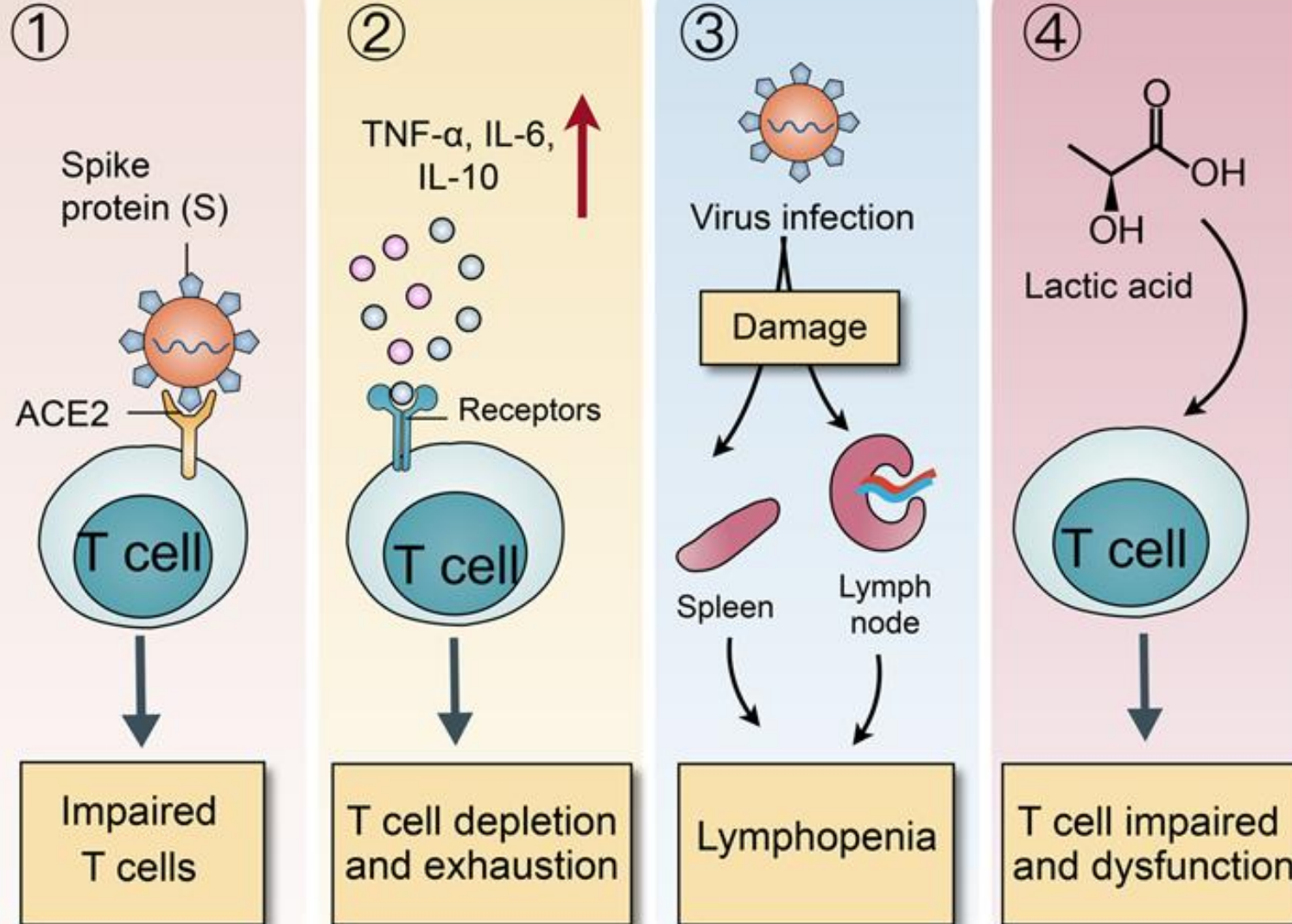


Yang, L, Signal Transduct
Target Ther. 2020 Jul
25;5(1):128

A. Potential mechanisms of depletion and exhaustion of lymphocytes

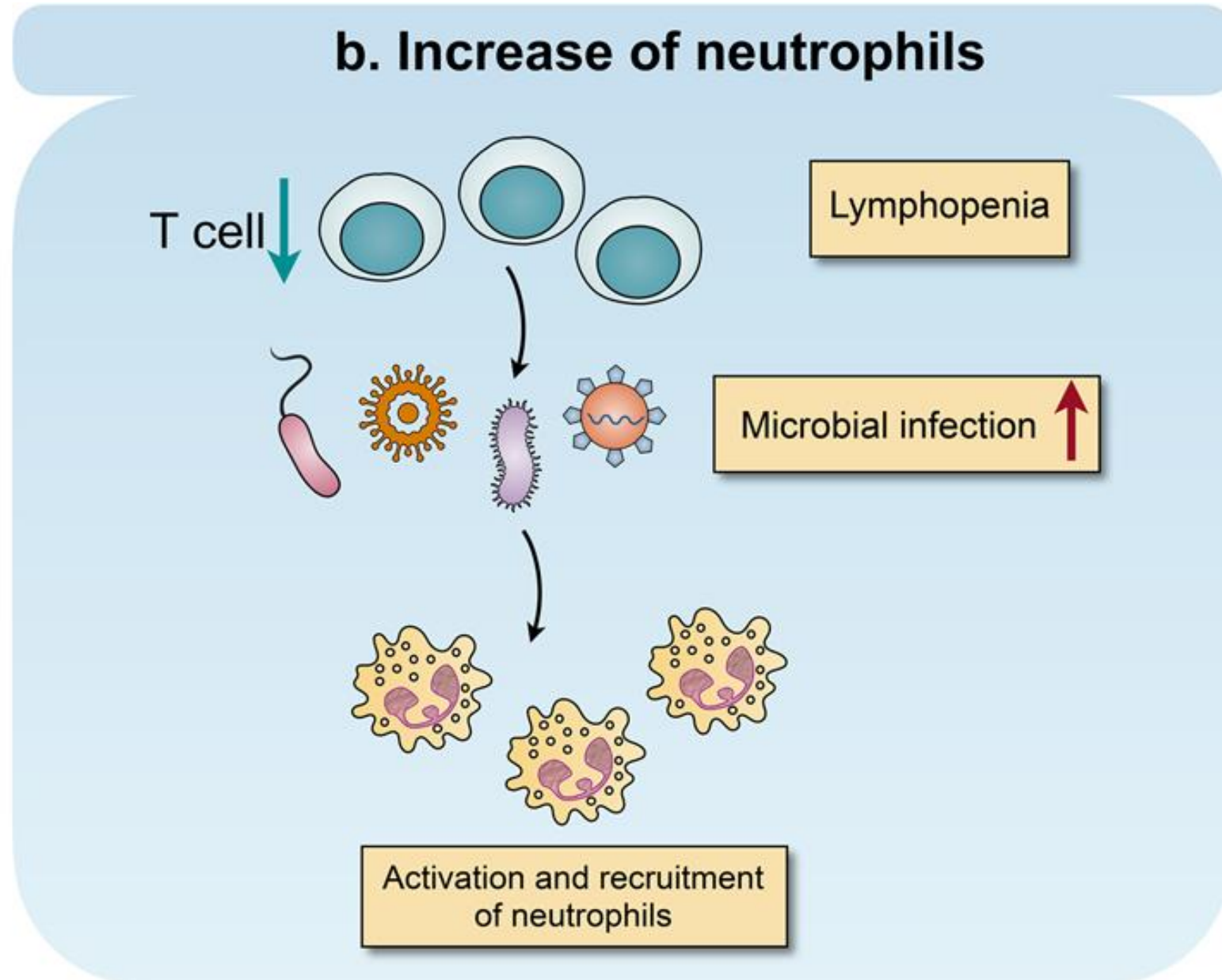


a. Depletion and exhaustion of lymphocytes



Yang, L, Signal Transduct
Target Ther. 2020 Jul
25;5(1):128

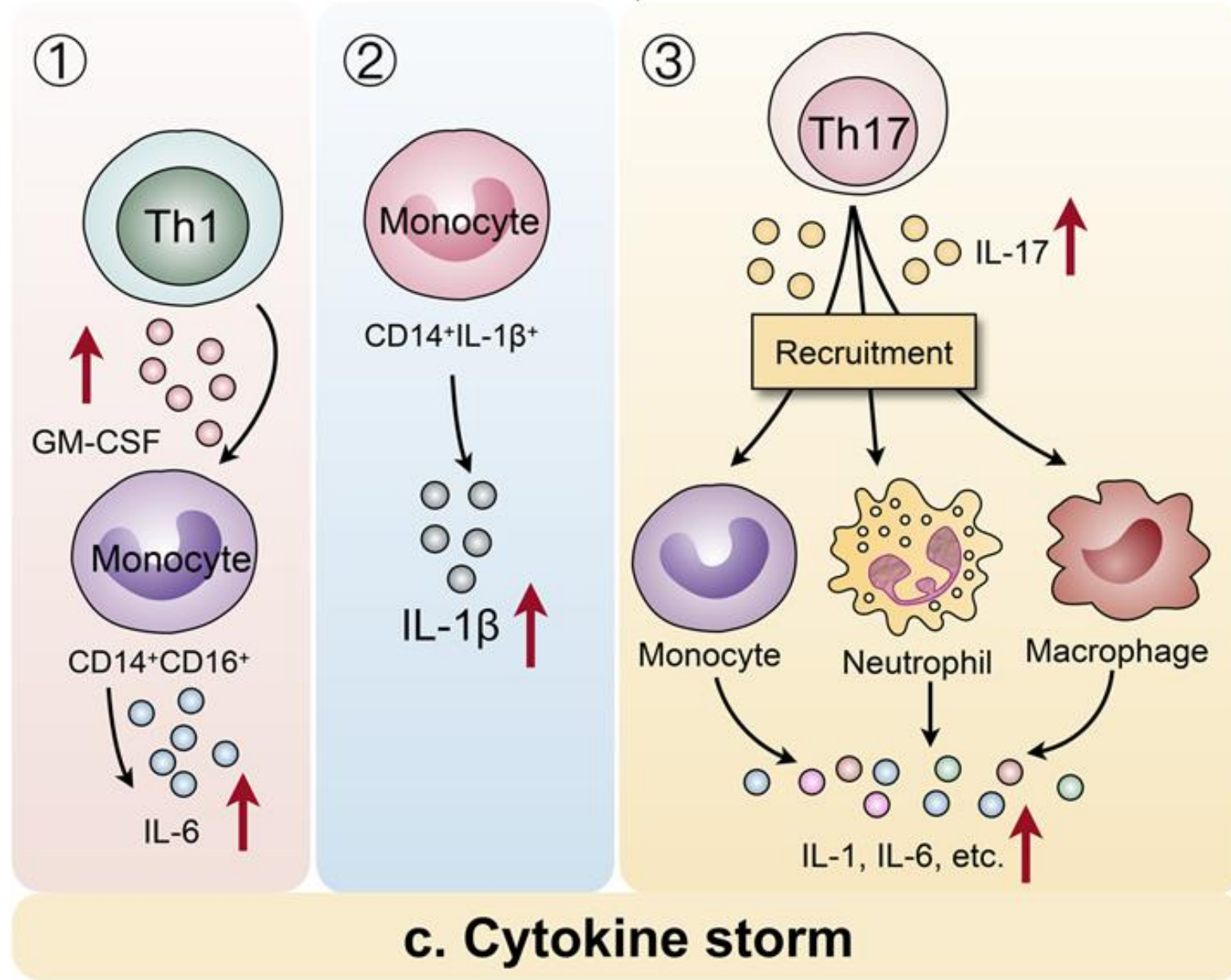
B. Increase of neutrophils



C. The potential mechanisms of cytokine storm induction

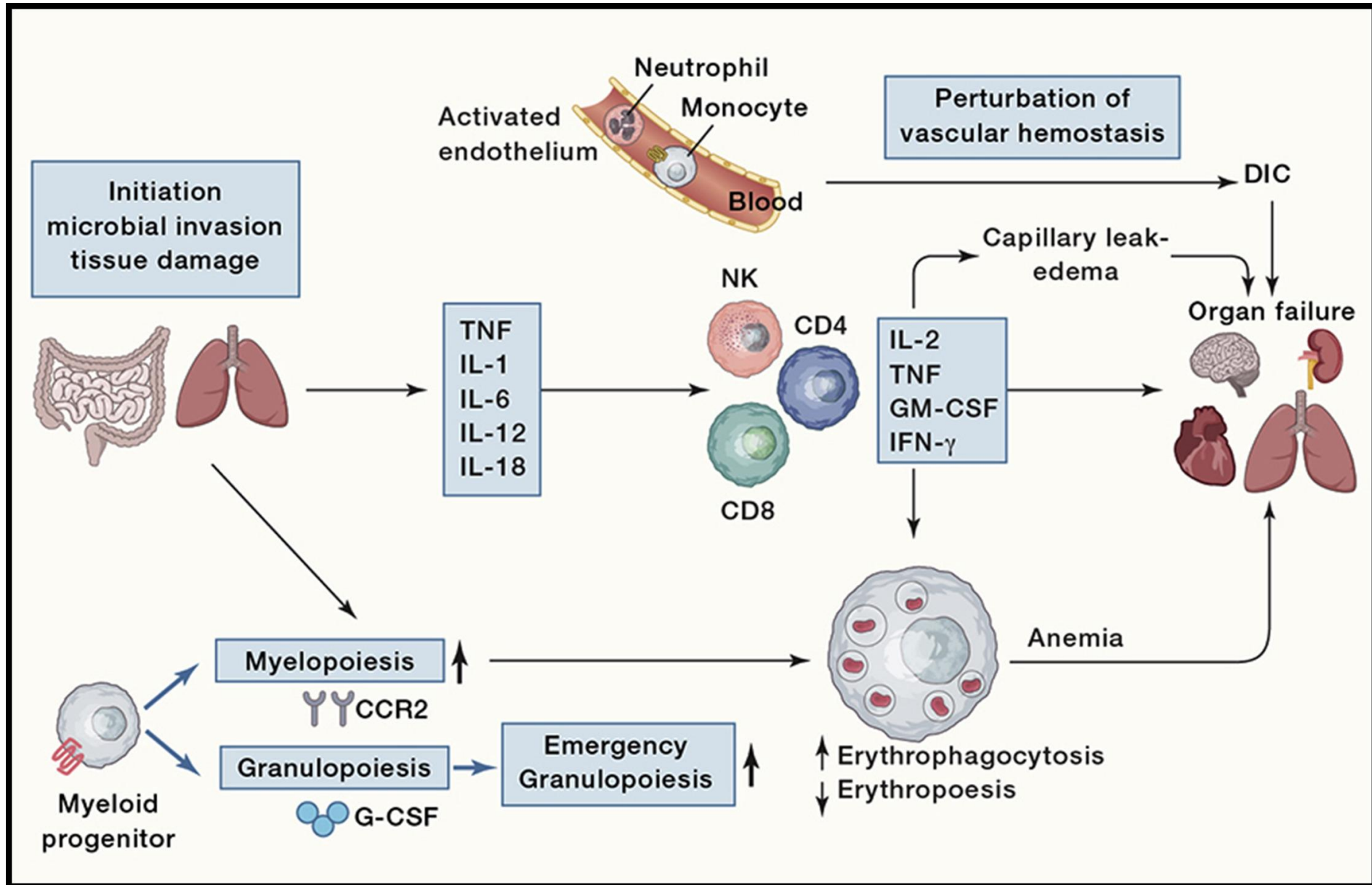


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Target Ther. 2020 Jul
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Pathophysiology of a Cytokine Storm

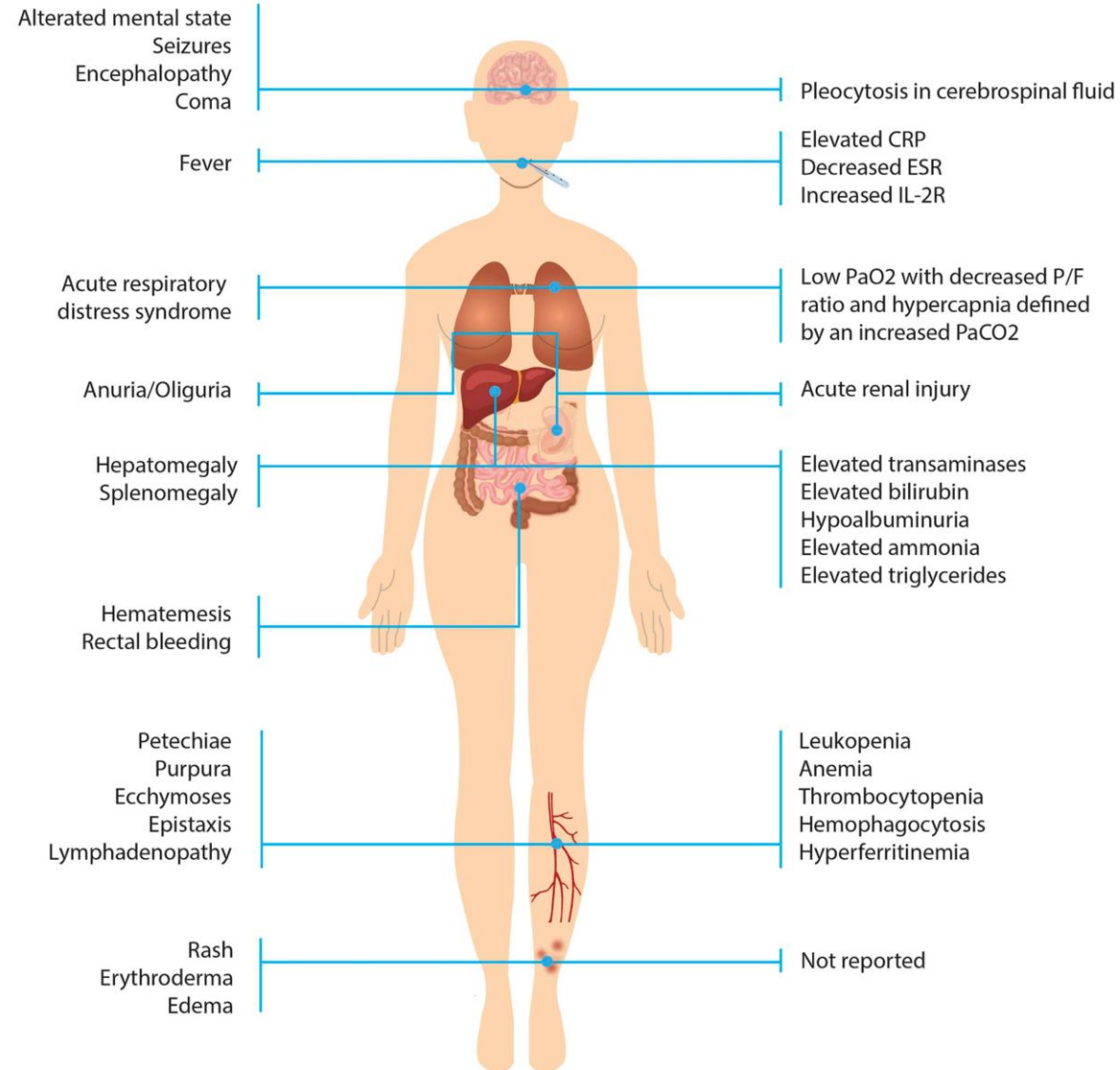


Clinical manifestations in the cytokine storm syndrome



Clinical manifestations

Laboratory findings

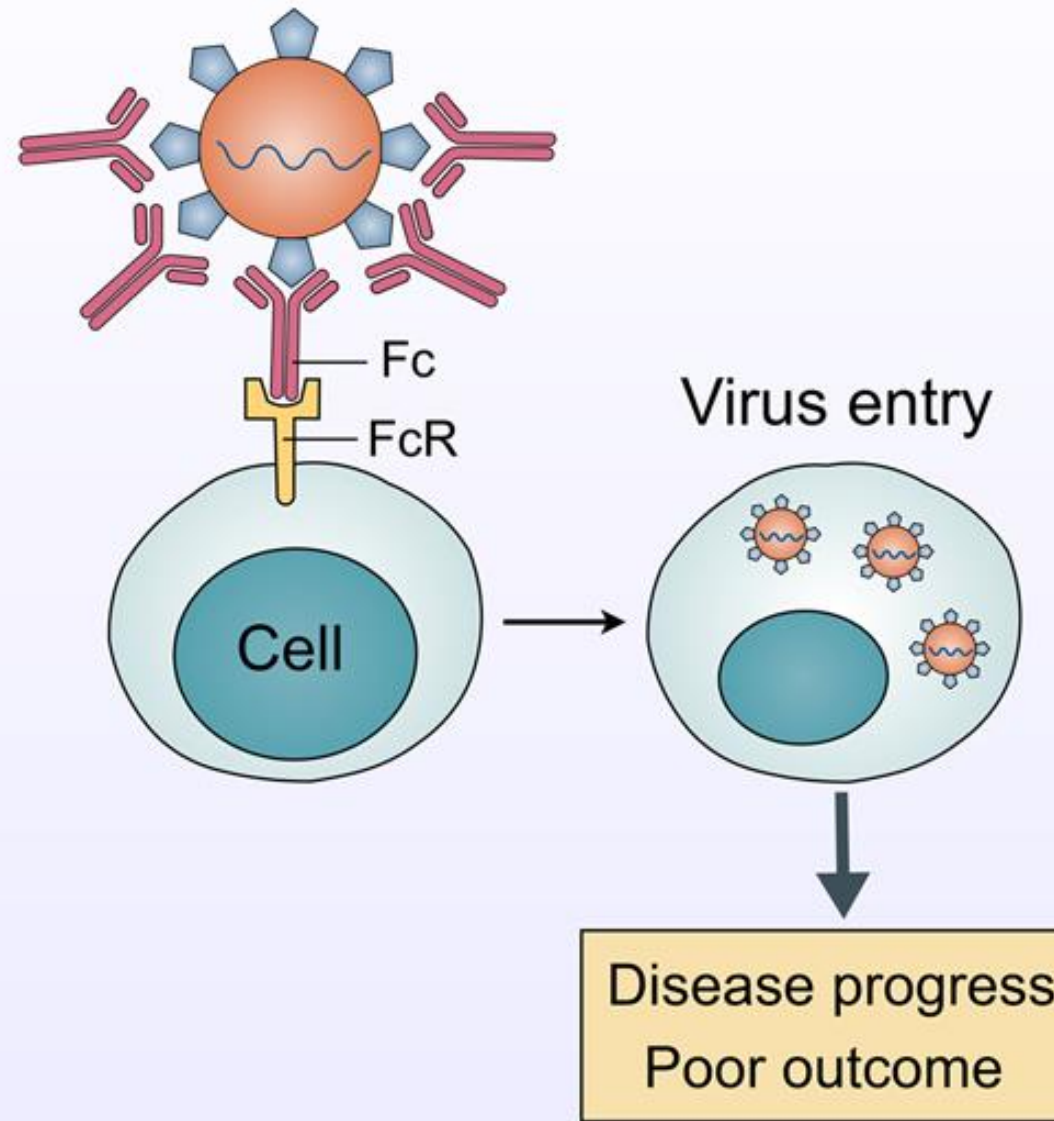


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D. Antibody-dependent enhancement



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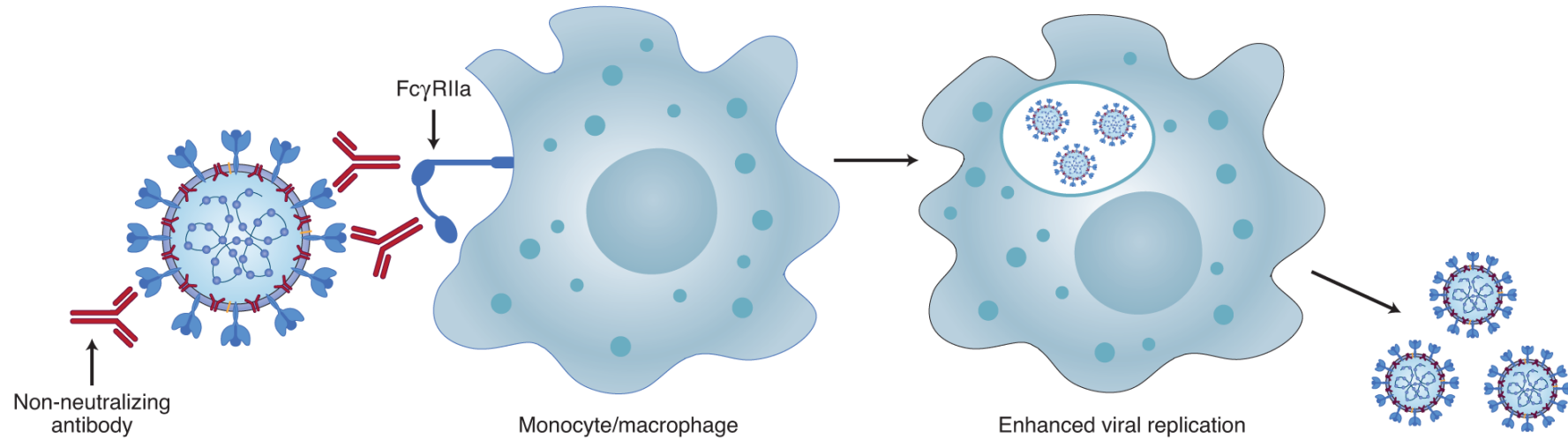


d. Antibody-dependent enhancement (ADE)

Two main ADE mechanisms in viral disease

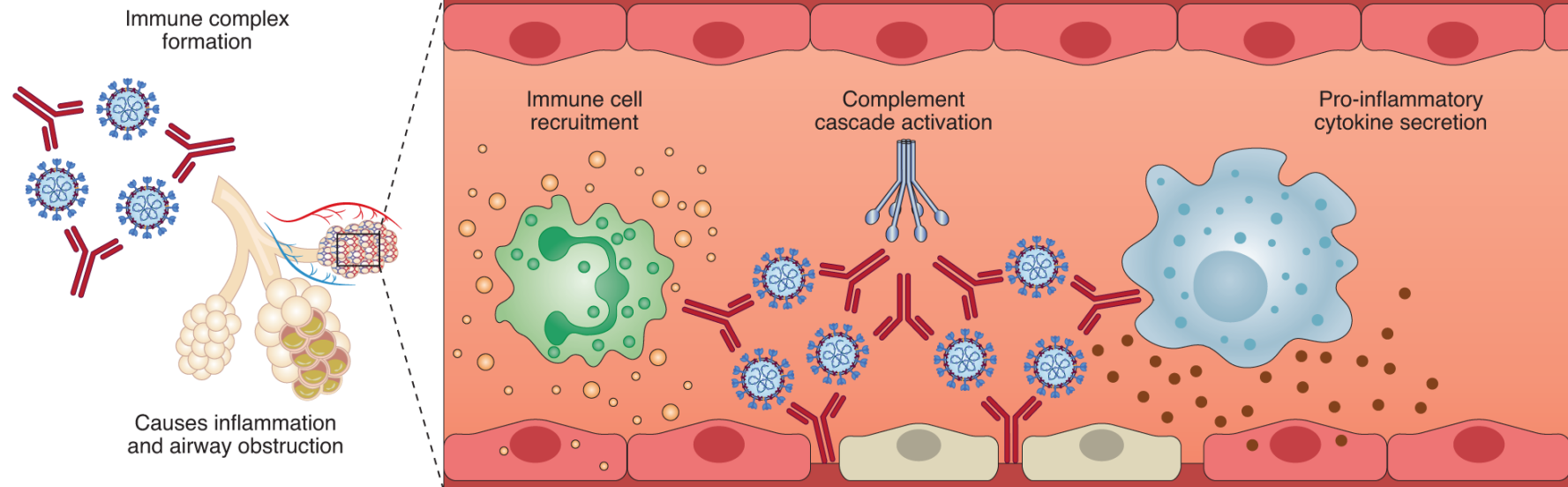
a

Macrophage-tropic viruses: dengue virus, FIPV



b

Respiratory viruses: RSV, measles



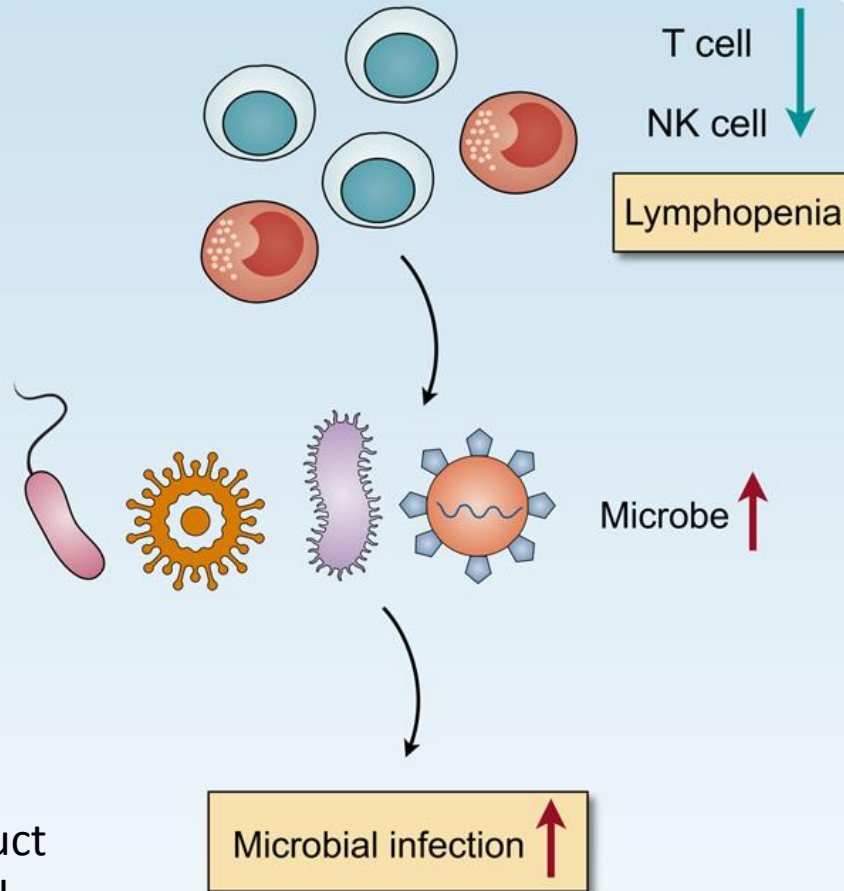
Lee, W.S, Nat
Microbiol.2020 May,
1185–1191

Clinical implications of SARS-CoV-2-induced immunopathology

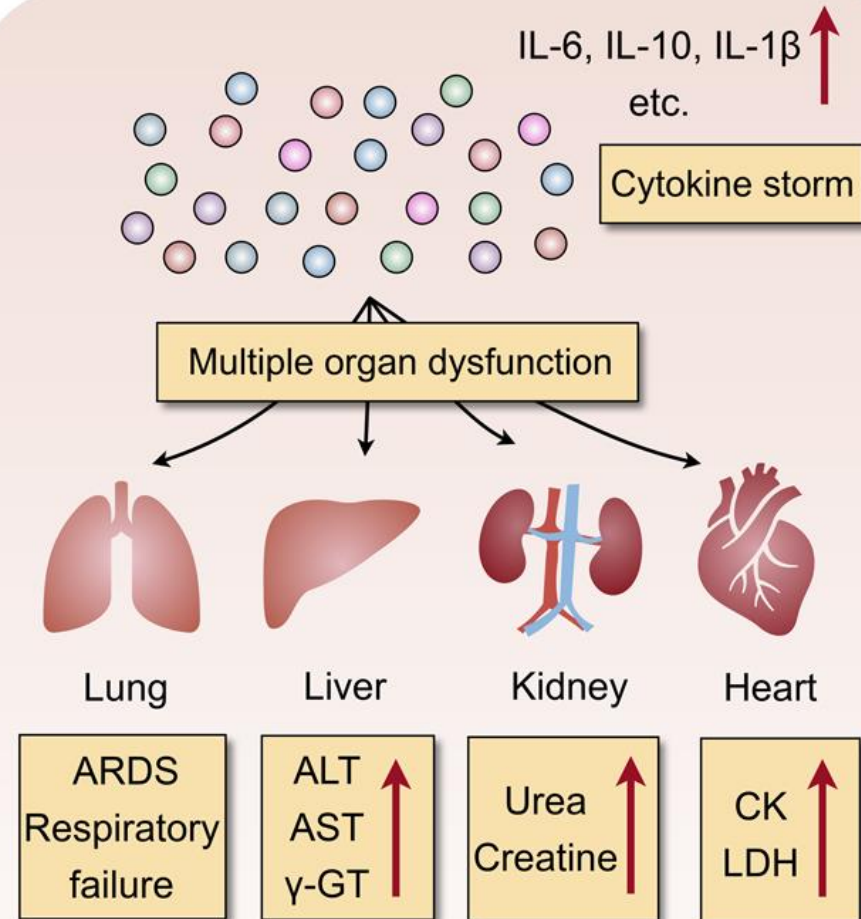


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The effect of lymphopenia on microbiota infection

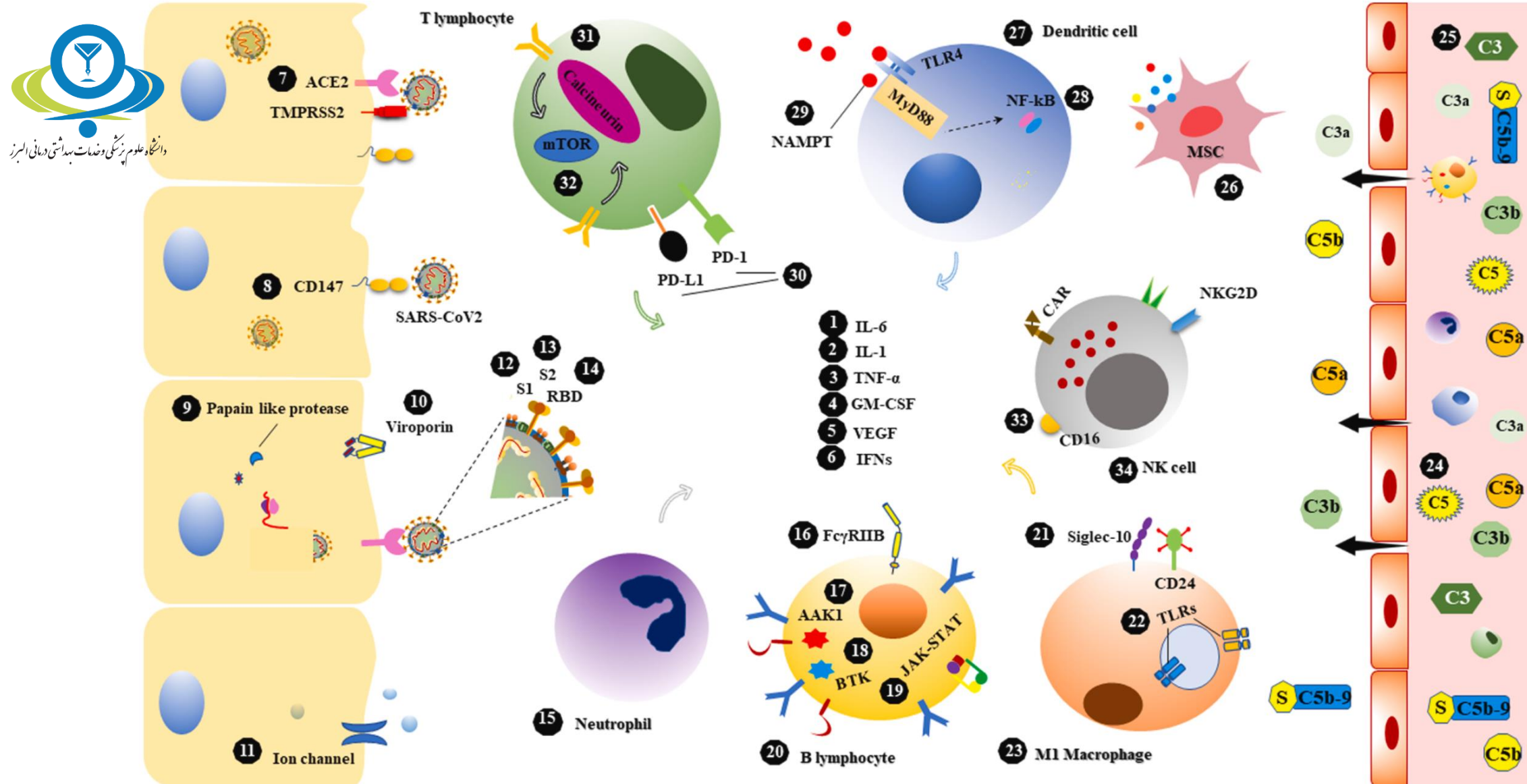


The effect of elevated cytokine production on severe syndromes



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Potential immunotherapeutic strategies for COVID-19



*Thank You
For Your Attention*

