**COVID-19**

Altered immune cell differentiation in the lungs of patients with critical COVID-19

This preprint from Wauters et al. analysed the single-cell transcriptome of bronchoalveolar lavages from 5 patients with mild and 26 patients with critical COVID-19, and detected important differences in immune cell functionality. In mild COVID-19, T cells assumed a resident memory CD8^+ or T helper 17 (T_h17) cell phenotype, whereas in critical COVID-19 they acquired an exhausted phenotype. In mild COVID-19, monocytes differentiated into macrophages with phagocytic and antigen-presenting capacity, whereas in critical COVID-19 monocytes did not differentiate and showed a pro-inflammatory phenotype. Interestingly, neutrophils showed a large capacity to phagocytose viral particles and/or infected cells. Future longitudinal analyses may show how immune cell differentiation correlates to the disease course of COVID-19.

**ORIGINAL ARTICLE** Wauters, E. et al. Discriminating mild from critical COVID-19 by innate and adaptive immune single-cell profiling of bronchoalveolar lavages. Preprint at bioRxiv https://doi.org/10.1101/2020.07.09.196519 (2020)

**COVID-19**

Attacking the defence: SARS-CoV-2 can infect immune cells

Lymphopenia and systemic viral dissemination are commonly found in severe COVID-19. This preprint study reports that immune cells (monocytes, CD4^+ T cells, CD8^+ T cells and B cells) are susceptible to SARS-CoV-2 infection. This was observed by in vitro infection of immune cells and by ex vivo detection of SARS-CoV-2 in peripheral blood mononuclear cells from patients with severe COVID-19. Post-mortem in situ analysis of lung tissues further confirmed the presence of infected immune cells in COVID-19. As monocytes and lymphocytes do not express ACE2, it remains to be seen whether the virus uses an alternative entry strategy and whether circulating infected immune cells contribute to viral spread and COVID-19 disease progression.

**ORIGINAL ARTICLE** Pontelli, M. C. et al. Infection of human lymphomononuclear cells by SARS-CoV-2. Preprint at bioRxiv https://doi.org/10.1101/2020.07.23.227911 (2020)

**NK CELLS**

Killing via nanotubes

During pregnancy, maternal immune cells must balance the contradictory demands of tolerating the fetus and providing protection against placental infection. A new study in Cell shows that natural killer (NK) cells in the placenta decidual tissue have an elegant way of achieving this balance. Instead of killing infected placental trophoblasts, decidual NK cells transfer the antimicrobial peptide granulysin through nanotubes to trophoblasts to kill intracellular bacteria, sparing the trophoblast.

Decidual NK cells are inferior killers compared with NK cells from the periphery, yet they express high levels of the cytotoxic effectors perforin, granzymes and granulysin. To better understand this conundrum and its impact on infection, Judy Lieberman and colleagues studied placental infection with Listeria monocytogenes, which can cause miscarriage, stillbirth and neonatal sepsis. Co-culture of human decidua or peripheral NK cells with a trophoblast-like cell line JEG-3 infected with L. monocytogenes significantly reduced intracellular bacteria levels but did not result in JEG-3 cell death. Bacterial killing could be inhibited by granulysin-blocking antibodies, but not by inhibitors of degranulation or perforin pore formation, and required NK cell–JEG-3 cell contact. Similar results were observed using primary

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