COVID-19 Multi-Omic Blood Atlas (COMBAT) published

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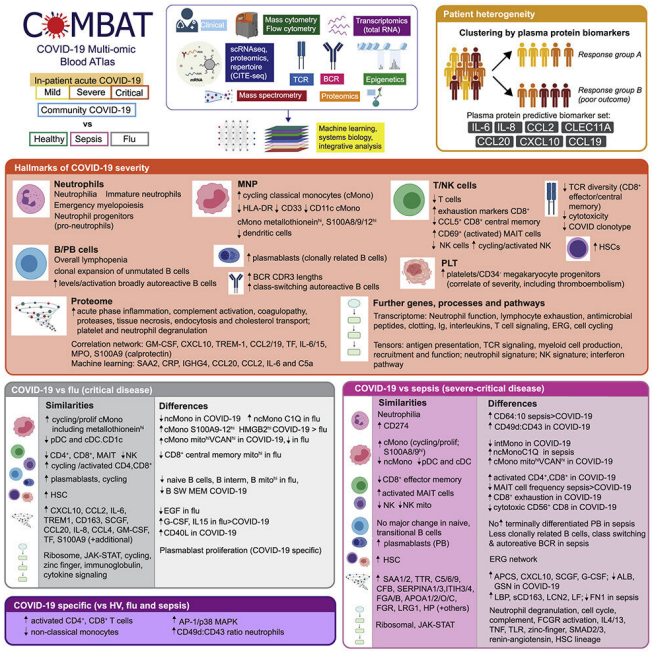

Graphical abstract. Credit: *Cell* (2022). DOI: 10.1016/j.cell.2022.01.012

A multi-disciplinary, cross-divisional collaborative team led by the University of Oxford has published a study defining hallmarks of COVID-19 disease severity. The team, led by Professor Julian Knight at the Wellcome Centre for Human Genetics, included over 200 researchers across 10 MSD and MPLS Departments, clinicians and nurses at OUH NHS FT and collaborators across the country, and performed multiple 'omics analyses on the blood of patients with varying COVID-19 severity and compared with severe influenza patients, sepsis patients and healthy volunteers.

Hallmarks of illness severity involved cells, their inflammatory mediators and networks as potential targets, including progenitor cells and specific myeloid and lymphocyte subsets, features of the immune repertoire, acute phase response, metabolism and coagulation. Persisting immune activation involving p38MAPK/AP-1 was a specific feature of COVID-19. The plasma proteome enabled sub-phenotyping into patient clusters, predictive of severity and outcome. Tensor and matrix decomposition of the overall dataset revealed feature groupings linked with disease severity and specificity. The systems-based integrative approach and blood atlas will inform future drug development, clinical trial design and personalized medicine approaches for COVID-19.

Professor Julian Knight said: "This has been possible through an extraordinary team from different disciplines working collaboratively to address an unprecedented health challenge. The work has advanced our understanding of why a small minority of those infected with SARS-CoV-2 develop severe illness, and provides opportunities to identify therapeutic targets and personalize care for patients. An in-depth multi-omic approach revealed the nature of underlying immune dysfunction, the extent to which this is specific to COVID-19 and how this varies between people."

More information: David J. Ahern et al, A blood atlas of COVID-19 defines hallmarks of disease severity and specificity, *Cell* (2022). DOI: 10.1016/j.cell.2022.01.012

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