Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Neutrophils as a pallbearer for SARS-CoV-2 disease burden

We read the Article by Bernadette Schurink and colleagues,[1] and were impressed, similar to the authors, with the heterogeneity of the invasion of end organs by neutrophils, despite a severe and systemic COVID-19 disease burden among the study sample. In other words, it is unclear why some organ systems among patients with COVID-19 are affected more extensively compared with others, despite the assertion of this Article that organ damage is predicated by a reactive infiltrate, perhaps independently of the presence of the replication of active severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the specific tissue.

Because there is evidence to suggest that the SARS-CoV-2 entry receptor,[2] ACE2, also has a role in mediating immune cell activity,[3] with the use of RNAseq data from GSE150316[4] we correlated *ACE2* expression from 17 lung specimens from autopsies of patients with SARS-CoV-2 normalised, and derived the ontology of the top 1% of differentially expressed genes. We found a significant correlation of *ACE2* expression with neutrophil activation ($p<0·0001$; appendix).[5] This finding provides support for the work by Schurink and colleagues, but does not conclusively establish this association.

Accordingly, we wondered if Schurink and colleagues have any histological evidence within their data to suggest that variation in ACE2 might serve as a crucial intermediary to end-organ infiltration by inflammatory cells, and consequent disease severity, in response to a SARS-CoV-2 infection.

We declare no competing interests.

*David DW Twa, Christine D Lukac, Kevin Kuchinski, Aidan Nikiforuk, Inna Sekirov
dtwa@bccrc.ca

BC Centre for Disease Control, Vancouver, BC V5Z 4R4, Canada (DDWT, CDL, KK, AN, IS); Department of Pathology (DDWT, CDL, KK) and School of Population and Public Health (AN), University of British Columbia, Vancouver, BC, Canada

1 Schurink B, Roos E, Radonic T, et al. Viral presence and immunopathology in patients with lethal COVID-19: a prospective autopsy cohort study. *Lancet Microbe* 2020; **1:** e290–99.
2 Li G, He X, Zhang L, et al. Assessing ACE2 expression patterns in lung tissues in the pathogenesis of COVID-19. *J Autoimmune* 2020; **112:** 102463.
3 Tomar B, Anders H-J, Desai J, Mulay SR. Neutrophils and neutrophil extracellular traps drive necroinflammation in COVID-19. *Cells* 2020; **9:** 1383.
4 Desai N, Neyaz A, Szabolcs A et al. Temporal and spatial heterogeneity of host response to SARS-CoV-2 pulmonary infection. *medRxiv* 2020; published online Aug 2. https://doi.org/10.1101/2020.07.30.20165241 (preprint).
5 Zhou Y, Zhou B, Pache L, et al. Metascape provides a biologist-oriented resource for the analysis of systems-level datasets. *Nat Commun* 2019; **10:** 1523.

See **Online** for appendix