Virus-neuropilin-1 interaction and animal models of SARS-CoV-2 infection

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The nice and elegant article by Dr Ludovico Cantuti-Castelvetri and coworkers (1) offers an absolutely reliable basis for deciphering the apparent discrepancies between angiotensin-converting enzyme-2 (ACE2)-expressing cells and tissues, on one side, and Severe Acute Respiratory Syndrome-CoronaVirus-2 (SARS-CoV-2) tissue tropism, on the other.
In this respect, the prominent expression of neuropilin-1 (NP1) on behalf of the neuro-olfactory epithelium provides biological plausibility for "anosmia", a sign commonly experienced by SARS-CoV-2-infected patients. Still of interest, endothelial cells - the damage of which is a key feature in the pathogenesis of SARS-CoV-2 infection, with special emphasis on those individuals affected by severe CoronaVirus Disease-2019 (CoViD-19) phenotypes - were reported to express consistent NP1 levels by the same Authors (1), with this finding representing another plausible basis for SARS-CoV-2 dissemination throughout the human host's body.
Nevertheless, while ACE2 is widely expressed also by endothelial cells (2), it should be additionally emphasized that pericytes - perivascular cells playing a key role in the maintenance of microvessel integrity - exhibit, at their turn, very high expression levels of ACE2, with SARS-CoV-2-induced damage (and dysfunction) of pericytes having been suggested as a pathogenetic driver of the severe vasculopathy found in CoViD-19-affected individuals (3).
It would be interesting to investigate, in my opinion, if (and to what extent) human pericytes do also express NP1 and, to this aim, a parallel investigation of the body cells and tissues expressing - either simultaneously, or separately - ACE2 and NP1 in a number of SARS-CoV-2-susceptible species (like macaques, cats, minks, hamsters, etc.) would be also recommendable. By doing so, in fact, the already existing data on the percentage(s) of sequence homology between human and animal ACE2 coronaviral receptors could become accompanied by new, relevant data regarding the percentage(s) of NP1 sequence homology between the aforementioned (and, possibly, other SARS-CoV-2-susceptible) species and the human one.
This could greatly help, among others, in "candidating" a given animal species as a potentially valuable model in the comparative pathogenetic study of human SARS-CoV-2 infection, thereby also contributing to shed light on the "past" and "future" trajectories of the virus, with special reference to its origin as well as to its "spillover and spillback" dynamics from animals to mankind (and viceversa).

References

1) Cantuti-Castelvetri L., et al. (2020) - Neuropilin-1 facilitates SARS-CoV-2 cell entry and infectivity. Science 20 Oct 2020: eabd2985 (DOI: 10.1126/science.abd2985).
2) Donoghue M. (2000) - A novel angiotensin-converting enzyme-related carboxypeptidase (ACE2) converts angiotensin I to angiotensin 1-9. Circulation Research 87:E1-E9.
3) Burel-Vandenbos F., et al. (2020) - Pulmonary vascular pathology in CoViD-19. N. Engl. J. Med. 383:886.