**COVID-19: On the way to a vaccine**

**Part III: How can COVID-19 symptoms be explained by the tropism of SARS-CoV-2?**

SARS-CoV-2 enters human cells by exploiting the presence of two proteins, ACE2 and TMPRSS2. What is the role of these two proteins? Explore the genetics of each protein by looking them up at OMIM (<https://omim.org>) and the Gene Database of NCBI (<https://www.ncbi.nlm.nih.gov/gene/>).

Answer the following questions:

* What chromosome is each gene located at?
* How many exons does each gene have?
* How many isoforms are there for each gene?

Use the human cell atlas and the GTEx database to find the tissues/cell types that express **both** ACE2 and TMPRSS2. How could your findings explain some of the reported COVID-19 symptoms?

**Part IV: Sex differences in COVID-19 symptom severity**

ACE2 is an interesting case, because its gene locus is located on chromosome X. This is especially notable, given the different prevalence of symptomatic cases between men and women. What possible explanations can you come up with regarding the observed sex differences? Consider both genetic and other perspectives, such as physiological and behavioral for your answer.