

[COMMUTE: COMORBIDITY MECHANISMS UTILIZED IN HEALTHCARE](#)

Description

The COVID pandemic can be seen as an experiment done with the entirety of humankind (as almost everybody has been or will get infected with SARS-CoV-2). It will therefore have the best coverage over the widest variation possible and is therefore ideally suited to study the effects of infections with SARS-CoV-2 on large quantities of heterogeneous individuals. In our project, we will focus on neurodegenerative diseases (NDDs), namely Alzheimer and Parkinsonism, as the NCDs under investigation.

COMMUTE is a project characterized by the intelligent combination of two fundamentally different approaches: a hypotheses-free, data-driven approach is building on available big data and the application of cutting edge AI/ML technologies to answer the question, whether infection by SARS-CoV-2 causes effects that result in a higher risk for the development of NDDs at population-level. Complementary to that, a hypothesis-driven, knowledge-based approach leverages the substantial knowledge in the scientific community working on NDDs on the putative comorbidity mechanisms linking COVID and neurodegeneration. Both approaches are informing and supporting each other through an intensive crosstalk between computational and experimental biology methods.

Understanding comorbidity between COVID and NDDs at causal level is the first goal of the COMMUTE project. The second goal is the translation of the actionable insights into personalized health applications. On the AI/ML side, the targeted outcome for translation into practice is a set of qualified biomarkers and predictive features that will be used for an AI-powered, model-generated recommender system that will allow for individualized risk assessment and personalized recommendations. On the side of the biomedical assay systems, COMMUTE will use cell-based assays based on clear pathophysiology mechanism understanding for drug repurposing screenings in collaboration with REMEDI4ALL, the largest of the EU drug repurposing platforms.

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