SARS-COV-2 vaccination in the VITAL cohort

A particular vulnerable population for infectious diseases, as also exemplified by the COVID pandemic, are older adults. This is thought to be due to immune senescence, the age related decline in immune responses. However, this may also affect response to vaccination. Vaccine responses towards influenza (subunit) vaccines are known to be lower in older adults. To improve vaccination strategies better insight in the factors that determine lower immune response to vaccination are needed. This will contribute to the development of vaccination strategies better suited for older people. Especially with novel vaccine platforms being developed, it is important to assess the immune responses against these novel (mRNA) vaccines.

The VITAL cohort, consisting of 326 participants divided over 3 age groups (young adults (25-50 years old), middle aged adults (50-65 years old), and old adults (65 years and older) that have received consequently the quadrivalent influenza subunit vaccine as well as the conjugated pneumococcal vaccine PCV13 is perfectly suited to also address the question what determines proper response to SARS-COv2 vaccination and whether the current novel vaccine platforms may work better for older individuals.

Within the cohort, biological samples before and at several time points after influenza and Pneumococcal vaccination were collected and can be used to assess intrinsic and extrinsic factors associated with the vaccination immune responses. From all individuals primary readouts for antibody and T cell responses will become available as well as a wealth of clinical and immunological data. Extension with In depth profiling of antibodies and T cells will shed light on the features important for protection. As this study was initiated during summer of 2019 we have pre-pandemic samples and baseline characteristics. In addition, medical ethical approval is obtained to determine SARS-CoV-2 exposure due to natural infection by serological read out to link infection with immunocompetence.

To study the role of age as well as other potential predictors for proper vaccine responses such as (clinical) frailty and immunological biomarkersc, we aim to assess the immune response to SARS-CoV2 vaccination in this well characterized cohort consisting of different age groups. Evenmore we can determine factors that affect immunogenicity towards influenza, pneumococcal and SARS CoV-2 vaccination. This data will be aligned with other vaccination studies that are currently designed to enable comparisons for age groups.

To enable comparisons within our own cohort, it's important that vaccination will be timed and the same vaccine concept of the same pharmaceutical company can be used for all age groups. Therefore we request 2x 300 vaccines of the Moderna mRNA vaccine for this study.

The vaccination can be easily implemented win the current followup, as the next visit (T9, assessment of 6M followup after pneumococcal vaccination) is scheduled for februari/march this year. Additional followup at the 2nd vaccination and 4 weeks after the 2nd vaccination will allow monitoring (antibody and cellular responses) of the vaccine response.

Overall, we believe this well characterized cohort is well suited to contribute to insight in differences between age groups and contribute to insight in differences between vaccine concepts.