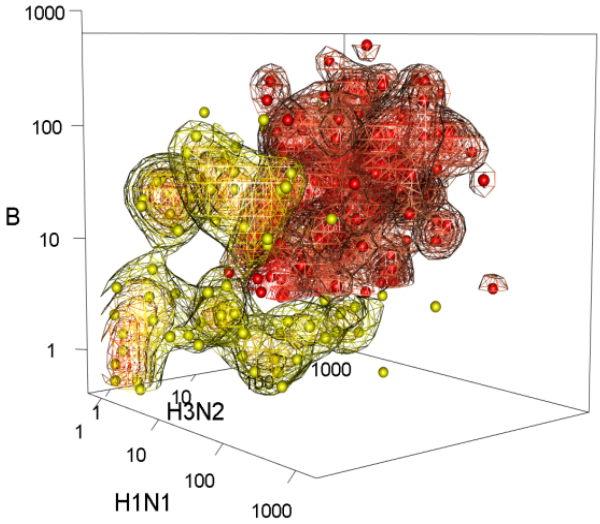
# Biological and Transcriptomic Signatures of Multi-strain Responsiveness in Elderly Trivalent Influenza Vaccination

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## Abstract

Vaccination remains one of the most cost-effective public health strategies to alleviate the healthcare burden imposed by influenza, with the primary aim of preventing serious infections, complications, hospitalizations and death. While vaccination efficacy in the elderly remains poorly perceived, a growing number of reports describe high seroprotection rates (>90%) and comparable vaccination efficacy between the young and old in influenza vaccinated cohorts; this heterogeneity in vaccination outcomes suggest that multiple host factors (genetics, immune competency, antigen exposure, metabolic constitution etc.) play a role in dictating vaccination outcomes in the elderly. In an earlier report, we described a cohort of 205 influenza-vaccinated elderly adults who attained high seroprotection (>95%) and seroconversion (>80%) rates. Since we observed considerable variability in the seroconversion capacity of individuals for each vaccine strain, we attempted to identify parameters that were associated with strain responsiveness. We observed that bile acid profiles were distinct between those who responded to all influenza strains and those who did not; the latter also displayed a more senescent T-cell profile. On day 7 post-vaccination, elderly who responded to multiple influenza strains upregulated genes associated with B cell proliferation and immunoglobulin synthesis, DNA processing and editing, and the unfolded protein response (UPR). Behaviorally, those who responded better to vaccination were also more physically active. We conclude that interventions that target the unfolded protein response may be important for the generation of a multi-strain response in the trivalent influenza vaccination (TIV) of elderly individuals.

## Segregation by strain responsiveness




**Stratification of volunteers by strain responsiveness. Using a comprehensive phenotyping approach, we identify cellular, metabolomic, genomic and proteomic parameters that distinguish high (red) and low (yellow) responders.**

## Recent Publications

1. Wong GCL (2019) Hallmarks of improved immunological responses in the vaccination of more physically active elderly females. Exercise Immunology Review.
2. Alam (2019). Recurrent circadian fasting (RCF) improves blood pressure, biomarkers of cardiometabolic risk and regulated inflammation in men. Journal of Translational Medicine.
3. Narang (2018) Influenza vaccine-induced antibody responses are not impaired by frailty in the community-dwelling elderly with natural influenza exposure. Frontiers in Immunology.
4. Mathieu Angin & Wong CLG (2016). Preservation of lymphopoietic potential and virus suppressive capacity by CD8+ T-cells in HIV-2 infected controllers. The Journal of Immunology.
5. He JS (2013). The distinctive germinal center phase of IgE+ B lymphocytes limits their contribution to the classical memory response. J Exp Med.



## Biography

Glenn's PhD research has focused on the study of immunosenescence, using HIV-infection as a model of accelerated immune aging. Since then, he has continued his pursuit on understanding the drivers of this aging phenomenon, and has focused on studying the impact of immunosenescence on vaccination in recent years. These studies are supported by cutting-edge flow cytometry and immune-profiling platforms.

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