

## **Vaccination is associated with reduced clinical symptoms and inflammation in patients with Long COVID**

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WHO defined PASC (Post-Acute Sequela of COVID-19) as the presence of symptoms 3 months after acute infection that lasts for more than 2 months. Vaccination against COVID-19 was launched to decrease the prevalence and severity of acute infections, but its effect on PASC is unclear. We investigated if vaccination against COVID-19 influences PASC clinical presentation and immune profile.

In IPCO (the Institut de Recherches cliniques de Montréal (IRCM) Post-COVID-19 Research Clinic) we enrolled 83 participants at any time between 1 to 12 months from the date of COVID-19 diagnosis with follow-up visits scheduled at 3, 6, and 12 months; and 2 to 4 weeks after vaccination date. IPCO protocol includes collecting demographic characteristics and clinical at the baseline visit, and well-being score, clinical evaluation, review of vaccination status and adverse effects, 49 PASC symptoms evaluation, and blood sampling for CBC, CRP, fibrinogen, ferritin, D-dimer, cytokine and chemokine profile at each visit.

The majority of participants were female (66.2%), with mild acute COVID-19 presentation (86.8%). Vaccinated participants had significantly fewer PASC symptoms, fewer organ systems affected, higher well-being score, and lower levels of cytokines/chemokines compared to the non-vaccinated group. We further observed correlations between certain cytokines/chemokines, as well as correlations between clinical parameters and certain cytokines/chemokines.

Together, the data from this study demonstrate higher pro-inflammatory responses associated with PASC symptoms and identify the role of vaccination in mitigation. The protective role of vaccination likely goes beyond acute COVID-19 and extends to alleviate PASC, potentially by regulating the immune responses.