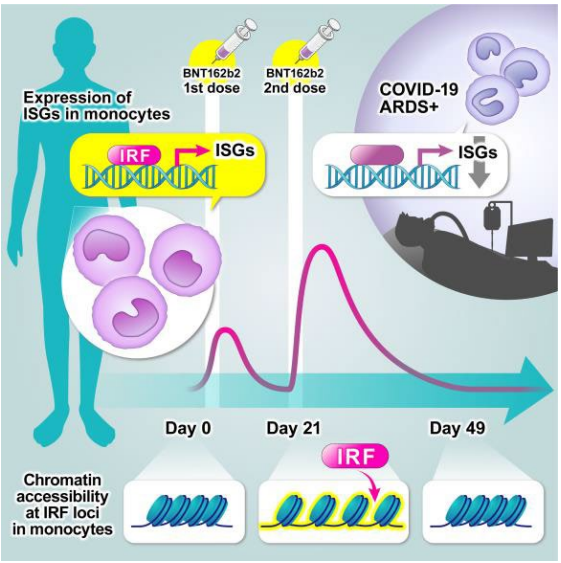
Consecutive BNT162b2 mRNA vaccination induces short-term epigenetic memory in innate immune cells

Keywords: COVID-19, mRNA vaccine, innate immune memory

Using mass cytometry, RNA-seq, and ATAC-seq, the research group of Yasuhiro Kato, Atsushi Kumanogoh (Graduate School of Medicine, Osaka University/IFReC) showed that BNT162b2 mRNA vaccination upregulated antiviral and IFN-stimulated gene expression in monocytes with greater effects after the second vaccination than those after the first vaccination.
Importantly, although consecutive BNT162b2 mRNA vaccinations boosted innate immune responses and caused epigenetic changes in isolated monocytes, they showed that these effects occur only transiently and disappear 4 weeks after the second vaccination.

Furthermore, single-cell RNA sequencing analysis revealed that a similar gene signature was impaired in the monocytes of unvaccinated COVID-19 patients with acute respiratory distress syndrome.
These results reinforce the importance of the innate immune response in the determination of COVID-19 severity but indicate that, unlike adaptive immunity, innate immunity is not unexpectedly sustained even after consecutive vaccination.



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