T-cell responses in the elderly rise slowly and contract quickly, finds study

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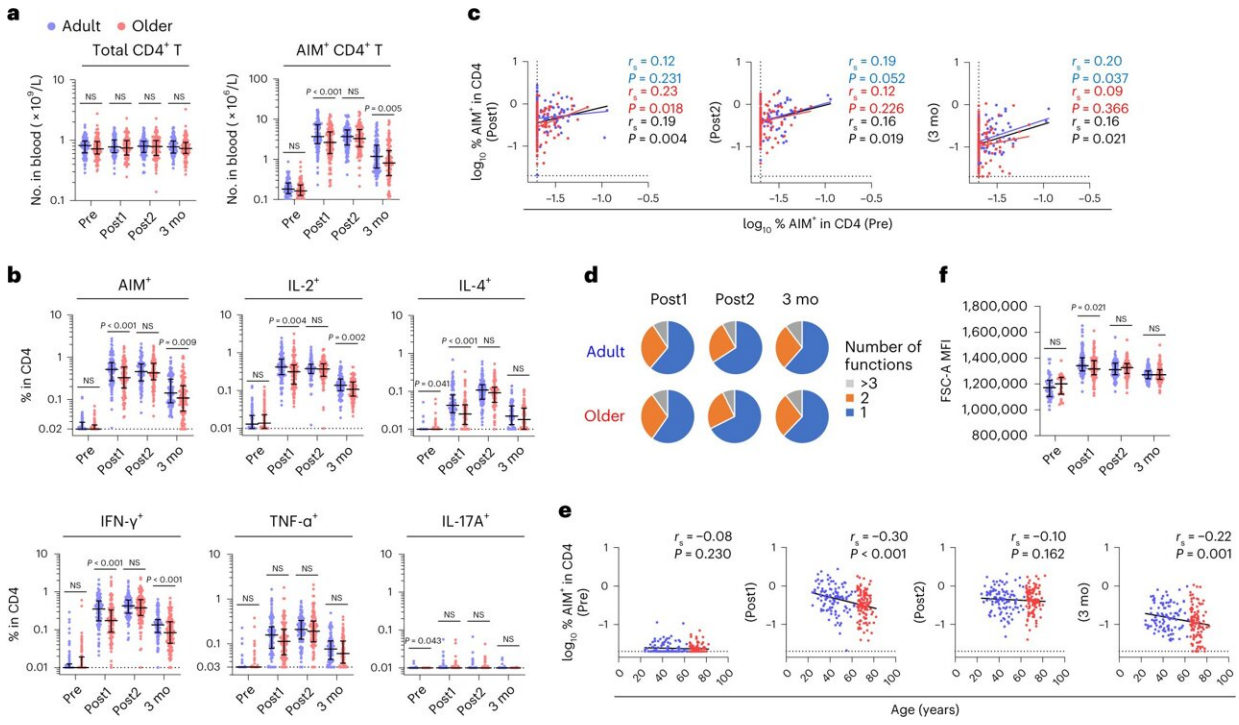

Lower induction and early contraction of spike-specific CD4$^+$ T cells in older adults. a, Absolute number of total and AIM$^+$ (CD137$^+$CD154$^+$) CD4$^+$ T cells in blood. Pre, Post1, Post2 and 3 mo represents the sampling point before vaccination, after the first dose, after the second dose and 3 months after the first dose, respectively. b, Frequency of AIM$^+$ and cytokine$^+$ CD4$^+$ T cells. c, Correlation between the percentage of AIM$^+$ CD4$^+$ T cells before and after vaccination. d, Proportions of multiple cytokine-expressing CD4$^+$ T cells after vaccination in adult and older adult group. The blue, orange and gray colors in pie charts depict the production of one, two and more than three cytokines, respectively. e, Correlations between the percentages of AIM$^+$ CD4$^+$ T cells and

age of donors. f, MFI of FSC-A in AIM^+ $CD4^+$ T cells. In a, b and f, the center line and error bars indicate the median and IQR, respectively. In b, c and e, the dotted line indicates limit of detection (LOD). Statistical comparisons across cohorts were performed using the Mann–Whitney test. Spearman's rank correlation (r_s) was used to identify relationships between two variables, with a straight line drawn by linear regression analysis. For correlation analysis, percentages of AIM^+ $CD4^+$ T cells were transformed into logarithmic values. NS, not significant. Blue, red and black characters represent the results of statistical test from adults (n = 107), older adults (n = 109) and both groups (n = 216), respectively. Credit: *Nature Aging* (2023). DOI: 10.1038/s43587-022-00343-4

The Yoko Hamazaki Laboratory at CiRA has reported that the slower onset of helper T-cell responses in the elderly after COVID-19 vaccinations is associated with lower antibody production, killer T cell activation, and frequency of adverse reactions.

It is well known that immune functions generally decline with age (immunosenescence). However, it is not well understood how and to what extent aging impacts the responsiveness of T-cells—which play a central role in immune responses against viruses and cancer—to stimulation in vivo. In this study, the research team aimed to address these questions by taking advantage of the rare opportunity of a massive vaccination campaign, in which large groups of individuals are exposed to an identical antigen to stimulate their immune systems.

A total of 216 healthy volunteers, approximately half adults (aged