NATURAL KILLER CELLS IN SARS-COV-2-VACCINATED SUBJECTS WITH INCREASED EFFECTOR CYTOTOXIC CD56DIM CELLS AND MEMORY-LIKE CD57+NKG2C+CD56DIM CELLS

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Background: As other European countries, Italy launched its SARS-CoV-2 vaccination campaign on 27 December 2020 (1). The analysis of SARS-CoV-2 vaccination impact on host immune system of healthy subjects might elucidate the potential impact on COVID-19 outcomes. It is known that the presence of high affinity and persistent protective antibody responses indicate an efficient humoral immune response to vaccination (2,3). The aim of this study is to evaluate whether mRNA-based anti-SARS-CoV-2 vaccination (Comirnaty) elicited a robust protective innate immune response.

Methods: PBMC were obtained form whole blood obtained by donors who received three doses of mRNA-based anti-SARS-CoV-2 vaccination (Comirnaty). NK (Natural Killer) cells immunophenotype and cytotoxicity have been tested after stimulation with SARS-CoV-2 spike antigen (Wuhan, Alpha B.1.1.7, Delta B.1.617.2, Omicron B1.1.529 variants) by FACS assay and related with the anti-SARS-CoV-2 antibody production.

Results: We reported the presence of specific effector cytotoxic CD56dim, characterized by high levels of CD107a and granzyme production, and memory-like CD57+NKG2C+CD56dim phenotype of NK cells exposed to SARS-CoV-2 spike antigen (Wuhan, Alpha B.1.1.7, Delta B.1.617.2, Omicron B1.1.529 variants), in association with specific anti-SARS-CoV-2 antibody production, especially after the booster dose (4).

Conclusions and Discussions: We found that the booster dose caused early NK CD56dim subset activation and memory-like phenotype, confirming the relevance of innate immune response in the efficacy of SARS-CoV-2 vaccination.

Keywords: SARS-CoV-2; vaccination; NK cells.

References

1. OlliaroP, Torreele E, Vaillant M. COVID-19 vaccine efficacy and effectiveness-the elephant(not) in the room. Lancet Microbe. 2021; 2: e279-e280.
2. Collier AY, McMahan K, YuJ, Tostanoski LH, Aguayo R, Ansel J, et al. Immunogenicity of COVID-19 mRNA Vaccines in Pregnant and Lactating Women. JAMA. 2021; 325: 2370-2380.
3. Rizzo R., Bortolotti D. et al. Humoral and adaptive immune responses to the SARS-CoV-2 vaccine. Int J Infect Dis. 2022, 412-414.
4. Gentili V., Bortolotti D. et al. Natural Killer Cells in SARS-CoV-2-Vaccinated Subjects with Increased Effector Cytotoxic CD56dim Cells and Memory-Like CD57+NKG2C+CD56dim Cells. ForntBiosci2023; 28:156.