Third dose of Covid-19 vaccine boosts immunity in children

A booster dose of the Covid-19 vaccine BNT162b2 (Pfizer & BioNTech) six months after the initial regimen increased Omicron-specific neutralizing antibody levels >30-fold in children aged 5–11 years. The Phase 2/3 trial, which enrolled 400 subjects, reported no new safety concerns following the booster dose.

Vaccination is beneficial even in people who recovered from the disease. According to three studies, which were conducted before the emergence of the Omicron variant, vaccinated individuals reported a lower rate of reinfection and longer antibody persistence compared to subjects with infection-acquired immunity alone.1–3

The adjuvanted, inactivated whole-virus vaccine VLA2001 (Valneva) was approved in UK for adults up to 50 years of age. Based on Phase 3 trial data showing higher immunogenicity of VLA2001 compared to the recombinant ChAdOx1/nCoV-19 vaccine (AstraZeneca), the approval decision makes it the sixth Covid-19 vaccine on the UK market.

The CpG 1018/Alum-adjuvanted vaccine candidate SCB-2019 (Clover) demonstrated high and durable protection in a clinical trial involving almost 15,000 adults. In subjects with no history of Covid-19, efficacy was 100% and 95% against severe disease and hospitalization, respectively, six months after the primary vaccination series. No safety concerns were observed.

In another Phase 3 trial with >17,000 participants, a self-amplifying mRNA vaccine candidate ARCT-154 (Arcturus) was safe and protected 55% and 95% cases of symptomatic and severe disease, respectively. The data were collected when Delta and Omicron strains dominated in Vietnam, where the study was conducted. ARCT-154, which requires a dose up to 20-fold lower than those of mRNA vaccines in use, is lyophilized during the production process and stable at room temperature until rehydrated.

Anti-Claudin CAR-T cell therapy promising in solid tumors in early trial

The autologous CAR-T cell treatment BNT211 (BioNTech) was safe and induced anti-tumor activity in patients with advanced solid cancers in a Phase 1/2 trial. According to preliminary data, six of 14 subjects with tumor indications spanning cancers of the genital tract, gastric cancer and sarcoma reported partial responses.

The treatment consists of BNT211 supported by a lipid nanoparticle-delivered self-amplifying mRNA vaccine for improved persistence. Both the engineered CAR-T cells and the vaccine target the oncofetal antigen Claudin-6, which is expressed by several tumor types.

RSV vaccine for older adults is tested in a large-scale trial

The RSV vaccine candidate MVA-BN (Bavarian Nordic) has entered the randomized, double-blind Phase 3 VANIR trial, which aims to assess efficacy against lower-respiratory tract RSV disease in 20,000 volunteers aged 60 years and older in US and Germany.

The vaccine targets five antigens from both A and B RSV subtypes. There is no licensed vaccine against RSV, which poses a significant health burden in infants and older adults.

Neoantigen immunotherapy provides limited benefit for patients with solid tumors

The neoantigen peripheral T cell immunotherapy GEN011 (Genocea) was well tolerated and provided a hint of clinical benefit to subjects with refractory solid cancers. The open-label, dose-escalation Phase 1/2 TITAN trial showed stable disease in four of five evaluated patients at the 8-week mark. While all subjects reported tumor progression after 16 weeks, the treatment led to improvement in disease symptoms.

GEN-011 consists of autologous CD4+ and CD8+ T cells that target up to 30 computationally identified neoantigens.

Lyme disease vaccine was safe and immunogenic in pediatric population

The Lyme disease vaccine candidate VLA15 (Valneva) was immunogenic and induced no serious adverse events in children aged 5–17 years. The randomized, observer-blind, placebo-controlled Phase 2 VLA15–221 trial tested two-dose (months 0 and 6) and three-dose (0, 2, 6) regimens in almost 200 subjects. Immune responses were superior to those observed in the trial arm with adults.

VLA15 targets the OspA antigen from six strains of Borrelia burgdorferi. Its clinical program received FDA’s Fast Track designation.

Immunotherapy combination increases tumor-specific immunity in three cancer types

The TLR-3 agonist rintatolimod (Ampligen, AIM ImmunoTech) together with the PD-1 inhibitor pembrolizumab (Keytruda, Merck) increased the levels of intratumoral CD8+ T cells in three small clinical trials.

Of 17 patients with recurrent ovarian cancer, two reported complete responses and three showed partial responses.

Patients with metastatic triple-negative breast cancer and recurrent colorectal cancer, who received the combination together with interferon α-2b, saw their tumors turn immunologically ‘hot’, which is a necessary condition for the success of checkpoint inhibitors.

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References

1. Hall V, Foulkes S, Insalata F, Kirwan P, Saei A, Atti A, Wellington E, Khawam J, Munro K, Cole M, et al.; SIREN Study Group. Protection against SARS-CoV-2 after Covid-19 vaccination and previous infection. N Engl J Med. 2022;386(13):1207–20. doi:10.1056/NEJMoa2118691.

2. Nordström P, Ballin M, Nordström A. Risk of SARS-CoV-2 reinfection and COVID-19 hospitalisation in individuals with natural and hybrid immunity: a retrospective, total population cohort study in Sweden. Lancet Infect Dis. 2022;S1473-3099:143–48.

3. Cerqueira-Silva T, Andrews JR, Boaventura VS, Ranzani OT, de Araújo Oliveira V, Paixão ES, Júnior JB, Machado TM, Hitchings MDT, Dorion M, et al. Effectiveness of CoronaVac, ChAdOx1 nCov-19, BNT162b2, and Ad26.COV2.S among individuals with previous SARS-CoV-2 infection in Brazil: a test-negative, case-control study. Lancet Infect Dis. 2022;S1473-3099:140–42.

Ron Ellis
Editor-in-Chief, Human Vaccines & Immunotherapeutics
rellis.hvi@gmail.com

Adam Weiss
Acquisitions Editor, Human Vaccines & Immunotherapeutics