The European Plotkin Institute for Vaccinology was established in Belgium

University of Antwerp and Free University of Brussels jointly launched a new institute for vaccinology research and clinical trials, the European Plotkin Institute of Vaccinology (epiv.eu). It bears the name of Stanley Plotkin, the long-time vaccine scientist and educator, HVE+1 Editorial Board member and Professor Emeritus at University of Pennsylvania.1

The Institute’s mission is to “accelerate the evaluation and development of vaccine candidates and to participate in global efforts for better pandemic preparedness and prevention.” Led by two eminent vaccinologists Pierre Van Damme (University of Antwerp) and Arnaud Marchant (Free University of Brussels), the Institute will focus on human controlled challenge trials, immunology of infection and vaccine responses, and coordination of international collaboration in vaccinology, including the collaboration between high- and low-income countries.

“We are happy to support the advancement of science by contributing to the construction of this institute in Belgium. Europe is the place where vaccinology began and where it is very appropriate to move it forward in this era of pandemics,” Dr. Plotkin and his wife Susan said.

The core of the Institute will be located in the newly built clinical testing facility in Antwerp, the Vaccinopolis, and a microbiology and immunology facility in Brussels, currently under construction. Both facilities span >6,000 m² and are equipped with biosafety level 2 & 3 laboratories.

Samples will be collected mostly at Vaccinopolis, which houses a 30-bed quarantine unit and ambulatory unit for Phases 1, 2, and 3 clinical trials, and analyzed at the Brussels laboratories.

The Institute aims to become a hub for advanced vaccinology research, host researchers from around the world, and work closely with other global institutions, such as World Health Organization (WHO), Coalition for Epidemic Preparedness, Bill & Melinda Gates Foundation and others.

Covid-19 vaccine was approved for small children

The mRNA vaccines BNT162b2 (Pfizer & BioNTech) and mRNA-1273 (Moderna) were granted emergency-use authorization by the US Food and Drug Administration (FDA) for prevention of Covid-19 in children aged 6 months to 5 years. BNT162b2 will be administered in three doses, each 1/10 the amount given to adults. mRNA-1273’s regimen consists of two 1/4 doses.

As many countries around the globe brace for another expected pandemic wave caused by the Omicron sub-variants BA.4 and BA.5, strain-specific vaccines are being tested. An updated version of BNT162b2, administered as the fourth dose, induced markedly more antibodies neutralizing the original Omicron variant BA.1 than the parental vaccine version. These antibodies neutralized BA.4 and BA.5 as well, although to a lesser extent.

The inactivated whole-virus vaccine VLA2001 (Valneva) was approved in EU for use in adults up to 50 years old. The vaccine, which contains high density of the SARS-CoV-2 spike protein, is adjuvanted with alum and Cpg 1018.

An FDA advisory committee recommended the approval of the protein vaccine NVX-CoV2373 (Novavax), which demonstrated 90% efficacy against early virus strains in a trial with 30,000 people.

Among other vaccines in clinical development are:

• another mRNA vaccine ArCoV (Walvax) developed in China, which was more immunogenic as a booster than the inactivated vaccine CoronaVac (Sinovac) widely used in the country.

• an adjuvanted recombinant peptide vaccine (Sanofi & GSK), which prevented 72% of symptomatic cases caused by Omicron in 13,000 adults enrolled in the Phase 3 VAT08 trial.

• a non-living nanocell vaccine (EnGeneIC) delivering the spike protein and an interferon-stimulating adjuvant, which elicited high-affinity, Omicron-neutralizing antibodies in a small trial involving 32 healthy subjects.

Developments of CAR T-cell immunotherapy on multiple fronts

The first CAR T-cell therapy ever approved in US, the CD19-targeting tisagenlecleucel (Kymriah, Novartis), improved long-term survival in children and young adults with relapsed or refractory B-cell acute lymphoblastic leukemia. Of 79 subjects, 55% were alive at the 5-year mark compared to 10% typical for this condition and other treatment options.

The CD20-specific autologous CAR T-cell MB-106 (Mustang Bio) induced a 94% response rate with 14 complete responses in 18 patients with follicular lymphoma, according to interim results of a Phase 1/2 trial. MB-106, which is modified to infuse both CD4+ and CD8+ CAR-T cells, is designed to inhibit B-cell differentiation into plasma cells.

The CD19-specific allogeneic CAR T-cell therapy CB-010 (Caribou Biosciences) induced complete responses in all six patients with relapsed or refractory B-cell non-Hodgkin lymphoma treated with the best-performing dose in the Phase 1 ANTLER trial. Two of these subjects remain disease-free after six months.
The autologous CAR T-cell targeting the oncofetal antigen Claudin-6 BNT211 (BioNTech) received priority-medicines designation by the European Medicines Agency for treatment of recurrent testicular cancer. The decision is based on Phase 1/2 trial data showing a disease control rate of >80% and response rate of >40% in 16 subjects.

Monkeypox outbreak slowly spreads throughout the world

A total of >3,000 cases of monkeypox and one death have been reported from 50 countries, according to WHO. Some of these countries have launched a ring-vaccination campaign, in which a vaccine for the related smallpox virus is given to acquaintances of infected people, and their contacts. The effectiveness of this approach remains to be determined.

The monkeypox-specific vaccine TNX-801 (Tonix) was protective and induced sterilizing immunity in all eight macaques challenged with the virus. The vaccine, which is based on synthetic horsepox virus, is designed to protect humans from monkeypox and smallpox.

Dupilumab approved for pediatric atopic dermatitis

The interleukin 4 inhibitor dupilumab (Dupixent, Regeneron) was approved by FDA to treat children aged 6 months to 5 years with moderate-to-severe atopic dermatitis, which cannot be controlled with other medication. This condition affects >70,000 children in the US alone.

Dupilumab given every 4 weeks improved the disease in half of children tested in a Phase 3 trial.

Atopic dermatitis is manifested as inflammation of the skin with persistent itch and painful skin lesions. The majority of cases develop by age 5.

Influenza vaccination reduces the risk of Alzheimer’s disease

Elderly who received the seasonal influenza vaccine were 40% less likely to develop Alzheimer’s disease (AD) in the next 4 years than their unvaccinated peers, according to a retrospective study of almost 2 million US adults aged ≥65 years old. The vaccinated and unvaccinated cohorts, which were matched for their AD propensity at baseline, reported a 5.1% and 8.5% incidence of AD, respectively, at follow-up. The mechanism of action for influenza vaccine to affect AD is unknown.

“The strength of this protective effect increased with the number of years that a person received an annual flu vaccine – in other words, the rate of developing Alzheimer’s was lowest among those who consistently received the flu vaccine every year,” lead author Avram Bukhbinder of University of Texas Health Science Center said.

AD affects ~6 million people in the US alone, a number that is growing due to aging population.

Hepatitis B immunotherapies in early-stage clinical trials

The HBV therapeutic vaccine VTP-300 (Vaccitech) as monotherapy or with low-dose PD-1 inhibitor nivolumab (BMS) was safe and led to a marked reduction of HBV surface antigen (HBsAg). The Phase 1/2 HBV002 trial enrolled 55 patients with chronic hepatitis B. VTP-300 is a heterologous vaccine consisting of HBsAg vectored by ChAdOx1 adenovirus as prime and MVA poxvirus as boost.

The bispecific antibody IMC-I109 V (Immunocore) was well tolerated and transiently decreased HBsAg levels in two of three subjects with chronic hepatitis B, according to preliminary data from the the Phase 1 ImmTAV trial. IMC-I109 V is designed to home T cells to infected hepatocytes by engaging both a T cell receptor and HBsAg.

One of first RSV vaccines closer to regulatory approval

The respiratory syncytial virus (RSV) vaccine RSVPreF3 (GSK) was safe and “exceeded” the primary endpoint of the Phase 3 ARsV1006 trial testing the candidate in 25,000 adults aged ≥60 years. Although actual results will be presented later, regulatory authorities have been engaged. RSVPreF3 contains a recombinant subunit prefusion RSV F glycoprotein adjuvanted with a combination of AS01 (GSK) and QS-21 STIMULON (Agensu).

Another RSV vaccine candidate, the alum-adjuvanted prefusion antigen VLP vaccine IVX-121 (Icosavax), demonstrated safety and robust immunogenicity in adults 18–45 and 60–75 years of age in a randomized, placebo-controlled, dose-finding Phase 1 trial. Vaccinated individuals produced antibodies neutralizing both RSV-A and RSV-B strains.

Bispecific antibody promising in B-cell lymphoma

Overall response rate of 60% and complete response rate of 40% were reported from the open-label Phase 3 EPCORE NHL-1 trial testing the bispecific antibody epicitamab (Genmab) in 157 patients with relapsed or refractory large B-cell lymphoma. Epicitamab is a subcutaneous antibody specific for the T-cell coreceptor CD3 and the B-cell antigen CD20 present on the surface of lymphoma cells.

Large B-cell lymphoma is a fast-growing type of non-Hodgkin’s lymphoma with estimated global incidence of 150,000 annually.

Another MMR vaccine approved by FDA

The FDA has approved the measles-mumps-rubella vaccine Priorix (GSK) for use in US children aged one year and older. The vaccine, which has been on the market elsewhere in the world for 25 years, is administered in two doses at ages 12–15 months and 4–6 years. The decision is based on a large-scale trials showing comparable efficacy with the available MMR vaccine (Merck).

Measles has been on the rise in recent years causing several outbreaks in the US alone. According to the Centers for Disease Control and Prevention, vaccine orders have decreased by 10%, and 400,000 fewer vaccinated children entered kindergarten than expected.
HPV immunotherapy combination fast-tracked by FDA

The combination of the nanoparticle lipid vaccine PDS0101 (PDS) with the PD-1 inhibitor pembrolizumab (Keytruda, Merck) received the fast-track designation by the FDA for treatment of recurrent or metastatic HPV16-positive head-and-neck cancer.

PDS0101 is a subcutaneous vaccine designed to activate both CD8+ and CD4+ T cell responses against HPV16-positive tumors. HPV strain 16 causes >90% of head-and-neck cancer cases.

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References

1. Plotkin SA. Portrait of an ISV fellow. Hum Vaccin Immunother. 2018;14(8):1836–1839. doi:10.1080/21645515.2018.1480199.
2. World Health Organization. Multi-Country monkeypox outbreak: situation update; [accessed 2022 July 5]. https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON396
3. Bukhbinder AS, Ling Y, Hasan O, Jiang X, Kim Y, Phelps KN, Schmandt RE, Amran A, Coburn R, Ramesh S, et al. Risk of Alzheimer’s disease following influenza vaccination: a claims-based cohort study using propensity score matching. J Alzheimers Dis. 2022;1–14. doi:10.3233/JAD-220361.