

Life-saving vaccines

Butantan produces 100 million doses of nine vaccines each year

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If successful, the Butantan Institute's dengue vaccine will add to a growing list of vaccines manufactured by the Brazilian institution.

Butantan currently has a portfolio of 13 antivenoms and 9 vaccines, producing a total of 100 million doses each year that are supplied to the Ministry of Health for distribution in Brazil. Most vaccines are manufactured entirely at the São Paulo institution; some products pending the completion of technology transfer processes are only partially produced at Butantan under agreements with private pharmaceutical companies. The vaccines produced in the largest volume in 2018 were seasonal influenza vaccines (60 million doses), followed by vaccines against hepatitis B (16 million), human papillomavirus (HPV, 7.6 million), diphtheria, tetanus, whooping cough (4.3 million), and hepatitis A (3.7 million).

The unit producing the influenza vaccine—which is reformulated each year depending on the types of influenza virus circulating around the world—is housed in Butantan's most advanced facility, a 10,000 square-meter building with a biosafety level 2 rating. As part of a technology transfer program with Sanofi, the French company that created the vaccine, Butantan developed the capabilities to produce a formulation identical to the product manufactured by the multinational corporation.

Although building on privately developed technology, the Brazilian institute had to engineer an innovative, proprietary system to inoculate embryonic eggs with influenza viruses



Eggs used in the production of influenza vaccines

to produce antigens for the vaccine. The system can process 520,000 eggs per day, with each resulting in one vaccine dose on average. “Our influenza vaccine factory is the only facility of its kind in Latin America. We have applied for certification by the World Health Organization [WHO] to be able to export the product,” says Ricardo das Neves Oliveira, who manages the production unit.

After five years of producing the original vaccine formulation, Butantan is considering upgrading the flu vaccine facility to produce more sophisticated products. The institute currently produces a trivalent vaccine, meaning that each annual formulation reacts to three different types of inactivated virus. The virus strains used each year are determined by the WHO based on global epidemic data. The Butantan vaccine provides protection against two subtypes of influenza A and one subtype of influenza B. “We’re running tests to add another subtype of influenza B to the formulation and produce a quadrivalent vaccine, which is already available on the market,” says Oliveira.

The institute also plans to begin the development of a high-dose flu vaccine with higher viral protein content for the elderly population, improving the immune response. Another improvement will be an increase in the number of vaccine doses produced from each egg. A collaboration has been established with two certified poultry farms to test eggs from different lineages of chickens. ■

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