

OPENING LECTURE

To begin with I want to express my gratitude to Dr. Willy Beçak and Dr. Isaias Raw for inviting me to come here. I am deeply honoured and thankful to be present at the inauguration of the First Symposium on Synthetic Vaccines and Vaccines Produced by Genetic Engineering.

This invitation came to me in a very suitable occasion because the subject of the last meeting I organized at the Pontifical Academy of Sciences was the same that will be discussed here. I believe that the initiative taken by the Instituto Butantan and the Weizmann Institute is of extreme importance for it deals with one of the most vivid aspects of modern scientific life, not only for its scientific interest, but also because these vaccines open new possibilities for the prophylaxis of some of the most serious diseases which affect human kind nowadays. The satisfaction of being in São Paulo is very great. São Paulo is, undoubtedly, the scientific capital of Brazil. From here the first pioneers advances were made with strength and courage, for the sake of the "Sanitary redemption of the Brazilians", a sentence I heard from my father many times.

Adolfo Lutz, Emilio Ribas and Vital Brazil, in whose house we are congregated now, were the first pioneers who allowed the creation of the Instituto Oswaldo Cruz, where I was raised and scientifically educated, the Institution where I belong and to which I am tied up with idealism and affection. These were the same feelings of my father and Oswaldo Cruz when they directed it for 17 years, each.

The first Institute for the production of vaccines in Brazil, the Instituto Vacinogenico built by the Baron of Pedro Afonso under the direction and financial support of Pedro II, the Emperor, became the "Instituto Oswaldo Cruz". It was at the Butantan Institute and at the Oswaldo Cruz Institute that the first attempts to introduce the pasteurian age in our country were made.

Research on the vaccine against the yellow fever was mostly done at the end of last century and the beginning of this century. Even today, if we visit the old bookshops, in Rio, we can find many monographies and thesis of great Brazilian scientists of that period. Among them I want to cite Domingos Freire and João Batista de Lacerda, who had vainly attempted to find the causal agent of the yellow fever, the great scourge of the Brazilian population. Their attempt to find the pathogenic agent to produce the vaccine was vain because those scientists were looking for a bacteria and the yellow fever is caused by a virus.

The first vaccines that appeared in our country were the vaccines against rabies, a fact that motivated the Emperor establishing the "Instituto Vacinogenico". It is curious to point out the work of a young man from Minas Gerais, Francisco de Mello Franco, who studied medicine at the University of Coimbra. He was the first scientist to utilize the "jennerian vaccine" against smallpox in a laboratory out of Great Britain.

The meeting that we will attend here represents a unique event in the history of Biology in Brazil. We will see the admirable advances obtained in the production of vaccines and, much more than this, the understanding of both the structure and the elements that the organism mobilizes against the patogenic aggression.

We will also see how far we are now from the time when, in China, before the Christian age, doctors used to place fragments of crusts - taken from people affected by small-pox - in contact with the skin of healthy people immunizing them against this disease.

If Jenner was the first to immunize against smallpox utilizing a virus similar to the virus of smallpox, but non-patogenic for the man (1976), the great step was taken by Pasteur, with his vaccines of attenuated patogenic strains "chicken cholera", in 1789, the "anthrax", 1881, and "rabies" in 1885, being this last one the first utilized in man.

In 1892, Wright produced a vaccine against "typhoid fever" with attenuated strains.

Following this event, Ramon came up with his sensational discovery which opened a new era for vaccines. Utilizing a fraction of the tetanic bacillus, Ramon

produced an anatoxine with great immunologic power, that modified the panorama of inoculations.

Other vaccines have been produced since then and I was a witness, in the forties, of the vaccination against yellow fever of 20 million Brazilians, a number only overpassed by the massive vaccination against meningytes, some years ago.

Speaking of vaccines by attenuated virus, we should quote the extraordinary work of Albert Sabin.

The evolution of Modern Biology is observed not only in the field of immunology but also in immuno-genetics, which gives new overtures to medicine.

The works of Macfarlane-Burnett and Peter Medawar have shown the importance of lymphocytes in the cellular immuno-defense.

The recombination of DNA and the knowledge of the molecular aspects of genetics has also opened new fields and has brought to immunology a completely new approach.

The knowledge of the immuno-system has opened new fields for the production of vaccines. Future vaccines may be of different categories and they will certainly be discussed by the great experts who are participating in this Symposium.

Some of the new vaccines are synthetic and I would say that they are a bit delayed in relation to the possibility they may offer. Others are vaccines in which the antibodies provoked by the epitopes, mimethyze the epitopes themselves.

I would also like to mention that under certain aspects we should call "synthetic" the vaccines obtained from the recombination of DNA which, in my opinion, present great perspectives.

Another point to be focused is that the epitopes may be inserted in one antigene or one transported. This will give preventive medicine an enormous possibility because, with a single introduction in the organism of various epitopes we can obtain the immunization against many diseases.

From the vaccines obtained by the recombinant DNA, certainly the one to begin with the struggle is the vaccine against "Hepatitis B". Not only for the extension of the problem - and even if vaccines obtained from the plasma of carriers of the virus are available in the mark -, the vaccine thus obtained is necessary to substitute the limitations imposed by shortness of the cited serun. This all indicates that humanity certainly will be free, very soon, from some of the scourges of humanity - AIDS, for example.

A Symposium like this, with its international characteristics, will give strength to the progress in the knowledge of vaccines, not only to our nation but also to ali countries. It will bring extraordinary results. I would only question about the time for these benefits to get to our country - certainly, a question difficult to be answered. Doctor Beçak has said, with strong reasons, of the high investments as well as of the human resources needed to give a conclusive solution to the problem. This is the focal point of the question. In many occasions, however, I have spoken of the "patents" for the "living beings" produced by Genetic Engineering. What has been done and what will be done for vaccines produced by Genetic Engineering must not be property of groups economically strong, or political parties, but Genetic Engineering ust be used for the benefit of the whole humanity. This knowledge has to be largely diffused in order hat all people can face the future and use the extraordinary benefits that science and technology can bring.

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