Erhan Akdoğan – President, Turkish Health Institutes (TUSEB)



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The president of the Turkish Health Institutes (TUSEB), Dr Erhan Akdoğan, provides a behind-the-scenes look at the development process of Turkovac, the country's first homegrown COVID-19 vaccine which is currently undergoing phase III clinical studies. Dr Akdoğan took over TUSEB, and the nine institutes under its responsibility, in the middle of the pandemic. He comments on the overlooked Turkish R&D capabilities, their work on a national genomic project, and the big opportunity to leverage the country's vast patient data to create new health technology.

Can you introduce TUSEB and the role that it is playing to promote healthcare research and development in Turkey?

The Health Institutes of Turkey (TUSEB) was established in 2014 to provide services in the field of health science and technology. Our main objectives in that field are reducing foreign dependency and increasing Turkish competitiveness.

Our mission is to lead the studies on innovation carried out in the field of health science and technology, providing scientific, technical, and financial support. TUSEB also provides resources to increase localization and nationalization to meet Turkey's needs. Within TUSEB, there are nine research institutes that have been established in line with that purpose: Turkish Cancer Institute, Biotechnology Institute, Maternal, Child and Adolescent Health Institute, Institute of Public Health

and Chronic Diseases, Traditional and Complementary Medicine Institute, Health Care Quality and Accreditation Institute, Health Policy Institute, Vaccine Institute, and the Institute of Health Data Research and Artificial Intelligence Applications.

Can you expand on the research and development assistance TUSEB provides and the role you have played during the pandemic, considering the several COVID-19-related projects taking place in Turkey?

During the COVID-19 pandemic, TUSEB has taken a very important role in Turkey's effort to mitigate the effects of the health crisis. The pandemic reinforced the importance of vaccine research and production, which led to several R&D studies to produce COVID-19 vaccines in our country. These initiatives developed rapidly with the help of the laudable efforts from scientists, the pharmaceutical industry and universities.

The priority given by the Minister of Health for vaccine production has played an important role in accelerating the process. This is why we are supporting seven different COVID-19 vaccine projects that are being developed in various universities such as Marmara University, Hacettepe University, Erciyes University, Yıldız Technical University, Akdeniz University and Ataturk University. In addition, we are supporting a private company for the development of a nasal COVID-19 vaccine, which is currently in examined via pre-clinical studies and will soon be moving to phase I.

Regarding the most advanced domestic vaccine candidate, Turkovac, how was the program started and what has been the role of TUSEB in achieving the phase III milestone? How does it compare to other vaccines on the global market?

Turkovac is an inactive vaccine. Phases I and II were done by Erciyes University with public funding. The vaccine candidate is currently in phase III which is being coordinated by TUSEB and we are working at 30 different clinical centres. The seven other vaccine projects we have funded include candidates that use recombinant protein-based technology and peptide protein-based technology; however, we are not currently working mRNA vaccines. In addition, we have given academic support for nasal vaccine production.

Are you planning to roll out the Turkovac vaccine just for the domestic population or do you intend to share it abroad?

Fortunately, there is not a shortage of COVID-19 vaccines in Turkey at the moment as people are served with Sinovac and Pfizer-BioNTech. Our aim is to produce Turkovac as soon as possible to inoculate the Turkish nation, and later send it to other countries, especially the ones that have not received enough supply to inoculate their vulnerable population.

There have been reports that the Turkish scientific community, the industry and public sector have united to facilitate the advancement of these COVID-19 projects. Can you take us through that journey?

In March 2020, we decided to support several projects and, in hindsight, it was very right decision. We have discovered a new collaborative model where researchers, companies that produce vaccines, and academicians can work together inside vaccine factories. It is a new model for the country and one that opens many opportunities going forward. Turkey has great potential to produce pharmaceuticals and vaccines.

After this pandemic experience, how do you evaluate the scientific infrastructure and technological know-how available in Turkey?

Turkey has good and strong background about vaccine production because, 100 years ago, a special institute was established for this purpose by Sultan Abdul Hamid II. Specialists were sent to Pasteur Institute where they obtained the necessary know-how and later came back to Turkey to start the institute.

The Turkish academician who developed Turkovac, Prof. Aykut Ozdarendereli, was able to achieve as a result of the available research ecosystem.

For the large-scale manufacturing of the vaccine, we were fortunate to collaborate with factories that could produce it under GMP standards.

What is your plan to use the experience obtained during the COVID-19 vaccine development to research and discover new treatments for other diseases?

Turkey is a developing and highly populated country with an ageing population which has increased our healthcare demands. The prevalence of chronic and rare diseases presents a great burden for the economy; because of this, TUSEB is also funding medical devices and digital healthcare projects, including artificial intelligence, wearable devices, personalized medicine and telemedicine. In addition, we are looking forward to starting the Turkish Genome Project in order to improve the diagnosis of genetic diseases.

We also want to increase the relationship between TUSEB and international organizations, funding international projects that allow our researchers to exchange know-how abroad.

What business or ownership model has TUSEB and the rest of Turkish COVID-19 vaccine developers implemented for the six projects, taking into account the high cost of such endeavor?

There are different types of models. In some of them, we share the intellectual property rights with universities and companies, and develop different types of sales models with companies.

What is the status of the Turkish Genome Project you have just mentioned?

In 2007, TUSEB started the genome project and obtained 100 genetic samples from the Turkish population, and we want to expand the project. Hence, we have provided support for the project and are waiting for the program to be approved.

You took over the position in July of 2020, in the middle of the pandemic. What has been your main learning from the experience so far?

I am an electronical and communication engineer, with a specialty in biomechatronics. In addition, I am an academician at Yıldız Technical University. I have worked on the design, production and artificial intelligence-based control of rehabilitation robots. Since my engineer perspective differs from the doctors', it adds good value to the organization while the researchers of the institute focuses mainly on medicine. I have learned a great deal from health professionals during this time; as we collaborated with them in Turkey's city hospitals. To this end, we served what they really needed to overcome this crisis.

Considering your expertise on artificial intelligence applied to medicine, how do you evaluate the potential to develop AI-powered technologies in Turkey?

Artificial intelligence (AI) can certainly be applied in many areas such as wearable technology, medical robotics, diagnostics and clinical support systems. TUSEB’s vision for AI includes the possibility to make a good and efficient use of the vast patient data that the Ministry of Health has obtained over the years. Analyzing and using that data is going to allow us to be an intermediary between engineers and medical specialists. TUSEB is working on some projects to develop software that can leverage that data for the benefit of all Turkish patients.

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