Tse Wen Chang – Founder & President, Immunwork, Taiwan

Whether Taiwan's biomedical industry can be robust will depend on the kinds of technologies we can build

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Dr Tse Wen Chang, founder of Immunwork, gives an update on the preclinical development process of the company's revolutionary T-E pharmaceutical products and goes on to give his expert insights on the dynamics at play within Taiwan's biotech and biomedical industries.

Since we last met you cancer treatment has reached some important milestones: immunotherapy has been on the rise, the market saw first approval of new cancer gene therapy, first new bladder cancer treatment in around 3 decades and many advancements in research. How have some of these advancements informed your own research interests?

I am very excited by the major breakthroughs which have happened in several areas of cancer research, particularly immunotherapies, immune checkpoint inhibitors, antibody drug conjugates, bio-specific antibodies, and CAR-T. The drugs being developed in these five areas all use antibody technology and are in one way or another related to manipulating the immune system. As an immunologist who has conducting antibody research for three or four decades, these new advancements motivated me to enter the game and develop T-E pharmaceuticals with Immunwork.

Immunwork's most advanced T-E™ pharmaceutical clinical trials were aimed to start by 2019. How have you progressed with the development timelines of these products?

We have four to five product candidates which we believe have reached the point of the validation phase. These assets are in primarily three indications, type II diabetes, cardiovascular for dissolving blood clots, and oncology. Our oncology series of drugs are based on a technology that, simply put, binds radioactive nuclei to antibodies which are then carried to the tumour to kill the cancer cells. In this series, we have three primary advanced products.

In the next two to three years, we are aiming to complete preclinical studies then move to early-stage clinical trials. Currently, we are focused on fundraising activities and building capital to carry out the development process. Many industry stakeholders say that the past two to three years have not the best time for raising capital in Taiwan. However, we are not limiting our search to just Taiwan – we are looking outside the island to key international markets such as China, Hong Kong, and even the US for example.

Taiwan faces the limitation of very small market size and the only way to bring the biomedical industry's development to the next level is to take advantage of global resources. What strategies could work best for Taiwan biotechs to accomplish this?

There are many different approaches that can be taken to accomplish this. In the case of Immunwork, our strategy is to form alliances with international companies for the partnered development of our products. Since Immunwork has more than 20 possible drug candidates, we are able to calculate a balance between holding our own marketing rights and licensing out to industry partners.

This strategy is based on my previous experience as the co-founder of Tanox Inc. With Tanox, we forged partnerships with the top industry players Novartis and Genentech. The collaboration worked very well, but the disadvantage was having to give away our marketing rights in several countries. However, this sacrifice we chose decreased our risk and minimized the potential of failure.

Looking at the global market, we are likely to divide our marketing regions between Asia and the rest of the Western world, where Immunwork would keep rights within the region with the rest of the world being managed by our partners. Nevertheless, looking forward in our pipeline, we would like to market T-E pharmaceutical products internationally on our own.

How do you envision Taiwan's role as an innovator within the global biotech and biomedical industry?

Whether Taiwan's biomedical industry can be robust will depend on the kinds of technologies we can build as a country. Not only does the country have to invest resources into the industry, but the people and talent must be capable to create very innovative technology and advanced product candidates. Whether or not this can be done – yes there is a possibility, but it must be proven. Thus far, the drugs that have been developed in Taiwan are not groundbreaking enough to make our industry a strong player on the global stage. Last year, the FDA approved 59 new chemical entity drugs, only one of which was from the greater China area. This drug was developed by the Taiwanese biotech TaiMed. Originally, the drug was being developed by Tanox, but when the company was acquired by Genentech a group of investors obtained the rights to develop the product here in Taiwan. Ten years later, after already being in phase II trials with Tanox in the US, the drug was finally able to reach the market under TaiMed. Creating a new concept drug is a major challenge for markets around the world, especially a small one like Taiwan.

In your opinion, do you believe the government has done enough with the Biomedical Industry Innovation Program on solving remaining legal and regulatory hurdles that slow down the drug development process in Taiwan?

I would say that there still has not been enough done for Taiwan's bio industry. We must have an overhaul of our research funding policies and participate in scientific research so that our professors and principal investigators can be more creative. Generally, people are not innovative enough in areas like Asia and Eastern Europe. Resources are being built to support research, but the academic system and research policies are not well positioned enough to generate real breakthrough innovations. Thus far, we have primarily been making incremental contributions to what already exists. Slowly, we are transitioning here but there is still a long way to go.

Do you believe it is the responsibility of the government to shape Taiwan's innovation model or is there a need for an overall change in the industry and stakeholder mindset?

Part of this can be attributed to the Taiwan culture which we can see reflected in the education system. Students do very well in basic learning but lack in creativity and in the university, there is

a high emphasis on papers and thesis but most of the research is not very original.

Compared to the US, Taiwan also does work very hard but makes much less money for this reason. In the US, there is an incentive to pursue research of great value and innovation. In Taiwan, these incentives also exist, but the question remains is it enough?

Translational research is a topic which is often discussed by the government and several mechanisms have been put into place to link academia with industry, such as the Development Center for Biotechnology (DCB). These initiatives are well thought out; however, the results have been minimal.

Many Taiwan biotechs chose to develop their products through early stages and ultimately licensing out to the international industry players. Can Taiwan truly create its own biomedical success story?

Taiwan is very small in terms of population and market size, so unless major changes are made, creating the “Taiwanese success story” will take decades. For example, Switzerland is a major hub for international pharmaceutical companies and other small countries like the Netherlands and Belgium have also built their unique positioning within the industry. Novo Nordisk from Denmark seized an opportunity to develop insulin and become a global leader in diabetes care.

This opportunity still exists for Taiwan, but we must find our niche in which we can succeed. Emerging fields such as cell therapies, CART, AI-assisted drug discovery, big data, and digital health are all major topics of discussion amongst the industry stakeholders today. Which direction is the correct way to go is still difficult to say. However, Taiwan has a historical strength in ICT and combining this with our life sciences and biological resources can give us a unique advantage.

What vision do you have for Immunwork as the developer of a new, safer and more effective class of immunotherapeutic drugs?

Immunwork has a very strong team of scientists with a stimulating environment for R&D. We have already protected our technology thoroughly, holding between 20 and 30 patents from several markets with another 100 applications in review. We have to be very calculated in the validity of our approach and be critical in how we chose to move our products into the advanced stage.

Immunwork is still a young company, but we are diligently continuing our research and we have confidence in the opportunity to bring groundbreaking advances to the biopharmaceutical industry. In this success, we are aiming to become a role model for what Taiwan’s biotech industry can be.

What motivates you in your own research pursuits?

At my age, I was preparing to retire but when I saw the major breakthroughs happening in antibody immunology, I could not help but get involved.

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