Tao Chen – CEO, Agsea & Head of Business Development, Absea, China

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13.11.2019

Tags: China, Diagnostics, AGSEA, ABSEA

Tao Chen, head of business development of Absea and CEO of the new spin-out Agsea, is entering the world of immunodiagnostics with a comprehensive panel of IHC antibodies in the hope of becoming a world leader in pathological diagnostics in just a few years.

Tao, as head of business development of Absea and CEO of the new spin-out Agsea, could you begin by introducing Absea and the motivations behind forming Agsea?

Absea started 18 years ago, with a number of Chinese and foreign scientists. The main founder of Absea is Professor Wei Zhang, who is an immunology professor at Peking Union Medical College (PUMC) in China. Professor Zhang did her PhD in Cambridge in the 1990s, which was exceptional during a time where not many people in China do their PhDs abroad.

During her PhD, Professor Zhang learnt two Nobel Prize-winning monoclonal antibody techniques: hybridoma technique and phage display technique, and uniquely, from the original inventors, the labs of Cesar Milstein and Greg Winter respectively, giving her a unique combination of technical expertise in China.

Professor Zhang’s main focus in Absea is on R&D. She takes care of the pipeline, technology development, and staff training

Absea has existed for 18 years and in that time, it has grown into a remarkable technological platform whose major business model is to act as a CRO. The antigen expression and antibody development pipelines are very robust. We have a strong track record: we serve academia, making monoclonal antibodies for research projects, as well as industrial partners, such as Novartis. We also have two extremely important industrial customers in Sweden. 95% of our customers are overseas. Our international scope is mainly due to the background of Professor Zhang, but we still need to improve our largely unfulfilled local marketing.

In Europe, the largest human life sciences project is called The Human Protein Atlas (HPA). HPA's mission is to develop all antibodies for all human proteins. This project is based on the ImmunoHistoChemistry (IHC) technology. At the start, they tested around ten companies in the world as a provider of monoclonal antibodies – and they eventually selected us. For the last twelve years, every single monoclonal antibody in that project was manufactured by us. Of course, they own the monoclonal antibodies, and we are very pleased to see they generate sizable profit for our partner. HPA offered us a remarkable developmental opportunity with regards to making IHC monoclonal antibodies. We also currently produce more than 2000 antigens per year for a Swedish company.

Why was Agsea established earlier this year?

For any industry, there are different business models. One of the business models is to provide service. The other is to provide products. Professor Zhang and I strategically planned for Absea to focus on the service and Agsea to focus on the products. Our work at Absea over the past 18 years has already proven our track record in antibody development and production, and I believe it is now time for us to move up the value chain to develop our own products for the market. After all, the global antibody industry is worth hundreds of billions USD.

In Agsea, we focus on products related to immunodiagnostics. There are many kits and solutions we can develop. However, we cannot target everything at once so we want to enter the field with a specific angle: pathological diagnostics. Agsea is trying to compete with big players, like Roche in this field, by creating a comprehensive panel of IHC antibodies that embody new properties. For the first year or two, our targeting market is naturally China, where we are based.

In our first year, the action plan can be summarized as the "APRIL" plan. These are the five main things we are focusing on.

A – A stands for **a**ntibodies. We have the idea of developing '100+5+N' antibodies: a hundred IHC antibodies that can be immediately delivered to the clinical market; five high-end products for companion diagnostics; and finally, N (or any number) of new antibodies developed using the proprietary transgenic mice antibody platform I developed last year.

P – P stands for **p**roducts. We want to apply our antibody capabilities to develop new pathological diagnostics. We are already collaborating with the top pathological departments in key hospitals in Beijing to obtain tissue samples, and our Chief Product Officer is actually a world-leading expert in IHC staining for the screening of these tissues.

Once the products are ready, we will register them with the National Medical Products Administration (NMPA). Today, the Chinese government is encouraging local manufacturing and development in a number of industries, including biopharma, so what we are doing aligns with that.

R – R stands for **r**ecognition. I am originally a computational biologist. Together with my colleagues, I have designed algorithms that are now being used worldwide – called TIDE for assessing gene editing experiments. As we will eventually be working with many products and pathological slides, I am already collaborating with a Professor in a top institution to develop a software framework to analyse and process these data to move in the direction of AI-based diagnosis.

I – I is for **i**nfrastructure. In addition to our current manufacturing capabilities, we also want to develop an R&D centre, a GMP facility and a robust operation structure.

L – L is for **l**inks. As we are now developing a new company, we need to increase our visibility and connections with the overall industry. This means networking with doctors, collaborators, customers, politicians, scientists, journalists, lawyers, as well as talents!

We are also in the process of conducting our pre-A round financing, and I have already approached various top investors in China.

What are the key challenges you anticipate for Agsea?

I am confident we can develop the products we aim to develop. But this is an unknown zone for me. As with any new enterprise, there are a number of uncertainties. Whether it is building partnerships with the right partners, achieving an optimal balance between commercial activities and R&D activities, and competing with established market players, these are all considerations

not just for Agsea but for any company! This is why my strategy is to immediately deliver a hundred antibodies to the marketplace and establish ourselves as a top player. For context, for instance, the previous top monoclonal antibody player producing a hundred antibodies in China was recently acquired for USD 1 billion. After the first year of Agsea, I want to be on that level.

What is your manufacturing capacity?

When thinking of manufacturing, there are two important aspects. The first is developing high-quality monoclonal antibodies. This we have no problem with. The second is to manufacture them at commercial scale. This is why we plan to build a GMP facility in Nanjing. When it comes to antibody manufacturing, the process is as important as the initial R&D. When talking about diagnostic products, we only need to produce grams – which can already be considered huge amounts but are far lower than the kilograms needed for antibody drugs.

How do you plan to recruit talent? Why would people be interested in joining Agsea?

In a very short period of time, Agsea will hopefully become a world leader for pathological diagnosis. This field, while small relative to the overall USD 1 trillion antibody market, is still a USD 10 billion market globally so this is still significant. We also have long-term goals of further expanding into other technologies such as chemical luminescence for clinical laboratories and mass spectrometry to discover new biomarkers.

We also place a lot of emphasis on developing new tools and algorithms, and by definition, we will produce new products and diagnostics. This is truly innovative and should be an exciting prospect for many researchers. For instance, 20 percent of our time will be spent on developing new assets based on the new transgenic mouse.

We have deep collaborations with scientists from China, the Netherlands and Germany so we will have very talented people joining our company in Nanjing, including post-docs from Berlin Humboldt University, Max Delbruck Center and Netherlands Cancer Institute.

In the following years, we will start to recruit from the industry more proactively.

Any final message?

For the first year or two, we will develop products for the Chinese market. However, when looking at the history of Absea, we have very strong international links. Accordingly, and because of the success of Absea, we will maintain the same strategy and strengthen our international relationships. Several scientists from the Netherlands and Germany will either be in the board of directors or advisory board and one or two will also be our shareholders. For me, there are no boundaries between countries. We will first help China and later the world.

Our mission is to push the boundaries of the immunology industry to have a global impact and improve the health of patients. Mature markets are not extremely innovative. I want to be part of the efforts that make China a top innovator. My ultimate dream is to be part of the discovery or invention of an extremely impactful technology that can drive global science forward and improve human health.

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