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Omics-Related Research On Rise in China

Formerly Conducted Mostly in Institutes, Field Blossoming Now as Companies See Benefits

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Molecular biomarkers and diagnostics are playing increasingly important roles in the modern pharmaceutical and healthcare industries. To more efficiently discover drugs, companies now increasingly apply these technologies in order to find the right drug for the right patient. These efforts are leading to the gradual realization of personalized medicine across the globe.

One of the forces driving the development of personalized medicine is genomic and proteomic research. Genomics and proteomics directly facilitate the development of new biomarkers and diagnostic tools. Moreover, genomics and proteomics are also increasingly employed in the development of translational medicines as the technologies can lead to the discovery of antibody-based biomarkers that are able to predict not only the efficacy but also the safety of a drug candidate.

Currently, there are about 250 Chinese companies involved in genomic and proteomic research and its application in the development of biomarkers and diagnostic products. Of these companies, about 70% were founded in the last three to five years. A large portion (about 25%) of these firms were either founded by foreign companies as their wholly owned Chinese divisions or jointly founded with local Chinese partners. Among the companies founded by Chinese entrepreneurs, a majority (about 80%) were founded by “sea turtles” who possess knowledge, experience, and skills gained from working abroad.

Current Technical Capability

In the past, genomic and proteomic research in China was mainly conducted at the country's research institutions. The Chinese government realized the potential of these technologies early on and has provided financial support and favorable policies.

The current capabilities of Chinese companies pursuing genomic and proteomic research include the development of reagents for measuring molecular events such as intracellular pathways, cell signaling, and gene expression, and development of nucleic acid-based biochips that can be integrated into next-generation diagnostic products.

Some companies also provide service for DNA synthesis, pathway profiling of lead compounds, assay development, and high-content/-throughput screening. Their

capabilities in proteomic research include protein expression, protein structural determination, molecular cloning for construction of monoclonal antibodies, and synthesis of gene vectors.

Using their skills and experience in genomics and proteomics, some companies also provide services for target identification and validation to help drug companies elucidate disease-causing mechanisms. A number of Chinese organizations also possess large-scale genetic databases resulting from genome/proteome sequencing. With their strong capability in bioinformatics, these organizations also provide custom service to outside companies.

At present the majority of China-based companies conducting genomic and proteomic research are focusing on the development of diagnostic products including testing reagents and kits for hospital and/or laboratory use. Most of the products are for in vitro use and were developed based on nucleic acid technologies.

A growing number of China-based companies also offer diagnostic testing services, including quantitative- and real-time PCR-based diagnostic assays.

So far we have not seen any evidence that Chinese biotech companies are capable of independently developing (including identification and validation) biomarkers to support clinical research. A number of them do, however, possess the ability to detect and analyze biomarkers.

This shortcoming is related to the industry's short service history. The majority of these Chinese biotech firms are still limited in service scope, capability, capacity, and experience compared with their counterparts in the developed countries. Currently, only a small number of them could be considered world-class players.

Current Market Value

The technical advances in genomics and proteomics have helped Chinese biotech companies develop new diagnostic technologies and products. The rapid advancement of the Chinese industry has been driven by the fast growth of the Chinese economy, which has made healthcare products more affordable. In addition, ongoing nationwide healthcare reform is making health insurance coverage more readily available to Chinese residents.

Based on our analysis, the current market value of the genomic and proteomic research sector in China is around \$175 million, growing at about 35% a year (CAGR) in the past five years (*Figure*). The rapid application of research results in genomics and proteomics to the development of new molecular diagnostic products has largely attributed to this fast growth.

Development of biomarkers has been slow in China, and application of the technology by Chinese drug companies has been limited, largely due to the still-low-level R&D activities found in the country.

Acceptance of the personalized medicine concept is also low in China, primarily because of the high price of these products. Most personalized medicines that are

marketed in the West have not been launched in China. The current market values for both biomarkers and personalized medicine sectors in China are thus very small.

Future Outlook

The fast growth of the Chinese genomic and proteomic sector has drawn the attention of foreign companies that are interested in seeking partnerships with local companies for co-developing or marketing their products in China.

Since genomics and proteomics have now been coupled with the development of molecular biomarkers and diagnostics it is, therefore, expected that this sector will grow appreciably in the near future.

It is also expected that the development of new technologies in these areas will take place not only in the Western pharmaceutical industry but also almost simultaneously in China, which will propel the Chinese industry to even faster growth.

In addition to the globally favorable R&D climate, a number of other factors, both internally and externally, will also determine China's future growth prospect in these areas.

Externally, demands by international drug companies for R&D collaboration with local Chinese companies/research institutions and co-marketing of their products in the Chinese market will prompt local Chinese companies to enhance their capability in order to meet demands.

Internally, China's large, well-trained workforce, government support, and the increasing availability of R&D funding from various sources will continue to drive the Chinese genomic and proteomic industry forward.

Among all industrial sectors, the strongest growth will likely occur in the Chinese in vitro diagnostic market. The relative ease and lower risk inherent in developing a diagnostic product will also induce more companies to get involved in the industry or new companies to emerge as the entry barrier to the industry is relatively low compared with traditional drug discovery and development.

Based on our in-depth analysis of its growth drivers and resistors, we believe that the Chinese genomic and proteomic industry will continue to grow with a CAGR of about 30% in the following five years and the market value will likely reach \$655 million by 2015.

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