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Yeul-Hong Kim, Director of K-MASTER details the project's success in creating a shared database of genomic data for Korean oncology professionals. Kim also explains the importance of collaboration with Big Pharma in their oncology projects, and the potential to become a pan-Asian venture in the future.

How do K-MASTER's operations fit within the ambitions of the Korean government regarding precision medicine?

The Korean government set a goal of collecting 10,000 cancer patients' genomic profiling data and clinical observations to form the initial database. The second goal was to widen the general coverage for precision medicine in Korea, expanding the participation in the project to every area of the country. We currently have 54 large university hospitals participating in the project and the clinical trials are run by the Korean Cancer Study group. All oncologists in the major hospitals are therefore participating in the project, which makes it truly nationwide.

Initially, the government wanted to focus on the most prevalent cancer types within the Korean population. However, the new targeting genes are observed in every form of cancer, so we can find mutations across types. Thus, we collect data on all cancers and from as many tissues as possible to maximise our data collection.

Korea precision medicine project includes two precision medicine projects sponsored by the Korean government. One project, P-HIS is focused on cloud-based data collection systems which can be shared across all of the hospitals in Korea. In that way, we can share patient data together and initiate one database.

The second project, K-MASTER project, is focused on cancer diagnosis and treatment. This project involved the next generation targeted sequencing and genomic profiling of tumour and circulating tumour DNA from cancer patients. We also connect this genomic data with clinical data by merging databases which can be utilised for new drug development and for prognoses. It is very important that we have a collaboration with pharmaceutical companies so that we can act as a bridge between patients and the developers of future treatments. Pharmaceutical companies also want to utilise this data in their drug development.

Finally, we are establishing a big cancer genomic database with clinical information. We are not only establishing a large database but are investigating how we can utilise this data for new drug development while keeping within the restrictions of data privacy.

Compared to Japan, Europe and the USA, what is your assessment of the level of Korean science?

Especially in the field of medical oncology, Korean scientists are very advanced and well educated. There are around 350 medical oncologists in Korea with a well-organised training programme. Moreover, most oncologists have at least 1-2 years' experience of working in the USA or Europe, exposing them to very advanced systems for clinical trials. They are well aware of precision medicine and accustomed to applying it to patients.

Notwithstanding that, the rapid pace of development in oncology research leaves many struggling to stay at the forefront of the field. Furthermore, there is still so much that we do not understand regarding the role of germline or somatic genomics in cancer and its treatment.

To keep our oncologists up to speed, we have developed a portal site and decision-assisting program to better utilization of our genomic data. Through this platform, doctors and researchers can look up the landscape of certain mutations and find out what type of clinical trials are ongoing around the world, such as in the USA. This programme supplies the necessary tools to aid the decision-making process of doctors.

What is the level of interest amongst global multinational companies towards K-MASTER project?

Innovative Korean pharma companies are still in their infancy, and thus have smaller pipelines and limited capabilities for drug development. Hence, we need to connect larger, experienced pharmaceutical companies around the globe and seek their assistance through partnerships.

In general, the global pharmaceutical companies are very responsive to our projects. However, each company has an interest in a specific stage of development, which varies widely across the industry. Often, we find that we are in a slightly earlier or later stage than the general development roadmap of the specific new drug and thus there may only be limited interest, particularly in the early investigative phases. Usually our programmes can conduct clinical trials as early phase II trials.

Regrettably, their development policies sometimes change, abandoning the partnership to pursue other developments. This leads to some pipeline candidates being discontinued. These are amongst the main challenges that we at K-MASTER face.

Nonetheless, our ambition is to run as many clinical trials as possible to maximise Korea’s chances of developing oncology treatments. We ask the pharmaceutical companies to supply the drugs for clinical trials and cover specific expenses such as customs and shipping. The remainder of the financing for conducting trial is covered by our fund.

How can K-MASTER, through its data and clinical trials, complement the research being generated in this field outside of Korea?

20 percent of the 10,000 people screened for our genomic data collection displayed a specific targetable mutation. About half of those patients can be treated with previously approved drugs, with the other ten percent being responsive either to drugs in development, or those that have been approved in other countries. Our project tries to connect those patients to clinical trials so that they can access these treatments.

The remaining 80 percent of patients possess other mutations, not currently identified as specific targets for treatments. If a pharmaceutical company does find a new specific target, we can link up those patients to give them the best chance of finding a treatment.

The main obstacle for precision medicine is the lack of knowledge amongst patients. Only physicians can prescribe the molecular gene testing and recommend further consideration regarding targeted treatments. If this information is not provided to the patient, those outside of our database will not have an opportunity to seek out new experimental treatments. We need to look at how we can broaden the opportunities not only physicians, but for patients too.

Are you looking to expand your projects to include other Asian Nations?

While the current plan is only for Korea, my ambition is to share this data and open up our portal system. At this time, we have uploaded the data of 6,500 of our 10,000 patients into our portal, which scientists in Korea can access online. Sharing this data and collecting more data from other Asian countries will be paramount in the long term for our project.

I am the president of the Asian Oncology Society, in which most Asian countries are participating. This also includes a clinical trial committee and a committee for standardised treatment guidelines. Across Asian countries, the main stumbling blocks are the unequal levels of scientific know-how and the variable quality of medical systems, ranging from world-leading to highly underdeveloped in some of the poorer nations. In developed nations, like Japan and Korea, most cancer drugs on the market have been approved. However, in underdeveloped nations, there are very few cancer drugs currently available. This makes our approach in its current form difficult to expand to the developing Asian countries. We need to play our part in ensuring that we can create a system where socio-economic conditions can be overcome to offer the best access to patients across the continent, not only in the developed Asian nations.

What would be your final message to our international audience?

The main goal of a pharmaceutical company, although profits are of course important, is to provide patients with access to the best treatments. Providing those opportunities through collaborations with projects like K-MASTER, not only guarantees access for more patients worldwide, but in the long term will be a financial benefit to Big Pharma. Together we can achieve a higher level of success than when we are acting in isolation, working together to support under-developed countries by suppling new drugs and assisting with clinical trials.

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