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Novel Solutions for Emerging Diseases: Molcure

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molcure

With increased life expectancy, an ageing society, and evolving infections, there is a growing demand for novel treatments to cure diseases. The researchers' perspective towards curing and preventing ailments is fast changing as microbes develop drug resistance. A group of four young graduates from Japan have set out to resolve these challenges through their innovative start-up, Molcure, takes pride in designing antibodies for varied diseases.

Newer technologies like genetic engineering and genome sequencing aim to develop drugs with increased precision and accuracy. With many challenges and newer diseases there is more scope for innovation and research, many startups are venturing into unique specialized areas of drug development to cater to the unmet medical needs of the society.

When Molcure began its journey in engineering antibodies, little did it know that the market would favor them in the long run. The market for antibody drugs in Japan is expected to almost double by 2020.

Molcure aims to excel in this market with their key software technology called "Abtracer". This tool identifies antibodies from vast gene pool libraries, which can then be designed into antibody-drugs using biotechnology, IT, and robotics. The Abtracer technology has already attracted eyeballs, winning the University Venture Grand Prix (UVGP) Entrepreneurship award, organized by the Ministry of Economy, Trade and Industry, Japan.

The Abtracer technology is unique as it will help generate novel solutions for known diseases. Mr Eli Lyons, chief data officer, Molcure said that the technology makes use of gene sequencing as compared to the conventional experimental framework of detecting antibodies for a potential target. "The Abtracer system discovers candidates with greater diversity by using next generation sequencing, this technique was not previously available. Later, advanced bioinformatics would be used to analyze sequencing results from the antibody library before and after screening. Results from the previous screens can also be compared and used to identify antibody candidates," he added.

Confident that the new technology would create waves in the market Mr Ogawa said, "We are aiming to engineer the micro-world with robotics and IT that can design antibodies rapidly with sustained stability to treat upcoming and existing disorders. In the next few years, we will provide our antibody or its blueprint to pharmaceutical companies."

The firm aims to make this technology available worldwide by devising advanced direct marketing strategies. This includes partnering with distributors and specialists in the field. One such initiative was active participation at the International BIO convention in San Diego that promised huge exposure and client lists.

Speaking about the challenges, Mr Lyons explained that competition and opportunity are equal in this market. He stated, "One of our challenges is that some antibody discovery companies see us as competitors when they can actually be our clients. We would like to help companies that already have their own antibody libraries, targets and a screening process by helping them improve their technique to increase the quantity and quality of anti- body candidates."

For a startup, right from revenue to manpower everything is a challenge, described Mr Lyons. "As a start-up we face the same challenges that any start-up faces. We have to work on R&D, funding and meeting with potential clients and collaborators. This spreads us pretty thin. However, we have a lot of good advisors and a talented team, so at this point it's about putting it all together to reach our goals," he added further.

Molcure also aims to solve potential problems faced by pharmaceutical companies in developing novel drug candidates. Since a new drug takes a minimum of 10-15 years to complete the prerequisite Good Manufacturing Practices (GMP) requirements, many corporates do not show any interest in drug discovery.

Mr Ogawa said, "We have devised a strategic business model that would allow us to secure revenue in the initial phase before a drug is approved. The milestone payment deal allows us to receive payment upon reaching a certain step. For example, we acquire income for reagent development and designing antibodies for experiments or for sensors. Also, we receive payment when a joint research with a pharmaceutical giant clears a certain stage. This model diversifies risks."

He aims to influence Japanese academia and industry through Molcure. He explained, "In recent times, I have seen many university researchers starting venture companies. Still, compared to other countries there is not enough cooperation across fields. For instance, in academia and industry, large and small companies on the medical front and engineering are all very distant. If we can cooperate across these separate fields, we can create better products. Molcure aims to contribute in that way too."

In the long run, Molcure aims to develop a machine that would instantly deliver a drug when a disease sample is inserted into it. Mr Ogawa said, "I would like the device to be installed in places like hospitals. It would allow the most effective drug to be given specifically to each patient and in a much shorter period."