

Biotech firm Carmine Therapeutics inks US\$900m deal with Takeda Pharmaceutical

The tie-up aims to discover, develop and commercialise two rare-disease drugs

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CARMINE Therapeutics, a biotech firm developing non-viral gene therapies for rare diseases, on Wednesday said it has signed a US\$900 million research agreement with Takeda Pharmaceutical Company to discover, develop and commercialise two rare-disease drugs.

The company will receive an upfront payment to support its re-

search, but the remaining amount will be doled out when the firm hits milestones such as pre-clinical studies, clinical trials and during commercialisation. Tiered royalties are also included in the deal.

The Boston- and Singapore-based biotech firm declined to reveal the amount received for the upfront payment, but said it has raised over US\$9.4 million in seed equity financing to date, led by Esco Ventures and Takeda Ventures.

In addition to the US\$900 million deal, Takeda has committed US\$5 million in convertible notes for Carmine Therapeutics' seed round to help develop its technology.

Carmine Therapeutics, which was founded in 2019 and incubated locally by Esco Ventures X, declined to name the two rare-disease drugs it is working on, but it is doing this by developing novel gene therapies that are based on red blood cell extracellular vesicles. Called Regent, the technology enables red blood cells to deliver nucleic acid drugs for treatment through extracellular vesicles, which are particles that are naturally released from cells.

Gene therapy is potentially curative and can address the disease at its root, since it can replace the function of a missing gene, said Lin Xiang Qian, founding chief executive of Carmine Therapeutics and managing partner of Esco Ventures X. "Current gene therapies in the market are mainly delivered using viruses, which have various limitations."

For example, introducing viruses in gene therapy might cause patients to develop adverse immune responses. Bodies might also reject these viruses.

"Not only is the process of using red blood cell extracellular vesicles

safer and cheaper, there is also the potential for repeat dosing and a significantly larger transgene capacity," added Mr Lin.

This technology was developed by two Singaporeans: Assistant Professors Minh Le at the National University of Singapore and Shi Jiahai at City University of Hong Kong.

However, as the trailblazer in the sphere, the firm will have to face challenges such as scaling up manufacturing processes and developing methods to characterise the drug products, said Mr Lin. He added that since this is a new class of medicine, there are no approved drugs in the market yet and the company would have to pave the way.

Takeda's rare-diseases drug discovery unit head Madhu Natarajan said: "Developing alternative gene therapy delivery vehicles like the Regent platform that could address the challenges of (virus-based) gene therapy is critical to one day delivering next-generation cures for rare diseases."

Esco Ventures is the life-science investment arm of Esco Group, a Singapore-based life-sciences company with factories and offices in 43 locations worldwide. Esco Ventures is the parent of Esco Ventures X, an incubator for biotech startups like Carmine Therapeutics.