

"Global investors can leverage our deep immunomics platform to develop TCR Cell therapies for solid tumours"

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The global biotech ecosystem continues to fluctuate and pose fresh challenges but many emerging enterprises and technologies are keen to collaborate with other stakeholders to solve healthcare challenges. Singapore is a leading startup hub in Asia having the expertise and network to be the launch pad to the region and beyond. Singapore's A*STAR spin-off ImmunoScape, a pre-clinical biotechnology company focused on the discovery and development of next-generation TCR cell therapies in the field of oncology has been thriving in the regional and global space. In an interaction with BioSpectrum Asia, Ng Choon Peng, Founder & CEO at Immunoscape discussed the opportunities and challenges in commercialising technology spin-outs from biomedical research amidst Singapore's fast-growing ecosystem for bioscience ventures



How crucial is the adaptation of next-generation TCR cell therapies for diagnostic and prophylactic purposes?

TCR cell therapies have evolved from their initial ventures around the isolation, expansion and re-infusion of T-cells to the patient, to newer and exciting ways of devising novel TCR cell therapies. As cell therapies are designed to be highly specific to a patient's tumour these are built using cutting-edge, in-silico Machine Learning approaches that can improve efficacy and

patient safety.

While current TCR technologies primarily address unmet treatment options, next-generation TCR cell technologies could potentially include the following:

- Diagnostic use cases such as the development of patient stratification tools, i.e., by identifying variations in antigen-specific T-cells within patient groups for a deeper understanding of the pathology. This ensures that the right drugs reach the right patients at specified times
- Prognostic use cases such as monitoring patient responses to alter treatment regimens and take positive responders off therapies, thereby reducing the economic burden
- Prophylactic use cases such as the development of TCR cell therapies for the prevention of opportunistic infections in patients on immunosuppressants for organ transplants

Although ImmunoScape's technology stack has the potential to address many of the above scenarios, we are very focused on our TCR discovery and development of TCR-based therapeutics.

How would you describe ImmunoScape's investor relationships globally and especially in Singapore?

ImmunoScape was spun out of A*STAR (by in-licensing key A*STAR technology) in 2017. ImmunoScape is dedicated to discovering and developing a diverse, risk-balanced portfolio of novel TCRs against solid tumours.

ImmunoScape's focus has been to partner with life science investors both in Singapore and globally. The value-add from these investors goes beyond just the financing, into business development, follow-on investments, and governance. Singapore's Economic Development Board Investments (EDBI) has helped introduce us to their global partners since ImmunoScape became a portfolio company. Based on their interactions with other portfolio companies across the globe, they have also offered us advice on best practices.

In addition, we received support from three more venture capitalists, namely; "Anzu Partners" who helped us set up and expand in San Diego from our headquarters in Singapore, "Amgen Ventures", who created rigorous due diligence on our cutting-edge science validates the technology. We are always grateful to our first institutional investor, the University of Tokyo Edge Capital (UTEC), who believed in us even when our technology was deemed early by many.

Global investors can join our journey in leveraging our deep immunomics and machine learning platforms, to discover and develop a diverse, risk-balanced portfolio of novel T Cell Receptors (TCR) to treat solid tumours.

What is your approach towards commercialising technology spin-outs from biomedical research?

ImmunoScape, a spin-out of A*STAR, focuses on novel TCRs against solid tumours. We keep an eye on what the market needs are and the other eye on how our technology can meet those needs. The way to create value is to identify the pain points and solve them, leveraging on the uniqueness of our technology. In our case, it is the unmet need of cancer, especially against solid tumours. Our unique deep immunomics and machine learning platforms can uncover novel TCRs against a diverse range of tumour antigens. We continue to build on the strengths of our highly skilled immunologists and computation biologists, many of whom are from A*STAR or local universities, to optimise our wet lab approaches and train predictive algorithms for our machine learning in predicting antigen specificities. The data from the wet lab feeds the unique database for machine learning and the wet lab in turn validates the predictions - creating this feedback loop that increases the accuracy for the next prediction.

Thus, ImmunoScape is working to generate a wealth of data that lead to the speedy discovery of many novel TCRs which have commercial potential. Some of these include lead therapeutic products that ImmunoScape can accelerate through clinical trials and bring to the market. Our own proprietary pipeline comprises novel TCRs against both validated and novel targets that are linked to solid tumour indications. With the in vitro and in vivo data that we are gathering now, we hope to file for an Investigational New Drug (IND) soon. Other disease signatures that biopharma companies might be interested in licensing from ImmunoScape are also in the running.

Harnessing the power of collaboration and diversity in the workplace is also crucial for us. Our discovery science teams comprise both local and global talents so we have a diversified set of skills and perspectives as we tackle various challenges.

Active collaboration with academic labs and clinician-scientists for access to patient samples for the discovery and validation of novel TCRs is also crucial for us. For example, we have an ongoing collaboration with the National Cancer Centre of Singapore to obtain patient-derived blood samples to identify novel TCRs. At present, we are also looking towards working with other biopharma companies with capabilities that can be synergised with that of ImmunoScape's to enable faster pre-clinical and clinical development of novel TCRs.

This synergistic approach is intended to maximise the utilisation of ImmunoScape's proprietary technology and resources to bring multiple therapies (and modalities) that will target solid tumour cancer patients suffering in a much shorter time frame.

How would you describe the strategic approaches adopted by ImmunoScape to capitalise on the opportunities in the global market? How does Singapore's enterprise ecosystem foster startups?

The Singapore startup ecosystem has grown from strength to strength over the last few years. Enterprise Singapore provided significant support for ImmunoScape in multiple areas, including funding and manpower.

In 2019 and 2020, we received two funding awards from Enterprise Singapore. The first was the Startup SG Tech Grant (2019-2020) and the latter was the Enterprise Development Grant (2020-2021). This funding went a long way as we expanded ImmunoScape in the US, as well as our executive and scientific teams. We were also provided with manpower support through A*STAR's "T-Up program", with Enterprise Singapore covering a significant portion of ImmunoScape's hiring costs.

In addition, Enterprise Singapore connected ImmunoScape with other potential investors to get additional funding and provided us access to networking opportunities with other successful start-ups, venture capitalists, and ecosystem partners. When we first started ImmunoScape, we were faced with challenges such as the lack of early-stage funders, appropriate lab spaces, and talent with the right skill sets. Entrepreneurs who want to start a bioscience business today will also have better access to shared lab spaces, incubation centres, and a larger pool of skilled talents as compared to 5-10 years ago. Connection to and facilitation of all these different resources play a big role in any startup's success, particularly during the early stages of growth.

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