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ASIA EDITION

“There’s a growing focus on developing novel ADCs tailored to address unmet medical needs”

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Nona Biosciences, a subsidiary of Hong Kong- listed Harbour BioMed is an emerging leader in Antibody-drug conjugates (ADCs). Nona excels in delivering comprehensive solutions from ‘Idea to IND.’ Their use of Harbour Mice technology and a team of seasoned experts enable them to offer integrated services in antibody discovery, from antigen preparation to pharmacological evaluation. Nona has forged partnerships with big pharma firms such as Pfizer and Moderna among others. Dr Jingsong Wang, Chairman of Nona Biosciences, shares more about the company, its plans and Asia’s ADC landscape.

Can you provide an overview of Nona Biosciences' integrated antibody discovery services?

Nona Biosciences is a global leading technology platform company committed to cutting-edge technology innovation and providing a total solution from ‘Idea to IND’ (I to I), ranging from target validation and antibody discovery through preclinical research.

The integrated antibody discovery services range from antigen preparation, animal immunisation, highly robust antibody screening, to antibody lead generation and engineering, developability assessment and pharmacological evaluation, leveraging advantages of Harbour Mice technology and the experienced therapeutic antibody discovery team.

Harbour Mice generates fully human monoclonal antibodies in a traditional two heavy and two light chain (H2L2) format, and a heavy chain only (HCAb) format. Integrating Harbour Mice with highly robust antibody screening platforms, Nona Biosciences is focused on driving global inventions of transformative next-generation drugs.

Can you share the successful collaborations that you have undertaken and how these have contributed to the advancement of therapeutic antibody discovery?

One notable instance is the licensing and collaboration agreement with Moderna, a global pioneer in mRNA therapeutics. The strategic collaboration focuses on discovering and developing nucleic acid-based immunotherapies using our proprietary heavy chain only antibody discovery platform (HCAb). Under the agreement, we will receive an upfront payment, and potential milestone payments based on pending achievement of certain regulatory, development, and sales milestones, and tiered royalties. The collaboration marks a significant milestone in our business development, affirming the potential of our HCAb platform and innovative capabilities.

Another pivotal collaboration is the licensing agreement with Pfizer for HBM9033, an mesothelin-targeted ADC generated from Nona's Harbour Mice and integrated ADC platforms, with the aggregate amount of $53 million upfront and near-term payments, up to approximately $1.05 billion in milestone payments and tiered royalties ranging from high single digits to high teens. This partnership with Pfizer underscores our robust capabilities and expertise in ADC drug discovery, further enhancing our global network of collaborations, thereby amplifying the scientific and commercial value of our technology platforms.

What are the key challenges faced in antibody discovery and engineering, and how do you address these challenges within your service offerings?

Antibody discovery and engineering encounter several significant challenges, including: Humanisation to reduce the risk of immunogenicity; The flexibility of selecting appropriate formats based on the intended application and desired properties; Addressing chain mismatch in bispecific antibody development and Screening to identify antibodies with the desired properties.

Our two proprietary transgenic mouse platforms can generate both conventional, as well as the next-generation biologics that are fully human, affinity matured with excellent solubility and developability.

The HCAb platform can generate unique 'heavy chain only' antibodies that are approximately half the size of a typical Immunoglobulin G (IgG). These antibodies possess IgG-like pharmacokinetic properties and Fc-domain functions, obviating the need for additional engineering or humanisation.

Moreover, due to the absence of light chains, HCAb naturally overcomes the challenge of light chain mispairing in bispecific antibody contexts. Consequently, leveraging HCAb and its derived single domain antibody (sdAb) enables the construction of bispecific or multispecific antibodies with smaller molecular weights, fewer polypeptide chains, and simpler structures.

To expedite antibody discovery, we have developed state-of-the-art high-throughput screening platforms, leveraging optimised murine plasma cell enrichment methods, robust and reliable in-chip assay development process, highly efficient single cell sequencing technology, and high-throughput recombinant antibody screening techniques. The single B cell screening (SBC) platform greatly shortens the workflow from months to days. Besides, we are highly motivated to embrace new technologies, such as AI, to further increase screening efficiency and sequence diversity.

Antibody-drug conjugates (ADCs) are gaining prominence as therapeutic modalities globally. How would you describe the current landscape of ADC development in the Asia Pacific region?

The landscape of ADC development in the APAC region is marked by increasing research and collaboration among pharmaceutical companies, academic institutions, and biotech firms. Nearly one-third of global ongoing trials in ADC are taking place in the APAC region.

There is a growing focus on developing novel ADCs tailored to address unmet medical needs, particularly in oncology, with the global market value predicted to reach $22 billion by 2030. Apart from oncology, ADCs are anticipated to address the needs of ageing populations.

Moreover, there are growing R&D activities for novel therapies in APAC. Companies in countries such as China, Japan, and South Korea are actively engaged in ADC research and clinical trials, aiming to bring innovative therapies to the market. Regulatory agencies in the region are also adapting to address the unique challenges and opportunities presented by ADCs, fostering an environment conducive to their development and commercialisation.

Additionally, companies are exploring new therapeutic targets and investing in cutting-edge technologies like AI-powered antibody technology. In conclusion, the APAC region is positioned to play a significant role in advancing ADC technology and expanding treatment options for patients.

What are your future plans or developments?

Nona Biosciences is a global leading technology platform company. As a technology platform company, Nona has established HCAb PLUS platform based on Harbour Mice HCAb platform, enabling the generation of multiple novel therapeutic antibody modalities, including single-domain antibodies, bi- and multi-specific antibodies, ADCs, CAR-Ts, and mRNAs, thereby expanding the frontiers of our ability to drive global innovation. In the future, we will continue to explore next-generation technology innovation opportunities, and to expand and enhance the technology toolbox available for our partners around the world.

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