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From Seoul to the Global Stage: Reimagining Antibody Discovery with AI

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Taeyong Park, Co-founder and Executive Vice President of Galux, discusses physics-driven AI, de novo antibody design, multi-property optimisation, and South Korea's growing role in computational drug discovery.

Artificial intelligence is rapidly transforming biologics discovery, but the industry's focus is shifting from generating novel protein sequences to creating therapeutically viable drug candidates. As pharmaceutical companies become more discerning in their evaluation of AI-enabled platforms, scientific rigor, experimental validation, and translational relevance are emerging as the true measures of success. **In this conversation with BioSpectrum Asia during BIO International Convention 2026, Taeyong Park, Co-founder and Executive Vice President of Galux,** explains how the company's physics- and chemistry-based AI platform is tackling some of biologics development's most difficult challenges, from de novo antibody design against complex targets to multi-property optimisation for next-generation therapeutics.

How is GaluxDesign differentiating itself within the increasingly competitive AI-driven protein and antibody engineering landscape?

GaluxDesign differentiates itself through the scientific philosophy behind the platform. Galux was founded by scientists with deep expertise in physics and chemistry, and that origin strongly shapes how we build GaluxDesign, our proprietary AI platform for protein design. Our philosophy is not simply to generate protein sequences, but to develop technology that incorporates the physicochemical principles underlying protein structure formation and molecular interactions. This foundation allows us to approach antibody and VHH design with a deeper understanding of how molecules fold, bind, and function in real biological contexts.

In an increasingly competitive AI-driven protein and antibody engineering landscape, we believe this physics- and chemistry-grounded approach is a key differentiator. GaluxDesign is focused on two core capabilities: de novo design of antibodies and VHHs, and multi-property optimization of existing proteins toward defined target profiles. Based on this scientific foundation and our results to date, we believe GaluxDesign has demonstrated performance that is highly competitive on the global stage.

What are the biggest scientific or translational challenges today in de novo antibody and VHH design, and how is Galux approaching them?

One of the biggest challenges in de novo antibody and VHH design is designing against flexible epitopes. When a target protein has flexible regions, or when the target epitope contains flexible loop structures, design success can be significantly lower than for rigid epitopes. This is because flexible epitopes can adopt multiple conformations, making it much harder to design the precise molecular interactions required for strong and specific binding.

Important target classes such as GPCRs and ion channels often have dynamic structures and flexible extracellular regions, which is one reason they have historically been difficult for antibody discovery.

Galux is approaching this challenge by developing proprietary AI technology that can more precisely account for target structure and epitope flexibility. Rather than treating the target as a fixed structure, we aim to incorporate a more realistic view of molecular motion, structural variation, and interaction dynamics into the design process. This reflects the same physicochemical foundation behind GaluxDesign: understanding not only what a protein structure looks like, but how it behaves and interacts.

Using this approach, we have already secured successful binder design cases against GPCR targets. We see this as an important proof point that a physics and chemistry-grounded AI platform can help extend de novo antibody and VHH design toward more complex and therapeutically relevant target classes.

From your perspective, how is South Korea positioning itself in the global AI-biology and computational drug discovery ecosystem?

South Korea is still at an earlier stage than the United States in terms of computing resources, investment scale, and the overall size of the AI-biology ecosystem. The U.S. has a much larger concentration of capital, infrastructure, talent, and mature biotechnology networks, and that gap remains meaningful.

However, Korea is moving quickly. National interest in AI-biology and computational drug discovery has grown substantially, and the Korean government is increasing support for research funding, infrastructure, and talent development in this area. Korea also has strong foundations in engineering, computation, life sciences, and biopharmaceutical manufacturing, all of which can become important as AI-driven discovery moves closer to real-world translation.

For Korea to become a meaningful player globally, it will need companies that can compete not only as local technology providers, but as serious scientific contributors to the international ecosystem. Galux is one example of a Korean company working to show that globally competitive AI-driven protein and antibody design can emerge from Korea.

Industry interest in multi-property optimisation is growing rapidly. How do you see this capability influencing future biologics development and partner expectations?

The field is clearly moving beyond binding affinity alone. For biologics to become viable therapeutic candidates, they must satisfy multiple requirements from the early design stage, including developability, stability, immunogenicity-related properties, and more. This is why multi-property optimization is becoming increasingly important in AI-driven biologics design.

At Galux, we are applying both de novo design and multi-property optimization with these development-relevant factors in mind. Our goal is to design molecules that are closer to the desired therapeutic profile from the beginning.

We believe this capability will increasingly shape partner expectations. Pharmaceutical companies will look for AI platforms that can deliver not only novel binders, but candidates with a stronger path toward development. Over time, these efforts could lead to AI technologies capable of designing development-ready assets in a much more direct, one-step manner, rather than relying on extensive downstream optimization.

As pharmaceutical companies evaluate AI-enabled discovery platforms more critically, what do you believe will define long-term credibility and commercial success in this sector?

As pharmaceutical companies gain a deeper understanding of AI-enabled discovery, they are becoming more critical and sophisticated in how they evaluate platforms. We see this as a positive and necessary development for the field. As the sector

matures, broad claims and future potential will matter less, while experimental validation and real therapeutic relevance will matter much more.

For companies developing truly differentiated technologies, this is a healthy shift. Long-term credibility will be defined by the ability to repeatedly generate results that hold up experimentally and address meaningful problems in drug development. In AI-driven protein and antibody design, the key question will not be how advanced a platform sounds, but whether it can create candidates with a credible path toward becoming medicines.

Commercial success should increasingly follow the strength of the technology itself. Business development capabilities and networks will always play a role, but we believe the ecosystem is moving toward a more evidence-driven phase, where companies with genuinely valuable technologies can receive the attention and opportunities they deserve. Ultimately, the companies that succeed will be those that translate AI-driven design into better therapeutic candidates and, eventually, into medicines that contribute to human health. That is the standard Galux is working to meet.