

Antibody Design at Lightning Speed: AI-Driven Precision for Complex Targets

Ainnocence's next-generation AI platform revolutionizes biologics discovery, achieving unprecedented scale, precision and speed in antibody and protein design.

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Our AI platform brings protein and antibody design into a new era”

Dr. Lurong Pan, CEO of Ainnocence

next-generation AI-driven biotech company, today announced a breakthrough in biologics design. The company's proprietary sequence-first AI platform can now virtually explore and optimize up to 10^{10} – 10^{12} antibody and protein variants, bringing in-silico precision engineering to a scale that mirrors nature's own evolutionary processes, all within days instead of months or years.

Unlocking the Full Potential of Antibody Diversity

Traditional antibody discovery depends on experimental libraries and high-throughput screening, which even at their largest are less than 10^8 variants. Virtual screening at this scale was previously impossible. By contrast, natural somatic hypermutation in B-cells can generate 10^{10} – 10^{12} potential antibodies, a range that Ainnocence's AI engine can now fully explore in silico.

The platform integrates deep generative modeling, multi-objective optimization and structure-based evaluation, enabling precise control over binding affinity, specificity, developability, stability and immunogenicity, prior to any experimental validation in the lab.

Key advantages include:

- Full-scale exploration of antibody diversity: Access to billions of potential antibody variants beyond traditional experimental limits.
- Designing complexity: Enables rational design against conformationally flexible, multi-epitope or “undruggable” targets.
- Accelerated timelines: Lead antibody identification reduced from 12–18 months to as little as 4–6 weeks.
- Improved quality and diversity: Produces high-affinity, stable antibodies suitable for therapeutic, diagnostic and vaccine applications.

- Reduced experimental costs: Minimizes reliance on iterative wet-lab cycles and low-throughput screening.
- Engineering Proteins with AI-Driven Precision

Beyond antibodies, Ainnocence's biologics engine extends to de novo protein design and protein engineering, predicting how sequence, structure, and dynamics interact across multiple properties. This enables the creation of proteins optimized for binding efficiency, solubility, thermostability, and function driving faster progress in enzyme design, vaccine development, and synthetic biology.

"Our AI platform brings protein and antibody design into a new era," said Dr. Lurong Pan, CEO of Ainnocence. "For the first time, we can navigate and optimize the vast biological sequence space on an evolutionary scale with the precision, direction, and speed of modern computation. This isn't just faster discovery; it's smarter biology."

Collaborate with Ainnocence

Ainnocence invites academic research groups and biopharma partners to leverage its sequence-first AI platform for antibody engineering, protein therapeutics, vaccine design, and hard-to-drug targets. For collaboration details, contact service@ainnocence.com or visit www.ainnocence.com.

About Ainnocence

Founded in 2021, Ainnocence is a next-generation biotech company whose self-evolving AI platform can virtually screen 10^{10} protein sequences, antibody variants, or small-molecule candidates for multitarget and multi-objective optimization. By simultaneously optimizing multiple biophysical and pharmacological properties, Ainnocence delivers high-probability leads with unprecedented speed, precision, and cost efficiency.

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