ENPICOM

Revolutionize antibody humanization with ENPICOM

Unlock the full potential of your therapeutic antibody development with our cutting-edge humanization services. Whether you need expert-driven support or a powerful self-service software solution, we provide the flexibility and precision you need to streamline your projects.
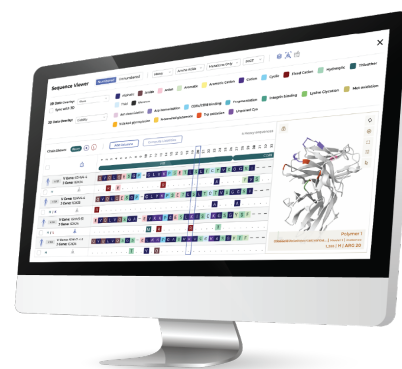
COMPARING HUMANIZATION APPROACHES

Antibody humanization is a crucial step in reducing immunogenicity while maintaining therapeutic efficacy, which is key to advancing a drug to the clinic. Traditional grafting methods, where CDRs are transferred from the parental molecule to human frameworks, are laborious, time-consuming, typically low throughput, and often reduce binding affinity. Deep learning has proven capable of overcoming some of these challenges, but current models like Biophi still tend to fall short in retaining binding affinity for most generated variants. ENPICOM's generative deep-learning humanization model eliminates the need for traditional grafting while showing far superior performance in retaining binding affinity when compared to e.g. BioPhi. Achieving higher success rates with fewer screened variants increases efficiency in both time and cost. Typically screening 3-5 humanized variants per parental clone is already enough to find a candidate that retains binding affinity.

THE ENPICOM HUMANIZATION MODEL

The significantly improved binding retention at clinically relevant humanness levels leads to considerable time and cost savings. With better retention, fewer sequences need to be screened, and sequence generation is faster. But how is this achieved?

The ENPICOM humanization model is built on our proprietary paired chain protein language model (pLM), which is part of our AIGX pLM family. In addition, we have trained a generative interface to suggest mutations that optimize sequence humanness, while allowing flexibility to protect residues expected to be key for binding. Besides, the model is designed to function agnostically with regard to the parental species and is fully flexible to account for optional additional restrictions. As a result, it can be run as a self-service software solution or operated by one of our experts as a service.

BENEFITS OF HUMANIZATION POWERED BY ENPICOM

✔ **High success rates**

Our deep learning model has proven to retain the binding affinity of parental antibodies exceptionally well, ensuring optimal outcomes for your therapeutic candidates.

✔ **Cost and time savings**

Express and screen fewer candidates while achieving higher humanization success rates, reducing both the time and cost associated with development.

✔ **Humanization forward**

The combination of high success rates and a reduced number of variants to be screened enables the humanization of more candidates earlier in your research, accelerating the discovery process.

✔ **Flexible configuration**

Our model is customizable by design, allowing you to modify default settings and add additional restrictions when needed. It provides a great out-of-the-box solution that can be fully tailored to align with your research objectives.

CASE STUDY: SUPERIOR SUCCESS RATES WITH AIGX VS BIOPHI

Our approach has been rigorously tested, consistently showing high success rates and reliable performance. In collaboration with Genovac, a leading antibody discovery company, our AIGX model outperformed current state-of-the-art models like BioPhi in humanizing antibodies while maintaining high germline identity and superior binding affinity.

Our model takes a given parental antibody from any species and provides a variety of humanized candidates for testing. Typically, testing just 3-5 humanized variants is sufficient to identify a candidate that retains similar affinity, significantly outperforming BioPhi, as presented at PEGS Boston 2024.

In this case study, antibodies humanized using ENPICOMs humanization model demonstrated a significantly higher success rate compared to BioPhi. Success was measured by:

- Achieving clinically relevant humanness levels (>85% and >90% germline identity), based on an analysis of all clinically reported anti-drug antibody response rates
- Retaining binding affinity similar to the parental clone

Our model also performs agnostically across species and works with a diverse set of parental germline sequences. This case study is just one example of how our model performs in real-world applications, validating its robustness and reliability in consistently delivering high-quality humanized antibodies primed for therapeutic development.
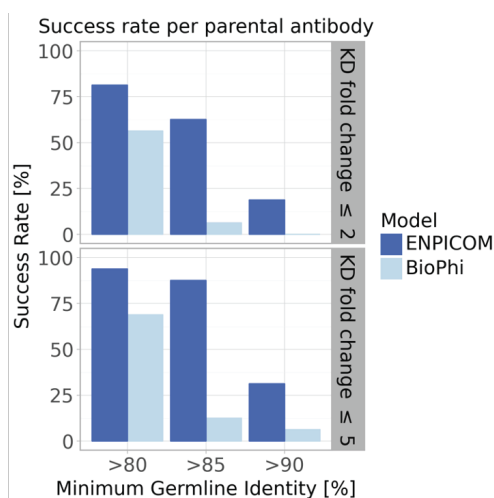

Figure: The AIGX humanization model included in Genovac's humanization offers significantly higher success rates in humanizing antibodies compared to BioPhi at >85% and >90% germline identity. Max. fc 2 = maximum 2-fold change in binding affinity; Max. fc 5 = maximum 5-fold change in binding affinity.

Watch the recording

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GETTING STARTED

ENPICOM's humanization services come in two customizable options, ensuring flexibility for your antibody humanization needs:

HUMANIZATION AS A SERVICE

Take the complexity out of antibody humanization with our dedicated team of experts. We handle every step of the process, from optimizing sequences to ensuring they are primed for further testing and development.

- **Expertise at your fingertips:** Our team of experienced scientists work with you to get a good selection of candidates.
- **Tailored to your needs:** Every project is personalized to your specific requirements.

Ideal for: Clients who humanize antibodies on a non-regular basis or appreciate expert oversight and guaranteed precision.

SELF-SERVICE HUMANIZATION TOOL

Empower your team to humanize antibodies independently with our easy-to-use humanization tool, controlling every step of the process yourself.

- **Move fast:** Accelerate your humanization workflows by starting right after selecting your lead candidates.
- **Complete control:** Explore different strategies and experiment at your own pace, with full autonomy over the process.

Ideal for: Researchers who regularly conduct humanization campaigns and prefer hands-on control throughout the process.

WHY CHOOSE OUR HUMANIZATION SERVICES?

Benefit	Full-service	Self-service tool
Expert guidance	Yes	No
Configuration	Tailored by our experts	User-driven
Speed	1-2 weeks	Instant results
Cost	Higher per clone, full service	Lower per clone, self-driven
Ideal for	Highly specific needs or occasional use	Regular users

YOUR PARTNER IN THERAPEUTIC DEVELOPMENT

At ENPICOM, we're not just offering solutions, we're partnering with you to accelerate therapeutic success. With our expert team and advanced technology, we help you bring safer, more effective therapies to patients faster.

Schedule a meeting

◇ ENPICOM

☐ +31 85 25 00 575
✉ sales@enpicom.com
🌐 enpicom.com

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