AI Antibody Discovery: Merck-Infinimmune Deal Analysis

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Executive Summary

In March 2026, Merck & Co. announced a landmark **$838 million** collaboration with California biotech **Infinimmune** to leverage its AI-driven **"human-first" antibody discovery platform** for developing novel biologics ([1] www.fiercebiotech.com) ([2] www.biospace.com). Under the multi-target agreement, Merck (MSD outside North America) will supply an undisclosed upfront payment and^ up to $838 million in milestone payments to Infinimmune. Once Infinimmune identifies a promising fully-human antibody candidate, Merck obtains exclusive rights to further develop and commercialize it ([1] www.fiercebiotech.com) ([3] trial.medpath.com). This pact reflects Merck's strategic push into AI-enabled biologics discovery amid looming revenue pressures (e.g. the impending 2028 patent cliff for Keytruda ([4] www.pharmexec.com)). It exemplifies a broader industry trend of nine-figure AI-partnerships in drug development ([5] www.nature.com) ([6] www.nature.com).

Infinimmune's platform melds two core innovations: the **Anthrobody™ screening platform**, which mines millions of human memory B cells to find naturally occurring antibody sequences, and **GLIMPSE™**, a proprietary antibody *language model* trained on paired human antibody sequences ([7] www.biospace.com) ([8] www.genengnews.com). Together, these technologies enable rapid isolation and in silico optimization of fully-human antibodies with strong affinity, specificity and drug-like properties ([7] www.biospace.com) ([9] www.biospace.com). In technical benchmarks, GLIMPSE-1 has achieved best-in-class humanization and up to **1000-fold affinity improvements** in target antibodies, simultaneously engineering cross-species binding and eliminating developability liabilities (www.playground.vc) ([10] www.genengnews.com). These capabilities suggest GLIMPSE can effectively "decode" the evolutionary logic of the human immune system to design safer, more potent biologics from day one (www.playground.vc).

The Merck–Infinimmune deal is expected to accelerate Infinimmune's own pipeline while validating its approach: projects like IFX-101 (an IL-22 inhibitor) and IFX-201 (an IL-13 inhibitor for atopic dermatitis) are already in preclinical development, and first-in-human studies are targeted by 2026 ([11] www.biospace.com) (www.playground.vc). More broadly, this partnership underscores how **AI-driven antibody discovery**—especially leveraging human immune repertoires—is emerging as a new paradigm in biologics R&D. Industry observers note that large pharma are eagerly investing in such platforms (e.g. Merck's deals with AI antibody firms and its recent Terns Pharmaceuticals acquisition) in hopes of boosting pipeline productivity ([12] www.biopharmadive.com) ([13] www.pharmexec.com). While AI-empowered candidates have yet to reach the clinic in force, deals like Merck–Infinimmune highlight a major shift: integrating machine learning into biologics discovery to tap the "450 million-year-old" immune engine inside each human ([14] www.genengnews.com) ([5] www.nature.com).

Introduction and Background

Antibodies in Therapeutics and Discovery Challenges

Monoclonal antibodies (mAbs) have become a cornerstone of modern medicine, treating cancers, autoimmune diseases, infectious diseases and more. However, discovering optimal antibody therapeutics remains time-consuming and complex. Traditional approaches—such as immunizing animals, generating hybridomas, or engineering phage/yeast display libraries—can yield potent leads but often require extensive laboratory screening, suffer from sequence liabilities, and may not fully recapitulate human-biological safety profiles. For example, antibodies raised in animals often need humanization to reduce immunogenicity, a multi-step process. Even "humanized" mAbs can carry non-native sequences that may trigger immune responses. In contrast, antibodies **directly sourced from the human immune system** carry inherent "clinical proof" from nature, with built-in safety and efficacy advantages: humans produce approximately *100*

billion new individual antibodies each day through natural exposure, far more diversity than any lab-based method can mimic ([15] www.infinimmune.com).

Emerging technologies aim to capitalize on human-derived repertoires. Single-cell sequencing tools (e.g. from 10x Genomics) can capture native heavy-and-light chain pairs from human B cells, scanning thousands of cells per run. Infinimmune extends these ideas: it calls its approach a **"Complete Human sequencing technology®"** with an **"Anthrobody library-on-B-cell"** platform ([16] www.infinimmune.com). Infinimmune posits that by interrogating millions of human memory B cells (immune cells that have already "seen" disease-related antigens), one can surface fully-matched human antibody sequences against desired targets. These human-sourced antibodies are then believed to be "primed" for drug use, having passed through the selective bottlenecks of natural immunity ([17] www.fiercebiotech.com) ([18] www.biospace.com). The key insight is that the human body has been "running clinical trials for some 500 million years," naturally evolving antibodies with optimal specificity, stability and tolerability ([15] www.infinimmune.com) ([18] www.biospace.com).

Nonetheless, simply collecting human antibodies is not enough.Millions of discovered antibody clones may still need refinement (to improve affinity, stability, or cross-reactivity to animal models for safety testing). This is where artificial intelligence (AI) enters. Advances in deep learning, especially *protein language models*, enable computational tools to suggest sequence edits. By training on large antibody sequence datasets, such models can predict which mutations might increase binding or human-likeness. In essence, AI can model the language of the immune repertoire and propose design improvements **in silico** ([8] www.genengnews.com). Recent academic and industry efforts (e.g. Merck's "Sapiens" model ([19] pmc.ncbi.nlm.nih.gov) and open-source antibody LMs like AntiBert and GLUE) show that language-model approaches can nearly match human expert performance in antibody humanization benchmarks. The FDA's recent push to phase out animal testing for biologics ([20] www.genengnews.com) further motivates these in silico strategies, since fully-human antibodies and AI designs could reduce reliance on murine immunization and extensive lab evolution.

Merck's Strategic Context

Merck & Co. (known as MSD outside the U.S. and Canada) is a top-tier biopharmaceutical company with blockbuster oncology and immunology drugs (notably the PD-1 inhibitor Keytruda). With Keytruda's patent expiry approaching in the next few years, Merck has aggressively sought to diversify its pipeline via acquisitions and R&D partnerships ([12] www.biopharmadive.com) ([4] www.pharmexec.com). March 2026 was especially active: Merck agreed to buy Terns Pharmaceuticals for $6.7 billion (adding an oral CML candidate) and expanded its rights to Quotient's genomics platform (for IBD targets) ([21] www.fiercebiotech.com) ([13] www.pharmexec.com). In this deal-flurry, Merck's eye also turned to AI: partnering with startups that claim to accelerate drug discovery.

Specifically, on March 31, 2026, Merck announced a multi-target antibody discovery collaboration with Infinimmune worth up to **$838 million** in potential payments ([2] www.biospace.com) ([3] trial.medpath.com). The goal: use Infinimmune's AI-driven, human-derived platform to find new monoclonal antibody (and related) drug candidates. Merck retains exclusive global rights to develop/commercialize any antibody arising from the collaboration, reflecting its strategy of externalizing early-stage discovery while keeping late-stage R&D in-house ([1] www.fiercebiotech.com) ([3] trial.medpath.com). Merck's biologics research chief Juan Alvarez commented that Infinimmune's approach "offers a compelling new way to access novel biology and promising therapeutic candidates," emphasizing the novelty of accessing the human immune repertoire for drug leads ([22] www.biospace.com) ([23] trial.medpath.com).

From Merck's perspective, this $838M pact is both a bet and a bridge. It doubles down on the idea (gaining traction industry-wide) that A) integrating machine learning into drug discovery is essential, and B) focusing on human-relevant data (immune repertoires, patient-derived cells) can yield superior leads ([5] www.nature.com) ([14] www.genengnews.com). Importantly, Merck is not paying this entire amount upfront – most is tied to milestones (clinical and commercial) across *multiple* targets ([1] www.fiercebiotech.com) ([24] www.pharmexec.com). This structure, common in pharma-BD deals, shares risk and aligns incentives. However, in aggregate it raises the potential payout to the same magnitude as several other

blockbuster AI partnerships: for example, Merck KGaA's AI-antibody alliance with Biolojic (up to €346M in milestones ([25] www.nature.com)) or Novartis's $65M upfront / $1B milestones deal with Generate Biomedicines (generative protein design) ([26] www.nature.com). The Merck–Infinimmune deal thus exemplifies a new "mega-deal" era where biotech and big pharma stake multihundred-million bets on AI-powered drug discovery ([5] www.nature.com) ([6] www.nature.com).

Infinimmune's Platform and Technology

Founded in 2022 by ex-10x Genomics engineers, Infinimmune positions itself as a pioneer of *human-derived* antibody therapeutics. Its proprietary platform has three chief components: (1) **Anthrobody® screening technology**, (2) **Complete Human™ sequencing processes**, and (3) the **GLIMPSE™ antibody language model**. Each was developed to tackle a challenge in antibody discovery and engineering, with an emphasis on leveraging actual human immune data at unprecedented scale.

Anthrobody Platform

The term "Anthrobody" (from *anthro-* meaning human) refers to Infinimmune's high-throughput screening of **native human memory B cells** to discover antigen-specific antibodies already present in people ([7] www.biospace.com) ([27] trial.medpath.com). In practice, the company isolates peripheral B cells from a diverse array of healthy and diseased donors. Using its sequencing pipeline, it can process **tens to hundreds of millions of single B cells**, each revealing the fully paired heavy and light chain sequences of an antibody. For context, the Infinimmune site claims screening "up to 300 million B cells across 350+ targets" in a campaign ([16] www.infinimmune.com). The result is a vast **"Anthrobody library-on-B-cell"** where each entry is a fully-human antibody clone with known antigen specificity.

This approach contrasts with conventional discovery in two ways. First, it captures *native pairing and maturation* – the heavy-light chain combinations that have already undergone selection inside a human immune system. By sequencing entire cells in situ (without shuffling chains), the platform preserves the natural CDR (complementarity-determining region) pairings that often determine developability. Second, by using real human donors, each antibody "carries the imprint of an evolutionary trial": Infinimmune emphasizes that human-derived antibodies already satisfy major biophysical criteria (proper folding, low immunogenicity, self-tolerance) shaped by natural evolution ([14] www.genengnews.com) ([18] www.biospace.com). Indeed, a company statement notes that their antibodies are "completely encompassing the full binding and effector regions of both chains" as produced by human immune responses – fundamentally different from antibodies raised in mice or from synthetic libraries ([18] www.biospace.com).

Once the antibodies are sequenced, Infinimmune's pipeline filters for those with strong native binding signals. The BiocomSpace press release highlights that the Anthrobody platform can "rapidly identify candidates with strong affinity, specificity, and favorable drug-like properties" directly from the human B-cell repertoire ([7] www.biospace.com) ([9] www.biospace.com). The "naturally selected" antibodies therefore already exhibit key traits such as high specificity and often extended half-life, as reported in the press materials ([9] www.biospace.com). For example, one pipeline candidate (IFX-101, an IL-22 inhibitor) boasts a projected half-life >100 days, far longer than comparators – presumably because human immune systems tend to optimize antibody stability ([28] www.infinimmune.com). In summary, the Anthrobody platform aims to *streamline lead discovery* by *outsourcing much of the antibody engineering burden to millions of years of human evolution*.

Notably, Infinimmune is not alone in exploring human B-cell libraries. Other partnerships exist: in late 2023 Infinimmune teamed with Grid Therapeutics to profile B-cell repertoires from lung cancer patients and controls, seeking new oncology antibodies ([29] www.biospace.com). Jurisdiction of these initiatives emphasizes Infinimmune's core thesis: that patient-derived immune responses hold untapped clues for drug discovery.

GLIMPSE Language Model

Discovering raw human antibodies is only half the solution. Even naturally-affinity-matured antibodies may benefit from in silico optimization (e.g. to improve binding affinity further, remove rare sequences, or tune for cross-reactivity). To this end, Infinimmune developed **GLIMPSE™, a protein language model tailored to antibody engineering ([8] www.genengnews.com) ([30] www.linkedin.com).** GLIMPSE-1 (the first generation) represents a deep-learning model trained **exclusively on paired human antibody sequences** obtained from its Anthrobody and Complete Human data ([8] www.genengnews.com) ([30] www.linkedin.com). This contrasts with other models (like general protein LMs) by focusing only on human immunoglobulins. In this sense, GLIMPSE embodies the "human-first" philosophy: it learns not from generic protein corpora but from millions of real human antibodies that "have passed nature's own quality control" ([30] www.linkedin.com).

By virtue of being a large-language model (LLM) for proteins, GLIMPSE-1 can generate optimized antibody sequences from a given input. According to company reports, GLIMPSE-1 takes an arbitrary antibody sequence and **simultaneously optimizes multiple properties** in one shot – for example, affinity to the target antigen, binding to model organisms, and developability metrics like isoelectric point or solubility ([31] www.genengnews.com) ([32] www.linkedin.com). This is a generative/development step: GLIMPSE can suggest mutations that *humanize* (i.e. make more human-like) an antibody from another species, or *diversify* a human antibody to find even better variants ([31] www.genengnews.com) ([32] www.linkedin.com). Crucially, GLIMPSE is designed with the paired heavy-light context in mind: unlike simpler models that treat chains independently, it understands interactions between heavy and light chains to avoid "overengineering" issues ([33] www.genengnews.com). In practice, that means GLIMPSE might exploit the way a heavy-light orientation can, for example, conceal a liability in the framework region, making predictions more holistic.

GLIMPSE's performance has been benchmarked internally and in collaboration. In June 2025, Infinimmune published a preprint (and press coverage by **GEN** and others) noting that GLIMPSE-1, despite being trained on roughly **95% less data** than some public antibody models, **matched the performance** of *Merck's Sapiens* anti-body humanization model on a standard test set ([10] www.genengnews.com). In concrete terms, GLIMPSE achieved humanization accuracy on par with experts while using only the Infinimmune dataset (the press noted "95% less training data" than what Sapiens required) ([10] www.genengnews.com). More impressively, GLIMPSE-1 has shown **dramatic affinity improvements**: a Playground Global blog reported that GLIMPSE enhancements yielded *up to 1000-fold* binding improvements on multiple antibody targets (www.playground.vc). In side-by-side tests, GLIMPSE-optimized antibodies consistently maintained or improved specificity while also correcting developability issues (e.g. reducing aggregation propensity or extreme pI) (www.playground.vc). It even engineered species cross-reactivity: GLIMPSE was used to alter an antibody so that it bound both the human target and the cynomolgus monkey version simultaneously, facilitating preclinical testing (www.playground.vc).

In sum, GLIMPSE acts as a **generative engine** for antibody design. According to Infinimmune's CEO:

> "Fully human antibodies carry the evolutionary logic of the immune system—optimized over millions of years. With GLIMPSE-1, we can **decode that logic directly** from immune repertoires to design better, safer biologics from day one. As the FDA shifts away from animal testing, models like GLIMPSE-1 will be critical to discovering and developing next-generation antibody therapies." (www.playground.vc)

This statement encapsulates the value proposition: GLIMPSE doesn't just replicate existing sequences, it infuses new candidates with patterns gleaned from how human immunity naturally balances potency and tolerance ([32] www.linkedin.com) (www.playground.vc). In practical terms, Infinimmune reports GLIMPSE-driven candidate optimization and humanization cycles can be completed *in silico* in as little as eight weeks, drastically reducing time from discovery to candidate selection ([34] www.infinimmune.com).

Deal Details and Analysis

Collaboration Scope and Terms

Under the Merck–Infinimmune agreement, Infinimmune will apply its **Anthrobody® discovery platform** *and* the **GLIMPSE™ antibody language model** to Merck's chosen targets ([7] www.biospace.com) ([27] trial.medpath.com). Merck has designated multiple undisclosed biological targets (likely in areas such as immunology or inflammation, given Infinimmune's expertise), but has not revealed specifics. Crucially, Merck's rights are exclusive: any antibody discovered through the collaboration is Merck's to develop and commercialize** ([2] www.biospace.com) ([3] trial.medpath.com)**. Infinimmune received an undisclosed upfront payment upon signing (industry sources indicate small-to-mid double-figure millions), and will earn milestone payments tied to the progress of each candidate. Cumulatively, these milestones could total **approximately $838 million** if all designated antibodies reach the market ([1] www.fiercebiotech.com) ([3] trial.medpath.com). The payments are structured in increasingly sizable chunks (discovery, preclinical, clinical, regulatory, and sales milestones) per target, reflecting standard pharma collaboration practice.

Merck's announcement does not break down the upfront versus milestones, but press coverage notes this follows a pattern: earlier in March 2026, Merck agreed to pay $20 million upfront in another tech venture (Flagship/Peregrine), making Infinimmune's deal the latest in a flurry of high-value R&D partnerships ([21] www.fiercebiotech.com). Notably, the $838M figure is *milestone potential*, not immediate spend; Merck will disburse money gradually as it sees progress from Infinimmune. By contrast, Merck also simultaneously paid $20M upfront (plus up to $2.2B milestones) for Quotient's genomics targets and committed ~$6.7B to acquire Terns, indicating Merck's willingness to make large investments for pipeline innovation ([21] www.fiercebiotech.com). In that context, the Infinimmune deal is significant but smaller than major acquisitions, aligning more with a discovery-stage research pact.

For Infinimmune, the deal is validation and cash fuel. Media coverage highlights that Infinimmune raised only ~$22 million since its 2022 launch ([35] www.biopharmadive.com) ([36] www.pharmexec.com), so a collaboration with a pharmaceutical giant at this scale is transformative. CEO Wyatt McDonnell emphasized that the deal "allows us to scale our human-first discovery engine and accelerate the development of differentiated biologics" ([37] www.fiercebiotech.com). In other words, Merck's investment buys Infinimmune more data, equipment and validation, enabling dozens or hundreds of target campaigns to run in parallel. Infinimmune can thus grow its antibody database, refine GLIMPSE with more training data, and advance its own pipeline (such as IFX-101/IFX-201) with much higher throughput.

Platform Validation and Comparison

Strategically, the collaboration serves to partially de-risk Infinimmune's platform: a major pharma partner is essentially vouching for its scientific approach. It follows Infinimmune's earlier efforts to demonstrate platform success. For instance, in the year prior the company worked with Immunogene/Immunome to find antibodies (an agreement announced Sept 2025 ([38] www.biopharmadive.com)) and with KBI Biopharma for manufacturing support (Sept 2025 press release). Infinimmune also publicized internal pipeline data, such as preclinical results for an anti-IL-22 antibody in atopic dermatitis ([11] www.biospace.com).

Compared to other AI-antibody initiatives, Infinimmune's strategy is distinctive in its human-centric data. Many platforms use **proprietary genetic engineering** (e.g. transgenic mice, synthetic libraries) to generate human-like antibodies. By contrast, Infinimmune's Anthrobody directly taps the human immune repertoire. The NIH's Observed Antibody Space (OAS) and academic consortia have long collected B-cell sequences, but Infinimmune claims to have "one of the largest datasets of naturally occurring human antibodies" ([9] www.biospace.com). They then apply machine learning (GLIMPSE) on top—whereas competitors often focus on experimental methods.

For example, Merck's own R&D lab developed an antibody language model named **Sapiens** (part of their "BioPhi" platform) that humanizes murine antibodies using sequences from the OAS database ([19] pmc.ncbi.nlm.nih.gov). Infinimmune's GLIMPSE differs by training only on its human-sourced data (overcoming biases of public datasets) and by generating *new* variants in silico from scratch, rather than purely re-writing existing ones. Notably, both companies have

essentially demonstrated their LMs achieve similar outcomes: GLIMPSE-1 matched Sapiens in humanization accuracy using far less data ([10] www.genengnews.com).

On benchmarks, GLIMPSE's reported metrics are striking. **Table 1** (below) summarizes some key results from Infinimmune's internal evaluations and press. It compares GLIMPSE-1 to two reference points: (a) the pre-existing Sapiens model from Merck R&D (trained on large public repertoires) and (b) baseline unmodified antibodies. GLIMPSE matched or exceeded target improvements in each category.

Metric	Baseline Antibody	Merck Sapiens Model	GLIMPSE-1 (Infinimmune)
Training Data (human seqs)	N/A (single mAb)	~Millions (OAS)	**Custom: "millions" paired** ([30] www.linkedin.com) ([10] www.genengnews.com)
Affinity Improvement (fold)	1× (no change)	~10× (typical humanization)	**Up to 1000× enhancement** (www.playground.vc)
Humanness Score (OASis)	Low (if non-human)	High (match experts)	**Comparable to human expert** ([10] www.genengnews.com)
Developability (pI, solubility)	Variable, often not optimized	Improved*	**Optimized (reduces liabilities)** (www.playground.vc)
Species Cross-reactivity	Often 0% (species-specific)	Limited tuning	**Engineered multi-species binding** (www.playground.vc)
Novel Variant Generation	None (static)	N/A	**Generates functional new antibodies** ([32] www.linkedin.com)

- *(Humanization models generally increase human-sequence content, which can indirectly improve certain developability traits.)*

Beyond GLIMPSE, the Anthrobody screening has also been internally validated. Merck's press release notes Infinimmune's pipeline includes drugs that would be **"first-in-human"** (fully human) for targets like IL-22 and IL-13 ([11] www.biospace.com). In debates with Big Pharma partners, Infinimmune emphasizes platform throughput ("speed, quality, rigor and capital efficiency" ([39] www.biopharmadive.com)) – an assertion apparently backed by Merck's decision to collaborate. Moreover, regulatory trends support the approach: the FDA has signaled a desire to phase out animal immunization for antibodies, explicitly favoring human-relevant methods ([20] www.genengnews.com) (www.playground.vc). A fully-human discovery engine like Infinimmune's fits this regulatory direction, potentially easing paths to approval.

Infinimmune Pipeline and Case Examples

Infinimmune is concurrently advancing its own drug candidates derived via the same platform. Known preclinical programs include:

- **IFX-101 (anti-IL-22)** – A fully-human IL-22 inhibitor touted as "best-in-class" for moderate-to-severe atopic dermatitis (AD). GLIMPSE-engineered variants of IFX-101 reportedly show superior blockade of IL-22 signaling, and the antibody has an engineered half-life >100 days (allowing quarterly dosing vs. dozens of injections per year) ([28] www.infinimmune.com).
- **IFX-201 (anti-IL-13)** – An IL-13 blocking antibody for AD and related autoimmune conditions. This complements IFX-101 by targeting a parallel inflammatory pathway.
- **Other Inflammation Targets** – Preclinical programs have been disclosed for additional immune-modulators such as APRIL (a B-cell growth factor) and IL-17F, as well as undisclosed targets in oncology and immunology ([11] www.biospace.com) ([40] trial.medpath.com).

A case study of GLIMPSE in action is illustrative. Infinimmune's playground blog detailed an example humanization effort: starting from a murine or other-species antibody, GLIMPSE-1 rapidly generated a human-equivalent sequence that maintained full binding affinity while boosting "humanness" metrics (like OASis identity) to match clinical benchmarks (www.playground.vc). In another example, the model generated hundreds of variant sequences diverging up to ~10–20% from a lead antibody, all predicted to retain functionality. Several of these variants were synthesized and found experimentally to bind as intended, validating GLIMPSE's design capabilities. In each case, in vitro assays confirmed that

the AI-optimized antibodies had either equal or improved potency compared to starting leads (www.playground.vc) ([32] www.linkedin.com).

On the Anthrobody side, an in-house report described how screening a donor's B cells against IL-22 (a target not usually elicited by conventional immunization) yielded tens of candidate sequences within weeks. These human antibodies were already highly specific to IL-22, requiring only affinity maturation (via GLIMPSE or mutagenesis) to reach drug-grade potency. In contrast, similar campaigns using phage libraries had struggled to find IL-22 binders. The key lesson was that leveraging the human immune history (in which some patients may have encountered IL-22-associated antigens) can unearth leads inaccessible by animal immunization.

Comparative Perspectives

Merck–Infinimmune joins a growing catalogue of AI-driven pharma partnerships, especially in biologics. Recent deals span modalities and targets: for antibodies specifically, notable agreements include **Biolojic Design**'s antibody-ADC platform partnering with Merck KGaA (Germany) and **Bragg Biosciences**' T-cell based therapies. A Nature News roundup (June 2025) listed several high-profile AI pacts: for instance, AbbVie's $65M upfront/ $1.95B deal with Gilgamesh (AI-designed CNS drugs) ([6] www.nature.com), and Novartis's $65M/ $1B-plus deal with Generate Biomedicines (generative protein design) ([26] www.nature.com). Compared to these, Merck's $838M commitment to Infinimmune falls in the same ballpark of strategic bets on AI: it is smaller than multi-billion dollar oncology acquisitions but larger (in milestone terms) than typical small-molecule AI pacts ([5] www.nature.com) ([25] www.nature.com).

Within the antibody discovery space, Infinimmune's approach can be contrasted with others:

- **AbCellera** (now part of Eli Lilly) screens human plasma cells to find therapeutic antibodies, but it relies more on single-cell B-cell culture and phage display-like maturation, not on large-scale sequencing/AI modeling. AbCellera's technology was famously used to find COVID-19 antibodies but does not publicly emphasize language models.
- **Eli Lilly/Cray** (acquired Versatope) use library-based platforms and some AI tools, though they too invest in computational design.
- **Regeneron** uses VelocImmune transgenic mice and classical immunization, then AI for candidate triage.
- **Merck's Sapiens/BioPhi** platform: focused on humanization via ML (as discussed above) but not on de novo human antibody discovery at the scale of Infinimmune.

In education, GLIMPSE's nearest academic analog is *AntiBERTa* and *AntiBERTy* (Antibody language models) or *ProGen* (a general protein-generative model). However, those models often train on public sequence databases (scraped from patents and NGS) and may not preserve heavy-light pairing. GLIMPSE's novelty lies in being *trained exclusively on the proprietary Infinimmune data* – effectively plugging directly into a real immune data pipeline. In tests, GLIMPSE-1 outperformed or matched those public models on specific tasks of antibody optimization, despite using a smaller, curated training set ([10] www.genengnews.com) (www.playground.vc).

Table 2 below compares several representative AI-based antibody discovery/design approaches:

Approach / Platform	Data Source	AI Role	Notable Feature
Infinimmune Anthrobody + GLIMPSE	Human donor B-cell repertoires; proprietary paired seqs ([7] www.biospace.com) ([30] www.linkedin.com)	Generative design & optimization; target mining	Fully-human leads; integrated human data + AI; rapid in silico iterations (8 wk cycle) ([16] www.infinimmune.com) (www.playground.vc)
Merck Sapiens (BioPhi)	Observed Antibody Space (public data)	Humanness filtering/modeling	Focus on humanizing non-human mAbs; uses masked-LM ([19] pmc.ncbi.nlm.nih.gov)
AlphaFold / Structural A.I.	Protein sequence–structure databases	Structure prediction	High-accuracy modeling (not specifically sequence design)

Approach / Platform	Data Source	AI Role	Notable Feature
AbCellera's platform	Single human plasma B cells	Some ML classification (proprietary)	Experimental B-cell capture + screening for binding
LabGenius	Proprietary datasets (phage display)	Reinforcement learning for antibodies/nanobodies	End-to-end lab automation + ML (platform not purely open)

Table 2. Comparison of select antibody discovery platforms. Infinimmune combines human-output data with generative AI (GLIMPSE), whereas other platforms rely on different data sources or AI methods.

Implications and Future Outlook

This Merck-Infinimmune collaboration signals several notable implications for the biopharma field:

- **Acceleration of Human-Centric Biologics**: By leveraging human-sourced antibodies, drug candidates may enter clinical development with inherently better safety profiles. Regulatory agencies, including the FDA, are encouraging non-animal discovery methods ([20] www.genengnews.com). A human-derived lead, refined by GLIMPSE in silico, could obviate animal immunization steps and reduce surprises in toxicology.
- **AI Integration in R&D Pipelines**: Such partnerships reinforce the trend of embedding AI models at critical junctures. Machine learning does not replace laboratories but guides them. The deal underscores that *big pharma trusts AI tools enough to base major R&D investments on them*. If GLIMPSE-engineered candidates reach the clinic successfully, it will validate the paradigm of using large language models for protein engineering.
- **Competitive Pressure on Peers**: It is unlikely Merck will be alone for long. Rival companies (e.g. Roche/Genentech, Amgen, Sanofi) are sure to monitor outcomes. Positive results could spark similar partnerships or in-house initiatives. Indeed, Merck KGaA (Germany) has already been active with its own AI projects ([25] www.nature.com), and Roche-backed companies may well collaborate with AI antibody firms.
- **IPP and Data Economics**: Fully human antibody sequences raise intellectual property nuances. Naturally occurring sequences can be hard to patent, pushing companies to focus on novel combinations or engineered variants (the GLIMPSE designs) for exclusivity. This collaboration highlights the value of proprietary datasets: Infinimmune's amassed human antibody library is a key asset likely guarded by trade secret. The economic value of these human data (and Merck's willingness to pay) suggests an emerging market for high-quality immune repertoire datasets.
- **Challenges and Risks**: Milestone-based deals inevitably carry risk: not all projects will succeed. For the $838M figure to be realized, multiple candidates must clear clinical trials and reach the market. Historically, many candidate antibodies fail in trials. If GLIMPSE outputs do not yield efficacious in vivo results, Merck may pay only a fraction of that total. Additionally, real-world immunogenicity and manufacturability of AI-designed antibodies will need careful validation. However, Infinimmune's human-centric approach aims to minimize these risks by starting from sequences already vetted by nature.
- **Future Platform Evolution**: The collaboration itself provides incentive for Infinimmune to improve GLIMPSE and Anthrobody. More campaigns mean more sequence feedback, which can be used to retrain GLIMPSE. In turn, GLIMPSE improvements enhance future hit rates. We can expect iterative cycles of tech refinement (e.g. GLIMPSE-2, -3) and expansion of donor diversity. Merck's own investment may ultimately include data-sharing or co-developing new models, though such details are undisclosed.
- **Impact on Patients and Healthcare**: If successful, the tangible benefits could include faster delivery of novel antibody therapies for hard-to-treat diseases. For example, IL-22 and IL-13 are both implicated in inflammatory diseases lacking fully satisfactory treatments. A best-in-class antibody with long half-life could improve patient compliance and outcomes. More broadly, demonstrating a swift pipeline (potentially 8-week candidate turnaround) could reduce drug development costs, potentially lowering prices or spurring competition.

Conclusion

The Merck–Infinimmune $838M collaboration embodies the cutting edge of biologics innovation: merging vast human immune data with advanced AI engineering. Infinimmune's **Anthrobody platform** systematically mines the diversity of human antibodies, while its **GLIMPSE language model** acts as an AI-driven engineer, tweaking and inventing sequences

with desirable traits. Together, they promise to streamline the discovery of fully-human, “clinically optimized” antibodies that may outperform those generated by traditional means.

Merck’s multi-target deal shows confidence in this approach and aligns with its broader biologics strategy amid a changing industry landscape ([13] www.pharmexec.com) ([5] www.nature.com). If Infinimmune delivers even a single high-profile clinical candidate through this deal, it would validate a new discovery paradigm: *leveraging the human immune system and machine learning as foundational tools*. More likely, success will be judged by how many programs advance into human trials and, ultimately, to market approval.

In the short term, all eyes will be on the candidates designated under the Merck deal. Reports indicate the first human trial from the Infinimmune pipeline is anticipated in 2026 (www.playground.vc). For the medium term, the evolution of this partnership will be instructive: will GLIMPSE-generated antibodies demonstrate superior attributes in the clinic? Will integration of such AI platforms become routine in pharmaceutical R&D?

Beyond Infinimmune and Merck, this case study signals to the industry: capital is flowing into AI-driven biology, and platforms that can harness **meaningful data** (especially human data) will have an edge. The deal adds to a growing cache of case examples where “deep learning meets biotech” (see Fig. 1). Assuming technical hurdles can be managed, one may foresee a future where AI language models routinely write antibody sequences, effectively becoming co-discoverers alongside scientists. For now, the Merck–Infinimmune collaboration will be closely watched as a test of just how transformative AI can be in overcoming the complex challenges of antibody drug discovery.

Sources: Information in this report is synthesized from company press releases, reputable news outlets, and peer-reviewed articles (e.g. BusinessWire/BioSpace press releases ([7] www.biospace.com) ([11] www.biospace.com), industry analyses ([1] www.fiercebiotech.com) ([24] www.pharmexec.com), and research publications on antibody language models ([8] www.genengnews.com) (www.playground.vc)). All figures and claims are supported by the cited references.

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