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# AI Enablement in Biotech: 2027 Benchmark Report

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# Executive Summary

Artificial intelligence (AI) enablement in biotech has moved from scattered pilots to a structural feature of research and development (R&D) strategy as of July 2026, though the industry remains far from mature deployment at scale. In ZS's 2026 CDIO Research, a Harris Poll survey of 115 U.S.-based technology executives at pharmaceutical and biotechnology companies conducted in July 2025, only 40% of artificial intelligence pilots reach scaled deployment, and just 17% of respondents say they can already prove measurable value from AI in discovery (www.zs.com). Deloitte's fourth annual Life Sciences Outlook Survey, fielded August to September 2025 among 280 C-suite biopharma and medtech executives, found that only 22% of life sciences leaders say they have successfully scaled AI, and just 9% report achieving significant returns from those efforts (www.deloitte.com). At the same time, investment is accelerating: KPMG's Q1 2026 U.S. AI Pulse Survey of 237 cross-industry C-suite and business leaders at organizations with annual revenue of $1 billion or more (not a life-sciences-specific sample) found average projected 12-month AI spending of $207 million, up from roughly $114 million in Q1 2025, nearly doubling in a single year (kpmg.com).

Adoption is uneven and use-case specific. Benchling's 2026 Biotech AI Report, based on a November 2025 survey of roughly 100 biotechnology and pharmaceutical organizations actively using AI in R&D, found that the "killer apps" concentrated in tasks with clean, verifiable data: literature review and knowledge extraction (76% adoption), protein structure and property prediction (71%), scientific reporting (66%), and target identification (58%) (www.benchling.com). Adoption fell sharply in areas requiring messier, harder-to-validate data:

generative molecular design (42%), biomarker analysis (40%), and absorption, distribution, metabolism, and excretion (ADME) prediction (29%) (www.benchling.com). Half of adopters report faster time-to-target today, and 56% expect meaningful cost reductions within two years (www.benchling.com).

The market underpinning this activity is large and growing quickly, though estimates vary by methodology. Grand View Research valued the global AI in drug discovery market at $2.3 billion in 2025, projecting growth to $13.8 billion by 2033 at a 24.8% compound annual growth rate (CAGR) over 2026 to 2033 (from $2.9 billion in 2026) (www.grandviewresearch.com). Fortune Business Insights put 2025 market size higher, at $4.46 billion, rising to $5.00 billion in 2026 (www.fortunebusinessinsights.com), while Alora Advisory estimated $5.5 billion in 2025 rising to $28 billion by 2032 (aloraadvisory.com). Regulators are moving in parallel: the U.S. Food and Drug Administration (FDA) issued draft guidance on AI in regulatory submissions in January 2025 (www.foley.com), and in January 2026 the FDA and the European Medicines Agency (EMA) jointly published ten guiding principles for good AI practice across the medicine lifecycle (www.ema.europa.eu).

Real-world clinical validation remains limited but is accumulating. Insilico Medicine's rentosertib, an AI-designed TNIK inhibitor for idiopathic pulmonary fibrosis, entered Phase III trials in July 2026 after Phase IIa results were published in Nature Medicine (insilico.com). Isomorphic Labs, Alphabet's AI-first drug design subsidiary, raised $2.1 billion in Series B funding in May 2026 to scale its AI drug design engine and advance its pipeline toward the clinic (www.prnewswire.com). As of July 2026, however, no fully AI-discovered drug has completed all clinical phases and received FDA approval, a sober counterweight to enthusiasm about the technology's transformative potential. This report examines the current state of AI enablement across biotech R&D, commercial, and regulatory functions; quantifies adoption, investment, and outcome data from more than a dozen primary surveys and market analyses; profiles five real-world deployments; and outlines the operational, data, and talent prerequisites organizations need to move from pilot to scaled value.

# Introduction and Background

"AI enablement in biotech" refers to the deliberate organizational work of embedding artificial intelligence, including machine learning (ML), generative AI, and increasingly agentic AI (AI systems that can act autonomously to achieve goals, make decisions, and perform tasks), into the operating model of a biotechnology or biopharmaceutical company. It spans far more than deploying a single tool: it covers data infrastructure, governance, talent, workflow redesign, and regulatory strategy across discovery, development, manufacturing, and commercial functions. The topic has become urgent for a straightforward reason: traditional drug discovery and development remains an arduous, resource-intensive process, historically taking approximately 10 to 15 years from initial discovery to regulatory approval and costing in excess of $1 to $2 billion per approved therapeutic, with fewer than 1 in 10 candidates entering Phase I trials ultimately reaching the market, according to a 2025 systematic review published in the peer-reviewed journal Pharmaceuticals (pmc.ncbi.nlm.nih.gov).

The industry's posture toward AI has shifted markedly over the past three years. ZS, a life sciences consultancy that has tracked pharma and biotech AI maturity annually since 2023, describes 2026 as an inflection point: "Leaders are no longer asking, 'Where can AI work?' They're asking, 'Where will AI drive the growth that matters, to our business and to the people we serve?'" (www.zs.com).The same survey found that 90% of pharma and biotech technology executives see competitive and regulatory pressures as active threats

to business growth (www.zs.com), which helps explain why AI investment keeps rising even as measurable returns lag. Capgemini's global biopharma research found that 82% of executives believe AI will fundamentally transform R&D, and 60% believe companies that fail to scale AI will fall behind in innovation and market relevance (www.capgemini.com).

This report is written from an adjacent-advisor vantage point: intuitionlabs.ai describes itself as a life-sciences and AI consultancy and a Veeva X-Pages Partner that helps pharmaceutical and biotech organizations implement AI-enabled commercial and R&D tooling on top of platforms such as Veeva. It is not a drug discovery software vendor and does not position itself as competing with the platforms and AI-native biotechs profiled below; its perspective here is that of a systems integrator observing how enablement plays out in practice, including the data, governance, and change-management prerequisites that determine whether a pilot survives contact with a regulated commercial or R&D environment. The sections that follow examine adoption across R&D use cases, the strategic and commercial dimensions of enablement, the regulatory landscape, the quantitative data underpinning market and adoption figures, five real-world case studies, and the implications for organizations still early in their AI journey.

# The Current State of AI Adoption Across Biotech R&D

Adoption of AI within biotech research and development is best understood as a set of concentric rings, with mature adoption at the center for tasks involving clean, structured, easily verified data, and declining adoption moving outward toward tasks involving messy, incomplete, or hard-to-validate data. Benchling's survey of roughly 100 organizations actively using AI in R&D, fielded in November 2025 across biopharma (59%) and biotech (41%) organizations in North America (70%) and Europe (30%), found that AI has become scientists' default interface for interrogating data: 89% of respondents said they use copilots or reasoning tools as their first stop when investigating and synthesizing information (www.benchling.com). Within the same survey, 92% of respondents said they use AI for non-scientific use cases such as document authoring, software engineering, and literature search, compared with 81% who use AI for scientific use cases such as biomarker discovery, molecule design, and experiment optimization (www.benchling.com).

Within discovery and design specifically, adoption tracks data quality closely. Protein structure and property prediction reached 71% adoption, lead optimization and selection reached 47%, hit identification reached 37%, and synthetic biology and pathway design reached 42% (www.benchling.com). By contrast, de novo generative drug design, arguably the highest-profile AI use case in the popular press, has only reached 42% adoption, and ADME prediction only 29%, reflecting the difficulty of validating generative outputs against sparse or proprietary wet-lab data (www.benchling.com). ZS's survey of pharma and biotech CIOs corroborates this pattern from the budget side: only 17% of respondents say they can prove measurable value today from AI investment in discovery, though 42% expect to demonstrate value within the next year, while clinical functions show roughly 30% demonstrating value today and 45% expecting progress within a year (www.zs.com).

Data infrastructure is the single most frequently cited constraint on further progress. Benchling found that among biotechs with low AI adoption, only 6% describe their data environment as "fully integrated," compared with organizations achieving deeper integration among high-adopters; 45% of low-adoption biotechs describe their data as merely "developing," with key datasets connected but inconsistent standards and gaps remaining (www.benchling.com). ZS's CIO survey similarly found that 68% of pharma and biotech leaders identify neglecting data quality and governance early as the primary reason AI initiatives fail (www.zs.com). In response, CIOs report increasing investment in cloud and infrastructure (88%), data products and platforms (86%), and dedicated AI platforms (84%) over the next 12 months (www.zs.com).

Talent sourcing is shifting inward rather than toward external hires. Benchling found that the top source of AI talent for biotechs is internal upskilling of existing scientific staff (67%), well ahead of hiring from AI-focused biotechnology firms (39%), biopharma companies (32%), or technology companies (21%) (www.benchling.com). This matches a broader labor market signal: ManpowerGroup's 2026 Talent Shortage Survey, based on interviews with 39,063 employers across 41 countries fielded in October 2025, found that AI skills have for the first time surpassed all other categories, including traditional engineering and information technology (IT) skills, as the hardest for employers to fill, with 72% of employers overall reporting hiring difficulty (www.manpowergroup.com).

# Strategic and Commercial Dimensions of AI Enablement

Beyond the laboratory bench, AI enablement is reshaping how biotech and biopharma organizations allocate capital, structure operating models, and engage with regulators and commercial partners. ZS found that pharma and biotech CIOs' top growth priorities for AI investment are accelerated discovery (52%), patient engagement (43%), portfolio diversification (36%), new revenue streams (33%), and ecosystem partnerships (31%) (www.zs.com). Nearly seven in 10 (67%) of surveyed CIOs warn that launching an AI initiative without clearly defined goals and success metrics is a common mistake (www.zs.com).

Investment levels have increased sharply. KPMG's Q1 2026 U.S. AI Pulse Survey, a cross-industry survey of 237 U.S.-based C-suite and business leaders at organizations with annual revenue of $1 billion or more (not a life-sciences-specific sample, and repackaged in a KPMG life sciences brochure), found projected average AI spending of $207 million over the next 12 months, with the brochure describing the shift as "a massive acceleration in investment, rapid deployment of AI agents, and a fundamental shift toward a collaborative human AI workforce" (kpmg.com). Two-thirds (67%) of leaders confirmed that AI remains a top, recession-proof investment priority (kpmg.com). The same cross-industry survey found that 54% of organizations were actively deploying AI agents (kpmg.com), with 87% of leaders upskilling staff and 63% requiring human validation of AI agent outputs (figures from the same cross-industry sample), reflecting a human-in-the-loop governance posture rather than full automation (kpmg.com).

Deloitte's 2026 Life Sciences Outlook found that nearly half of surveyed executives (48%) identified accelerated digital transformation as a trend likely to have a substantial impact on their organizations in 2026, a statistically significant increase over 2025, while 41% cited the proliferation of generative AI specifically as an influential trend (www.deloitte.com). Notably, 30% of respondents cited agentic AI as an influential trend, a

category introduced for the first time in the 2026 survey, signaling growing but still nascent interest in autonomous AI systems (www.deloitte.com). ZS similarly found agentic automation moving from concept to practice fastest in information technology (IT) operations (45% of respondents planning agentic workflows) and R&D discovery (41%), while customer- and patient-facing functions remain more cautious, favoring human-in-the-loop task automation (www.zs.com).

Operating models are changing as a consequence. ZS found that 55% of CIOs already have the authority to reshape their enterprise operating model, and 86% are testing or making changes to roles and teams to redeploy resources more effectively (www.zs.com). Some companies have gone further still: Moderna merged its technology and human resources (HR) departments into a single function to support its AI transformation (www.zs.com). This organizational restructuring reflects a broader theme: Takeda's chief data and technology officer, Gabriele Ricci, told Deloitte that "we're all entering a period of purposeful transformation, where discipline and innovation must coexist as the industry matures beyond hype toward measurable productivity from AI and data" (www.deloitte.com).

Advisory firms supporting these transitions, including consultancies working within the Veeva ecosystem such as intuitionlabs.ai, typically frame their engagement around three prerequisites before a biotech or pharma client can responsibly deploy AI in a regulated commercial or R&D workflow: **regulatory compliance** built in by design rather than retrofitted, **enterprise integration** with existing validated systems rather than parallel shadow tools, and **data security** commensurate with the sensitivity of clinical and commercial data. This framing echoes the survey data above: the gap between pilot and scaled deployment is rarely a model-quality problem and is far more often a data, governance, and change-management problem.

# Generative AI, Drug Discovery, and the AI-Native Biotech Model

A distinct category within AI enablement is the rise of "AI-native" biotechs, companies built from inception around a proprietary AI drug design platform rather than adopting AI as a supplementary tool within a conventional R&D organization. **Insilico Medicine**, a clinical-stage biotechnology company traded on the Hong Kong Stock Exchange (HKEX: 3696), exemplifies this model through its Pharma.AI platform, which combines the PandaOmics biology engine with the Chemistry42 generative chemistry platform (www.drugtargetreview.com). Since 2019, Insilico has nominated 22 preclinical candidates from its own chemistry and biology platform, with 10 programs reaching clinical stage and one, rentosertib, successfully completing Phase IIa (www.prnewswire.com). A 2025 systematic review in Pharmaceuticals cites an earlier Insilico milestone: identifying a novel target for idiopathic pulmonary fibrosis and advancing a candidate into preclinical trials within 18 months, versus a typical 4 to 6 years, at a disclosed cost of $150,000 excluding wet-lab validation (pmc.ncbi.nlm.nih.gov). The same review notes that Exscientia's DSP-1181, developed with Sumitomo Dainippon Pharma in under 12 months, was the first AI-designed molecule to enter human clinical trials (pmc.ncbi.nlm.nih.gov).

Generative AI's role in drug discovery specifically is now well established at the proof-of-concept level but not yet at the level of regulatory approval. Capgemini's global biopharma research found that 74% of executives believe generative AI holds significant potential in drug discovery specifically, and 63% anticipate that most

new molecular entities (NMEs) will originate from AI-driven platforms within the next decade (www.capgemini.com). Grand View Research's market analysis found that the drug optimization and repurposing application segment led the AI in drug discovery market with 52.4% revenue share in 2025, driven by generative AI models hypothesizing novel drug-target interactions and natural language processing (NLP) systems extracting insights from biomedical literature (www.grandviewresearch.com). Oncology led by therapeutic area with 24.3% revenue share, reflecting the concentration of AI applications on cancer targets and biomarkers derived from genomic and transcriptomic tumor data (www.grandviewresearch.com).

Consolidation is also reshaping the AI-native biotech landscape. Recursion Pharmaceuticals and Exscientia completed a business combination in November 2024, with Exscientia becoming a wholly owned subsidiary, creating what the companies described as "a vertically-integrated and technology-enabled drug discovery platform" (ir.recursion.com). The combined entity reported more than 10 clinical and preclinical programs, more than 10 partnered programs, and roughly $450 million in upfront and realized milestone payments to date, with potential for more than $20 billion in additional milestones (ir.recursion.com). Despite this consolidation and the scale of capital involved, biopharma venture capital (VC) overall has recovered only modestly: PitchBook and the National Venture Capital Association reported that biopharma VC deal value reached $33.8 billion in 2025, a modest increase from the prior year, even as investors remain selective and favor later-stage programs (www.biospace.com).

# Regulatory and Governance Frameworks for AI in Biotech

Regulatory clarity has historically lagged the pace of AI deployment in biotech, but 2025 and 2026 marked a turning point. The FDA published its first draft guidance specifically addressing AI, titled "Considerations for the Use of Artificial Intelligence To Support Regulatory Decision-Making for Drug and Biological Products," on January 6, 2025 (www.foley.com). The guidance establishes a **risk-based credibility assessment framework** that sponsors can use to establish and evaluate the credibility of an AI model for a particular context of use (COU) (www.fda.gov). The framework is deliberately not tool-specific: it addresses the use of AI to produce information or data supporting the safety, effectiveness, or quality of drugs, regardless of the underlying model architecture (www.fda.gov).

Building on this foundation, the FDA and EMA jointly published, in January 2026, ten guiding principles of good AI practice covering the full medicine lifecycle, "from early research and clinical trials to manufacturing and safety monitoring" (www.ema.europa.eu). European Commissioner for Health and Animal Welfare Olivér Várhelyi called the initiative "a first step of a renewed EU-US cooperation in the field of novel medical technologies," aimed at preserving transatlantic leadership in innovation "while ensuring the highest level of patient safety" (www.ema.europa.eu). The FDA's own summary of the principles document states that "these 10 guiding principles are intended to lay the foundation for developing good practice that addresses the unique nature of these technologies" and to "cultivate future growth in this rapidly progressing field" (www.fda.gov).

For biotech organizations, the practical effect of this regulatory activity is that AI used to produce information or data intended to support regulatory decision-making on the safety, effectiveness, or quality of a drug falls within the scope of FDA's January 2025 draft guidance, which proposes a risk-based credibility assessment

framework; that guidance is non-binding and marked "not for implementation" until finalized. This raises the bar for AI governance considerably relative to non-regulated commercial use cases such as sales force analytics or medical information chatbots. Deloitte's outlook survey found that in the United States specifically, 36% of surveyed executives cited agency restructuring within the FDA and the Department of Health and Human Services (HHS) as a factor shaping 2026 strategy, alongside 39% citing broader economic policy changes including tariffs (www.deloitte.com). Outside the United States, 51% of non-U.S. respondents pointed to national regulatory changes, including the European Union's (EU) AI Act, as shaping organizational strategy in 2026 (www.deloitte.com).

# Emerging Trends and the Biotech AI Strategy Roadmap

Looking beyond current adoption levels, several emerging trends are shaping how biotech and broader healthcare and life sciences organizations are building their AI strategy for 2027 and beyond. NVIDIA's 2026 survey of hundreds of healthcare and life sciences professionals found that the sector has passed a maturity inflection point in the past year, with organizations now "seeing a return on investment from their top AI projects" and increasingly building on open-source foundation models fine-tuned against proprietary data rather than starting from scratch (www.nvidia.com). The report frames agentic AI as making "a promising debut" in the sector, a finding consistent with Deloitte's and ZS's data on the early but accelerating adoption of autonomous AI agents in life sciences workflows described above (www.nvidia.com).

A parallel research effort from Modus Create and Ascend2, surveying 119 product leaders across hospitals, pharma, biotech, and medical device companies operating under Health Insurance Portability and Accountability Act (HIPAA), FDA, and Good Practice (GxP) requirements, offers a more granular strategic picture. The survey found that 98% of healthcare and life sciences organizations are modernizing legacy infrastructure to support AI workloads at scale, with 53% already pursuing active cloud migration (www.moduscreate.com). Governance friction remains the dominant brake on deployment speed: 79% of surveyed organizations reported slowing an AI deployment in the past year because regulatory or ethical considerations were not resolved upfront, even though 51% already maintain a centralized data governance policy and continuous monitoring dashboards (www.moduscreate.com). The report's authors describe the underlying issue as one of ownership rather than standards: "the problem isn't a lack of standards. It's that governance is fragmented across compliance, risk, and engineering teams with no single owner" (www.moduscreate.com).

Contrary to the popular narrative that generative AI headlines are where the real value lies, the Modus Create research found that operational, lower-risk use cases deliver the most measurable return within regulated environments: customer and market research (52% adoption), security and performance monitoring (50%), and quality assurance (45%) led adoption, while experimental prototyping sat at just 22% (www.moduscreate.com). Sixty-three percent of surveyed organizations reported achieving measurable ROI within six months of deployment for these operational use cases, a notably faster payback window than the multi-year time horizons associated with generative drug discovery platforms (www.moduscreate.com). This

finding has direct strategic implications: organizations building a biotech AI strategy for 2027 should sequence quick, operational wins (commercial analytics, quality assurance, security monitoring) alongside, not instead of, longer-horizon R&D bets, since the former can fund and build organizational confidence for the latter.

On talent strategy specifically, the same survey found that top-performing organizations are reskilling existing developers and scientists (55%) at roughly twice the rate they are reducing headcount (27%), reinforcing the internal-upskilling pattern Benchling identified among biotech R&D organizations (www.moduscreate.com). Yet the same organizations remain heavily reliant on external expertise: 96% consider external partners essential to AI implementation, with the highest demand concentrated in security and compliance specialization (32%), AI and machine learning model development (27%), and data infrastructure (27%) (www.moduscreate.com). As one contributor to the report put it, "expertise is what makes AI valuable. Without professionals who understand how to build, govern, and apply AI effectively, outcomes quickly become unreliable, insecure, and full of unintended consequences" (www.moduscreate.com). This dual pattern, internal upskilling paired with continued reliance on specialized external partners for compliance, model development, and infrastructure, describes the operating model that most biotech and pharma organizations are converging on for 2026 and 2027, and is consistent with the advisory posture that consultancies serving the sector, including those built around Veeva implementation work, typically take: augmenting internal teams on infrastructure and governance rather than displacing them.

*Table 2* below consolidates the operational adoption and governance statistics from the Modus Create and Ascend2 survey of 119 healthcare and life sciences product leaders, illustrating where practical AI value is concentrating today relative to the more speculative, headline-grabbing generative discovery use cases discussed earlier in this report.

| Use case or governance metric | Reported figure | Interpretation |
|---|---|---|
| **Customer and market research adoption** | 52% (cited above) | Highest-adoption use case; low regulatory risk, fast ROI |
| **Security and performance monitoring adoption** | 50% (cited above) | Infrastructure-layer use case, compliance-adjacent |
| **Quality assurance and testing adoption** | 45% (cited above) | Directly supports GxP validation workflows |
| **Experimental prototyping adoption** | 22% (cited above) | Lowest priority; regulated firms avoid unproven bets |
| **Achieve ROI within six months** | 63% (cited above) | Operational use cases pay back faster than R&D bets |
| **Slowed a deployment due to governance/ethics gaps** | 79% (cited above) | Governance ownership, not standards, is the bottleneck |
| **Modernizing legacy infrastructure for AI** | 98% (cited above) | Near-universal recognition of infrastructure debt |
| **Consider external partners essential** | 96% (cited above) | Reinforces build-versus-buy-versus-partner strategy |

The pattern in *Table 2* reinforces a theme that recurs throughout this report: in a regulated industry, the AI use cases that scale fastest are rarely the most publicized ones. Generative de novo drug design captures far more press attention than security monitoring or quality assurance automation, yet the latter categories are where organizations report the fastest, most measurable returns. A coherent biotech AI strategy for 2027 therefore needs to hold two timeframes simultaneously: near-term operational deployments that can demonstrate ROI within two quarters, and multi-year R&D and discovery bets, exemplified by Insilico Medicine and Isomorphic Labs, that may take a decade or more to reach a regulatory decision.

# Data Analysis and Evidence

*Table 1* below summarizes the principal quantitative surveys underpinning current estimates of AI adoption and value realization in biotech and pharma, drawn from publicly reported surveys by research firms, consultancies, and technology vendors (including the vendor-sponsored Benchling and NVIDIA surveys), with varying levels of disclosure on sample size and methodology.

| Survey/report | Sponsor | Sample and methodology | Key adoption or value finding |
|---|---|---|---|
| **2026 ZS CDIO Research** | ZS, fieldwork by The Harris Poll | 115 U.S.-based technology executives at pharma/biotech firms, surveyed July 2025 (www.zs.com) | Only 17% prove measurable AI value in discovery today; 40% of pilots reach scaled deployment (www.zs.com) |
| **2026 Life Sciences Outlook** | Deloitte US Center for Health Solutions | 280 C-suite biopharma/medtech executives, U.S./Europe/Asia, August to September 2025 (www.deloitte.com) | Only 22% have successfully scaled AI; 9% report significant ROI (www.deloitte.com) |
| **2026 Biotech AI Report** | Benchling (vendor-sponsored) | ~100 biotech/biopharma organizations actively using AI in R&D, November 2025 (www.benchling.com) | Literature review 76% adoption; generative design only 42% (www.benchling.com) |
| **AI Quarterly Pulse Survey** | KPMG US | 237 U.S. C-suite and business leaders at $1B+ organizations across industries, Q1 2026 (repackaged in a KPMG life sciences brochure) (kpmg.com) | Projected AI spend nearly doubled, $114M to $207M (kpmg.com) |
| **Smart bet, only option, or both?** | Capgemini Research Institute | Global biopharma executives (www.capgemini.com) | 82% believe AI will transform R&D; 79% building AI R&D strategies (www.capgemini.com) |
| **State of AI in Healthcare and Life Sciences 2026** | NVIDIA (vendor-sponsored) | Hundreds of healthcare/life sciences professionals globally (www.nvidia.com) | Sector climbing the AI adoption curve; open source central to model building (www.nvidia.com) |
| **2026 Talent Shortage Survey** | ManpowerGroup | 39,063 employers, 41 countries, October 2025 (www.manpowergroup.com) | AI skills now the single hardest skill category to fill globally (www.manpowergroup.com) |

*Table 1* illustrates a consistent pattern across these publicly reported surveys: enthusiasm and investment are running well ahead of demonstrated, scaled value, and the gap is widest in the most scientifically complex, least data-mature workflows. This is corroborated by market-size analyses, which, while methodologically

inconsistent with one another, agree directionally on rapid growth. Grand View Research estimated the global AI in drug discovery market at $2.3 billion in 2025, forecasting growth to $2.9 billion in 2026 and $13.8 billion by 2033 at a 24.8% CAGR, with North America holding 52.8% revenue share in 2025 (www.grandviewresearch.com). MarketsandMarkets, using a narrower process-based segmentation, projected the market to reach $6.89 billion by 2029 from $1.86 billion in 2024, a 29.9% CAGR (www.marketsandmarkets.com). Roots Analysis put 2025 market value at $6.0 billion, rising to $8.6 billion in 2026 and $25.0 billion by 2035 (www.rootsanalysis.com). The wide range of published estimates, from roughly $2.3 billion to $6.0 billion for 2025 alone, reflects differing scope definitions (software-only versus full value chain, including services and infrastructure) rather than a genuine market-size dispute, and readers should treat any single figure as directional rather than precise.

On a peer-reviewed research basis, the Pharmaceuticals systematic review, which screened 19,465 initial records down to 173 eligible studies published between 2015 and 2025, found that machine learning was the dominant AI method (40.9% of studies), followed by molecular modeling and simulation (20.7%) and deep learning (10.3%) (pmc.ncbi.nlm.nih.gov). Oncology accounted for 72.8% of studies, far ahead of dermatology (5.8%) and neurology (5.2%) (pmc.ncbi.nlm.nih.gov). Notably, 97% of the reviewed studies reported industry partnerships, underscoring how tightly academic AI drug-discovery research is coupled to commercial development programs, while clinical outcome reporting appeared in only 45% of studies, a reminder that much of the published evidence base remains preclinical rather than clinical (pmc.ncbi.nlm.nih.gov).

# Case Studies and Real-World Examples

## Insilico Medicine: Rentosertib Reaches Phase III

Insilico Medicine's rentosertib (formerly ISM001-055/INS018_055) is among the most clinically advanced AI-discovered small molecules as of mid-2026 (other computationally designed candidates, such as Takeda's zasocitinib, are also in late-stage development, and whether they count as "AI-discovered" is debated). The company initiated a Phase III trial in July 2026 for the oral TNIK inhibitor, targeting idiopathic pulmonary fibrosis (IPF), following the discovery-to-clinic journey published in Nature Biotechnology and positive Phase IIa clinical results published in Nature Medicine (insilico.com). The peer-reviewed Phase IIa trial, published in Nature Medicine and described in the underlying PubMed abstract, was a randomized, double-blind, placebo-controlled study across four arms of 17 to 18 patients each (pubmed.ncbi.nlm.nih.gov). Patients on the 60 mg once-daily dose showed a mean improvement in forced vital capacity (FVC) of +98.4 mL at 12 weeks, compared with a mean decline of -20.3 mL in the placebo arm (www.prnewswire.com. The Phase III trial plans to enroll 320 patients in a prospective, randomized, double-blind, placebo-controlled design (www.drugtargetreview.com. This case illustrates both the promise and the limits of AI-native drug discovery: rentosertib is among the furthest-progressed AI-discovered, AI-designed small molecules in the clinical pipeline, yet as of July 2026 it has not yet secured regulatory approval, underscoring that AI can compress discovery timelines without eliminating the multi-year clinical validation process required for safety and efficacy.

## Isomorphic Labs: A $2.1 Billion Bet on AI-First Drug Design

Isomorphic Labs, the Alphabet subsidiary spun out of Google DeepMind and built on AlphaFold protein-structure prediction technology, raised $2.1 billion in Series B funding in May 2026, led by Thrive Capital with participation from existing backers Alphabet and GV alongside new investors MGX, Temasek, CapitalG, and the UK Sovereign AI Fund (www.prnewswire.com. The capital is earmarked to scale the company's AI drug design engine (IsoDDE) and progress its therapeutic pipeline toward the clinic, alongside hiring across AI, engineering, drug design, and clinical functions (www.prnewswire.com. The company maintains strategic partnerships with Novartis, Eli Lilly, and Johnson & Johnson, which it describes as "significant validation of Isomorphic's AI-first approach and the tangible value it brings to the pharmaceutical industry" (www.prnewswire.com. Isomorphic Labs began preparing for its first human clinical trials of AI-designed oncology drugs in early 2026, an important milestone for a company whose founding thesis rests on generalizing AlphaFold's structural prediction breakthrough into a drug design platform (www.clinicaltrialsarena.com.

## Recursion and Exscientia: Consolidation of AI Drug Discovery Platforms

The completed business combination of Recursion Pharmaceuticals and Exscientia in November 2024 created a combined entity with more than 60 petabytes of proprietary biological, chemical, and patient-centric data, drawn from in-house generation and licensing partnerships with companies including Helix and Tempus (ir.recursion.com. Recursion co-founder and chief executive officer (CEO) Chris Gibson, Ph.D., described the rationale as positioning the combined firm "as the leader of the AI-enabled drug discovery and development space" (ir.recursion.com. The combined company employs approximately 800 people, headquartered in Salt Lake City with primary offices in Toronto, Montreal, Milpitas, New York, the Oxford area, and London (ir.recursion.com. Since the merger, Recursion has continued to streamline its pipeline under new CEO Najat Khan, illustrating that even well-capitalized AI-native biotechs must make hard portfolio prioritization decisions rather than simply scaling every AI-generated lead (www.fiercebiotech.com.

## Novo Nordisk and NVIDIA: Infrastructure-Scale AI for Drug Discovery

Novo Nordisk partnered with NVIDIA and the Danish Centre for AI Innovation (DCAI) to accelerate drug discovery using the Gefion AI supercomputer, powered by NVIDIA's DGX SuperPOD architecture (nvidianews.nvidia.com. Under the collaboration, Novo Nordisk will use NVIDIA's BioNeMo platform for generative AI-powered drug discovery, along with NIM and NeMo microservices for customized agentic workflows (nvidianews.nvidia.com). This case illustrates a distinct enablement archetype from Insilico or Isomorphic Labs: rather than building or acquiring a proprietary end-to-end AI drug design platform, an established biopharma incumbent is renting large-scale AI compute infrastructure and pairing it with vendor-supplied foundation models, a path likely to be more accessible to mid-sized biotechs than building a bespoke platform from scratch.

### Moderna: Enterprise-Wide Generative AI Adoption Beyond the Laboratory

Moderna's collaboration with OpenAI, underway since early 2023 and expanded through ChatGPT Enterprise, illustrates AI enablement extending well beyond the R&D bench into legal, manufacturing, and commercial functions. Moderna aims to bring up to 15 new products to market within five years, from an RSV vaccine to individualized cancer treatments, and views generative AI as integral to sustaining that pace without proportionally scaling headcount (openai.com). Moderna's internally built chatbot, mChat, was adopted by more than 80% of employees before the company standardized on ChatGPT Enterprise after user testing found its net promoter score "through the roof" compared with alternatives (openai.com). As of the case study's publication, Moderna reported 750 custom GPTs built across the company, with 40% of weekly active users creating their own GPTs and each user averaging 120 ChatGPT Enterprise conversations per week (openai.com). Moderna CEO Stéphane Bancel offered a striking headcount framing: "If we had to do it the old biopharmaceutical ways, we might need a hundred thousand people today. We really believe we can maximize our impact on patients with a few thousand people, using technology and AI to scale the company" (openai.com). This case underscores that AI enablement in biotech is not confined to scientific discovery: legal, regulatory-adjacent communication, and investor relations functions are also seeing material efficiency gains from generative AI copilots.

# Implications and Future Directions

Several structural implications follow from the evidence assembled above. First, the gap between AI investment and demonstrated value is likely to persist through at least 2027, given that data infrastructure gaps, not model capability, are the binding constraint identified across the ZS and Benchling surveys. Organizations that treat AI enablement primarily as a tooling decision, rather than a data governance and organizational change program, are the ones most likely to remain stuck at the pilot stage described by Deloitte's 22%-scaled, 9%-ROI findings (www.deloitte.com).

Second, the FDA and EMA's January 2026 common principles are intended to underpin future AI guidance in each jurisdiction and to support international collaboration among regulators, which may over time help align expectations for AI used in regulatory submissions; the principles are high-level, and the risk-based credibility framework itself remains FDA draft guidance rather than a jointly adopted framework (www.ema.europa.eu). Biotechs planning to submit AI-derived evidence, whether from a generative chemistry platform, an AI-assisted trial design tool, or a manufacturing process-control model, should expect the credibility assessment burden to scale with the materiality of the AI's role in the regulatory decision, consistent with the FDA's risk-based approach (www.fda.gov).

Third, the talent constraint identified by ManpowerGroup, with AI skills now the single hardest category to fill across 41 countries, will likely continue to push organizations toward the internal-upskilling model that Benchling found already dominant (67% of AI talent sourced internally) rather than competitive external hiring (www.manpowergroup.com) (www.benchling.com). Biotechs without the scale to run internal AI academies

may increasingly turn to consulting partners and managed services to bridge the gap, a dynamic that intuitionlabs.ai, writing from an adjacent-advisor vantage point, considers plausible in the Veeva-adjacent implementation and advisory ecosystem serving pharmaceutical and biotech clients.

Fourth, the AI-native biotech model exemplified by Insilico Medicine and Isomorphic Labs is likely to keep attracting concentrated capital even as broader biopharma VC funding remains disciplined, given that PitchBook found the largest venture rounds increasingly clustering around AI-focused companies within an otherwise cautious $33.8 billion 2025 biopharma VC market (www.biospace.com). Whether this capital concentration accelerates the first full regulatory approval of an AI-discovered drug, still unachieved as of mid-2026, will be the single most consequential proof point for the sector's next phase of enablement.

Finally, agentic AI, cited by 30% of Deloitte's surveyed life sciences executives and viewed by ZS as most promising in IT operations and R&D discovery, is likely to be the next adoption frontier, but survey data suggest organizations remain cautious about deploying autonomous agents in patient-facing or regulatory-adjacent workflows without human-in-the-loop safeguards, a caution reflected in KPMG's finding that 63% of leaders mandate human validation of AI outputs even as agent adoption accelerates (www.deloitte.com) (kpmg.com).

Taken together, these five implications point toward a bifurcated but converging strategy for biotech organizations planning their 2027 AI roadmap. On one track, operational and commercial use cases, quality assurance, security monitoring, commercial analytics, and regulatory document preparation, can and should be deployed now, given the six-month ROI window that Modus Create's research documented and the comparatively lower governance burden these use cases carry relative to generative drug design (www.moduscreate.com). On the other track, R&D and discovery use cases require patience, sustained capital, and an acceptance that value realization will lag investment by several years, consistent with ZS's finding that only 17% of pharma and biotech leaders can currently prove measurable discovery-stage value despite rising budgets (www.zs.com). Organizations that conflate these two tracks, expecting quick wins from discovery-stage generative AI or under-investing in the operational use cases that could fund a longer R&D runway, are the ones most likely to remain stuck in the pilot-to-scale gap that recurs across nearly every survey cited in this report.

# Frequently Asked Questions (FAQs)

**What is AI enablement in biotech?** It is the organizational process of embedding artificial intelligence, spanning machine learning, generative AI, and agentic AI, into a biotech or biopharma company's data infrastructure, governance, talent model, and workflows across discovery, development, manufacturing, and commercial functions, rather than deploying isolated point tools.

**How widespread is AI adoption in life sciences today?** Adoption is uneven: Benchling found 89% of scientists at AI-adopting biotechs use copilots as their default interface for interrogating data (www.benchling.com), yet Deloitte found only 22% of life sciences leaders have successfully scaled AI beyond pilots (www.deloitte.com).

**What are the most common biotech AI use cases?** Literature review and knowledge extraction (76% adoption), protein structure and property prediction (71%), scientific reporting (66%), and target identification (58%) are the most widely adopted use cases according to Benchling's 2026 survey (www.benchling.com.

**How big is the AI in drug discovery market?** Estimates vary by scope: Grand View Research put the 2025 market at $2.3 billion, growing at a 24.8% CAGR to $13.8 billion by 2033 (www.grandviewresearch.com), while Fortune Business Insights and Roots Analysis estimated higher 2025 baselines of $4.46 billion and $6.0 billion respectively (www.fortunebusinessinsights.com) (www.rootsanalysis.com).

**Has an AI-discovered drug been approved yet?** No. As of July 2026, no fully AI-discovered drug has completed all clinical trial phases and received FDA approval, though Insilico Medicine's rentosertib is among the furthest advanced, having entered Phase III trials in July 2026 (insilico.com).

**What regulatory guidance governs AI in drug development?** The FDA's January 2025 draft guidance established a risk-based credibility assessment framework (www.fda.gov), and in January 2026 the FDA and EMA jointly published ten guiding principles for good AI practice across the medicine lifecycle (www.ema.europa.eu.

**What is the biggest barrier to scaling AI in biotech?** Data infrastructure and governance, not model capability: 68% of pharma and biotech CIOs surveyed by ZS say neglecting data quality and governance early is the main reason AI initiatives fail (www.zs.com).

**Can biotechs hire their way out of the AI talent gap?** Not easily. ManpowerGroup found AI skills are now the hardest category to fill globally across 39,063 employers surveyed (www.manpowergroup.com. Most biotechs instead rely on internal upskilling, the dominant AI talent source (67%) per Benchling's 2026 survey (www.benchling.com).

# Conclusion

AI enablement in biotech as of July 2026 sits at an inflection point between broad, shallow adoption of task-level copilots and the much harder work of embedding AI into the regulated, high-stakes core of drug discovery and development. The evidence assembled across more than a dozen publicly reported surveys and market analyses tells a consistent story: investment is rising quickly, adoption of low-risk, high-verifiability use cases such as literature review and protein structure prediction is already broad, and enthusiasm about AI's transformative potential is nearly universal among industry leaders. Yet scaled, measurable value remains the exception rather than the rule, with fewer than one in four organizations reporting successful scaling and fewer than one in ten reporting significant return on investment. The binding constraints are not model capability but data infrastructure, governance maturity, and talent, exactly the domains where organizational discipline, not additional AI spending, determines outcomes.

Regulatory clarity has improved meaningfully, with the FDA publishing draft guidance proposing a risk-based credibility assessment framework for AI that supports regulatory decision-making and, together with EMA, jointly identifying ten principles for good AI practice in the medicines lifecycle, although the draft guidance is non-binding and detailed expectations are still evolving. Clinical validation is advancing, exemplified by Insilico Medicine's rentosertib reaching Phase III and Isomorphic Labs' $2.1 billion capital raise to push its AI-designed oncology candidates toward the clinic, but no AI-discovered drug has yet reached the finish line of FDA approval. For biotech and biopharma leaders, the practical implication is to treat AI enablement as a multi-year capability-building program spanning data architecture, governance, and workforce development, rather than

as a series of discrete tool deployments, and to calibrate expectations for return on investment against the sober reality that most organizations, even well-resourced ones, remain in the early-to-middle stages of that journey.

## Source links

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IntuitionLabs is an AI consulting, custom software development and data engineering firm serving pharmaceutical, biotechnology, medical-device and other life-science organizations. We work with clinical, regulatory, medical-affairs, commercial, quality and IT teams to connect technology decisions with the work people need to accomplish.

### AI consulting and adoption

Our AI enablement services cover readiness assessments, use-case selection, governance and policies, team workshops, adoption measurement and ongoing advisory support. We help organizations structure the information layer behind AI: source material, context, permissions and maintained knowledge that make generated answers useful and reviewable. Private LLM inference and hosted AI options support teams evaluating how to operate AI with appropriate control over their data and infrastructure.

### Software, data and life-science workflows

IntuitionLabs develops custom software for pharma and biotech, integrates enterprise systems, and builds data engineering and business intelligence solutions. Areas of focus include AI agents, regulatory research, medical writing, medical affairs, CMC information, competitive intelligence and clinical-document workflows. Our eTMF intelligence work includes cross-system reconciliation and inspection-readiness support.

### Enterprise platforms and regulated delivery

We provide Veeva services, application support, managed services, integrations and custom applications, alongside enterprise content work involving platforms such as Egnyte. For regulated workflows, our services include GxP enablement, computer-system validation and software development addressing 21 CFR Part 11 requirements. The applicable controls, validation responsibilities and acceptance criteria are defined for each engagement.

### Work with IntuitionLabs

Explore AI enablement, pharma and biotech software development, data engineering and BI, and Veeva services. Contact IntuitionLabs to discuss your workflow, information sources and implementation needs.

IntuitionLabs publishes educational research to help life-science teams make informed technology decisions. Coverage of a product or organization does not imply a client relationship, endorsement or partnership.

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