IntuitionLabs

INTUITIONLABS / RESEARCH & PRACTICAL GUIDANCE

AstraZeneca Acquires Modella AI: Oncology Foundation Models

> Build practical AI for pharma and biotech with IntuitionLabs. We help life-science teams turn complex information and workflows into useful software, governed knowledge systems and AI tools.

Published by IntuitionLabs · 2026-05-06 · modella ai · foundation models · oncology ai · drug discovery · pharma ai mergers · multimodal ai · digital pathology

Original article: https://intuitionlabs.ai/articles/astrazeneca-modella-ai-oncology-foundation-models



In this article

1. Executive Summary
2. Introduction and Context
3. Foundation Models and Multi-Modal AI in Drug Discovery
4. AstraZeneca's Acquisition of Modella AI
5. Implications for Pharma AI M&A and Strategic Trends
6. Data Analysis of Pharma-AI Deals
7. Broad Strategic and Future Implications
8. Conclusion

Executive Summary

In January 2026, AstraZeneca announced a landmark acquisition of **Modella AI**, a Boston-based startup specializing in multi-modal generative AI for oncology pathology (www.modella.ai) (finance.yahoo.com). According to company statements and press coverage, this move – which AstraZeneca itself described as "the first acquisition of an AI firm by a big pharmaceutical company" (finance.yahoo.com) – embeds **Modella's multi-modal foundation models and AI agents** into AstraZeneca's global oncology R&D pipeline (www.modella.ai). AstraZeneca CFO Aradhana Sarin said the acquisition would *"supercharge"* quantitative pathology and biomarker discovery efforts, enhancing cancer drug development through unprecedented data integration (finance.yahoo.com) (www.modella.ai).

This report analyzes the strategic context, technical underpinnings, and wider industry implications of the AstraZeneca/Modella AI deal. We explain the **concept of foundation models** – large AI models pre-trained on vast, heterogeneous datasets – and how *multi-modal foundation models* (which link text, images, molecular data, etc.) are poised to transform oncology drug discovery and development (www.researchgate.net) (pmc.ncbi.nlm.nih.gov). We review relevant case studies and recent M&A trends: for example, the notable **Recursion–Exscientia AI merger** in 2024 (~$688 million) (www.genengnews.com) and **BioNTech's 2023 acquisition of AI startup InstaDeep** (~$389M plus milestones) (www.pharmamanufacturing.com). These illustrate a broad surge of pharma interest in in-house AI capabilities. We also examine mega-deals with overlapping themes (Novartis' $12B purchase of Avidity Biosciences in late 2025 for RNA therapeutics (www.fiercebiotech.com), Merck's $1B+ AI partnership with Google Cloud in 2026 (www.fiercebiotech.com)), situating the AstraZeneca/Modella deal within an industry-wide pivot to AI and data-driven R&D.

Our analysis delves into the technical promise (e.g. pathology foundation models like Microsoft's **Virchow**, generative pathology models (www.microsoft.com), and the ability to synthesize genomic profiles from tissue images (www.repository.cam.ac.uk)) and the practical challenges of integrating AI into drug pipelines. We discuss **M&A implications**: why pharma firms are partnering or acquiring AI innovators, how such deals compare to past R&D investments, and what successful integration means (drawing on expert commentary (www.pharmavoice.com) (www.fiercebiotech.com)). Finally, we consider future directions – from regulatory considerations for AI-enabled R&D to how foundation models might evolve (for example, more powerful multimodal biomedical AI (colab.ws) (pmc.ncbi.nlm.nih.gov)). Throughout, we provide extensive data, citations, and multiple viewpoints. The overall conclusion is that AstraZeneca's move is a strategic milestone reflecting a broader shift: as AI – especially large, generalist models – matures, pharmaceutical companies are becoming early adopters and consolidators of these technologies to accelerate drug discovery and development, with significant implications for competitive dynamics and innovation in oncology.

Introduction and Context

The pharmaceutical industry is undergoing a rapid transformation driven by the emergence of **artificial intelligence (AI)**, particularly large-scale "foundation models". Over the past decade, AI has evolved from specialized algorithms for narrow tasks to *general-purpose, pre-trained models* capable of adapting across a wide range of applications (www.researchgate.net) (colab.ws). These *foundation models* – typified by large

language models like GPT-4 – are usually trained on massive, diverse datasets (text, images, molecular structures, etc.) and can then be fine-tuned or deployed for specialized tasks (www.researchgate.net) (colab.ws). In medicine and life sciences, researchers are now envisioning **generalist medical AI (GMAI)** systems that can simultaneously interpret imaging, genomic data, electronic health records, and more, potentially performing complex tasks (diagnosis, prognosis, drug design) with little or no task-specific supervision (colab.ws) (pmc.ncbi.nlm.nih.gov).

Within **pharmaceutical R&D**, the promise of such AI is profound. Drug discovery and development involve vast, heterogeneous data – from chemical libraries and molecular simulations to genomic assays, electronic health records (EHRs), and medical images. Traditionally, AI in pharma has been applied in siloed domains (e.g. modeling a specific target or optimizing yields). But the new generation of foundation models can *"connect molecular strings, graphs, and 3D conformers with protein sequences, pocket structures, reaction contexts, and free-text descriptions"* within one unified representation space (pmc.ncbi.nlm.nih.gov). Preliminary evidence suggests that multi-modal AI can uncover patterns in oncology (e.g. linking tissue histology with gene expression to predict outcomes (www.repository.cam.ac.uk)) and accelerate tasks such as target identification, molecular optimization, and biomarker discovery(www.researchgate.net). For example, Microsoft Research (with Paige.AI) recently trained the **Virchow2/Virchow2G** pathology models on over 3.1 million whole slide images (WSI) across dozens of cancer types; that general model showed strong performance on multiple cancer-detection tasks, including rare subtypes (www.microsoft.com). Similarly, a recent study introduced **PathGen**, a diffusion-model approach to synthesize gene-expression profiles from routine pathology slides, enabling AI models to predict patient survival and tumor grade with accuracy comparable to using actual genomics (www.repository.cam.ac.uk).

Pharmaceutical companies, sensing the strategic value of these technologies, are increasingly partnering with or acquiring AI startups. Notable examples in recent years include **BioNTech's January 2023 acquisition of British AI startup InstaDeep** (initially $389M, plus future milestones) to bolster drug design capabilities (www.pharmamanufacturing.com), and **Recursion Pharmaceuticals' 2024 "merger" with AI-driven Exscientia** (~$688M upfront (www.genengnews.com)) to combine biology- and chemistry-focused AI platforms. Tech giants are also engaging: in April 2026, for instance, **Merck & Co. (known as MSD outside the United States and Canada) announced a partnership with Google Cloud valued at up to $1 billion** to deploy agentic AI across its R&D and manufacturing operations (www.fiercebiotech.com). This activity mirrors a broader industry trend: an *EY report*, cited by PharmaVoice, noted a surge of AI partnerships and acquisitions in life sciences over the past five years, signaling the opportunities that "AI offers to life sciences companies" (www.pharmavoice.com).

The AstraZeneca–Modella AI deal (Jan 2026) occurs against this backdrop. Both companies had already collaborated since mid-2025, when AstraZeneca and Modella AI announced a multi-year R&D agreement. Now AstraZeneca is **integrating Modella's AI platform directly into its oncology pipeline** (www.modella.ai) (finance.yahoo.com). Modella AI, co-founded by Jill Stefanelli, PhD, and computational pathologist Faisal Mahmood (Harvard/MGH), specializes in **multi-modal generative and agentic AI for pathology and clinical data** (finance.yahoo.com). Their models were explicitly trained on pathology images and clinical metadata with the goal of accelerating cancer research. AstraZeneca's goal is to leverage those foundation models – including sophisticated pathology-image models – to **accelerate clinical development, discover novel biomarkers, and automate data-intensive workflows** in oncology (www.modella.ai) (finance.yahoo.com).

This report provides an in-depth examination of the Modella acquisition, the science of foundation models in oncology, and the strategic implications for pharma M&A. We begin by defining foundation models in the drug-discovery context, then review AstraZeneca's specific announcement and technical integration plan. Next, we survey case studies (e.g. Recursion/Exscientia, BioNTech/Instadeep) and present data on recent pharma-AI deals. We include markdown tables categorizing major deals and representative foundation-model projects. Finally, we discuss broader implications – from pipeline productivity to competitive strategy – and outline future directions for AI in pharmaceuticals. Throughout, every factual claim is documented with citations to industry news, peer-reviewed research, and expert commentary.

Foundation Models and Multi-Modal AI in Drug Discovery

Foundation models are large-scale AI systems that are pre-trained on broad data corpora and can be adapted to many downstream tasks (www.researchgate.net). In traditional AI, models were typically built and trained for a very specific application (e.g. one target prediction or disease detection). By contrast, a foundation model is "trained once at scale" on extensive, heterogeneous data (unlabeled if necessary) so that its internal representations capture fundamental patterns of the domain (pmc.ncbi.nlm.nih.gov) (www.researchgate.net). In biomedicine, this means learning representations of molecules, proteins, and clinical data that can generalize across different projects. Notable examples outside pharma include GPT-4 (text), DALL·E (images), and AlphaFold (protein folding); each learned broad patterns (language or molecular geometry) then enabled many applications.

A 2025 peer-reviewed review observed that **>200 foundation models in drug discovery** had been published since 2022, covering tasks from target discovery to molecule optimization and preclinical studies (www.researchgate.net). The authors note that *"pharmaceutical R&D has been at the forefront of experimenting with and adopting foundation models"* (pmc.ncbi.nlm.nih.gov) (www.researchgate.net). The key advantages of foundation models include: (1) **transfer learning** – once pre-trained, the model can be fine-tuned for specific drug projects with comparatively little new data; (2) **multi-task performance** – a single model can potentially handle sequence design, molecular property prediction, and other tasks, reducing engineering effort; and (3) **data efficiency** – by leveraging large unlabeled datasets (e.g. chemical libraries or text corpora), they can discover patterns that elude smaller models.

A critical feature is **multi-modality**. Modern biomedical foundation models often integrate diverse data types. For example, recent work has connected *molecular sequences (e.g. SMILES or proteins)* with *3D structures* and *textual knowledge* (pmc.ncbi.nlm.nih.gov). Emmanuel Pastore et al. (2026) highlight that pretraining across "sequences, graphs, 3D structures, and text" produces unified embeddings that capture relationships between chemistry and biology (pmc.ncbi.nlm.nih.gov). This means a foundation model could, in principle, relate a small molecule's SMILES string to its protein target or to literature abstracts mentioning related pathways. By using multimodal pretraining, these models exploit correlations implicit in real data (e.g. labs where certain assays are used, or text where particular drugs appear together) while respecting the physics of molecules (pmc.ncbi.nlm.nih.gov).

In oncology specifically, multi-modal AI can link pathology images (histology slides) with genomic assays and clinical outcomes. For instance, as one group notes, *“for chemistry and biology, the opportunity is to connect molecular strings, graphs, and three-dimensional conformers with protein sequences, pocket structures, reaction contexts, and free-text descriptions within a coherent pretraining and evaluation framework.”* (pmc.ncbi.nlm.nih.gov). This unified framework allows the model to learn that similar tissue morphology or genetic markers imply similar drug response, potentially improving predictions of efficacy or toxicity.

Recent research demonstrates the early power of this approach. Microsoft Research and Paige.AI published a *pathology* foundation model named **Virchow** (and successors Virchow2, Virchow2G) in *Nature Medicine*: trained on over 2.4 petabytes of whole-slide images (over 3.1 million slides) from 45 countries, this model (1.85 billion parameters in Virchow2G) achieved state-of-the-art performance across many cancer types (www.microsoft.com). Importantly, a single Virchow model “can be useful in detecting both common and rare cancers, fulfilling the promise of generalizable representations” (www.microsoft.com). They emphasize that *“the rise of foundation models is introducing a new paradigm in computational pathology”* (www.microsoft.com), moving beyond narrowly-trained classifiers to universal cancer-image analysis.

Another example is **PathGen** (Nat Commun), which fused digital histopathology with transcriptomics. Dey et al. developed a diffusion-based generative AI that infers a patient’s gene-expression profile directly from routine H&E pathology images. Crucially, their model showed that *“gene expressions synthesized from digital histopathology jointly predict cancer grading and patient survival risk with high accuracy”*, achieving performance comparable to using real genomic data (www.repository.cam.ac.uk). In other words, by training a multimodal model end-to-end (histology → gene expression), they unlocked prognostic insights from image data alone, which would traditionally require an expensive RNA-seq assay. Across four tumor cohorts, incorporating the AI-generated transcriptomic features gave statistically significant gains in grading accuracy and survival prediction over using images alone (www.repository.cam.ac.uk). This proof-of-concept highlights how generative multimodal AI can effectively create *virtual omics* from images, potentially saving cost and time in oncology studies.

On the genomics side, multimodal AI is also promising. For example, R.J. Chen et al. (Mahmood Lab) built an interpretable deep-learning model that integrated *whole-slide pathology images, RNA-seq, copy-number, and mutation data* across 14 cancer types (5,720 patients) (deep.ai). Their multimodal model outperformed separate image-only or genomics-only models on survival prediction for most cancers. They could even identify which histologic patterns and molecular markers drove risk stratification. This illustrates that multimodal integration can *“fuse these heterogeneous modalities for predicting outcomes,”* leveraging all available information (deep.ai).

Other frontier examples include **PharMolixFM** (ArXiv 2025): an all-atom foundation model for structural biology that uses multimodal generative techniques to improve protein–small-molecule docking (huggingface.co). And in the medical AI field, Moor et al. (Nature 2023) outline the vision of **Generalist Medical AI**: systems pretrained on *“large, diverse datasets”* that can interpret combinations of imaging, EHRs, lab results, genomics, and text, and then output free-text explanations, recommendations, or annotated images (www.nature.com). They warn such models will require new validation and regulatory approaches, but they encapsulate the potential: one model handling multivariate medical data.

In sum, foundation-model AI – especially multimodal and generative models – is rapidly expanding in drug discovery and oncology research (www.researchgate.net) (pmc.ncbi.nlm.nih.gov). These models promise to accelerate target identification, optimize leads, and streamline trial design by learning from massive unstructured datasets (clinical records, literature, images) that were previously too complex for traditional methods. AstraZeneca's acquisition of Modella AI is aimed squarely at harnessing this promise in their oncology pipeline. Modella's founders have already built prototype models at the intersection of pathology and patient data, and embedding those algorithms into AstraZeneca's systems should allow the company to derive new biological and clinical insights, automate analyses, and scale workflows that were previously manual-heavy (www.modella.ai) (finance.yahoo.com).

Model / Project	Organization / Authors	Data Modalities Integrated	Application / Use-Case	References
Virchow / Virchow2	Microsoft Research & Paige.AI	Digitized pathology slides (WSI)	Multi-task cancer detection/classification from H&E images (www.microsoft.com)	[25]
PathGen	Dey *et al.* (Cambridge University)	Digital histopathology slides + synthesized transcriptome	Predict tumor grade and patient survival using image-derived gene-expression (www.repository.cam.ac.uk)	[35]
Pan-cancer Multimodal DL	Chen *et al.* (Mahmood Lab)	WSIs + RNA-seq + mutation + copy-number data	Prognosis/patient stratification across 14 cancer types (deep.ai)	[36]
PharMolixFM	Luo *et al.* (ArXiv 2025)	3D all-atom structures of proteins & ligands	Improved protein–ligand docking and molecule generation (huggingface.co)	[42]
Generalist Medical AI (GMAI)	Moor *et al.* (Stanford/Yale 2023)	Medical imaging + EHR + labs + genomics + text	Vision for AI that can perform diverse medical tasks with minimal labels (www.nature.com)	[33]

Table 1. Examples of foundation-model or multimodal AI projects relevant to drug discovery and healthcare. Each integrates heterogeneous biomedical data for complex tasks, illustrating the trend toward larger, more general AI systems. References are given for each example.

AstraZeneca's Acquisition of Modella AI

On January 13, 2026, AstraZeneca and Modella AI announced that AstraZeneca had **acquired** Modella AI, integrating it into AstraZeneca's oncology R&D organization (www.modella.ai) (finance.yahoo.com). The deal follows an earlier collaboration: in July 2025 the two companies had launched a **multi-year partnership** to apply Modella's AI platform to AstraZeneca's oncology pipeline. The acquisition expands that collaboration by fully embedding Modella's team and technology into AZ's in-house capabilities (www.modella.ai) (finance.yahoo.com). Financial terms were **not disclosed** (www.modella.ai) (finance.yahoo.com), though press reports indicate AstraZeneca did not publicly reveal the price. At least one news outlet noted AstraZeneca called this deal *"the first acquisition of an AI firm by a big pharmaceutical company"* (finance.yahoo.com) (www.channelnewsasia.com), underscoring its significance.

Modella AI was founded in Boston with the explicit goal of developing **AI for oncology pathology and medicine**. The co-founders include Jill Stefanelli, PhD (co-founder and CEO) and Dr. Faisal Mahmood (Pathology Professor at Mass General Brigham and Harvard Medical School) (www.modella.ai) (finance.yahoo.com). Modella's team blended AI research with deep pathology expertise, focusing on **agentic and generative AI**. In practical terms, Modella built multi-modal foundation models that ingest digitized pathology images (histology slides), clinical data, and omics to extract insights. According to Modella's own statements and AstraZeneca's press release:

- Modella's **chief commercial officer Gabi Raia** emphasized that *"oncology drug development is becoming more complex, more data-rich, and more time-sensitive"*, while co-founder and CEO **Jill Stefanelli** said that joining AstraZeneca would allow Modella to *"apply our multimodal foundation models and agentic AI platform across a world-class oncology pipeline to accelerate development and… improve outcomes for patients"* (finance.yahoo.com).
- Co-founder Faisal Mahmood highlighted that *"Modella AI was built at the intersection of pathology, clinical data, and advanced generative AI to tackle some of the hardest problems in oncology."* He added that integrating Modella's models *"directly into AstraZeneca's research ecosystem will help translate methodological advances into real-world impact faster."* (www.modella.ai)
- From AstraZeneca's side, leaders framed the acquisition in evolutionary terms: AstraZeneca's Chief of AI for Science (Jorge Reis-Filho) stated that AZ is *"transforming its drug discovery and clinical development through… innovative AI solutions"*, and that acquiring Modella brings *"state-of-the-art frontier pathology foundation models and AI agents"* to their pipeline. These tools will *"enable the development of targeted therapeutics along with diagnostics in our oncology portfolio"* (finance.yahoo.com).

The public statements repeatedly mention **"multi-modal foundation models"** and **"AI agents"**. In context, "multi-modal" refers to models that combine different data types (e.g. pathology images + clinical lab values + EHR notes), while "AI agents" suggests interactive or autonomous AI workflows (e.g. AI systems that can query data, run experiments, or suggest next steps). The combined implication is that AstraZeneca will deploy AI models that can seamlessly analyze complex patient and disease data to generate hypotheses or direct analyses, rather than one-off tools. As one company release summarized: the deal will *"embed Modella AI's multi-modal foundation models and AI agents into AstraZeneca's oncology R&D environment, enabling the generation of new biological and clinical insights, as well as greater automation, scalability, and consistency across data-intensive workflows."* (www.modella.ai).

Importantly, AstraZeneca CFO Aradhana Sarin said the acquisition would *"supercharge"* the firm's quantitative pathology and biomarker discovery efforts (finance.yahoo.com). In remarks at the J.P. Morgan 2026 Healthcare Conference, Sarin said that integrating Modella's technology would bring **more data and AI capabilities in-house** for AstraZeneca, particularly benefitting oncology by accelerating development of personalized diagnostics and treatments (finance.yahoo.com). In summary, AstraZeneca views the acquisition as a way to internalize a cutting-edge AI team and technology stack, so that sophisticated pathology- and data-driven analyses become routine parts of its drug research process.

Strategic Rationale: Several factors likely motivated this move. First, oncology R&D in large pharma has always been data-intensive and time-critical. Tumor biology and patient outcomes are highly complex; having AI tools that can rapidly spot patterns (e.g. predicting which histological features correlate with drug response) can shorten development timelines and improve go/no-go decisions. Second, a multi-modal AI platform can aid *biomarker discovery* (finding molecular or image markers that predict drug efficacy or toxicity), a key bottleneck in trial design. As Modella's press release notes, the integration will *"accelerate clinical development"* and *"enhance biomarker discovery"* (www.modella.ai). Third, by acquiring Modella rather than simply licensing their tools, AstraZeneca gains direct control over the technology and can tailor it to internal data. They effectively onshore the AI R&D capability, rather than relying on external collaborations that might be less aligned or slower. CFO Sarin's comments about bringing capabilities *"in-house"* (finance.yahoo.com) capture this logic.

Finally, AstraZeneca's move must be seen competitively: other pharma giants are aggressively pursuing AI strategies (as detailed below). If drugmakers like Sanofi, Roche, or Merck mount their own AI accelerations, AstraZeneca needs comparable tech to maintain its R&D edge. In this sense, the Modella acquisition is both a technological bet and a signal to the industry that AstraZeneca intends to be a leader in AI-driven pharma research.

Implications for Pharma AI M&A and Strategic Trends

AstraZeneca's acquisition of Modella fits a broader **wave of AI-related M&A in life sciences**. Over the past few years, major drug companies and biotechs have either bought or partnered with AI-driven firms to bolster their pipelines. Some high-profile examples (see Table 2) include **BioNTech's 2023 take-over of InstaDeep**, **Recursion's 2024 merger with Exscientia**, and **Novartis's 2025 acquisition of Avidity Biosciences** (www.pharmamanufacturing.com) (www.genengnews.com) (www.fiercebiotech.com). In each case, the acquiring company cited strategic gains: gaining AI expertise, expanding technological platforms, or accessing novel targets. Notably, BioNTech's deal followed years of AI collaboration on mRNA design, implying that sustained partnership often precedes acquisition (www.pharmamanufacturing.com). Similarly, AstraZeneca had collaborated with Modella for six months before finalizing the purchase. Table 2 summarizes some recent big-ticket AI/drug deals.

Year	Acquirer (Buyer)	Target / Partner	Type	Value (USD)	Notes / Purpose	References
2023	BioNTech (Germany) (www.pharmamanufacturing.com)	InstaDeep (UK AI)	Acquisition	~$389M upfront + up to $243M milestones (www.pharmamanufacturing.com)	Expand AI-driven R&D (mRNA vaccine and oncolytic design)	[17]
2024	Recursion Pharmaceuticals (USA) (www.genengnews.com)	Exscientia (UK AI)	Merger/Acq.	~$688M upfront + ~$200M mid-term milestones (www.genengnews.com)	Consolidate AI drug design (biology + chemistry)	[19]

Year	Acquirer (Buyer)	Target / Partner	Type	Value (USD)	Notes / Purpose	References
2025	Novartis (Switzerland) (www.fiercebiotech.com)	Avidity Biosciences (USA)	Acquisition	$12.0B (www.fiercebiotech.com)	Bolster RNA therapeutics in neurology/dystrophies	[54]
2026	AstraZeneca (UK) (finance.yahoo.com)	Modella AI (USA)	Acquisition	Undisclosed (private)	Embed multi-modal pathology AI into oncology R&D	[12] [14]
2026	Merck & Co. (MSD) (USA) (www.fiercebiotech.com)	Google Cloud (USA)	Partnership	Up to $1.0B over time (www.fiercebiotech.com)	Deploy agentic AI platform across R&D and manufacturing	[28]

Table 2. Selected recent pharma/biotech deals involving AI or data-driven platforms (2023–2026). Sources are news reports and company releases. "Type" distinguishes outright acquisition vs. partnership/collaboration deals.

Beyond outright acquisitions, many companies have struck **large AI partnerships in R&D**. For example, Novo Nordisk announced a major enterprise-wide partnership with OpenAI in early 2026 (pursuing clinical and commercial AI tools), and Merck announced (Apr 2026) a **$1+ billion multi-year deal with Google Cloud** to integrate Google's agentic AI (Gemini Enterprise) across the company (www.fiercebiotech.com). Technology firms are also jockeying for pharma business: NVIDIA partnered with several big pharma (e.g. a $1B collaboration with Eli Lilly announced Jan 2026) to supply AI computing infrastructure and develop specialized models. Even Contract Research Organizations (CROs) are acquiring analytics firms, reflecting that the entire drug pipeline (discovery to manufacturing) is becoming AI-enabled.

Several industry analysts note that pharma's AI investments are accelerating. A February 2025 PharmaVoice article cites an EY report observing a "surge in AI partnerships and acquisitions in the past five years" in life sciences, reflecting the technology's potential to transform R&D (www.pharmavoice.com). Recursion Pharmaceuticals' CFO Ben Taylor was interviewed in a PharmaVoice article that called the Recursion–Exscientia tie-up "the biggest life sciences AI merger to date" (roughly $700M) (www.pharmavoice.com), and, as the reporter paraphrases him, believes more such deals should be expected down the road (www.pharmavoice.com). He likened the current inflection to the rise of biologics a decade earlier: at that time, drugmakers tried strategies ranging from large acquisitions to in-house development, and now AI seems to be provoking similar strategic experimentation (www.pharmavoice.com).

In parallel, internal data science units within pharma are growing. AstraZeneca itself has been investing in its AI infrastructure: prior to the Modella deal, AZ had already created an "AI for Science" organization and hired computational pathology experts like Reis-Filho. Other companies have appointed "Chief AI Officers" or created algorithmic research hubs. AstraZeneca CFO Aradhana Sarin described the July 2025 partnership with Modella as a "test drive," adding that AstraZeneca ultimately wanted Modella's data, foundation models and AI talent in-house (finance.yahoo.com).

Case Study: Integrating AI Expertise

The **Recursion–Exscientia** merger (announced Aug 2024, completed Nov 20, 2024) is instructive. Recursion, a U.S. biotech, had built an AI-powered imaging platform for phenotypic drug discovery, while Exscientia (UK) had a strong AI-driven small-molecule design platform. By merging, they combined complementary strengths. Recursion CFO Taylor, in an interview with *PharmaVoice*, explained that the companies share a 12-year history of AI-focused drug discovery. He stressed that *"you're not going to solve all the different aspects to create a new molecule with a single algorithm"*: integration of multiple methods (biology and chemistry) is needed (www.pharmavoice.com). The merged Recursion/Exscientia now has 10 programs in its pipeline and hundreds of millions in pharma partnerships (with Sanofi, Roche, etc.) (www.pharmavoice.com). Importantly, PharmaVoice reports that Taylor believes that, despite being novel, life sciences leaders will start to see more of these AI deals down the road (www.pharmavoice.com). His advice to pharma companies scanning for AI partners was to *"look for the use case. Look for the validation"* – i.e. ensure the AI startup has proven technology relevant to a clearly defined problem (www.pharmavoice.com).

Another example: **BioNTech's 2023 acquisition of InstaDeep** (a London/Tunis startup). BioNTech invested ~$389 million upfront (plus potential milestones) in InstaDeep, which specializes in optimization algorithms for mRNA therapy design. This deal built on a prior collaboration since 2020, where InstaDeep's AI helped optimize cap sequences and neoantigen selection in BioNTech's pipelines (www.pharmamanufacturing.com). Post-acquisition, BioNTech has expanded its computational capabilities for rapid drug development, especially relevant given its mRNA platform. The deal shows how a large pharma/biotech first pilots a technology via partnership, then locks it in via M&A once proven.

These cases highlight a **key implication**: big pharma is now choosing both the build and the acquire paths, but M&A is a fast track to internalizing talent and tech. Our table (Table 2) places AstraZeneca/Modella among other major transactions. Notably, unlike blockbuster therapy acquisitions (such as Avidity for $12B), AI-related deals are typically of more modest size (hundreds of millions), underscoring that they assimilate technology rather than buying market-leading drugs. However, their strategic impact – reshaping R&D workflows – can be equally transformative.

Industry Perspective and Cautions

Multiple stakeholders in pharma have commented on what the AI trend means. AstraZeneca's executives portrayed the Modella deal as part of *"transforming [our] drug discovery"* via AI (finance.yahoo.com). Venture investors and analysts observe that investor enthusiasm for pharma-AI M&A is high. For example, Reuters reported that the AstraZeneca–Modella deal was one of a number of pacts between major drug firms and AI companies unveiled at the J.P. Morgan Healthcare Conference in January 2026, including a $1 billion collaboration between NVIDIA and Eli Lilly (finance.yahoo.com). On public markets, companies with strong AI pipelines (like NVIDIA and emerging biotechs) saw their valuations boosted.

At the same time, integration challenges loom. Recursion's Ben Taylor cautioned that the No. 1 requirement is commitment. When big pharma partners with an AI outfit, it must fully commit to new workflows or risk underutilizing the technology (www.pharmavoice.com). He described failed collaborations as often those where a pharma tried to bolt an AI solution onto its legacy processes without true buy-in. Achieving an "AI-first" environment, according to Taylor, requires top-to-bottom organizational change; otherwise the "lowest quality

point" (traditional processes) drags down the AI benefits (www.pharmavoice.com). Furthermore, data availability remains a limiting factor. Taylor noted that *"most of the data isn't worth anything"* unless it is formatted and curated for AI use (www.pharmavoice.com). Pharma companies often find their historical data inconsistent or siloed, necessitating expensive cleanup or even re-collection of fit-for-purpose datasets. According to Taylor, rebuilding key datasets in a streamlined way can be more efficient than trying to wrangle decades of legacy data (www.pharmavoice.com).

Regulatory and ethical issues are also on the horizon. Regulatory agencies (FDA, EMA) have so far focused on approving therapies, but as AI becomes part of the discovery/diagnosis process, new frameworks will be needed. The "generalist medical AI" concept itself raises challenges: Moor *et al.* warn that regulators and validation protocols will have to adapt for AI models that output free-text explanations or advice, rather than discrete, fixed-label outputs (www.nature.com). In oncology, using AI-driven biomarkers or patient stratification tools may require new clinical trial designs and data standards. Meanwhile, patient privacy and data governance remain critical: multimodal models often combine patient-level data (EHR, genomics) that is highly sensitive. Pharma companies must navigate HIPAA/GDPR rules and patient consent when integrating these data for AI use.

Finally, economists and strategists note that M&A for AI may be as important strategically as acquiring drugs in the past. The strategic case for such acquisitions rests on making R&D more efficient and pipeline growth faster. If that works, the return on these AI acquisitions will be measured in accelerated clinical success and new drug launches, rather than immediate revenue. However, as with any structural shift, there is risk: if a foundation-model strategy fails to deliver, companies could face sunk costs. Until now, no major pharma has announced that it is abandoning AI plans; on the contrary, investors seem to be betting on a sustained technology adoption curve.

Data Analysis of Pharma-AI Deals

To quantify the recent M&A trend, we compiled data from public reports and industry summaries. Table 2 (above) lists several high-profile deals involving pharmaceutical or biotech companies acquiring or partnering on AI/data platforms. In this table, we see that while therapy acquisitions (like Novartis/Avidity) can reach multi-billion-dollar values, *AI-focused deals* tend to be in the hundreds of millions. Because the listed deals mix acquisitions, partnerships and a non-AI RNA-therapeutics purchase (Novartis/Avidity), we do not compute an average value; the disclosed AI-focused deals range from several hundred million dollars to about $1 billion, well below blockbuster drug buyouts.

A breakdown by year shows a growing frequency: in 2023 we had the BioNTech–InstaDeep acquisition (www.pharmamanufacturing.com); 2024 saw Recursion/Exscientia (www.genengnews.com); 2025 featured Nova/Avidity (not AI, but context) (www.fiercebiotech.com); and early 2026 has AstraZeneca/Modella (finance.yahoo.com). Moreover, partnerships like Merck/Google ($1B) (www.fiercebiotech.com) and Lilly/NVIDIA ($1B) indicate that even when AI firms are not being acquired outright, large-scale collaborations convey comparable resource commitments. (For example, in January 2024 Isomorphic Labs and Lilly announced a multi-target research collaboration under which Isomorphic receives a $45 million upfront payment and is eligible for up to $1.7 billion in performance-based milestone payments.)

On the investor side, biotech companies with AI-centered business models have attracted capital. Exscientia's shares rose 17% after the Recursion deal was announced (www.genengnews.com). These market signals reinforce that pharma sees AI not as a niche toy but as a core R&D investment.

Of course, not all efforts hinge on acquisitions. Many large pharmaceutical firms are also pursuing **in-house AI development and partnerships**. For instance, AstraZeneca's own AI for Science group collaborates widely (for example, through its own AI for Science group). However, given the pace of AI innovation (new generative models, LLMs, graph networks), acquisitions allow pharma to "buy cutting-edge" rather than build it from scratch. This appears to be the logic behind AstraZeneca's move: dividing the burden of research with an established AI team, as opposed to growing an equivalent group internally, which could take years to recruit and train.

Broad Strategic and Future Implications

The AstraZeneca/Modella AI acquisition has several potential long-term impacts on the industry:

- **Acceleration of AI adoption**: By folding Modella's models into its workflows, AstraZeneca may expedite certain projects (e.g. identifying patient cohorts, virtual screening of compounds) in months instead of years. Other companies will watch closely: if AstraZeneca reports faster candidate selection or trials thanks to AI, rivals may feel pressure to replicate this model. Indeed, Recursion CFO Ben Taylor believes life sciences leaders will see more such AI deals "down the road" (www.pharmavoice.com).
- **Competitive differentiation**: AstraZeneca has emphasized that Modella's AI will be applied *"across a world-class oncology pipeline"* (finance.yahoo.com). If this yields novel biomarkers or first-in-class therapies at a faster pace, AZ could gain a market edge. Conversely, competitors who lag in AI might face slower pipelines. The competitive landscape in oncology is already intense (PD-1/PD-L1 inhibitors, CAR-Ts, etc.). AI-enhanced R&D could become a new axis of competition akin to having a wider chemical library or a more efficient clinical network.
- **Role of data and infrastructure**: For Modella's models to deliver on promises, AstraZeneca must provide rich data (massive image repositories, comprehensive molecular assays). This acquisition implicitly signals that AZ is committing resources to collect, curate, and maintain large datasets – not just buy the models and forget the data. Indeed, Sarin's comment about bringing *"more data… in-house"* (finance.yahoo.com) suggests AZ is ramping up data infrastructure. In the future, companies with stronger data ecosystems (biobanks, EHR partnerships, integrated labs) may have an advantage in AI. It also raises the prospect of data sharing consortia: could oncology consortia emerge to train next-generation foundation models, pluralistically benefiting all members?
- **Mergers & acquisitions strategy**: This trend may influence corporate development strategy. Smaller biotechs should note that AI capabilities can significantly boost their exit valuation (as with Recursion/Exscientia). Large pharma M&A teams will likely evaluate startups not just on their drug pipelines but on their AI platforms and data assets. We may see more AI-building or acquisition arms inside pharma, analogous to tech companies' venture divisions.

- **Regulatory and ethical frameworks**: The increased use of foundation models will pressure regulators to adapt. For example, medical imaging models (like Virchow) often operate as “decision-support” rather than diagnostics. If AstraZeneca uses Modella’s AI to assist pathologists, regulatory agencies will need to define validation standards. Similarly, AI-driven biomarker discovery could lead to new diagnostic approvals. Recently, regulatory bodies (FDA, EMA) have begun offering guidance on AI/ML in medicine, but those focus mainly on on-label medical devices. Drug R&D is a different domain. One risk is that poorly validated AI could suggest non-reproducible targets or biases in patient selection. Companies will need to invest in rigorous AI validation – including *prospective* clinical trials that test AI-derived hypotheses – to solidify trust.
- **Future directions**: Looking further ahead, one can speculate that foundation-model capabilities will expand. For instance, as generative AI matures, we could see *AI-designed multi-agents* that run autonomous experiments in simulated biology, accelerating in silico pharma R&D. AstraZeneca and others might also leverage large language models for literature mining – indeed, GMAI’s vision of handling text and lab data means future AI could generate draft publications or propose next experiments. Additionally, multimodal foundations could be extended beyond pathology: integrating imaging (CT/MRI), digital health data (wearables), and real-world evidence could make oncology R&D even more data-rich. Partnerships between pharma, tech, and academia will likely proliferate. Companies like NVIDIA, Google, and Amazon will offer specialized platforms for life-science AIs (e.g. Google’s Vertex AI for healthcare), and we may see consortium models (similar to COVID vaccine collabs) for AI when the problem is too big for any one company to solve alone.

In conclusion, while AstraZeneca’s acquisition of Modella AI is notable for its timing and for AstraZeneca’s own description of it as a pioneering AI-firm acquisition, it reflects a clear strategic direction: **AI is being treated as a core component of drug R&D**. Foundation models and generative AI are expected to complement traditional biomedical research, much like high-throughput screening or genome sequencing before them. Though it remains early and much work is needed to demonstrate clear clinical payoff, this deal signals that the age of big data and big models in pharma is coming into focus. AstraZeneca’s bet is that by embedding multi-modal AI within its walls today, it will unlock new efficiencies and innovations that will pay dividends in its oncology programs in the years ahead. As Recursion CFO Ben Taylor put it, *“You’ve got to invest the time. If you’re not bought in on the process changing… You’re going to lose most of the benefits of the more novel platform that way.”* (www.pharmavoice.com). AstraZeneca’s acquisition of Modella AI shows that they are indeed “bought in,” and the industry will watch closely to see what breakthroughs result.

Conclusion

AstraZeneca’s 2026 acquisition of Modella AI highlights a transformative moment at the intersection of AI and pharmaceuticals. This deal – formally integrating a **multimodal foundation-model platform** into a top-tier oncology pipeline – underscores how seriously major drugmakers now view advanced AI technology. As we have detailed, foundation models represent a new paradigm in R&D: leveraging massive, diverse datasets to build generalist AI systems for drug discovery, biomarker finding, and clinical prediction (www.researchgate.net) (colab.ws). Early research and case studies (Virchow pathology models

(www.microsoft.com), PathGen for generating gene-expression (www.repository.cam.ac.uk), multimodal prognostic AI (deep.ai)) demonstrate the practical gains possible in oncology, a field notorious for complexity and data intensity.

From a business perspective, the AstraZeneca–Modella union is a bellwether. It follows other notable acquisitions and partnerships (Table 2) showing an industry shift: Big Pharma is no longer only buying late-stage drug candidates, but also **buying AI expertise**. Acquisitions like BioNTech/Instadeep and Recursion/Exscientia consolidate AI R&D capabilities to stay competitive. Likewise, mega-deals (e.g. Merck/Google, Lilly/NVIDIA) indicate that companies are embedding AI into their core processes on a large scale. AstraZeneca's statements – emphasizing *"state-of-the-art foundation models"* and *"AI agents"* – make clear that they intend to be at the forefront of this wave (finance.yahoo.com).

The broader implication is that the value chain in pharmaceuticals is evolving. Historically, knowledge was concentrated in chemists and biologists; now, data scientists and AI engineers are becoming strategic assets. Companies that master the integration of AI into discovery and development could achieve significant time and cost savings. However, as experts caution (www.pharmavoice.com), realizing this value requires deep commitment, appropriate data infrastructure, and organizational change. Poor integration could leave AI projects underutilized.

Looking ahead, the continued M&A and collaboration activity suggests a few likely trends: (1) **Acceleration of dealmaking** in pharma AI, as more companies seek to match the capabilities that innovators like AstraZeneca, Recursion, or BioNTech have acquired. We expect to see additional acquisitions of specialized AI/biotech firms in the coming years, as well as continued large-scale partnerships with cloud/tech providers. (2) **Maturation of foundation models in biology**: as computational power grows and more data becomes available, future biomedical foundation models will likely increase in parameter scale and modality. For example, next-generation pathology models may integrate imaging with spatial transcriptomics, or "self-driving labs" could use AI to autonomously design and test drug candidates. (3) **Regulatory evolution**: agencies will have to develop guidelines for AI-driven R&D processes, from validating digital pathology tools to approving AI-discovered drug candidates. This may involve new standards for data provenance and model transparency.

Ultimately, the AstraZeneca/Modella AI deal exemplifies how an established pharmaceutical leader is adapting to the AI era. As one Modella executive put it, embedding their models *"into AstraZeneca's research ecosystem will help translate methodological advances into real-world impact faster"* (www.modella.ai). If this proves true – if targeted cancer drugs reach patients more quickly due to advanced AI insights – it will serve as a proof point validating the foundation-model approach in pharma. Conversely, if challenges arise, it will offer lessons on the limits of AI integration.

Either way, this acquisition is a harbinger of a crucial trend: *the merger of deep learning and medicinal innovation*. The way oncological therapies are discovered, optimized, and tested is likely to change dramatically in the coming decade, and large language/computer vision-style models will be a key underpinning. AstraZeneca's move may well be remembered as an early defining step of that transition. Future research and analysis will reveal how effectively this strategy translates into new treatments and whether it reshapes drug R&D economics. But for now, the deal sends a clear message: pharma considers multimodal AI platforms not just a nice-to-have, but a strategic necessity in the fight against complex diseases like cancer.

References

- Delile et al., *Drug Discov Today*, “Foundation models in drug discovery: Phenomenal growth today, transformative potential tomorrow?”, Volume 30, Issue 12 (Dec 2025) (www.researchgate.net).
- Pastore & De Rango, *Molecular Informatics* (Mar 2026), “Foundation and Multimodal Models for Drug Discovery in Molecular Informatics” (pmc.ncbi.nlm.nih.gov).
- Severson et al., Microsoft Research Blog (Aug 2024), “Large-scale pathology foundation models show promise on a variety of cancer-related tasks” (www.microsoft.com).
- Moor et al., *Nature* 616:259-265 (Apr 2023), “Foundation models for generalist medical artificial intelligence” (www.nature.com).
- Dey et al., *Nature Communications* 17, “Generating crossmodal gene expression from cancer histopathology improves multimodal AI predictions” (www.repository.cam.ac.uk).
- Chen et al., *ArXiv* (2021), “Pan-Cancer Integrative Histology-Genomic Analysis via Interpretable Multimodal Deep Learning” (deep.ai).
- Luo et al., arXiv 2503.21788 (Mar 2025), “PharMolixFM: All-Atom Foundation Models for Molecular Modeling and Generation” (huggingface.co).
- Modella AI press release (Jan 13, 2026), “Modella AI Announces Acquisition by AstraZeneca to Advance AI-Driven Oncology R&D” (www.modella.ai) (finance.yahoo.com).
- Yahoo Finance/Reuters (Jan 13, 2026), “AstraZeneca to acquire Modella AI to speed oncology drug research” (finance.yahoo.com).
- Channel NewsAsia, “AstraZeneca to acquire Modella AI to speed oncology drug research” (Jan 13, 2026) (www.channelnewsasia.com).
- PharmaVoice (Feb 2025 interview with Recursion CFO Ben Taylor), “AI deals are surging, and Recursion’s ongoing Exscientia merger points to a new world of integration” (www.pharmavoice.com).
- GEN (Aug 2024), “Recursion to Acquire Exscientia, Combining AI Drug Pioneers” (www.genengnews.com).
- Fierce Biotech (Oct 26, 2025), “Novartis goes big for neuroscience with $12B deal for late-stage dystrophy biotech Avidity” (www.fiercebiotech.com).
- PharmaManufacturing (Dec 2023), “Pharma AI deals of 2023” (www.pharmamanufacturing.com).
- Fierce Biotech (Apr 22, 2026), “Merck goes with Google for AI push, striking enterprise partnership worth up to $1B” (www.fiercebiotech.com).
- CureCompass (Jan 15, 2026), “Farmacéuticas y gigantes IA ya cerraron 25 acuerdos por más de USD 12.000 millones” (curecompass.com.ar).
- (Additional references cited inline as noted.)

Source links

Links cited in this article, in order of first appearance. Full addresses are provided for readers using extracted text.

1. https://www.modella.ai/az-acquisition
2. https://finance.yahoo.com/news/astrazeneca-acquire-modella-ai-speed-170943466.html
3. https://www.researchgate.net/publication/396981065_Foundation_models_in_drug_discovery_Phenomenal_growth_today_transformative_potential_tomorrow
4. https://pmc.ncbi.nlm.nih.gov/articles/PMC13014059
5. https://www.genengnews.com/topics/artificial-intelligence/recursion-to-acquire-exscientia-combining-ai-drug-pioneers

6. https://www.pharmamanufacturing.com/production/automation-control/article/33016315/pharma-ai-deals-of-2023
7. https://www.fiercebiotech.com/biotech/novartis-goes-big-neuroscience-12b-deal-late-stage-dystrophy-biotech-avidity
8. https://www.fiercebiotech.com/ai-and-machine-learning/merck-goes-google-ai-push-1b-enterprise-deal
9. https://www.microsoft.com/en-us/research?p=1065690
10. https://www.repository.cam.ac.uk/items/a50ee3bc-46ac-4a92-9116-ddb6c51af397
11. https://www.pharmavoice.com/news/ai-deal-pharma-exscientia-recursion-drug/741040
12. https://colab.ws/articles/10.1038%2Fs41586-023-05881-4
13. https://finance.yahoo.com/news/modella-ai-announces-acquisition-astrazeneca-170200809.html
14. https://deep.ai/publication/pan-cancer-integrative-histology-genomic-analysis-via-interpretable-multimodal-deep-learning
15. https://huggingface.co/papers/2503.21788
16. https://www.nature.com/articles/s41586-023-05881-4
17. https://www.channelnewsasia.com/business/astrazeneca-acquire-modella-ai-speed-oncology-drug-research-5856591
18. https://curecompass.com.ar/farmaceuticas-biotechs-y-gigantes-ia-ya-cerraron-25-acuerdos-por-mas-de-us-12-000-millones

THE PUBLISHER

About IntuitionLabs

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.

Website: https://intuitionlabs.ai

This article is educational. Verify consequential medical, legal, financial, regulatory and technical decisions with appropriate professionals and the cited primary sources. Company services are described separately from the article's research findings.