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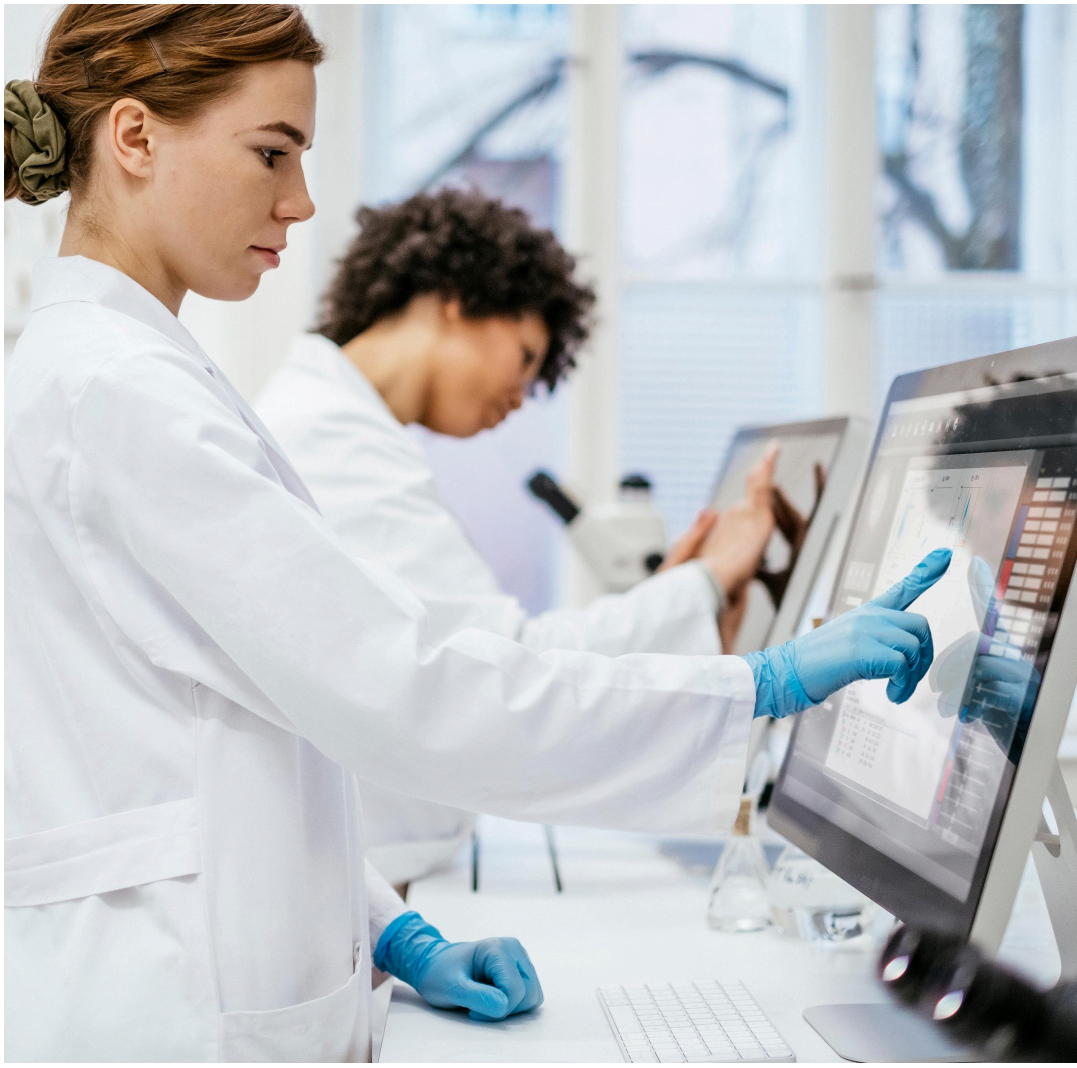

AI-Native Biotech Is an Opportunity for UK Leadership and Growth

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Contents

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Executive Summary

"AI is transforming every part of the economy, and the opportunity to discover and make new medicines and vaccines is particularly exciting. This report argues that the UK should make itself the home of AI-native biotech – and this offers benefits for patients and the economy. AI-based drug discovery will increase opportunities and could radically shorten the time to invent new treatments. The UK is home to Europe's largest AI sector, and combined with our deep skills base in pharmaceuticals, we are ideally placed to unlock its potential to boost work right across the life-sciences sector."

Lord Patrick Vallance *Minister of State for Science, Research and Innovation*

A new era of biotechnology is emerging. The past 75 years have produced remarkable feats in traditional biotech – from genetically engineered bacteria producing human insulin to mRNA programming our bodies to fight viruses – but artificial intelligence is now revolutionising the foundations of the industry at every stage and across every stakeholder. For the first time, human, machine and nature's intelligence are coming together in a new polyintelligent era of AI-native biotechs.[1,2]

These AI-native biotechs are fundamentally different to traditional biotech companies, in that AI is not just a support tool but a novel foundation upon which value is created and captured. They are built with AI from the ground up, which impacts not just their operations but their fundamental value propositions and how key business decisions are made. For example, where previously discovery was directed by human expertise and progressed through linear processes of "hypothesis, test, repeat", AI can now be used to generate hypotheses from data, which can be explored and refined through automated closed-loop experiments.[3] While still in the early stages, with

some discouraging setbacks for a few first-movers and open questions on where the strongest signals of impact will be, these new paradigms have already begun to change the art of the possible.

These fundamental differences mean that AI-native biotechs will need a unique set of conditions to thrive. Specifically, in order to compete they require:

- a strong compute infrastructure to develop their models
- high-quality biomedical data to train the models
- capital that is patient enough to allow for the development of an AI platform before products are created
- regulators that are agile enough to handle those innovative products

Any country in a position to provide such an environment stands to benefit hugely: biotech already generates about $1.5 trillion to $2 trillion globally every year, and that market value is expected to grow to more than $4 trillion to $6 trillion in the next decade.[4,5,6]

The United Kingdom should be one of those countries. Several of the UK's unique sovereign assets could be developed to make it a destination of choice for AI-native biotechs looking to set up and scale. It has a world-class academic-science base, as well as scaled, longitudinal and multimodal medical data sets, an agile medicines regulator and a sophisticated finance industry. The UK is one of the strongest biotech ecosystems outside the US, with the highest concentration of biotech startups and venture-capitalist (VC) funding in Europe.[7] This year, London alone has attracted more than £1.5 billion in VC investment, with more than half of this investment going to companies leveraging AI.[8]

The UK has also proven to be a place where AI giants can emerge, as Deepmind has shown. Indeed, a number of companies are already pioneering AI-native drug development in the UK. In 2024, Demis Hassabis and John Jumper were awarded the Nobel prize in chemistry for protein-structure prediction and since then, UK AI firm Isomorphic Labs has been applying and building on their model.[9] Meanwhile, another foundational UK

company for AI-native biotech, BenevolentAI, has been using machine learning to identify novel therapeutic targets from existing clinical data.[10] In 2025 the UK saw a significant boost to its AI infrastructure with new commitments from the tech industry of more than £31 billion;[11] this promises to help the country to build on early-mover advantage in AI and leverage specialist AI talent.

However, these AI tailwinds stand in contrast to recent headwinds in biotech. At a global level, biotechs are facing unprecedented levels of economic, regulatory and policy uncertainty. Not only does this impact long-term decision-making, but it also puts pressure on biotechs to be as capital efficient as possible to survive.[12] Those pressures are being felt particularly acutely in the UK. There are long-standing and well-documented issues with scaling biotech companies in the UK that need to be addressed, such as access to growth capital and experienced entrepreneurial talent, but now there are new pressures too.[13]

Over the past few years, a combination of foreign tariffs, domestic pricing, rising competition, regulatory backlog, competing government priorities and shifting geopolitics has caused many of the big companies that the UK formerly relied upon for R&D funding to move their bases, trials and R&D spend outside the UK.[14,15] This peaked during one tumultuous week in September 2025, when up to £1.4 billion in commitments from the pharmaceutical industry were either cancelled or paused.[16] That week called the future of traditional biotech in the UK into question.

However, just a few targeted changes to the way the UK develops, tests, licenses and deploys biotech – along with changes to the way the industry is funded – could transform the UK into the destination of choice for a new wave of AI-native biotechs to scale. These “precision system changes” are targeted interventions that fundamentally reorient how a system operates, including underlying structures, incentives, dynamics, resource flows and relationships. Precision system changes borrow from the logic of precision medicine: identifying specific points in a process where personalised intervention could deliver outsized impact within a complex system. As such

they are designed to complement rather than replace the comprehensive recommendations captured in the UK's innovative *Life Sciences Sector Plan* and NHS ten-year plan.[17,18]

In this paper, we describe four key areas where these precision system changes could make a profound difference in the UK: its academic-science base, biomedical data, regulatory and trial innovation environment, and financing. For each we consider three changes that would have the biggest impact on helping the UK to evolve for the era of AI-native biotech:

- External interface: how the four key areas interact with biotechs
- Internal dynamics: how they work internally
- AI transformation: how they use the technology themselves

FIGURE 1

A vision for the UK in the AI-native biotech era

	External interface	Internal dynamics	AI transformation
Academic-science base	Agile partnership models for biotech: centrally protocolised and coordinated biotech partnerships that would have associated co-funding.	Reoriented academic incentives: IP created and investment secured would be weighed equally against publications and grant funding for advancement.	Agentic academic partnership platform: opt-in, federated, national infrastructure showcasing licensable IP, data and assets needing partnership (a data commons).
Biomedical data	Preferential data-access agreements: data used as national asset to advantage UK-domiciled biotechs; equity would replace upfront financing.	AI native, AI safety: working with industry to harmonise data capture with AI frameworks, and ensure AI safety and patient privacy.	Agentic clinical-insights interface: agentic framework within HDRS and NHS that would bridge downstream insights with biotech decision-making.
Regulatory and trial innovation environment	Partner for visibility: deep understanding of emerging technology five years out from clinical application	Prioritising innovation: capacity and capability would be oriented towards innovative	Clinical regulatory co-pilot: historical data and diverse subject-matter expertise would be captured by multi-agent tools readily

	would enable safe innovation in clinical-research regulations.	medicines, enabled by mutual recognition.	available to MHRA.
Financing	National Capital Intelligence Platform: AI-enabled tools would bridge expertise gap for biotech towards growth funding across pensions and tech.	Catalytic infrastructure investment: climate-finance capital and risk-management tools could be leveraged to fund AI-native infrastructure.	Sovereign autonomous labs: autonomous labs would be a national asset to supercharge UK industry and academic science.

The UK has a choice. It has already made a commitment to life sciences as a driver of economic growth in the next decade and it already has a unique set of sovereign assets at its disposal – will it choose to restore the conditions that established its historical position in traditional biotech, or evolve to meet the needs of future AI-native biotechs and host the next phase of the biotech revolution?

01

Academic-Science Base: Pioneering a New Symbiosis With Biotech

The UK's world-class academic-science base is a key reason that the country has had such a thriving biotech industry: it is home to four of the top ten universities in the world; its scholars contribute disproportionately to the biomedical science literature compared to the rest of the world; and UK institutions have spawned countless commercially successful companies. UK biotechs raised about £1.25 billion from VC in 2023, amounting to 41 per cent of all European biotech investment.[19]

However, in the AI-native era, the role of academia – and therefore its relationship with industry – is likely to change. Traditionally, the value of academia has been at the very early stages of platform and product development: generating the intellectual property (IP) that university spinouts develop and commercialise. For AI-native biotechs, academic collaboration could be particularly valuable later in the development pathway. A good example is in drug development, where the early part of the process – biological discovery and target identification – is being revolutionised by applying sophisticated generative AI to large, high-quality data sets within industry.[20] As biotech platforms uncover novel biology and targets, the value of academia can be in its ability to help interrogate the basic biology and validate targets.

This is where bottlenecks exist for AI natives – and this is where academia can help. It has the infrastructure and expertise to be utilised in investigating newly uncovered biology, forming new disease models and conducting wet-lab testing for multiple targets (in parallel across a range of modalities). Prioritisation is particularly important for resource-constrained biotechs – which have limited "shots on goal" in the early stages – as is the non-dilutive funding that academic institutions benefit from. Academia can also help establish benchmarks for AI-native biotechs to assess the performance of their models.

The UK's academic institutions could be natural partners for this new generation of AI-native biotechs. The Francis Crick Institute, for instance, has 15 core science and technology platforms and more than 100 basic and disease biology labs, which have carried out several projects with industry partners such as GSK;[21] the newly formed Ellison Institute of Technology in Oxford is building advanced AI and robotics platforms for discovery, aiming to break down silos between research and industry;[22] and Cambridge University has begun to centralise ways to navigate its own rich ecosystem, such as through collaboration with Cambridge University Health Partners.[23] Biotech partnerships could be very timely for UK academic institutions, given the role that pharma R&D funding played alongside government investment and philanthropic donations for labs.

This is a space that AI-native biotechs could potentially step into, but it would have to involve a very different relationship between academia and industry. Biotechs need speed, agility and adaptability in partnerships to be competitive. Unlike big pharma, early-stage biotechs are unable to fund decades-long research partnerships with academic institutions: they are far too under-capitalised and often have high upfront costs themselves. They are, however, fast-growing – and, when successful, high return.

As such, a partnership model that accelerates operational set-up times and establishes the option for a shared equity model with academia, or one based on royalties, could work better for biotechs. However, a precondition of success would be for participating institutions to spread risk across a range of companies or technologies with a portfolio approach. For these biotech partnerships to proliferate beyond the relatively small subset of labs that currently engage with industry, academics would need to be rewarded for securing these partnerships. A fundamental shift in the longstanding incentive structures of academia, which tie career advancement to metrics such as grant funding secured and papers published, could be transformational.

Academia also brings a diverse range of assets and capabilities to the table that potential partners may not even know exist. Partnerships with academic assets could include access to tissue banks or laboratory data sets, or licensed IP; partnerships with academic capabilities could include a project

that uses a lab's disease models or an institution's specialised facilities. To support partners in navigating these opportunities – and to catalyse partnerships with them – multi-agent frameworks could be used (like a data commons) to simplify access, linking these assets and capabilities across universities through national funders. These frameworks could become a key interface through which the UK academic-science base secures global partnership and investment.

Shortly we will lay out the first of our suggested "precision system changes". These borrow from the logic of precision medicine: identifying specific points in a process where personalised intervention could deliver outsized impact within a complex system.

FIGURE 2

The similarities between precision medicine and "precision system changes"

Precision medicine	**Precision system change**
Targets molecular or genetic mechanisms that underlie a disease.	Targets the structural or incentive mechanisms underlying systemic misalignment.
Seeks maximum therapeutic impact with minimal collateral damage.	Seeks transformative leverage through focused interventions rather than diffuse reforms.
Uses data, analytics and feedback loops to refine interventions.	Uses systems mapping, behavioural insights and iterative learning to continuously adjust strategy.
Moves from one-size-fits-all treatments to personalised, evidence-based approaches.	Moves from one-size-fits-all policy reform to context-specific, adaptive, evidence-informed change.

These changes are targeted interventions that fundamentally reorient how a system operates, including underlying structures, incentives, dynamics, resource flows and relationships.

Academic-science base: precision system changes

1. **Agile partnership models for biotech:** Protocolised partnership agreements would foster the speed, agility, adaptability and clarity of the engagement model that universities and AI-native biotechs will need. This model includes new financial frameworks, replacing large upfront or milestone-based payments with equity- or royalty-linked approaches. Non-dilutive co-funding vehicles for biotech partnership would support the co-generation of IP and advance public-private partnerships in basic and applied scientific discovery.
2. **Reoriented academic incentives:** Incentive models would be shifted to value IP generation and attracting industry funding (whether through biotech partnership or VC investment) on equal terms with published articles and the awarding of grant funding. Biotech partnership could be proliferated at scale throughout academia, because academics would be rewarded with career advancement for working in concert with biotech to advance science that delivers impact.
3. **Agentic, academic data commons (shared platform):** Data from universities would be generated in a standardised framework optimised for analysis with AI. Federated data of all kinds, ranging from universities' patents to lab experiments, could be organised and navigated by AI agents that are trained in the domains relevant to that data, such as law or chemistry. Universities could use the multi-agent framework to showcase their best assets for investment or partnership with industry and other universities, both directly and through participation in a harmonised national framework.

SPOTLIGHT

Foundations for a New Symbiosis

"The ethos of the Crick is to promote interdisciplinary research and an open, collaborative approach to advance scientific understanding. Specifically, we work with industry, investors and other external partners to integrate the Crick's deep scientific insight and leading technology platforms with the resources, expertise and capabilities of biotech and pharma, to accelerate the translation of pioneering discovery research into innovative medical products, technologies and services."

Stephen Mayhew *CBO, Francis Crick Institute*

"At Oxford's Ellison Institute of Technology, with world-class scientists, technologists and entrepreneurs, we build AI-native platforms and partnerships that turn momentum into commercially sustainable solutions for society. We also train the next generation of leaders at this frontier, so capability and capacity scale together. As AI transforms discovery, we break down silos across science, research, industry and policy so that academia and industry evolve together, combining strengths to reimagine the path from discovery to applied impact."

Cecilia Lindgren *Principal Scientist, EVP, AI & Robotics Institute, Ellison Institute of Technology; former Director of the Oxford Big Data Institute*

"Academic science in the UK is one of our strongest national assets, especially in the life sciences and AI. To help create partnerships that change the world, Cambridge University Health Partners has built a one-stop gateway to navigate and engage the diverse Cambridge ecosystem –

one of the most dense and innovative biotech clusters in the world. Evolving our academic model to create a stronger symbiosis with industry will be more important than ever as AI changes how science is done, and we're prepared to meet this challenge."

Kristin-Anne Rutter *Executive Director, Cambridge University Health Partners*

02

Biomedical Data: Aligning New National Data Sets With Biotech

Biomedical data have long been a core component of biotech development. For example, the 100,000 Genome Project at Genomics England (GEL), and the Genomics and Proteomics data sets at UK Biobank, have been foundational for countless discoveries in biotechs the world over.[24] For AI-native biotech, access to biomedical data will be even more critical. Data are the foundational building blocks of this new industry – assets that are critical at every step in the drug-development pathway – and countries seeking to host AI-native biotechs will need high-quality biomedical data as part of their ecosystem.[25]

The UK already has the basis for what could be one of the most attractive scaled biomedical data sets in the world for AI-native biotech. The NHS looks after patients from cradle to grave by delivering primary, secondary and tertiary care, and boasts one of the most diverse populations in the western world. And although there are well-documented issues with fragmentation of the data that this care produces,[26] there are clear government plans to integrate it and simplify access through a new Health Data Research Service (HDRS). In addition, the UK has committed to expanding this data set: it has become one of the first countries in the world to begin whole genome sequencing from birth[27] and has created the world's largest cohort study (more than 2 million participants so far) to prevent disease, in the form of Our Future Health.[28]

However, for AI-native biotechs to benefit from high-quality biomedical data, it will be important to ensure that access to these data sets is improved. Access costs are prohibitively high for early-stage biotechs and the composition of biomedical data sets for research will need to change. Historically, many of these data sets were shaped for the needs of large pharmaceutical companies, but AI-native biotechs will have unique needs suited to their operating model: compatibility with agentic frameworks, generative models and bioplatform approaches.

In current consortium models for data generation, high access fees are paid to secure exclusive rights to the results of experiments funded and planned by consortiums (usually made up of pharma companies or very mature biotechs) for a fixed period of time; thereafter the results are added to the common data set and made available to all.[29] This is an effective mechanism for enriching the data set, but it tends to favour large incumbents. In future models, UK taxpayer investments in data could be turned into a competitive advantage for UK-domiciled biotechs, and their technology and insights could help future-proof these data sets.

Achieving this will require fresh thinking and new ways of working. For instance, lower access fees or preferential access terms could be a strong pull for those looking to set up and scale in the UK. However, these incentives would need to be matched by compensatory returns such as equity in the budding biotech royalties from future drugs or in-kind support of consortium data, such as lending technology or data-curation services. Similarly, while a more tailored composition of medical data might be possible, it will only be achieved by bringing tech, biotech and pharma to the table early on.

These shifts could prove hugely beneficial for national data assets such as HDRS in the future, but they could also offer significant benefit to existing data sets right now. UK Biobank, for example, already hosts one of the most highly curated sets of scaled biomedical samples in the world: deeply phenotyped, multi-omically characterised and longitudinally tracked. Biotech participation in new data generation from these samples could add new dimensions by applying emerging technologies, and new AI methods could allow insights to be generated from a smaller number of samples at a lower cost. This would generate value from the UK's existing data resource while adapting new data sets for the future.

As data sets evolve with AI, it will be key to maintain historically high standards in patient privacy and how data are used, ensuring AI safety downstream. As biotechs draw on growing clinical data sets in the UK, agentic AI can discover insights embedded in the data about what it takes

to get an intervention approved and adopted in a complex system. On a national level, these insights can be used to inform the early decisions that biotechs make on what therapies or devices to develop.

Biomedical data: precision system changes

1. **Preferential data-access agreements:** Preferential terms of access for domestic biotech startups and scaleups would drive economic growth and foreign direct investment by attracting the best AI-native biotechs to the UK. Payment models for new data consortiums could evolve to include options beyond high upfront costs, such as shared upside or in-kind contributions to increase the quality of the data. This would complement existing models with new sources of long-term growth.
2. **AI native, AI safety:** National organisations would create, integrate and analyse UK biomedical data, working with tech, biotech and pharma to shape how data are captured and annotated. These processes would be designed to be AI native and adaptable, and to maximise insights. Patient privacy and input would continue to be the highest priority in shaping new secure data environments are shaped, and AI-safety standards would be key in granting access to the data.
3. **Agentic clinical-insights interface:** Different kinds of clinical data across many diseases – such as the standard of care, symptoms, patient history, adherence to medications, adoption of new medications and reimbursement – would be integrated, potentially via the HDRS, into a framework of multiple AI agents. Agents would navigate the data and emulate key specialties in the care pathway, pulling on training carried out

on national data, best practices and relevant literature. This agentic clinical-insights interface would become an invaluable tool for biotechs to decide what drugs or devices they would develop.

SPOTLIGHT

Paradigm-Shifting National Data Assets

“Our first programme, the 100,000 Genomes Project, led to the NHS being the first national health-care system to integrate genome sequencing into care. Through it, we developed the capabilities in delivering national digital genomic systems, in developing evidence that drives adoption, and in ethics, equity and public engagement. We're using those capabilities today as we explore new areas like newborn sequencing; and they're vital as we enter the AI era. The UK is uniquely placed to support this revolution.”

Rich Scott *CEO, Genomics England*

“The UK Biobank stands as a cornerstone of the UK’s global leadership in life sciences, with its multimodal and longitudinal data powering thousands of biomedical discoveries worldwide. As AI transforms research, the way we generate and use scaled biomedical data must evolve in step, supported by collaboration across academia and industry. We’re preparing for that future so that UK Biobank remains at the heart of the UK’s AI-native data infrastructure and its long-term scientific competitiveness.”

Sir Rory Collins *Chief Executive, UK Biobank*

“Wellcome will continue to prioritise high-quality, trustworthy data as the foundation of the AI-native life-sciences economy – from flagship cohorts like UK Biobank and Our Future Health to the new Health Data Research Service – which will enable fast, responsible access to UK life-science data for public benefit.”

Tariq Khokhar *Head of Data for Science and Health, Wellcome Trust*

03

Regulatory and Trial Innovation Environment: The UK as a Partner for Innovative Medicine

The UK's Medicines and Healthcare products Regulatory Agency (MHRA) is one of the most trusted reference regulators in the world; however, AI-native biotechs require a different approach to regulation. This approach will require agility and the rapid creation of technological expertise to keep pace with the transformation and acceleration being driven by AI. If MHRA leads in this new approach it could be a powerful catalyst in making the UK the home for this new era of biotech.

The MHRA has already shown itself to be an innovative regulator: it was the first to approve a CRISPR therapy (Casgevy) and the first in the western world to approve a Covid-19 vaccine (Comirnaty).[30,31] Recently it also forged first-of-their-kind public-private partnerships called Launchpads across industry, the National Institute for Health and Care Research (NIHR), the NHS and GEL, to co-design new systems that could accelerate cancer vaccines and therapies.[32,33] Its most recent business plan also sets out clear plans to build on the success of programmes including the Innovative Licensing and Access Pathway, Centres of Excellence for Regulatory Science and Innovation, and the AI Airlock, to consolidate its position as the globally preferred partner for regulatory innovation.[34]

Experience shows that a key factor in determining the success or otherwise of regulating innovation at the cutting edge is working closely with industry. The MHRA's experience with mRNA vaccines during the Covid-19 pandemic is a good example of this. At the time, mRNA was new and little understood. The MHRA partnered with Moderna and was able to benefit from its deep understanding of this new modality as a first-mover, working with NIHR to establish new regulatory and trial paradigms for cancer vaccines and more.[35] Industry insight into the pipeline also helped the MHRA prepare to safely and innovatively regulate future mRNA products across the wider industry, through advanced capability and expertise-building.

There is now an opportunity for the MHRA to create a niche for itself in the regulation of innovative medicines – but to do so it will need to operate differently. For instance, to regulate new platforms safely and effectively at speed, the MHRA, NIHR and NHS will need to work closely with industry far earlier to horizon-scan and prepare capability for an increasing volume of diverse products requiring regulatory and clinical innovation. The MHRA will probably have to specialise too. For example, rather than regulating all treatments by itself in the UK, it may have to "concentrate on domains where truly novel and transformative therapies are emerging" and rely far more on "the mutual recognition of products approved by trusted international partner organisations", as Lord Patrick Vallance has suggested.[36] As a go-to regulator for innovative biotech products, the UK could set international standards and drive up activity in clinical trials. And as a member of the Access Consortium, the MHRA will be in a position to share these learnings and new paradigms with a trusted set of global regulators to amplify impact.

It is also likely that the MHRA will need to use AI to regulate this new industry. Tools that can help regulators and advisors at all levels of experience to learn quickly from the MHRA – and the industry's historical data on guidance, trials, technologies and diseases – can become a key asset in the future of regulation.

Regulatory and clinical innovation: precision system changes

1. **Partnering for visibility:** National regulatory and clinical-trial organisations would partner with industry on the regulation of innovative products to develop a deep and earlier understanding of emerging technologies. This early visibility would allow the UK to prepare the expertise and capability to regulate and test innovative products created by these technologies in a safe and innovative manner.
2. **Prioritising innovation:** The UK would concentrate on innovative products, which would require far greater reliance on the mutual recognition of products approved by trusted international partner organisations. However, the focus and expertise of the MHRA (and the UK more broadly) would make it the go-to partner for clinical trials to test new, innovative products, driving growth on the part of first-movers and fast-followers.
3. **Clinical regulatory co-pilot:** Innovation in regulation and trials would be powered by agentic AI frameworks. These federated AI frameworks would learn from historical data and leverage diverse domain-specific expertise in technologies and disease areas, to help in the evaluation of new products. The frameworks would also serve as a UK clinical-regulatory co-pilot and a training tool for regulators and clinicians.

SPOTLIGHT

Leaders Anticipating Shifts in AI

"Regulation in the age of AI and personalised medicines should be iterative, rapid and proportionate, rather than an all-or-nothing leap over an improbably high bar; like a hurdles race, not a high jump. In a rapidly changing regulatory world with the advent of AI, to achieve our goal at the MHRA of being an agile organisation that drives innovation and growth, strengthening our collaboration with industry partners will be vital so we can adapt and prepare to safely regulate the emerging technologies of the future."

Lawrence Tallon *CEO, MHRA*

"The commercial-trials review recommended a set of actions that would create a faster, smarter, more agile clinical-trials system – and that remains the foundation for UK leadership. The next step is preparing for a world where AI transforms how trials are designed, run and analysed. That will require deeper collaboration across industry and regulators to stay ahead of innovation while maintaining safety and trust. Done well, the UK can make its clinical-trials infrastructure ready for the AI era and restore its global leadership."

Lord James O'Shaughnessy *Author, Commercial Clinical Trials in the UK: The Lord O'Shaughnessy Review*

"Moving from analogue to digital is a priority in the NHS ten-year plan. The use of AI and machine learning will form an important part of this as the NHS focuses on how we use technology to transform patient care, much in the way other industries have harnessed the power of AI to become responsive to needs and ensure services are easier to engage with."

David Probert *CEO, University College London Hospitals*

04

Financing: Building the Capital and Compute Foundations for AI-Native Biotech

All biotechs need capital to scale – but AI-native biotechs are particularly dependent on a limited set of multidisciplinary specialist investors who can understand them, and domestic AI infrastructure that can propel them.[37]

With regards to scaling capital, there are well-documented issues with access across sectors in the UK, as outlined in TBI's recent paper, *From Startup to Scaleup: Turning UK Innovation Into Prosperity and Power*. While UK biotechs do well on startup VC funding, the growth capital gap often means biotechs are acquired by big pharma prematurely, or leave the UK entirely to secure scaling capital abroad.[38]

Successive governments have made efforts to increase UK growth capital. For example, a subsidiary of the British Business Bank (BBB) was formed in 2018 to invest £2.5 billion in UK growth-stage funds and companies through dedicated vehicles such as the Life Sciences Investment Programme;[39] with the BBB's two-and-a-half-fold increase in financial capacity to £25.6 billion in 2025, these specialist teams are ideally positioned to move the needle.[40]

As a first step towards mobilising pension-fund capital to scale UK companies, the Mansion House Compact was created in 2023 as a voluntary agreement between major UK pension funds to increase domestic allocations.[41] Many are working tirelessly to advocate for formalising commitments and creating new vehicles for deployment. We echo the view that even a small percentage of the more than £3 trillion[42] managed by UK pension funds flowing into UK life sciences would be transformative. However, we focus our discussion on new precision system changes that can augment existing efforts, and create outsized impact from existing and future vehicles.

Because AI-native biotechs operate at the intersection of two fields that are changing quickly, they can be difficult for specialist biotech or tech investors to understand, let alone VC or pension-fund investors. To create a fertile financing environment it will be important to build bridges to non-specialist investors who can ensure capital flow at scale.

With its sophisticated finance industry and AI expertise, the UK is well positioned to create AI-enabled tools that can help generalist investors distil scientific complexity into investable narratives and risk-return profiles that they can evaluate. Together, these tools could mobilise growth capital from managers who are reluctant to build dedicated life-sciences teams, playing a similar role to biotech analysts. Such tools, brought together into a National Capital Intelligence Platform, could serve as a compelling use case for the newly formed £500 million Sovereign AI Unit[43] as it aims to build UK AI capabilities for economic growth.

Alongside their capital needs, AI-native biotechs rely heavily on infrastructure such as cloud compute and high-performance compute. Recent data-centre investments by several tech giants, and the government's AI Research Resource initiative to build national AI supercomputers, are a strong start. However, it will be critical to crowd in private capital to scale this infrastructure dramatically if the UK wants to compete in AI-native biotech.

In this regard the UK should look to its own impressive track record in innovative climate finance: the Green Investment Bank lent to green infrastructure projects; the Climate Finance Accelerator funded international low-carbon projects; the government's Contracts For Difference scheme created new investable asset classes in areas such as solar and wind power; and the India Green Guarantee, a sovereign-backed credit scheme, pioneered a risk-mitigation instrument for the World Bank in considering green infrastructure investments.[44,45,46,47] More recently, the Advanced Research and Invention Agency (ARIA), a non-dilutive funder for innovative research, and the National Wealth Fund (NWF), a £27.8 billion vehicle for national infrastructure investment, have been created to crowd in commercial capital.[48,49]

In many ways, funding the transition to AI-native industries is not dissimilar to funding the transition to net zero. Both have high upfront costs (and so are well suited to equity agreements), both are heavily infrastructure dependent (requiring a lot of government investment), both have long time horizons (requiring patient capital) and both have a high degree of regulatory and technical risk (necessitating a portfolio approach). In the short term, existing vehicles such as the NWF, that have traditionally focused on climate infrastructure, could make a substantial impact in financing and risk mitigation for compute infrastructure.

Another powerful enabler for AI-native biotechs is emerging: autonomous labs. Autonomous labs combine advanced robotics, sensors and data systems with AI models that can design and interpret experiments.[50] Many are calling these systems "AI scientists", and they are designed to carry out the scientific method without needing human intervention. They are being piloted and scaled for applications from biology to materials science, and have the potential to fundamentally change the way science is done; they could also transform the systems in industry and academia (such as finance and education) that support it. In the UK, ARIA has already launched an AI-scientist funding call to learn how to engage with this emerging technology.[51] As the technology matures, autonomous labs are likely to become a critical source of competitive advantage for countries looking to lead and grow in AI-native biotech. The time to establish a first-mover advantage is fast approaching.

Financing: precision system changes

1. **National Capital Intelligence Platform:** A UK AI co-pilot for capital allocation would bridge expertise gaps to flow capital from non-specialist investors toward AI-native biotech. The platform could leverage market trends, insights from sovereign investors such as the BBB and portfolio simulation, to allow pension funds, tech investors and other asset managers to dynamically quantify and contextualise AI-native biotech risk and potential return.
2. **Catalytic infrastructure investment:** Catalytic, patient-capital and risk-mitigation instruments could be deployed through existing vehicles such as the National Wealth Fund, which has a mandate in the life sciences: to crowd in private-capital investment to scale the UK's compute infrastructure.
3. **Sovereign autonomous labs:** AI-integrated, modular laboratory units would be built as a national asset to supercharge and transform the industry and academic science in the UK. These autonomous labs could conduct continuous cycles of hypothesis generation, experimental testing and learning across a range of scientific domains.

SPOTLIGHT

Shifting Finance Landscape in the UK

"Through decisive actions like the Mansion House Reforms and the launch of the Sterling 20 group, the UK government is building a framework to enable Britain's wealth to crowd in alongside global investors, and back British innovations in life sciences to scale up. New financial institutions have the mandate and remit to de-risk private investment and create innovative new funding streams for AI-native biotechs. As AI transforms the economy, life sciences included, the UK is building an environment where innovators can grow and succeed."

Steve Bates *Executive Chair, Office for Life Sciences*

"ARIA is unlocking new ways to fund breakthrough science in the UK, focused on bold ideas that can change how discovery happens. We're exploring what it means to work at the frontier of AI – and what becoming an AI-native funder could enable. Our AI Scientist call is central to that effort, supporting work that tests and clarifies what today's AI systems can and can't do in science, and where they may open genuinely new frontiers."

Pippy James *Product Officer, Advanced Research and Invention Agency*

"For years we've talked about unlocking capital for UK biotech; now we're finally seeing the pieces align. The science has always been world-class, but what's changing is the system around it: the data infrastructure, the AI capabilities, the scaled capital sources the UK is creating and bridging into, and the global environment we're operating in. We're entering a moment

where capital can flow into that connected system with real velocity. When it does, the UK won't just compete: it will define what leadership in AI-native looks like."

Dan Mahoney *UK Life Sciences Investment Envoy and Chair of the British Industry Association*

Conclusion

The time to act on UK biotech, and prepare it for the AI-native era, is now. On the one hand, the biotech industry faces immense pressure to adapt to shifting geopolitical and technological challenges; on the other, AI offers a uniquely disruptive tool to help achieve that. This is an unprecedented opportunity delivered at a time of unprecedented uncertainty – and it will require precise and decisive action.

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Endnotes

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