Bana Jabri â?? Director, Institut Imagine

Academic institutions are increasingly responsible for the most challenging aspects of drug developmentâ??target identification, mechanism validation, and early-stage clinical translationâ??while pharmaceutical companies focus on later-stage clinical trials and commercialization.

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Professor Bana Jabri, Director of the Institut Imagine, brings a transatlantic perspective to advancing genetic medicine. After 25 years in the US, she now leads efforts in France to harness genomic technologies, foster interdisciplinary collaboration, and modernise academicâ??industry partnerships. Her vision calls for strategic investment, institutional autonomy, and greater risk tolerance to help France compete globally in biotechnology.

What motivated your decision to leave the US after 25 years to assume leadership at the Institut *Imagine*?

My decision to transition from the University of Chicago, where I had recently been appointed to establish the Institute for Immunology, was driven by a convergence of strategic opportunities that represent the future of genetic medicine. The Institut *Imagine* presented a unique ecosystem that addresses three critical elements essential for breakthrough innovation in healthcare.

First, the instituteâ??s campus within the Necker-Enfants Malades Hospital provides an unparalleled integration of clinical practice and research excellence. This 200-year-old institution has consistently operated at the forefront of medicine, establishing a culture where research and clinical application are inextricably linked. The instituteâ??s interdisciplinary approach, centred around genetic diseases

as a unifying framework, enables comprehensive investigation spanning neuroscience, immunology, and developmental biologyâ??a holistic perspective that reflects the current paradigm shift toward systemic understanding of disease mechanisms.

Second, the instituteâ??s connection to more than 30 reference centres for rare diseases in France creates unprecedented access to patient cohorts and clinical data. This infrastructure provides the foundation for translating genetic discoveries into therapeutic applications. The combination of physician-scientists leading research initiatives alongside clinicians embedded within laboratory settings creates an environment where innovation can rapidly progress from bench to bedside.

Third, as an Institut Hospitalier Universitaire, we have an explicit mandate for valorization, the systematic translation of research discoveries into biotechnology ventures and therapeutic solutions. This obligation aligns with my conviction that academic institutions must play an increasingly active role in bridging the gap between scientific discovery and clinical implementation.

The international search process itself demonstrated the instituteâ??s commitment to excellence. The independent selection committee, chaired by distinguished leaders including Nobel laureate Elizabeth Blackburn, signaled an institutional culture that prioritizes merit and strategic vision over conventional hierarchies.

You have described this as a pivotal moment in genetics. What technological developments are driving this transformation?

We are witnessing a fundamental paradigm shift in genetic medicine, driven by breakthrough technologies that are expanding our analytical capabilities beyond traditional coding regions to encompass the entire genomic landscape. This represents perhaps the most significant advancement in genetic analysis since the advent of next-generation sequencing.

The initial revolution in exome sequencing dramatically improved diagnostic capabilities, increasing identification rates for genetic disorders from ten percent to 40-50 percent. However, we have reached a plateau with this approach. The limitation lies in our previous focus on coding regions, which represent merely two percent of the human genome. The remaining 98 percent consists of regulatory elements that control gene expression, alternative splicing mechanisms, and three-dimensional chromatin structures that fundamentally influence cellular function. In addition to uncovering the role of digenism and multiple gene interactions, the next frontier lies in the exploration of non-coding variants and epigenetic modificationsâ??both of which are essential to fully understanding genotype-phenotype relationships.

Recent technological breakthroughs from companies such as PacBio and Oxford Nanopore have revolutionized our capacity to analyse these previously inaccessible genomic regions. These platforms enable comprehensive whole-genome sequencing with simultaneous analysis of methylation patterns, splice variants, and messenger RNA profiles. This multi-dimensional approach provides unprecedented insight into the regulatory networks that govern cellular behaviour.

The implications extend far beyond improved diagnostic capabilities. Understanding the three-dimensional architecture of DNA, epigenetic modifications, and regulatory networks opens entirely new avenues for therapeutic intervention. We can now identify how genomic variations influence disease susceptibility, drug response, and treatment outcomes at a level of precision that was previously impossible.

This technological convergence creates a strategic opportunity for institutions with the appropriate infrastructure and expertise to lead the next generation of genetic medicine. The Institut *Imagineâ??s* interdisciplinary approach and clinical integration position us to maximize the potential of these emerging technologies.

How do you envision implementing your strategic priorities of international collaboration, diversity, ethics, and global physiological approaches?

Our strategic framework is designed to address the increasing complexity and cost of cutting-edge research while maintaining the flexibility necessary for breakthrough innovation. The evolution from single-author publications to collaborative efforts involving 40-50 researchers reflects the fundamental shift toward team-based science and shared technological platforms.

At the national level, we are establishing strategic partnerships with the Pasteur Institute and Curie Institute to create shared technological platforms and collaborative research initiatives. This approach reduces capital expenditure while expanding access to specialized expertise across institutions. We are implementing joint hiring programs and shared student training initiatives that enhance our collective capacity for innovation.

Internationally, particularly in rare disease research, we must transcend geographical boundaries to access sufficient patient populations and diverse technological capabilities. We are developing a comprehensive database that leverages our patient cohorts and genetic mutation analysis to identify regulatory gene networks, making this resource available to the global research community while maintaining appropriate ethical safeguards.

How does the Institut *Imagine* contribute to Franceâ??s national plans for rare diseases and genomic medicine?

Franceâ??s leadership in rare disease research, exemplified by the national plans for rare diseases and Plan France MÃ©decine GÃ©nomique 2025, reflects a strategic understanding of both the humanitarian imperative and the economic opportunity inherent in genetic medicine. The collective impact of rare diseases affects millions of individuals across Europe, representing a significant public health challenge that requires coordinated national response.

However, the strategic value of rare disease research extends beyond patient care to encompass broader implications for common diseases. Our research on genetic mutations affecting receptors linked to Parkinsonâ??s disease demonstrates how insights from monogenic disorders can illuminate pathways relevant to prevalent conditions. Similarly, our work on telomere-related genetic disorders provides insights into aging mechanisms with potential applications across multiple therapeutic areas.

The challenge lies in implementing these national strategies while preserving the institutional autonomy necessary for innovation. Centralized coordination is essential for establishing common biobanks, standardized protocols, and shared databases. However, excessive centralization can stifle the flexibility and rapid decision-making that characterize breakthrough research.

Our approach emphasizes collaborative autonomyâ??participating actively in national initiatives while maintaining the independence necessary for rapid technological adoption and strategic partnerships. This requires sophisticated governance structures that balance collective objectives

with institutional prerogatives.

What changes do you envision in the relationship between academic institutions and pharmaceutical companies?

The current trajectory of pharmaceutical development presents both challenges and opportunities for academic institutions. The industryâ??s increasing emphasis on risk reduction has created a widening gap between basic research and clinical development. Pharmaceutical companies are demanding progressively lower-risk profiles, sometimes requiring phase I safety data before engaging with academic discoveries.

This shift places academic institutions in an increasingly critical position within the innovation ecosystem. We are being asked to assume greater responsibility for translating basic discoveries into clinically viable therapeutics, yet the current framework does not adequately compensate academic institutions for this expanded role.

The disparity between academic discovery and pharmaceutical development is particularly evident in areas such as gene therapy, where treatment costs can reach EURO 500,000. Yet weâ??ve seen alternative models like in Barcelona, where CAR-T therapies are being produced in-house at EURO 80,000.

Academic institutions like AP-HP are exploring biotech licensing to enable direct therapeutic development, but regulatory frameworks often limit these capabilities.

This situation requires fundamental reconsideration of the risk-reward balance in academic-pharmaceutical partnerships. Academic institutions are increasingly responsible for the most challenging aspects of drug developmentâ??target identification, mechanism validation, and early-stage clinical translationâ??while pharmaceutical companies focus on later-stage clinical trials and commercialization.

We need frameworks that recognize the academic contribution to pharmaceutical innovation and provide appropriate returns on investment. The checkpoint inhibitor example illustrates this dynamic: academic researchers working on immune tolerance identified the molecular targets, demonstrated proof-of-concept in animal models, and provided the scientific foundation for what became a multi-billion-dollar therapeutic category.

Future partnerships must acknowledge this reality and create mechanisms for academic institutions to participate in the value creation process. This might involve more sophisticated licensing agreements, joint venture structures, or public-private partnerships that align incentives across the innovation ecosystem.

What structural changes does France need to realize its potential in biotechnology innovation?

France possesses extraordinary talent and innovative capacity across the life sciences sector. President Macronâ??s commitment to simplifying regulations and promoting innovation reflects recognition of this potential. However, realizing this potential requires fundamental changes in how we approach risk, investment, and institutional autonomy.

The primary impediment to innovation in France is not lack of talent or resources, but rather insufficient trust in institutional leadership and reluctance to accept the risks inherent in breakthrough innovation. The American model succeeds because individual universities possess the financial resources and decision-making autonomy necessary for rapid adaptation to changing circumstances.

France must understand that innovation requires risk-taking, and risk-taking requires freedom. Institutions must be empowered, not micromanaged. If France wants to lead globally in life sciences, it must invest not only in infrastructure and funding, but in governance models that value trust, independence, and strategic agility.

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