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Precision medicine in the post-genomic era

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Precision medicine–and its ability to improve patient outcomes with targeted illnesses–is evolving. This change is being driven by advancements in multiomics technologies, including genomics, proteomics, metabolomics, and others. Only recently have we been able to measure enough proteins to obtain a signal and understand it. Advances in mass spectrometry, spatial imaging, affinity-based proteomic tools, and more are enabling high-throughput proteomic analysis to identify predictive biomarkers across diseases.

Life sciences firms will need novel investment strategies to realize the clinical and commercial potential of emerging breakthroughs in multi-omics. For instance, forward-looking firms are already exploring M&A to acquire multi-omics IP and capabilities that can position them at the forefront. Leaders that act now could catch the next great wave of innovation in life sciences.

The evolution from genomics to multiomics is being driven by a dramatic reduction in cost and the applicability of artificial intelligence (AI) to the massive amounts of data produced by other omics technologies. Specifically, the cost to sequence a genome has seen a spectacular decrease, from $2.7 billion for the original human genome project to $600 today,[1] making genomic data much more accessible for research and clinical applications.

The volume of data created by analyzing the genome has already been unwieldy, and the proteome contains more than 1,000 times more cellular information than the genome. Since integrating and interpreting incredibly high volumes of data from different omics sources is cumbersome, sophisticated computational tools and standardized protocols[2] such as AI and machine learning have become critical. These technologies can help identify patterns and make predictions that inform which precision medicine interventions are appropriate for particular patients, uncovering insights that would be impossible for a human to detect. It is important to bear in mind that a data set focused on one disease may also be of use in analyzing other diseases with biological similarities at the molecular level.[3] In the future, AI will allow scientists to analyze all the available data on humans; discover hidden patterns; and output a comprehensive view of the inner workings of cells, tissues, and organs.

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The post-genomic era

These developments are part of what life sciences leaders are calling the "post-genomic era." Although the term more broadly refers to the time period since the completion of the Human Genome Project, the term has gained currency due to the influence of life sciences leaders making great strides in multiomics, which provides a more complete picture of a patient's physiology and more accurate and effective diagnostics and therapies.

For example, the life sciences tools and diagnostics company Bruker has made a major commitment to investments in proteomics, multiomics, and spatial and single-cell biology. Bruker president and CEO Frank Laukien noted at the 2024 JP Morgan Conference that "the last 20 years were dominated by genomics. But proteomics and related fields like glycomics, lipidomics, metabolomics, epiproteomics…will [in many areas] be able to go far beyond what genomic medicine was able to do."[4]

Standard BioTools is another pioneer in the post-genomic era. The company's 2023 merger with SomaLogic was designed to establish a leading platform for multiomic technologies and unlock value in the underserved portion of the $100 billion industry. According to Dr. Michael Egholm, president and CEO of Standard BioTools, "The combined company…represents certainly the broadest next generation of solutions serving the proteomics customer and market in the beyond genomics era."[5]

> "Proteomics will [in many areas] be able to go far beyond what genomic medicine was able to do."
>
> **— Frank Laukien**
> *President and CEO of Bruker*

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The multiomics deal environment

Forward-looking life sciences firms are pursuing mergers and acquisitions to acquire intellectual property and capabilities in multiomics and emerging fields. The top deals over the last two years are:

Life sciences tools and diagnostics deals:

Bruker:

Over the past year, Bruker invested more than $1.6 billion to acquire nine companies, which will help solidify its leadership in post-genomic precision medicine.[6] The largest deals include Phenomex for $136 million and nanoString for $393 million (spatial and single-cell biology); ELITechGroup for $936 million (molecular diagnostics); and ChemSpeed for $176 million (lab automation).

Danaher:

In December 2023, Danaher completed the $5.7 billion acquisition of Abcam, a provider of antibodies and proteomic tools for research, discovery, and diagnostics. The deal expanded Danaher's presence in the proteomics market and contributed to the company's strategy to map complex diseases.

Thermo Fisher Scientific:

In October 2023, Thermo Fisher Scientific completed the $3.1 billion acquisition of Olink, a Sweden-based provider of next-generation proteomics solutions. The deal promises to advance the company's life sciences research in precision medicine.

Standard BioTools:

In January 2024, Standard BioTools completed a $0.6 billion merger with SomaLogic, creating a leading platform for differentiated multiomics tools with the highest throughput and data quality to power clinical research insights. The deal is expected to generate $80 million of annual cost synergies by 2026 and drive what CEO Michael Egholm calls "accelerate(d) breakthroughs in human health."[7]

Biopharma deals:

In 2023, 9 of the top 10 biopharma deals involved acquisition targets with a presence in precision medicine. This trend continued in 2024. Top deals include Vertex's $4.9B acquisition of Alpine Immune and Gilead's $4.3B acquisition of Cymabay.[8]

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Harnessing multiomics for precision medicine in disease treatment

Life sciences researchers can gain a comprehensive understanding of disease mechanisms using multiomics. This approach accelerates biomarker discovery and advances diagnostic development across various disease areas. These advancements highlight the potential of multiomics in early disease detection and personalized treatment strategies.

Some examples of how multiomics can impact specific disease states include:

Oncology:

In oncology, multiomics combines genomic, proteomic, and other data to understand tumor heterogeneity and identify cancer subtypes to develop targeted therapies.[9] In immuno-oncology, multiomics helps researchers study the tumor immune environment and host-tumor interactions to develop targeted immunotherapies.[10]

Neurodegenerative diseases:

Plasma proteomics has been instrumental in identifying biomarkers for Parkinson's disease, predicting disease onset up to seven years before symptoms appear.[12] In Alzheimer's disease, multiomics helps unravel complex molecular mechanisms, leading to the discovery of potential biomarkers and therapeutic targets.[13]

Autoimmune diseases:

In autoimmune diseases like multiple sclerosis, multiomics can yield a detailed picture of the cells involved. These insights can lead to a better understanding of disease pathogenesis and, ultimately, the development of breakthrough treatments.[15]

Featured example:

Argenx BV developed the drug Efgartigimod (Vyvgart) to treat generalized myasthenia gravis using multiomics approaches to identify FcRN as a therapeutic target for the disease. Reducing levels of circulating antibody IgG, the drug appears in clinical trials to be safer and of substantial durability in its duration of effect.[16]

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In the post-genomic era, the integration of multiomics technologies will be critical for life sciences companies aiming to stay at the forefront of drug development. The ability to harness comprehensive data from genomics, proteomics, metabolomics, and other 'omics fields is revolutionizing our understanding of disease mechanisms and enabling the creation of highly targeted therapies. A number of companies have already recognized the immense potential of multiomics through strategic mergers and innovative platforms.

To avoid being left behind, it is imperative for life sciences tools companies and pharma companies to do the following:

01

Investigate their current portfolios (both launched and pipeline) for potential 'omics enhancements and expansions. Clearly calculate and articulate potential ROI by program and cross-program to justify investment.

02

Conduct diligence across both access and development of 'omics programs using partners or inorganic means.

03

Develop bespoke 'omics program and onboard critical AI and 'omics methodologies in house and with partners. By doing so, they can unlock new therapeutic targets, accelerate drug discovery, and ultimately deliver personalized medicine solutions that transform patient care.

How KPMG can help

The Precision Medicine deal market is one of the most active and dynamic in the Life Sciences industry. Our Precision Medicine team provides clients with wide-ranging deal support, from deal strategy, target identification and prioritization, commercial, financial and operational diligence, to execution for acquisitions, mergers, and divestitures and post-deal value capture. Our practice has been on the buy- and sell-side for deals in the Precision Medicine ecosystem for both corporate and private entities.

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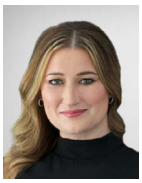

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