

The New Era of Multi-OMICs Therapy: Our investment in Character Bio

Age-related macular degeneration (AMD) affects millions worldwide, leading to progressive vision loss and limited treatment options. Character Bio is changing that paradigm by combining an AI-driven multi-omics platform with the world's richest AMD dataset to develop new precision therapies for these patients. At Luma, we invest in transformative companies, and Character Bio's groundbreaking work promises to redefine the future of eye health.

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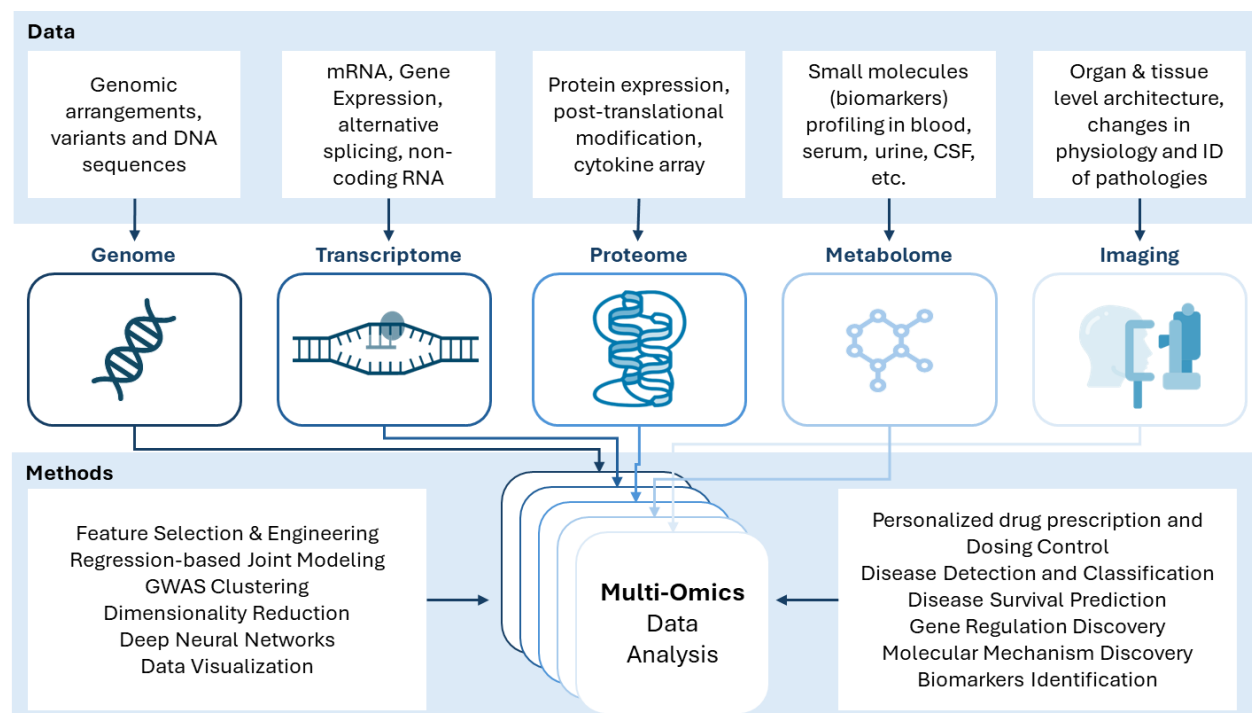
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Over the past two decades, the biotech and pharmaceutical industries have advanced significantly, driven by discoveries from first-generation “-OMICs” data, like genomics. Early successes such as HER2-targeted breast cancer therapies demonstrated that data-centric approaches yield transformative treatments, ushering in the era of precision medicine and numerous therapies. Yet, one truth is increasingly clear as healthcare evolves: we need more high-quality multidimensional data to propel the next wave of precision therapies.

At Luma, our investment philosophy is simple yet powerful: **better data leads to better scientific decision-making and, ultimately, better patient outcomes**. This principle shapes our investment strategy, guiding us to partner with companies leveraging robust, multi-dimensional data to drive drug discovery and accelerate clinical development. Researchers now have powerful tools—e.g., single-cell sequencing, metabolomics and proteomics—to generate large datasets. But more data doesn’t automatically mean better data. The key is to derive meaningful insights. A capability that must grow with data generation. For complex diseases, a holistic understanding of interrelated datasets is vital in helping to unravel disease biology.

We view multi-OMIC data as foundational—and our recent investment in Character Biosciences (Character Bio) reflects this holistic, data-centric approach. Forward-thinking companies like Character Bio are illuminating the complexity behind numerous unmet medical needs and unlocking new discoveries by increasingly leveraging AI and machine learning to analyze these enormous datasets.

Graphic 1: Concatenation and Analysis of Multi-OMIC Dataset



Source: adapted from <https://levelup.gitconnected.com/multi-omics-analysis-3857956a7a3d>

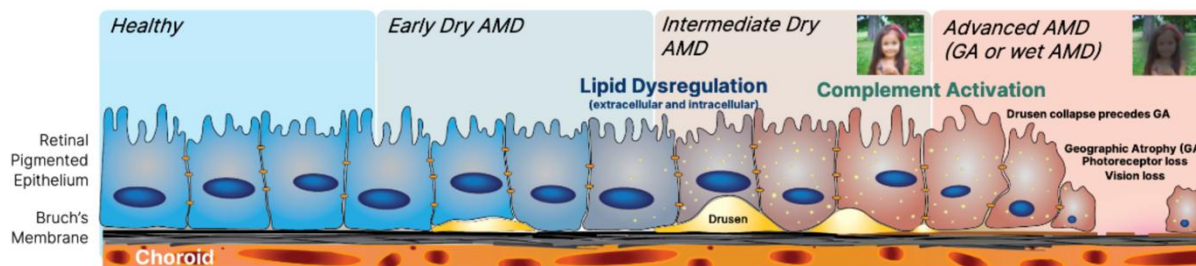
Below, we share why we invested in what we believe to be a paradigm-shifting ophthalmology-focused company – one leveraging AI-driven, multi-OMICs data and insights to pioneer new drugs and clinical trial designs.

Off the Beaten Path: A Move into Ophthalmology

In early 2024, we turned our focus to ophthalmology—specifically, the urgent unmet needs in age-related macular degeneration (AMD). Globally, 1 in 8 people over 50 show signs of AMD, and roughly 10% will progress to geographic atrophy (GA), an advanced form of dry AMD. Both intermediate dry AMD and GA are progressive diseases of blindness and carry a high clinical burden yet currently lack disease-modifying treatments.

The impact is deeply personal: vision loss from AMD and GA can make reading, driving, or recognizing loved ones increasingly difficult—turning daily life into a source of anxiety and isolation. Patients are left with either no available options or therapies with limited efficacy and concerning safety profiles. However, breakthroughs in gene therapy and retinal regeneration point to a coming inflection point - offering new pathways to preserve vision and restore hope for millions.

Graphic 2: Disease Pathology and Progression of Dry AMD



Source: Image provided by Character Biosciences

What struck us most about the AMD/GA landscape is the notable innovation gap in therapeutic development and clinical trial design. Despite a large patient population and extensive genomics research, progress toward effective treatments has been limited. Fields such as oncology and cardiometabolic diseases have leveraged genetic insights to significantly advance drug development, and therapies based on causal genetics are 2.6x more likely to succeed in clinical trials.¹ Additionally, two-thirds of all drugs approved by the FDA in 2021 were supported by robust genetic correlation.² These observations reinforce our belief that the AMD/GA field is primed for breakthroughs driven by leveraging large OMIC datasets to improve therapies and trial outcomes.

We believe that leveraging large multi-OMICs data to pinpoint the complex disease drivers behind AMD/GA pathologies—specifically complement dysregulation, lipid deposition and ischemia—can lead to targeted therapies and smarter clinical trials.

¹ <https://www.nature.com/articles/s41586-024-07316-0>

² <https://www.nature.com/articles/d41573-022-00120-3>

Finding Character Bio

Through our exploration in ophthalmology, we were fortunate enough to meet with CEO and Co-Founder, Cheng Zhang and the Character Bio team back in 2024. From the outset, Character Bio stood out to us for many important reasons:

- **Origin in Rich Data:** Character Bio has dedicated resources to building out the largest, richest database developed for AMD drug discovery and development via self-sponsored observational trials since day one.
- **Integrated Approach:** Rather than focusing on a single biological pathway, Character Bio employs AI to analyze genetic and longitudinal clinical data simultaneously offering an unparalleled view into disease mechanisms, especially those that drive progression.
- **Patient Stratification & Clinical Trial Design:** Character Bio's platform not only identifies high-value targets but also stratifies patients most likely to progress and respond to therapy, drastically improving the odds of clinical success.

An exciting motif that frequently emerged in our conversations with industry leaders was the recurring sentiment: "I wish I had their multi-OMICs datasets." This feedback further bolstered our conviction that Character Bio had developed something truly distinct. That validation was further reinforced by the recent signing of a multi-target drug discovery [collaboration agreement](#) with Bausch + Lomb earlier this year.

Big Data, Big Impact

Our investment in Character Bio underscores the transformative power of "**better data, better decisions**," a principle that guides much of our work at Luma. We're excited to see Character Bio continue to reshape treatment for intractable diseases like dry AMD and show the impact that AI-driven analytics have on developing effective therapies. The company's focus on ophthalmological research has the potential to give people back the freedom to navigate the world with confidence.