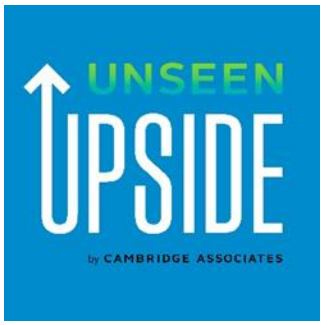

Season Six: Episode Three
AI & Biotech: Accelerating Breakthroughs in Medicine
Launch Date: November 18, 2025

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Hillary Ribaudo: AI touches almost everything these days—from the apps we use and the content we consume to how our money stays safe. But one industry has been especially transformed: medicine. AI can scan X-rays and MRIs and flag what a human might miss, helping doctors catch problems sooner. And hospitals are rolling out full AI programs to ease paperwork and improve care.

So, as AI permeates every corner of the industry, can that momentum fix what's broken in drug development?

Sunil Dhaliwal: Expensive, slow, and not very likely to succeed is a pretty bad combination when you think about applying capital to get a return.

Hillary: Bringing a new medicine to patients is a long haul.

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Hillary: It often takes 10 to 15 years from lab to pharmacy shelves. By the time a drug even reaches a clinical trial, companies may have poured over a billion dollars into R&D. And nearly nine out of ten drug candidates that enter human testing never make it to market.

Sunil: Right now there's plus or minus 50 therapies that are approved for patients every year. That number is way too small. We need to figure out how to double or triple the amount of groundbreaking medicines that can reach the patients that need them. And we think that AI is the answer.

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Hillary: An important part of creating medicines is making sure they don't harm the body, so with the help of AI, Axiom Bio is working to make the drug development process safer, faster, and more ethical.

Brandon White: We're focused on solving drug toxicity by replacing physical experimentation with AI experimentation.

Hillary: Today, Axiom is building one of the largest human-relevant toxicity datasets to train AI, so we can spot safety problems even earlier. Until now, screening leaned on animal tests that are slow and risky. As regulators step back from many of those requirements, investors and clinicians are taking notice. Which raises a bigger question: how is AI changing healthcare on the ground?

This is Unseen Upside by Cambridge Associates, where we explore investments beyond their returns. I'm Hillary Ribaudo.

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Brandon: The first time I built a ML algorithm to detect cancer from a blood draw, and it was accurate, and you could see the model learning how to find the signs of cancer was just a really powerful moment for me, as it demonstrated that ML has the opportunity to learn and understand biology in a way that humans cannot.

Hillary: Brandon White has shipped cancer-detection models into the clinic, built AI at Uber, and he's even been a professional video gamer.

Today, Brandon is the co-founder and CEO of Axiom, a company leveraging AI to eliminate drug toxicity, without using animals. Before Axiom, Brandom was a Senior Product Manager at the biotech company Freenome. He was designing a platform to detect cancer at an early stage. But his path towards creating tools for scientists came after what at first felt like a setback.

Brandon: When I was younger, I really wanted to be Barack Obama. I think he was awesome speaker. He was very inspiring person. So I wanted to be a lawyer and then become a politician and so, my father took me to visit a very famous lawyer and talk about how I could become a lawyer and, he basically laughed me out of the building and he told me that I would never become a lawyer and that I could never succeed in that space, and that was very painful, but I think it helped me understand where I thrive, and that's through building.

Hillary: Brandon found his skills were well-suited for the rapidly evolving world of AI. After honing his chops as a ML engineer, he teamed up with Alex Beatson to found Axiom. The company is aimed at transforming drug development, starting with toxicity. Historically, animal testing has been the standard way to assess drug toxicity before medicines advance into human clinical trials.

Brandon: 90% of drugs that are safe and effective in these animal tests fail because they are not safe and effective in humans. So safety and efficacy are the biggest causes of failure for drugs, about 50 to 60% fail the late stages of preclinical development because of animal testing.

Sunil: The dirty little secret of animal testing is animal biology does not translate very well to human biology when you think about safety.

Hillary: Sunil Dhaliwal is a general partner at Amplify Partners, an early stage fund focused on technical founders. They back researchers, scientists, engineers, and otherwise technical people across domains like infrastructure, AI, developer tools, and digital biology. Amplify backed Axiom early—betting on its data-driven alternative to animal-based toxicity testing.

Sunil: I can do a test on a mouse or a rat or a primate that tells me that something is likely to be safe and get a very different result when I actually give it to a human just in those modest differences in biology.

Brandon: They are just poor models of human outcomes. They're very inaccurate. They're also extremely expensive and slow. But it's all what we have, and it's better than nothing, so we're kind of trapped.

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Hillary: But in drug discovery, what does “toxicity” actually mean?

Brandon: The core, the tenant of the drug discovery is finding a drug where the benefit of the drug is higher than the risk. And toxicity is the risk, and that manifests itself as clinical adverse events that happen when you take a drug. It starts off with, grade one, like nausea and fatigue, and then it progresses at things like major organ failure and stroke. And then the final grade is death.

Hillary: Over the past few decades, drugs like Vioxx for arthritis pain, Rezulin for diabetes, and Baycol for cholesterol, were pulled from the market after serious safety issues surfaced post-approval. And all three had cleared the usual preclinical tests—including multi-species animal toxicology—before entering human trials and winning approval.

And policy is also shifting.

Brandon: Animal testing is one of the only bipartisan issues. And it's not only a bipartisan issue in Congress, it's also what the FDA wants. It's also what the NIH wants.

Hillary: In the U.S., Congress opened the door in 2022 by letting drug makers use validated non-animal methodologies in place of traditional animal tests. This spring, the FDA went even further—proposing a roadmap to phase out many animal-testing requirements and explicitly encourage human-relevant lab systems and AI-driven toxicity models. And the NIH is pushing in the same direction. They’re funding strategies to reduce reliance on animals. In Europe, the European Commission is drafting a formal roadmap to phase out animal testing in chemical safety.

Brandon: Big Pharma wants this, society wants this, so there is this huge societal tidal wave across every level of institution that is enabling this.

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Hillary: Since 2023, Axiom has aimed straight at drug toxicity. In year one, they began assembling what they call the world's largest human-relevant liver-toxicity dataset.

Brandon: Liver tox is the largest problem in small molecule drug discovery. So in talking to a bunch of Big Pharma, 20 to 25% of the drugs fail because of liver tox, and 30% of the drugs that are approved are withdrawn because of liver tox, and a huge amount of approved drugs have liver tox issues which limit their applicability and their commercial success.

Hillary: Brandon says Axiom uses two main data sources. The first is real clinical-trial data showing what happened in patients.

Brandon: And then the other type is the experimental data.

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Hillary: To understand what Axiom does, we need to take a step back.

So let's imagine for a moment that we're testing the safety of a recent car model. In a simplified version, we'd need to bring the car to a real test track, mark a path, set a bunch of cameras in all angles, so they can record the process several times, and run the tests.

Afterwards, machines would help engineers pinpoint weak spots.

That's the idea with Axiom. And they run two lab models:

In Model 1, they use dishes of real human liver cells. They dose those cells with tiny amounts of a drug, and then measure what happens using stains, microscopes, and instruments.

In Model 2, they create a more realistic mini-liver made from several human liver-related cell types together. This setup can show more complex, slower kinds of damage that the simple dish might miss.

Here's where AI comes in. All that lab work creates a huge, human-relevant dataset: images, biomarkers, dose–response curves, and more. Axiom trains two AI models on it, and those models do the smart analysis, and they learn to forecast which new drugs are likely to be safe for people—and which are risky.

Brandon says the clinical data helps them understand the relationship between drugs and human outcomes.

Brandon: We're building like this internal scale AI that can take in that data, and then it's annotated, and it's corrected by human experts in drugs and clinical trials.

And then the experimental data, this is all built in the laboratory.

Hillary: Axiom uses its own proprietary experimental protocol. For the liver, they've built a large set of lab tests, so they can spot early which drugs could cause liver damage.

Brandon: We scale this experimental data set up to be the largest human liver toxicity dataset in the entire world.

Hillary: Their dataset has over 130,000 unique small molecules so far—but scale only matters if scientists trust the answers.

Brandon: Trust is the most important part of Axiom. Our core focus is on trying to have the drug hunters deeply trust that Axiom improves their odds of success. And if we don't have the trust, we don't have anything, and everything that we are gonna do doesn't have impact.

Hillary: Brandon and his team put trust at the center of everything they do, beginning with a commitment to transparency.

Brandon: Giving the drug hunter access to everything from the training to the data, to the methods, to the evals, to where the model is good to so bad, and we don't want to hide anything, and we want them, the drug hunter, to feel like they deeply understand every aspect of how the AI was created.

Hillary: But models only matter if they actually hold up in the real world. To validate the data and prove clinical relevance, Axiom needs industry partners—teams who can test its predictions against actual patient outcomes.

Brandon: So at the moment, Axiom has a fantastic opportunity to work with some of the largest Big Pharma companies like Pfizer, Takeda, BMS, but also, we're working with the largest cosmetic companies like Unilever, L'Oreal, and also agrochemical, companies like Syngenta. And these companies are paying Axiom to understand and to validate and to perfect our technology, and to collaborate with us on how to understand where it works, where it fails, how to integrate into the drug discovery and then how to upscale this. Where do we wanna take it in the future?

Hillary: Axiom's liver tox models are more accurate than old wet-lab screens—and they run faster and cheaper. That's why pharma and consumer-health teams are leaning in. Amplify Partners has seen this trend building over the past decade.

Sunil: Now we're at this moment where there's an entire generation of scientists that are trained as undergraduates in computer science, and then they do their PhDs in biochemistry or in genetics, or the other way around.

Hillary: Amplify Partners' Sunil Dhaliwal.

Sunil: They move freely between the worlds of computation and biology. So these are kind of true natives of both worlds, and they think about these problems in an integrated way rather than thinking about the other discipline as the one to be distrusted in some dimension. That I think is really powerful.

Hillary: For Brandon and Sunil, AI is not a black box that replaces scientists, but a partner that tells them which experiments to run or which ideas to set aside and why.

Sunil: In the case of biology, there is no opportunity for AI to exist absent humans. We're not trying to say, here's the computer model and here's the answer. What we're trying to say is, this is the best path for you to run your biological experiment.

And biology is always gonna be the thing that rules at the end of the day but giving confidence to those researchers, so they know which experiments to run, and which ones to avoid. That's gonna be the biggest power of these tools.

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Hillary: Sunil says that traditional, non-AI methods like trial and error, and slow bench science are hard to scale up.

Sunil: We now have these tools, we now have this cultural shift, and we've got this pressing need for an industry that both investors and operators are saying, "This is broken." It is kind of that perfect storm that comes together to say, we can make a real shift in how this industry works going forward.

Hillary: AI and tech are now front and center at places like Cleveland Clinic. This is a hospital known for big firsts—from early breakthroughs in heart imaging to pioneering bypass surgery. They also moved early into digital, building their own electronic records before most hospitals even had them, and later standardizing a single system across the organization. Today, that same spirit is fueling new work in high-performance computing and AI. And it's part of their investment strategy.

Stefan Strein: More and more we're starting to see those investment partnerships and frankly, I should say, look for investment partnerships that are taking life sciences plus AI because at the end of the day, AI is helping to amplify and facilitate and quicken the life sciences discoveries that are out there.

Hillary: Stefan Strein is the Chief Investment Officer at Cleveland Clinic.

Stefan: We're actually the first health system in the world to have a dedicated quantum computer on our campus, and we did it in partnership with IBM.

We needed their quantum expertise, and they wanted our life sciences and clinical expertise, so we have a multi-year partnership with them for multiple generations of this quantum computer. And in fact, they're upgrading it right now.

Hillary: Stefan says he can literally eat lunch next to their quantum computer—it's right there in the cafeteria. And he points to that visual for a reason: the Clinic doesn't hide its tech. It bets big on serious computing, out in the open.

Stefan: It's essentially a big glass box. It looks like the cross between an engine and a musical instrument, with a lot of different tubes and connections. And then that, essentially shiny gold object, which is almost oblong in shape, is then sheathed in a stainless steel tube, so it looks like a giant pill capsule.

Hillary: So how does a quantum computer connect to AI? Well, modern medicine needs huge computing power. AI spots patterns and makes predictions, and quantum aims to speed up the hardest math—like simulating how molecules behave—and that could slow down normal computers. Different tools with the same goal: make medicine faster and safer.

That's why Cleveland Clinic is leaning into AI investments too—backing teams that use human-relevant data, like Axiom's models.

Stefan: Almost immediately, there were portfolio companies inside the Amplify portfolio that were interesting to Cleveland Clinic, from a strategic standpoint.

Hillary: Stefan says that good governance accelerates innovation, so Cleveland Clinic folds AI into its long-standing governance and ethics framework, and routes new tools through an AI task force.

Stefan: The AI model development is really shepherded by a multidisciplinary group with diverse backgrounds within the organization, led by our data governance and our data science offices, which include legal, IT ethics, researchers, and clinical caregivers.

It's essentially, taking cross stakeholder feedback and peer reviews to serve to mitigate against bias and discrimination in the data and the models that are being developed, and to make sure that that patient data and the organizational data is protected in the best way.

Hillary: With those guardrails, tools are moving from pilot to practice fast. A recent example has to do with sepsis, which is a life-threatening reaction to infection. After testing Bayesian Health's AI, a model that scans data for subtle sepsis signals and alerts clinicians, Cleveland Clinic announced in September it's expanding the system across hospitals in Ohio and Florida.

Stefan: We think about AI at Cleveland Clinic in, let's call it four different categories. The first of which is obviously patient care and, you know, aligning patients with the right care in a timely manner can be accelerated with AI. And our view is that AI can also

synthesize unstructured data from patients resulting in better care individually and collectively.

An example of that would be like AI in mammography or AI in imaging for epilepsy patients.

Hillary: The second focus for AI at Cleveland Clinic is the caregiver environment.

Stefan: Essentially allowing the caregivers to use AI applications and tools to become more efficient, to spend more time caring for patients. And a great example of that has been in the news an awful lot this year has been the ambient listening tool that we've implemented.

Hillary: That tool is an AI tech that listens to your conversations with a doctor, so they can focus on you instead of paperwork and forms.

Stefan: Today, there are about 4,000 of our physicians and clinicians that are using this tool. Where they used to, and many people experience this today. Sit there, type into the computer, their notes either during the patient visit or in the evenings after the patient visit. Today, that ambient listening tool is freeing clinicians to interact with patients more directly, look them eye to eye, and really understand their care.

It has completely revolutionized both the patient experience as well as the provider experience.

Hillary: Quick privacy check: your doctor should ask you before turning this on—and you can always say no. Hospitals set the storage rules, and some even post them publicly. UC Davis, for example, says recordings made with Abridge, which is another clinical note-taking AI, are deleted after 30 days. Some tech providers also say that they don’t keep your audio or use it to train their models. And everything runs under HIPAA and it has encryption and limited access. Researchers are now working on clearer, more consistent ways to give consent. Okay, now back to the Cleveland Clinic…

Stefan: The third way we're using AI affects more me, so using AI to run our business smarter and more efficiently. We're doing that, as you can imagine, in the revenue cycle function, in the coding function, in some of the back office functions that we have in our legal department, but also in the investment office.

Hillary: The fourth focus is research, using AI to speed up studies and reveal connections that might otherwise be missed.

Stefan: There's a lot of unstructured data that AI is really well known to be used for. And medical research is a great application, and we're seeing that in our investment portfolios too. So many of the investment partners in the venture capital and private equity space, and even in public equities, are essentially using AI to use research data to more effectively find new therapies or, frankly, new uses for existing therapies.

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Hillary: And as AI opens new doors in research and efficiency, it's also drawing more investment.

Stefan: I think the Cleveland Clinic and the investment office together have adopted like a crawl, walk, run strategy towards AI, and so, while the promise of AI is really quite high, we know this is a multi-year, maybe multi-decade journey to fully implement AI and find its best and highest uses. As you would imagine, the Cleveland Clinic as a health system has a very strong governance and ethics platform that it has used for decades, and AI is just an additive facet to that platform.

Hillary: The payoff of using AI isn't only faster answers, it's better ones, that potentially cause less harm to humans…and animals.

Sunil: We test on animals because we can't test on humans, and we shouldn't.

Hillary: Amplify Partners, Sunil Dhaliwal.

Sunil: We need to know that drugs are at least reasonably safe before we start administering and testing to humans. And I think as a society, we made a decision years ago that it is more ethical to run these tests on animals before we would take them to humans. But if you said we had a viable other choice, and you said, now, would you still do that? I think ethically you'd go, no, you wouldn't.

There's another way to do it. What Axiom's trying to do is really make that a no-brainer. Now if I have this combination of things are cheaper, things are faster, and there's just better experimental results to know that this drug is safe in a human. Then if you started asking the question "Is that really ethical to continue with animal testing?" I think once we cross all three of those things off the list, definitively, the industry's gonna move very quickly to say, no, it's, it's not very ethical.

Hillary: That's better for patients, for science, and for ethics. It's investment beyond returns.

Brandon: Money is awesome. I think the, the reason folks like it is because it gives them freedom. And it allows them to do what they want to do. But I think if you study all the richest people in the world, they are still limited by biology, and they can't free themselves from aging or disease, and they can't free their kids. And I think a lot of these folks are trying to invest in biology, not just for the returns, but to give themselves actual true freedom that money cannot buy.

Hillary: Cleveland Clinic's CIO, Stefan Strein.

Stefan: I hope that AI is able to reshape healthcare not only to benefit patients with better outcomes, to find cures that the human mind could not conceive of because of the complexity.

But I also hope that it helps everyone in the healthcare system operate at the top of their license.

Sunil: What I want this industry to drive towards is the true creation of personalized therapies where understanding everything about you, your genetics, your particular health, how your body behaves differently than others. All of those things are gonna be important inputs into designing and developing a medicine that just treats you, and it will be maximized effectiveness and maximized safety based on your unique biology versus mine.

And I think once we start breaking down some of those barriers, we are gonna see dramatic improvements in both human lifespan and human health span.

Brandon: I think as capital allocators, it's really important to allocate capital that has returns but as humans, it's also more important to ensure that we are creating a better world for ourselves and our future.

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Hillary: If you want to learn more, please visit us at cambridgeassociates.com/unseenupside or check out the show notes. If you like what you're hearing, leave us a review and tell your friends and colleagues.

If you'd like to see us in-person and experience and participate in conversations shaping the future of investing, I hope you'll join us at our Investment Leaders Exchange on April 13th and 14th in Chicago. For more information, visit https://www.cambridgeassociates.com/events/.

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