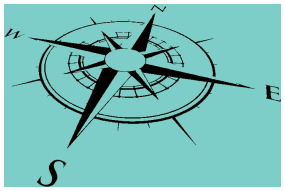
About Benevolent

From Data to Medicine. Our team is harnessing the power of AI to accelerate the journey from data to medicine. It's a journey that starts with formulating a hypothesis that predicts the underlying cause of a disease and follows that through many rounds of experimentation and testing until we validate that hypothesis. Then we begin the process of designing, synthesising and developing a new compound to treat that disease for a specific group of patients that are most likely to respond to that medicine. This is a radically different approach to traditional drug discovery and helps uncover new knowledge to discover and develop more effective medicines, faster than ever before.

Contents



BenevolentAI (BAI)

Description:

Powerful Synergies. BenevolentAI integrates AI technologies at every step of the drug discovery process: from early discovery to late stage clinical development. Our platform of computational and experimental technologies and processes, draws on vast quantities of mined and inferred biomedical data and is built and used by our world-class scientists, researchers, and technologists, working side-by-side, to improve and accelerate every step of the drug discovery process.

Stakeholder(s):

The Benevolent Management Team :
Our passionate leadership team brings experience from businesses in technology, science and consulting, and guides cross-functional practice at BenevolentAI.

Ken Mulvany :
Executive Chairman

Joanna Shields :
CEO

Jackie Hunter :
CE Clinical and Strategic Partnerships

Michael Brennan :
Head of Corporate Development

Alix Lacoste :
VP Data Science

Anne Phelan :
Chief Scientific Officer

Ben Medlock :
Chief Technology Officer

Bruce Campbell :
Scientific Advisor

Catherine Tucker :
VP Business Development

Daniel Neil :
VP Artificial Intelligence

Davy Suvee :
SVP Technology

Dylan Curley :
SVP Product Development

Eve Berry :
VP Head of Finance Operations

Gareth Jones :
VP Intellectual Property

Ivan Griffin :
Co-founder and SVP Partnerships

JB Michel :
Scientific Advisor

Justin Stebbing :
Scientific Advisor

Mark Davies :
SVP Biomedical Informatics

Nuala Johnson :
VP Financial Planning Analysis & Reporting

Peter Cox :
VP Drug Discovery

Tom Holgate :
Group Finance Director

Trecilla Lobo :
SVP People

Will Scrimshaw :
General Counsel

Vision

To drive transformational change through scalable technology solutions that result in a consistent pipeline of successful trials and new medicines for patients.

Mission

To unlock the power of AI to transform drug discovery and bring effective medicines to every patient.

Values

Humanity: We do it to benefit humanity.

Transformation: We do it to transform the way medicines are discovered and developed.

Importance: And we do it because it matters.

Integration: Our strength comes from [our] integrated, end-to-end approach, combined with a relentless pursuit of scientific and technological excellence.

Science

Technology

Excellence

Collaboration: Benevolent disease sprints: cross-functional collaboration. At Benevolent we run disease sprints. We combine cross-functional teams of scientists and technologists to work from multiple angles to tackle complicated diseases. We deliberately break down the boundaries between technology and science, human and machine. This brings focus. It enables innovation, quick experimentation and continuous feedback loops. Building the right team means harnessing the right mix of broad biology, chemistry, informatics and drug discovery perspectives. It requires machine learning experts who can tackle the most demanding challenges, working constantly with scientists who develop and embrace new ideas. Our strength comes from this integrated approach where we focus our collective energy on a single disease with one common goal. We develop a deep understanding of that disease and tailor our machine learning models to reason specifically about the disease.

Patient Focus: Put patients first. * Everything we do is geared to getting the right medicine to the right patient, faster. * We each know the impact we create every day in helping to deliver value to patients. * We place patient insights and data at the heart of our work.

Boundarylessness: Break boundaries. * We deliberately cross traditional boundaries between technology and science, human and machine, to create unique approaches * We fearlessly invite difficult questions and diverse opinions * We relentlessly challenge assumptions and ask “why not?”

Ownership: Own the solution. * We never hold back from contributing our point of view and taking responsibility * We say what we’re doing and we do what we’re saying * We champion positivity and persistence, focusing on solutions, not problems

Success: Drive to delivery. * We use data to drive decision-making and deliver with the right level of validation * We support each other in taking measured risks in order to innovate * We prioritise ruthlessly and fixate on the fastest path to success

Drugs

Apply scientific data to make more effective drugs.

What we do. Unlocking the power of scientific data to make more effective drugs for the people that need them.

1. Knowledge

Keep up with and process the wealth of information that exists to garner real insight.

The biomedical big data challenge. 90% of the world's data was produced in the last two years. This rapid increase in data creation is felt most acutely in medical science. The sheer quantity of biomedical information available to scientists is increasing exponentially: from biomedical, genomic, patient, clinical trial and molecular data to consumer genetic data. Add to that the fact that the human body is one of the most complex data systems with over 37 trillion cells. This presents a task that is impossible for even the most learned scientists and research teams to keep up with, let alone process the wealth of information that exists to garner real insight. This is a massive human limitation, but it represents a perfect opportunity for machine learning.

1.1. Curation & Standardisation

Curate and standardise knowledge from structured and unstructured biomedical data sources.

The perfect machine learning opportunity. BenevolentAI has spent the last five years developing a knowledge pipeline that pulls data from various structured and unstructured biomedical data sources and curates and standardises this knowledge via a data fabric.

1.2. Extraction & Contextualisation

Extract and contextualise the relevant information.

This is fed into our proprietary knowledge graph which extracts and contextualises the relevant information. The knowledge graph is made up of a vast number of contextualised, machine curated relationships between diseases, genes, drugs and with over 20 types of biomedical entities.

2. Targets

Focus on the most promising targets to progress into molecular design

Target identification. Human biology is one of the most complex information systems, and any variations of the underlying biological processes can cause symptoms and diseases to occur. Yet, the origin of a disease and the exact biological processes or pathways involved are often not clear.

2.1. Genes & Proteins

Determine which genes and proteins are associated with a disease and can be altered.

Determining which genes and proteins are associated with a disease and can be altered is the first step in being able to develop effective drug therapies. To do this, we bring together experts across ML, engineering, biology, bioinformatics, and chemistry together for each of our research programmes.

Stakeholder(s):

ML Experts

Bioinformatics Experts

Engineering Experts

Chemistry Experts

Biology Experts

2.1.1. ML & Data Science

Use machine learning and data science.

Technology enabled target identification. We use machine learning and data science to guide the entire process of target identification. Relation inference AI models help us predict potential non-obvious disease targets that may be overlooked by scientists. Our differential expression based models help us identify proteins or genes that express differently in a disease and healthy cell.

2.1.2. Views

Look at the data in many different ways.

The workflows we have developed look at the data in many different ways at the same time, allowing our scientists to establish solid hypotheses for possible drug targets.

2.1.3. Ordering

Order targets based on criteria.

Data-driven triage process. Our AI triage process automatically orders targets based on criteria such as chemical opportunity, safety and druggability and then presents the ranked targets, together with rich metadata, to our scientists for an informed and nuanced evaluation. This allows them to focus on the most promising targets to progress into molecular design.

2.1.4. Testing & Feedback

Test the targets feed the results back to the inference models.

These targets are tested in the lab and the results are fed back to our inference models.

3. Design

Recognise and design drug-molecules that ensure safety, potency, duration of impact and novelty.

Molecular Design. The chemical space for exploration is almost infinitely vast and only a small fraction of it can potentially be made into medicines.

Stakeholder(s):

Medicinal Chemists :
Medicinal chemists train for decades to recognise and design drug-molecules that ensure safety, potency, duration of impact and novelty. This is a true art form and even the best chemists can only optimise a limited number of properties at any given time.

3.1. Compounds

Accelerate compound optimisation using AI.

By leveraging advanced AI, our EvoChem product is continuously learning from this vast chemical space and generating drug-like molecules with desirable properties that can be synthesised 'on demand'. EvoChem designs de novo compounds based on multiparametric optimisations with a scoring function that factors in all the properties we are seeking to optimise for that molecule.

3.1.1. Ranking & Selection

Rank and select the best candidates for synthesis

The compound ideas are ranked and the best candidates are selected directly for synthesis, whilst others serve to inspire chemists to further explore the chemical space.

3.1.2. Data & Feedback

Combine experimental data and expert feedback.

Iterative design cycles combining experimental data and expert feedback.

3.1.3. Synthesis, Feedback & Refinement

Synthesise the selected compounds and generate data to feed back in and refine the models.

We then take these selected compounds, synthesise them in our labs and generate real experimental data which is then fed back in, to refine the models. But what's unique about our process is that it is assisted, from start to finish, by our AI algorithms and generative models. The result is a system that is self-correcting and requires fewer molecules to be synthesized, speeding up the process of selecting a final candidate from an industry average of 4.5 years to just 14 months.

4. Endotypes

Define endotypes to improve target identification and clinical trial design.

Precision Medicine. Better defining endotypes to improve target identification and clinical trial design. Traditionally diseases have been defined by symptoms or location in the body, not by their underlying molecular mechanisms, pathways or the biological processes specific to a patient. The result is that 30-50% of top selling drugs don't work in the patients they are prescribed for.

Stakeholder(s):

Patients

4.1. Patients

Apply machine learning models to identify patient groups.

At BenevolentAI we apply machine learning models to identify patient groups by the molecular signature of their disease and design, allowing us to run faster clinical trials.

Stakeholder(s):

Patient Groups :
This precision medicine guided approach allows us to identify patient subtypes more likely to respond to drugs, further increasing the probability of success in the clinic.

4.2. Existing Medicines

Apply this approach to existing medicines as well.

This approach has benefits for existing medicines too: it can be used to elucidate the mechanism of action, identify new patient responders, improve diagnosis and more precisely target treatment.

4.2.1. Mechanisms

Elucidate the mechanism of action.

4.2.2. Patient Responders

Identify new patient responders.

4.2.3. Diagnoses

Improve diagnosis.

4.2.4. Treatments

Target treatments more precisely.

Administrative Information

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End Date:

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Submitter:

Given Name: Owen
Surname: Ambur
Email: Owen.Ambur@verizon.net
Phone: