

# Exploring the Rising Use of AI in Every Phase of Drug Development from Discovery through Commercialization

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- **Managing Director, Quantum Venture Management**

# AGENDA

**1 Ed Addison - AI Background**

**2 Artificial Intelligence: Myth v Reality**

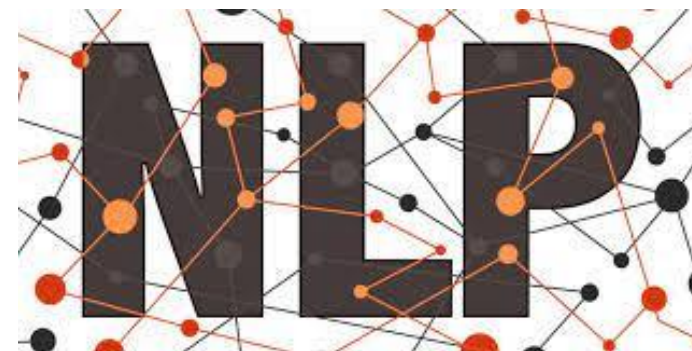
**3 What's All This About Generative AI?**

**4 Is AI the Product or the Tool?**

**5 Drug Development Problems Where AI Matters**

**6 Some Prominent AI in Drug Development Players**

**7 The Transformation of Cloud Pharma**







Academic or  
Entrepreneur?

5 Years to a Breakthrough  
Paper or 5 Months to a  
Million Dollar Product?



What AI Can  
Do and What  
it Cannot







Is AI the  
Product?

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PROOF

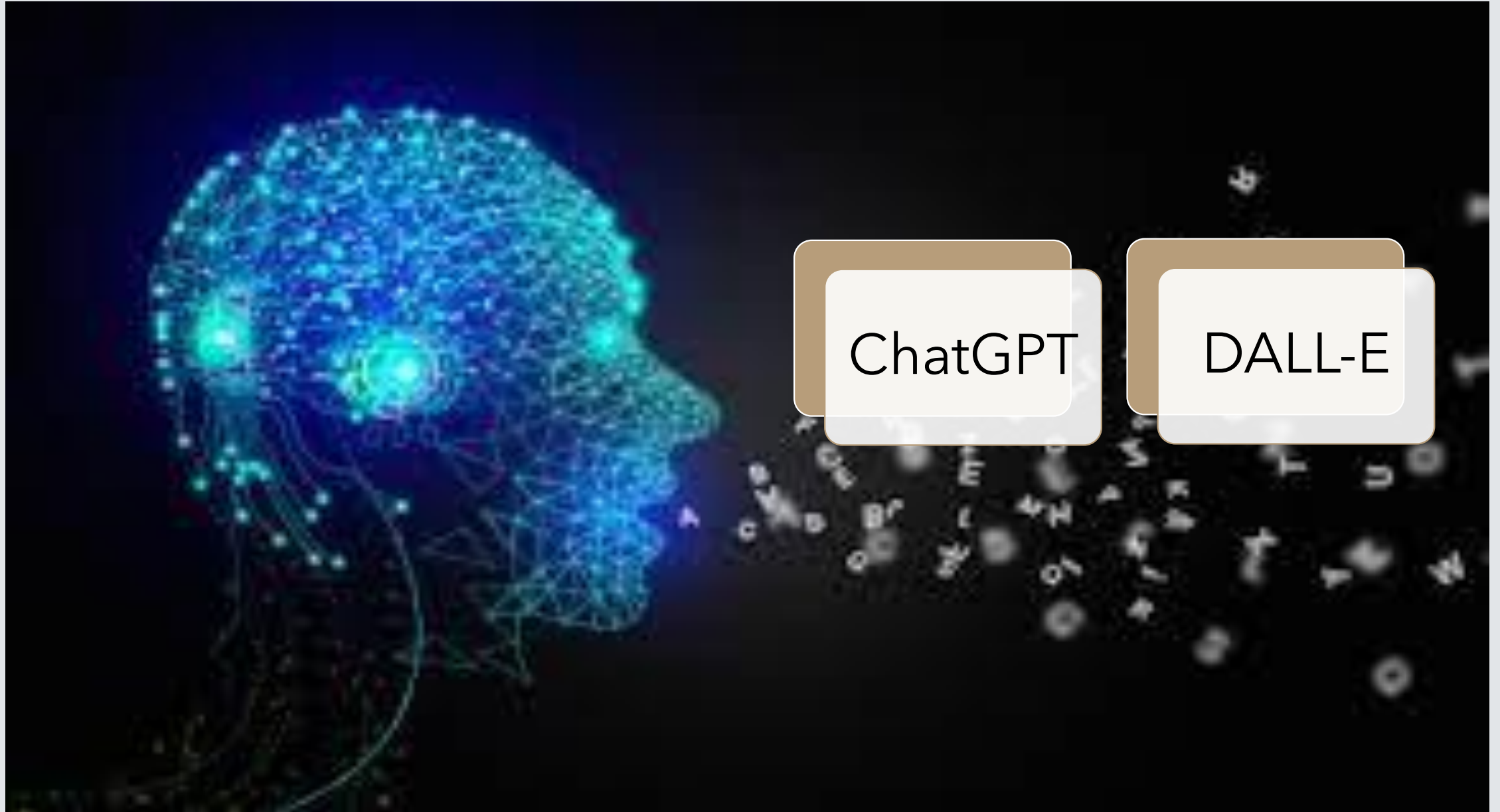
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# Prevailing Standard

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- **Proof**
- **Repeated**
- **Platform**
- **No Vaporware**
- **Collaboration**

# Enter Generative AI:






# Generative AI

- Is it Intelligent? NO !!

*It is as good as the data it generates from and creates the illusion of being better. Can be hard to tune.*

- Is it useful? YOU BET !!

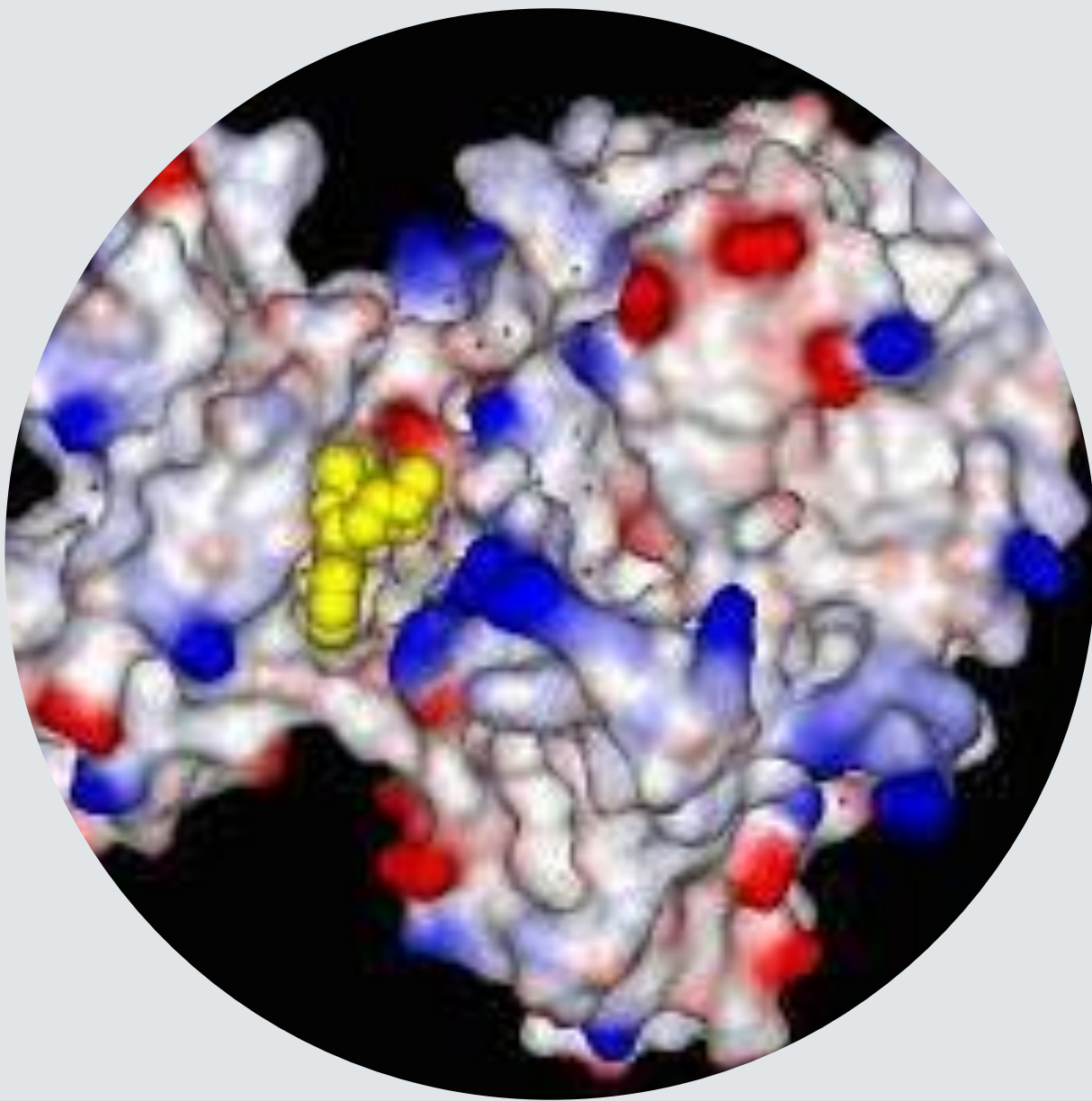
*It can be used to generate novel molecules (small molecules, proteins, antibodies), but a discriminator is still needed.*



# How can AI make drug development efficient?

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**Many Ways**



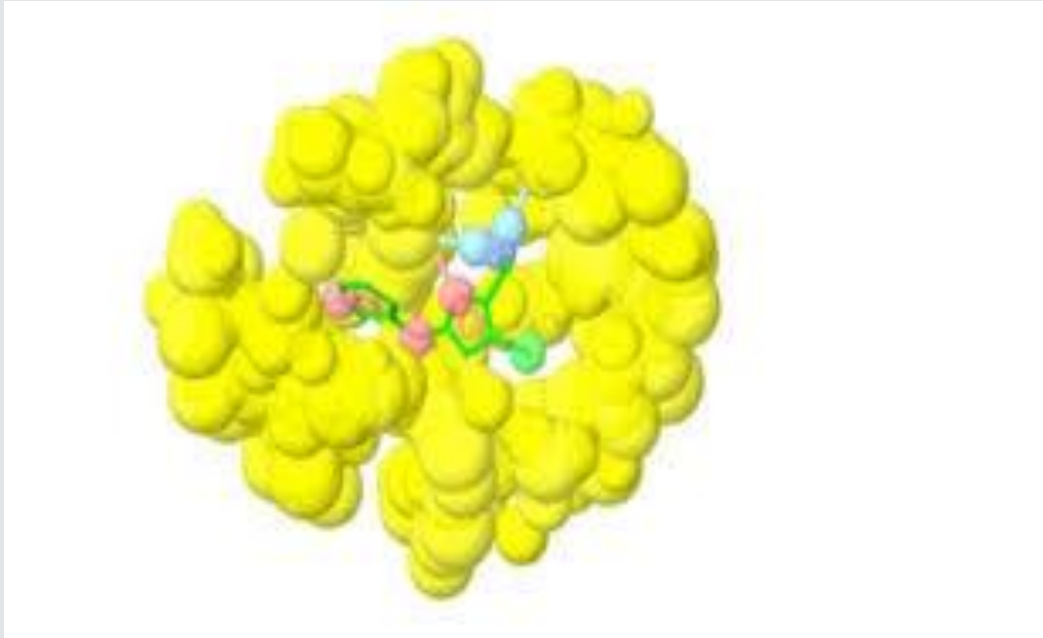
# Novel Target Discovery

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- **Natural Language Extraction**
- **Genome Wide Expression**
- **OMICS Mining**
- **Pathway Modeling**

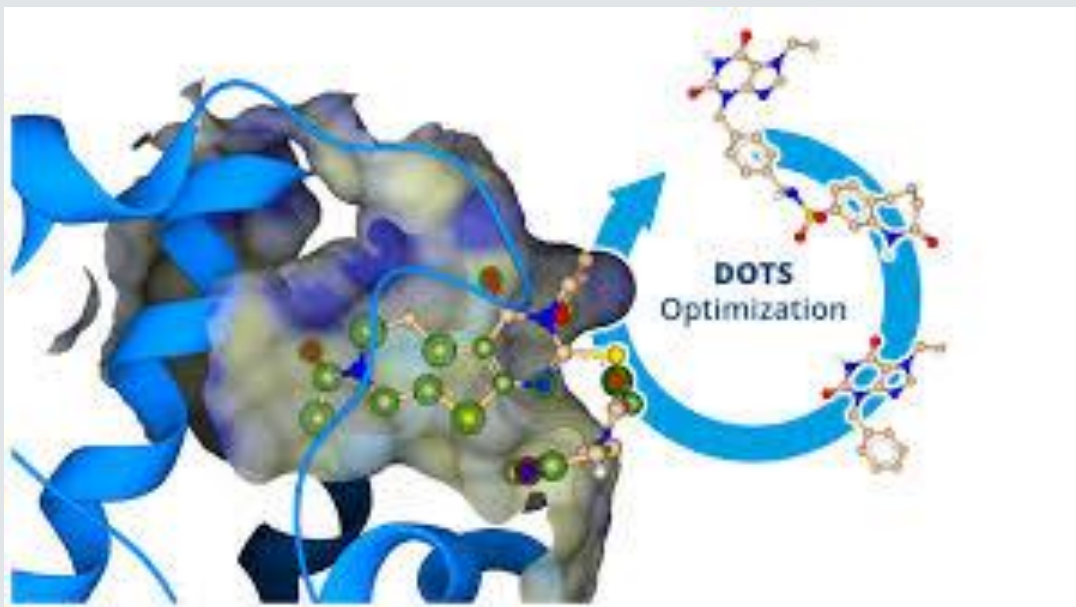


# Lead Design



- **Chemical Space Generation**
- **Binding Affinity**
- **Chemical Property Prediction**
- **Often Uses GANs**

# Hit to Lead Optimization



**Molecular Variation**



**Property Prediction**



**Account for Toxicity**

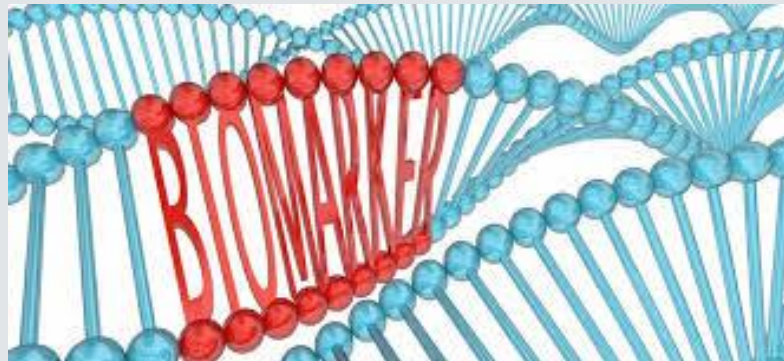


**Bioavailability**

# Biomarker Discovery

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- **Natural Language Extraction**
- **Clustering Genomics Data**
- **Electronic Medical Records**





# Toxicity Prediction

## Based on Machine Learning

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# Drug Repurposing

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- **Natural Language Extraction**
- **Mining EMR**
- **OMICS Data**



# Protocol Design

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- **Machine Learning**
- **Natural Language Extraction**
- **Text Generation**





# Clinical Trial Enrollment

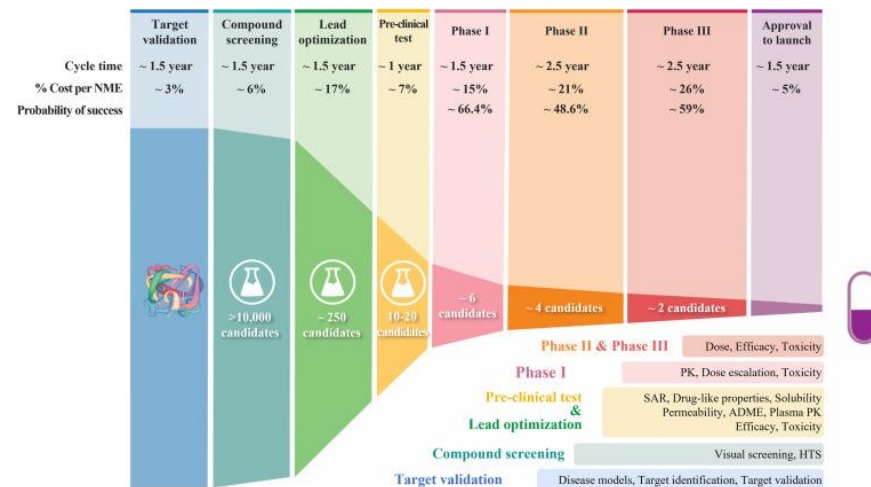
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- **Intelligent Search Engine**
- **Electronic Medical Records**
- **Mining Patient Groups**

# Drug Program Success Prediction

- Machine Learning Over Clinical Data
- Public OMICS Data
- Similarity Analysis



# Regulatory Filing Assistant

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- **Text Generation**
- **ChatGPT ?**





# Clinical Data Interpretation



- **Machine Learning**
- **Clustering**
- **Data Mining**
- **Explanation**

# Recovering Failed Phase 3s

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- **Patient Group Optimization**
- **Machine Learning**
- **Clustering**
- **Precision Medicine**





# Drug Safety

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- **Statistical Correlation**
- **Clustering**
- **Machine Learning**
- **Pharmacovigilance**

# A Sampler of Significant Players...

<b>AI Drug Discovery</b>	<b>Generative AI</b>	<b>CROs</b>	<b>Pharma</b>
<b>Recursion</b>	<b>Generate BioMed</b>	<b>Charles River Logica</b>	<b>GSK</b>
<b>Benevolent Bio</b>	<b>Profluent</b>	<b>SAS - ViYA</b>	<b>Abbvie</b>
<b>InSitro</b>	<b>Yseop</b>	<b>Millipore Aldrich</b>	<b>Pfizer</b>





# New Open-Source Tools



- **Nvidia announced a suite of life science models this week**
- **OpenAI has released multiple Generative AI models**
- **Combined with open-source AI, public OMICS data, and open-source chemistry software, workflows are now possible to go from Indication to Candidate in a week**

# Cloud Pharmaceuticals

**Small Molecule Discovery → PolarisQB**

**mRNA Therapeutics → Pancreatic Cancer**

**Precision Repurposing → Hypertension**

**Rapid Discovery → Target to Candidate in a Week**



# Thank You!



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