

from absci import de_novo_model
model = de_novo_model.load_latest()
antigen = model.load_pdb("7olz.pdb",
chain="A")
antibodies = model.predict(antigen, N=300000)

from absci_library import codon_optimizer
library
= codon_optimizer.reverse_translate(library)
library.to_csv("covid-antibody-designs.csv")
library.to_wet_lab(assay="ACE")

from absci import lead_opt_model
lead_optimizer = lead_opt_model.load_latest()
library.naturalness =
lead_optimizer.naturalness(library)
lead_optimizer.optimize(library).to_wet_lab(as
say="SPR")



CORPORATE PRESENTATION JULY 2023 ABSCI CORPORATION 2023 ALL RIGHTS RESERVED from absci import genetic_algorithm; parameters=["maximizelbinding_affinity:pH=7.5", "minimizelbinding_affinity:pH=6.0",
"maximizelhuman_naturalness"]; library = genetic_algorithm.multiparametric_optimization(library, parameters, evolutions=100);
library.to_wet_lab(assays=["ACE", "SPR", "Bioassays"])

Disclaimers

Forward-Looking Statements

Certain statements in this presentation that are not historical facts are considered forward-looking within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, including statements containing the words "will," "may," "anticipates," "plans," "believes," "forecast," "estimates," "expects," "predicts," "advancing," "aim," "potential," and "intends," or similar expressions. We intend these forward-looking statements, including statements regarding our strategy, financial performance and results of operations, including our expectations and guidance regarding cash, cash equivalents and restricted cash, our projected cash usage, needs and runway, future operations, future financial position, future revenue, internal research and technological development activities, the effective incorporation of our technology in drug design and discovery to accelerate drug development and increase probability of success, advancements toward in silico drug design and creation, research and technology development collaboration efforts, growth plans, projected costs, prospects, plans and objectives of management, to be covered by the safe harbor provisions for forward-looking statements contained in Section 27A of the Securities Act and Section 21E of the Securities Exchange Act, and we make this statement for purposes of complying with those safe harbor provisions. These forward-looking statements reflect our current views about our plans, intentions, expectations, strategies, and prospects. which are based on the information currently available to us and on assumptions we have made. We can give no assurance that the plans, intentions, expectations, or strategies will be attained or achieved, and, furthermore, actual results may differ materially from those described in the forward-looking statements and will be affected by a variety of risks and factors that are beyond our control, including, without limitation, risks and uncertainties relating to the development of our technology, our ability to secure milestone payments and royalties, and our ability to effectively collaborate on research, drug discovery and development activities with our partners or potential partners; along with those risks set forth in our most recent periodic report filed with the U.S. Securities and Exchange Commission, as well as discussions of potential risks, uncertainties, and other important factors in our subsequent filings with the U.S. Securities and Exchange Commission. Except as required by law, we assume no obligation to update publicly any forwardlooking statements, whether as a result of new information, future events, or otherwise.

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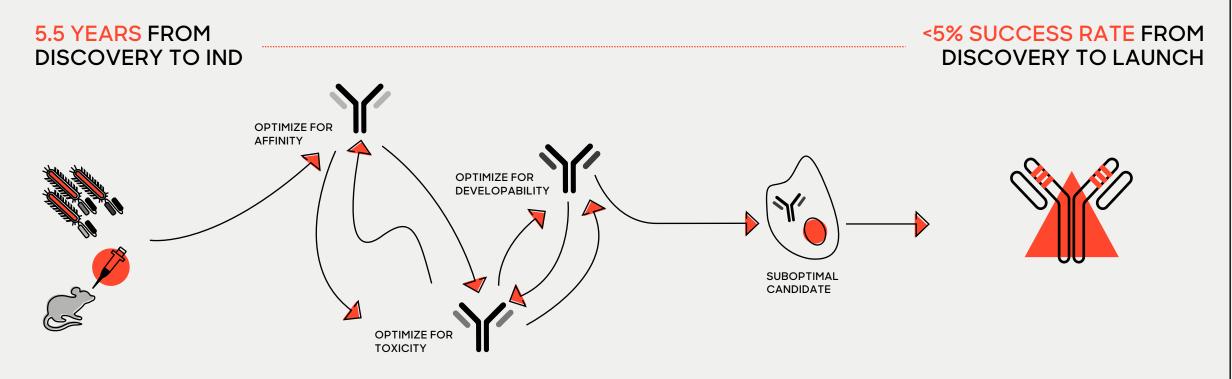
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What if the next transformative drug was not discovered, but created at a click of a button?



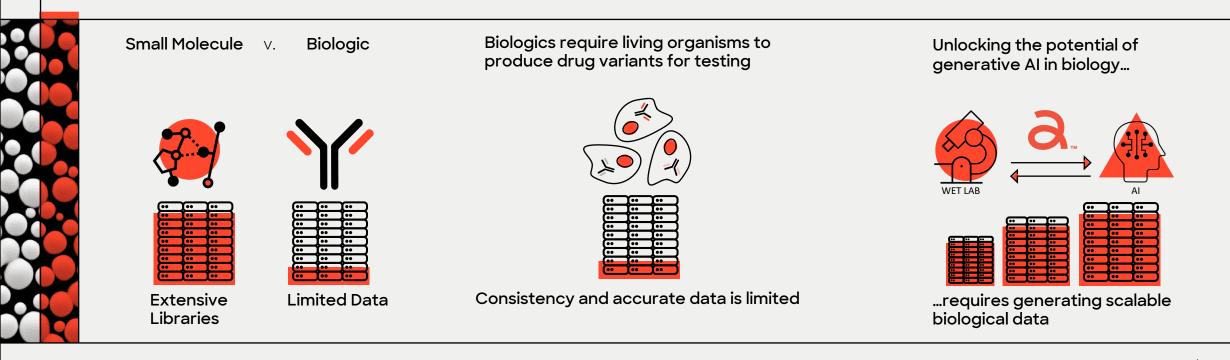
The drug discovery paradigm is ripe for disruption



Long iterative process resulting in drug candidates with suboptimal attributes

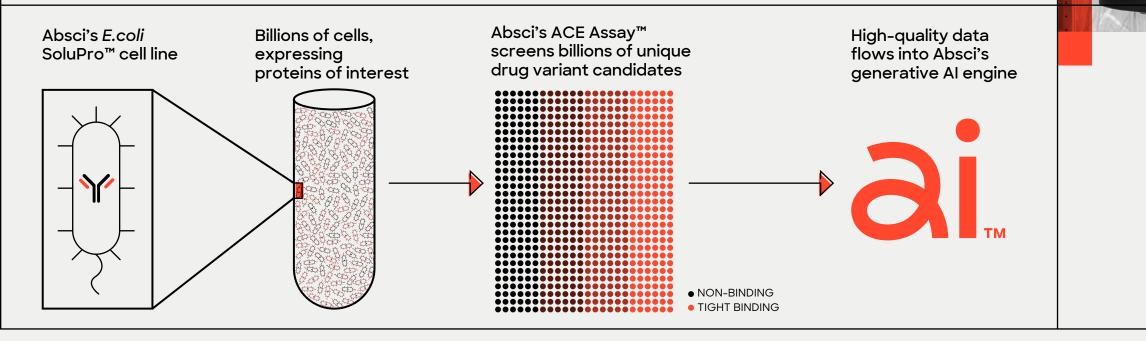
WHY HASN'T GENERATIVE AI TRANSFORMED BIOLOGIC DRUG DISCOVERY?

Unlocking the potential of generative AI in biology requires scalable biological data



BIOTECH INDUSTRY INFLECTION POINT

Absci is solving the problem of scalable biological data enabling true generative AI for biologics drug discovery



vroved, 11.2% of drugs entering clinical trials approved 2006: 22 approved, 11.2% 2007: 18 approved, 10.7% 2008: 24 approved, 6 approved, 7.8% 2010: 21 approved, 6.8% 2011: 35 approved, 6.1% 2012: 39 approved, 5.3% 2013: 27 approved, 5.2% 2014: 41 7% 2015: 45 approved, 13.8%

Instead sf finding the needle in the haystack, Absci is creating the needle.

Truba

DUR - LA OURO =

The Solution

At Absci, the future is now with our Integrated Drug Creation™ platform

DATA TO TRAIN

Proprietary wet-lab assays capable of generating billions of protein-protein interactions a week for ML training

WET LAB TO VALIDATE

Scalable wet-lab infrastructure capable of validating 2.8 million unique AI-generated designs a week



AI TO CREATE

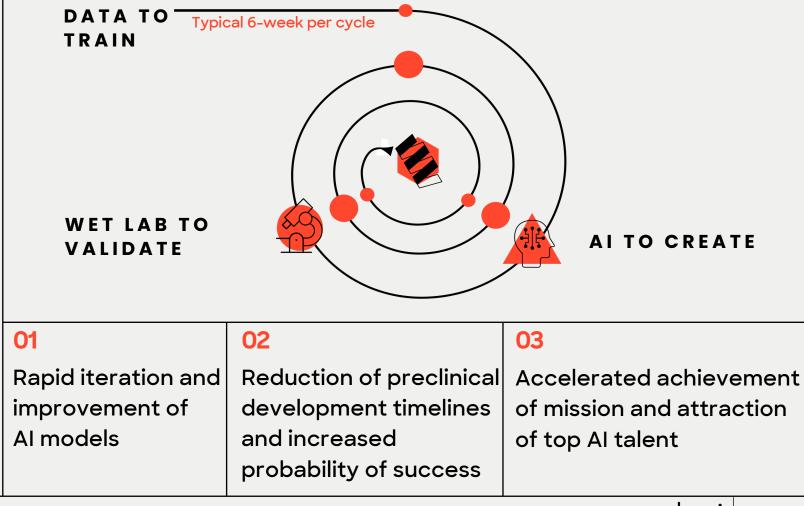
Generative AI engine to create new antibodies and next-gen biologics

ABSCI IS THE LEADER IN GENERATIVE AI DRUG CREATION FOR BIOLOGICS

Cycles completed within weeks

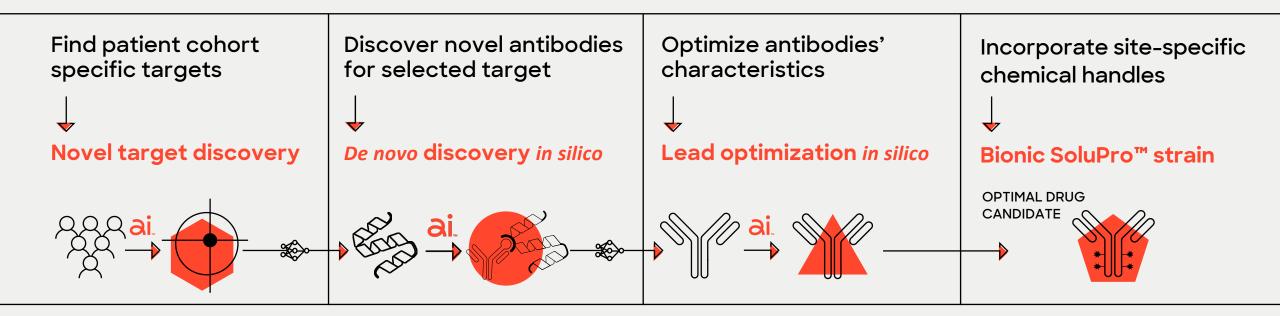


Absci's rapid cycle times allow for:



ABSCI'S END-TO-END PLATFORM SOLUTION

The leading full-stack AI platform for biologics drug creation





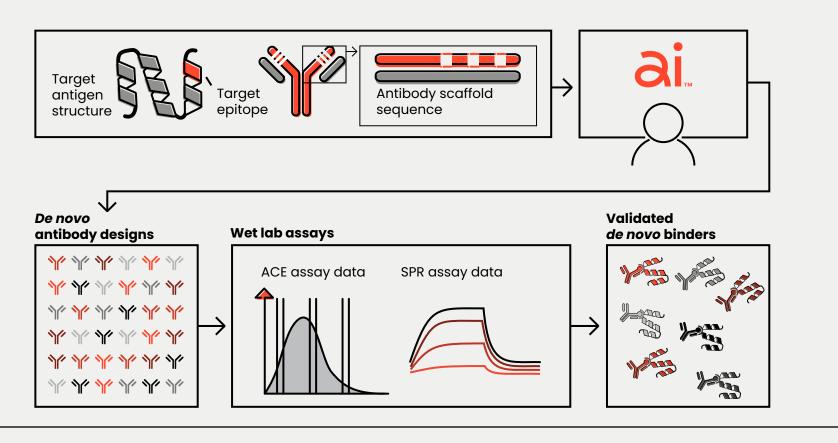
Zero-shot: a machine learning technique in which a model is trained to recognize and classify new objects without explicitly being trained on those objects' examples.

For antibodies, this means designing an antibody to bind to an antigen with no previous demonstrations of binders to said antigen.

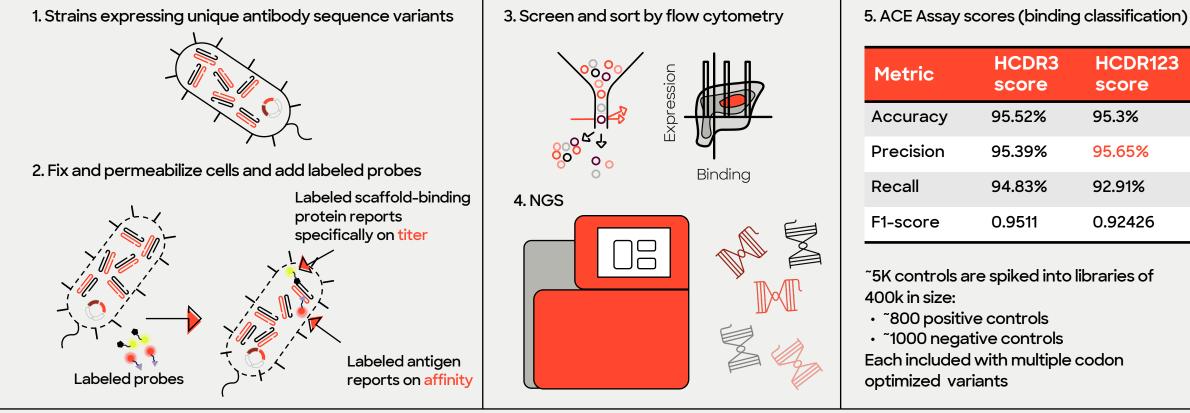


De novo design in silico

De novo drug creation with 'zeroshot' generative AI



DE NOVO DESIGN IN SILICO REQUIRES LOTS OF HIGH-QUALITY TRAINING DATA Highly validated ACE Assay generates highquality and high-throughput data to train deep learning models



Bachas, S., Rakocevic, G. et al., "Antibody optimization enabled by artificial intelligence predictions of binding affinity and naturalness," 2022 pre-print in bioRxiv.

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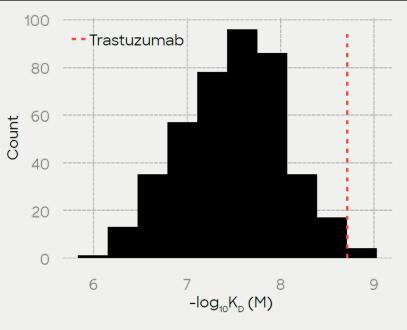
CASE STUDY: *DE NOVO DESIGN IN SILICO* Laboratory validation straight out of the model; 421 designs confirmed by SPR

We selected **trastuzumab**, which binds **HER2**, as a scaffold to test the HCDR3 predictions

The model is conditioned with **HER2 3D structure** and trastuzumab **scaffold excluding HCDR3** designs



Any antibody known to bind to HER2 or any homolog (>40% sequence identity or part of the same homologous superfamily) to HER2 is removed



- 440,354 antibody variants designed
- Approx. 4,000 estimated binders by ACE Assay
- 421 confirmed by SPR
- 71 exhibit <10 nM affinity
- 3 bind tighter than WT trastuzumab

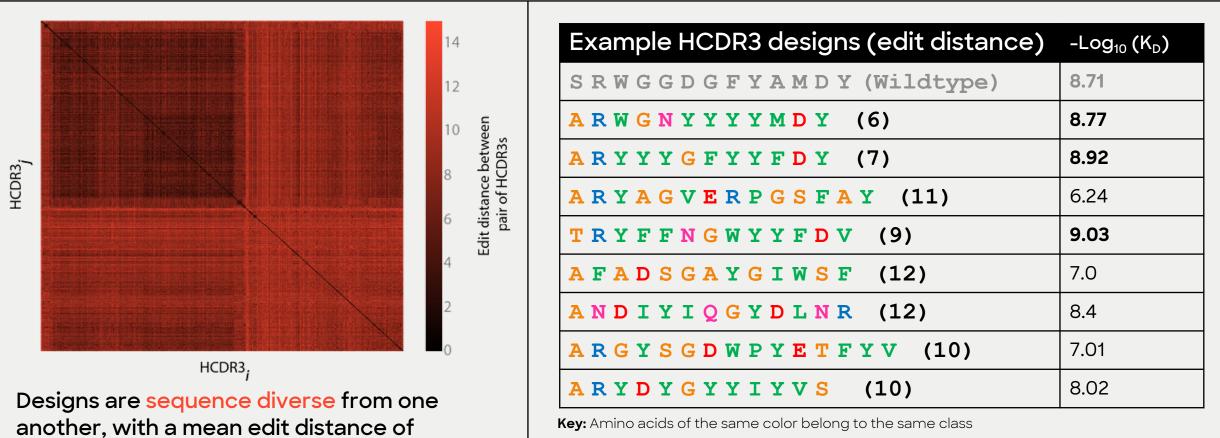
CASE STUDY: DE NOVO DESIGN IN SILICO

AI designs of all HCDRs achieve high binding rates and outperform biological baselines

HER2 Binding Rate (%) measured via ACE assay				
		HCDR3	HCDR123	
Zero-shot <i>de novo</i> generated				
Matched input antigen Mis-matched input antigen	Human HER2 Rat HER2	10.6 2.8	<mark>1.8</mark> 0.5	 Al designs are specific Inputting a mis-matched undesired antigen (e.g., Rat HER2, HER3, VEGF) into the model results in significant performance decrease towards desired antigen Indicates the model's use of antigen information for sequence designs
Mis-matched input antigen	HER3	2.9	0.2	
Mis-matched input antigen	VEGF	2.5	0.0	
Biological baseline				Al models outperform biological baselines
	OAS	2.68	0.16	 De novo designed HCDR3s achieve a 4-fold improvement over random OAS baseline De novo designed HCDR123s achieve an 11-fold improvement over random OAS baseline
	OAS-J	5.25	0.32	
	SAbDab	3.16	0.06	
Random baseline				
	Permuted sequences	0.33	N/A	

CASE STUDY: DE NOVO DESIGN IN SILICO

High sequence diversity supports patent estate expansion and differentiation



Key: Amino acids of the same color belong to the same class

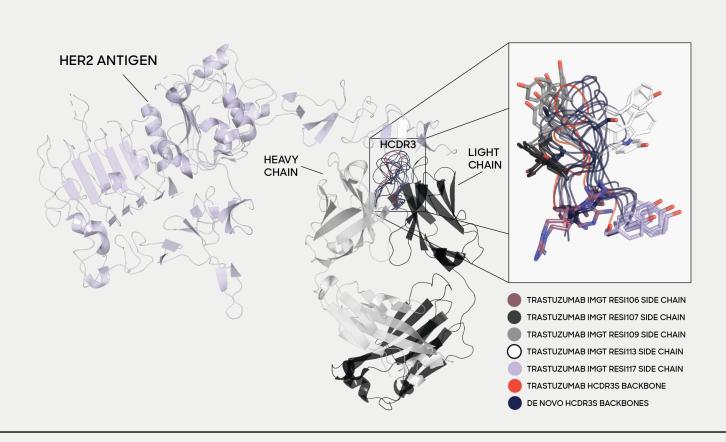
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7.7 ± 2.1 SD

CASE STUDY: DE NOVO DESIGN IN SILICO

'Zero-shot' designs of new antibodies from scratch using generative AI

- Zero-Shot: Model has never seen a binder to target or homologs
- Binders were identified straight out of the model – no lead optimization was performed
- Predicted structures reveal meaningful biological interactions
- Demonstrated across four therapeutic targets: HER2, VEGF-A, COVID omicron, undisclosed target



In silico validation of Zero-shot designs toward diverse targets

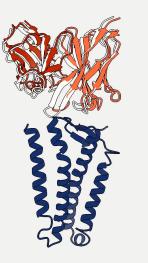


Al-generated Heavy Chain Al-generated Light Chain



Antigen

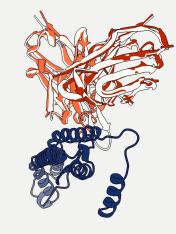
¹Known binder crystal structures are literature sourced



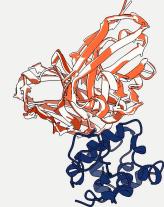
Prostaglandin E receptor EP4, GPCR, Fab (5YHL)



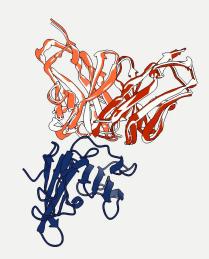
S. aureus a-hemolysin monomer, Fab (4IDJ)



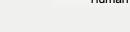
P. vivax RBP2b, monoclonal (6WOZ)



Pekin duck egg lysozyme, Fab (5VJQ)



Human urokinase receptor (2FD6)





BREAKTHROUGH IN DE NOVO DRUG CREATION

Absci harnesses generative AI to lead a new paradigm of drug creation instead of drug discovery

Unlocking $de\ novo$ antibody design with generative artificial intelligence

Amir Shanehsazzadeh^{*}, Sharrol Bachas^{*}, George Kasun, John M. Sutton, Andrea K. Steiger, Richard Shuai, Christa Kohnert, Alex Morehead, Amber Brown, Chelsea Chung, Breanna Luton, Nicolas Diaz, Matt McPartlon, Bailey Knight, Macey Radach, Katherine Bateman, David A. Spencer, Jovan Cejovic, Gaelin Kopee-Belliveau, Robel Haile, Edriss Yassine, Cailen McCloskey, Monica Natividad, Dalton Chapman, Luka Stojanovic, Rodante Caguiat, Shaheed Abdulhaqq, Zheyuan Guo, Katherine Moran, Lillian R. Klug, Miles Gander, Joshua Meire⁸⁰

Absci Corporation, New York (NY) and Vancouver (WA), USA

* Equal contribution ⊠ Corresponding author (jmeier@absci.com)

Abstract

Generative artificial intelligence (AI) has the potential to greatly increase the speed, quality and controllability of antibody design. Traditional de novo antibody discovery requires time and resource intensive screening of large immune or synthetic libraries. These methods also offer little control over the output sequences, which can result in lead candidates with sub-optimal binding and poor developability attributes. Several groups have introduced models for generative antibody design with promising in silico evidence [1-10], however, no such method has demonstrated de novo antibody design with experimental validation. Here we use generative deep learning models to de novo design antibodies against three distinct targets in a zero-shot fashion where all designs are the result of a single round of model generations with no follow-up optimization. In particular, we screen over 400,000 antibody variants designed for binding to human epidermal growth factor receptor 2 (HER2) [11] using our high-throughput wet lab capabilities. From these screens, we further characterize 421 binders biophysically using surface plasmon resonance (SPR), finding three that bind tighter than the therapeutic antibody trastuzumab [12]. The binders are highly diverse and have low sequence identity to known antibodies. Additionally, these binders score highly on our previously introduced Naturalness metric [13], indicating that they are likely to possess desirable developability profiles and low immunogenecity. We open source the binders to HER2 and report the measured binding affinities. These results unlock a path to accelerated drug creation for novel therapeutic targets using generative AI combined with high throughput experimentation.

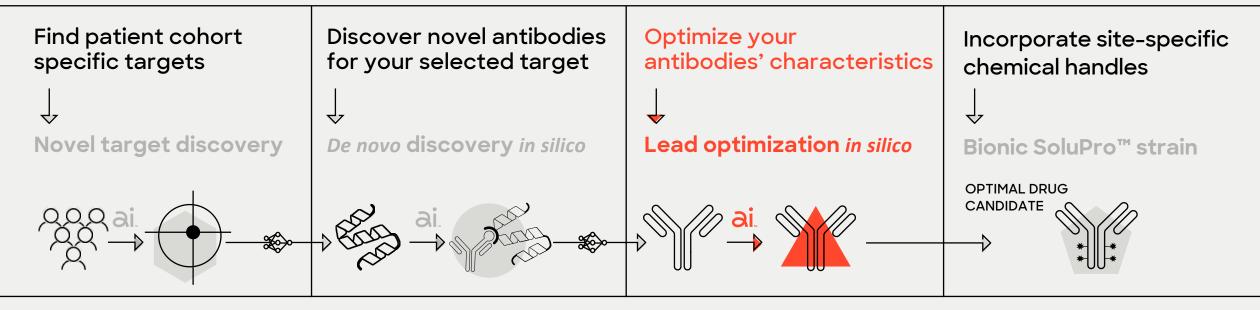
"...no prior method has demonstrated de novo antibody design with experimental validation."





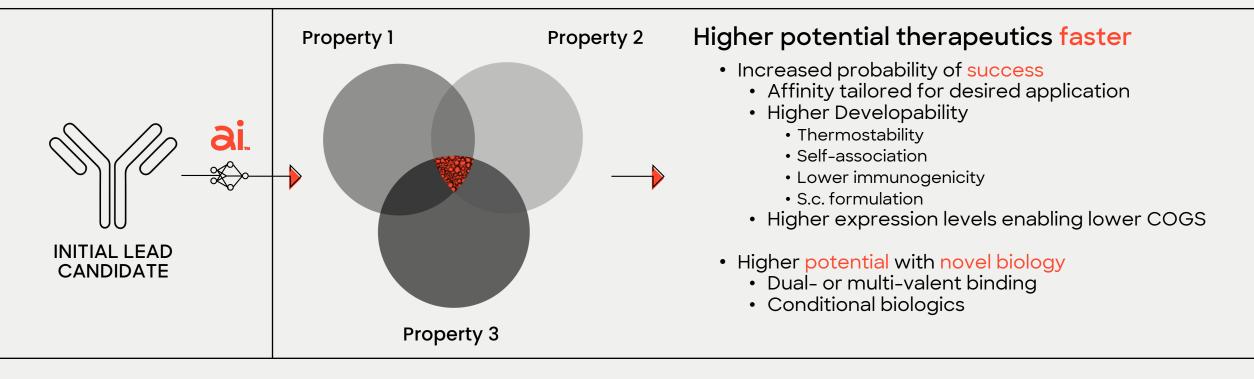
AI DRIVEN LEAD OPTIMIZATION

Multiparametric AI lead-optimization can enable higher potential therapeutics and increased PoS



CASE STUDY: AI-DRIVEN LEAD OPTIMIZATION

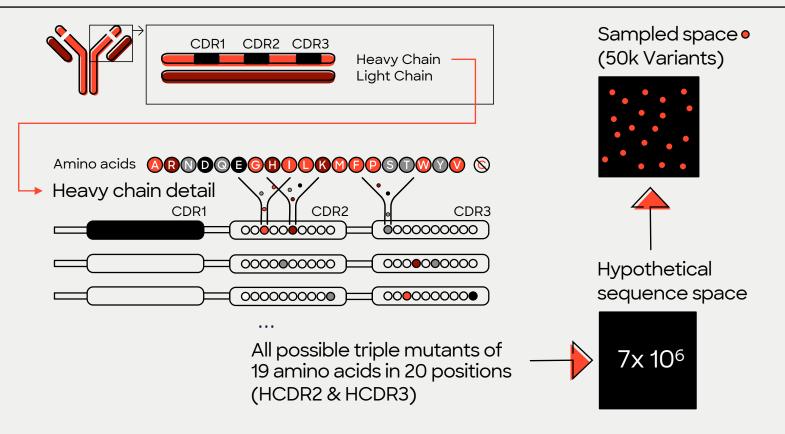
Multiparametric AI lead-optimization for increased success rates & higher potential therapeutics



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CASE STUDY: DESIGNING BETTER HER2 BINDERS Al models expanded search space by orders of magnitude

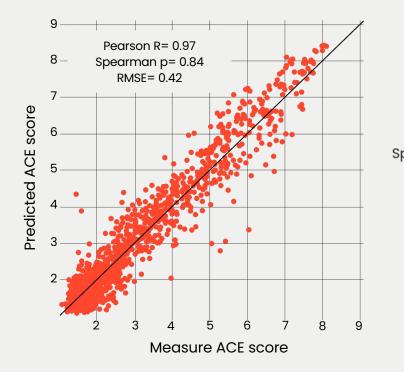




- Combinatorial mutagenesis of up to 3 mutations over ten amino acids each in HCDR2 and HCDR3
- Sampled less than 1% of the sequence space
- Measured binding affinity of nearly 50,000 sequence variants

Bachas, S., Rakocevic, G. et al., "Antibody optimization enabled by artificial intelligence predictions of binding affinity and naturalness," 2022 pre-print in bioRxiv.

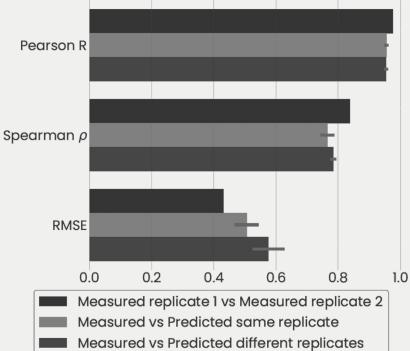
CASE STUDY: DESIGNING BETTER HER2 BINDERS Al quantitatively predicts antibody affinity



HIGH PREDICTIVE PERFORMANCE

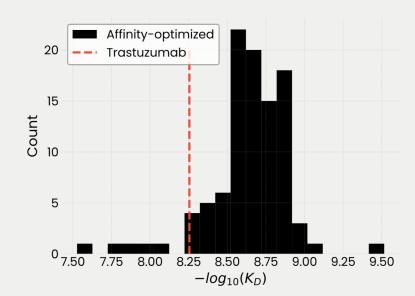
Pearson R correlation of 0.93

- Trained on 90% of dataset
- Results shown for 10% of dataset not seen by model



HIGH QUALITY DATA

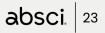
Models trained on one replicate can predict unseen data from a different replicate



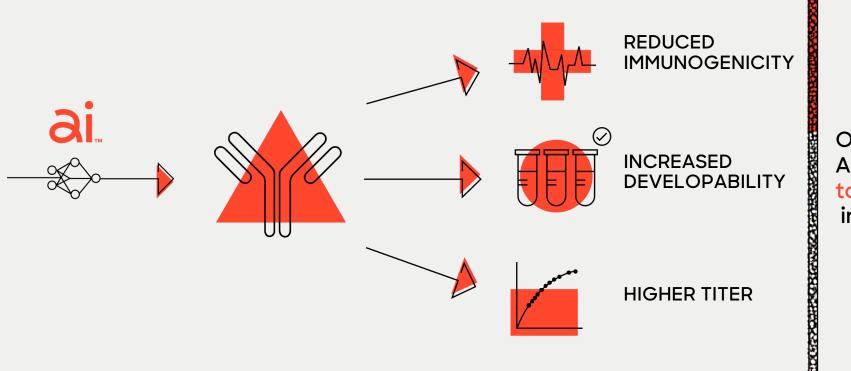
HIGH AFFINITY PREDICTIONS

Models can find variants with higher affinity than seen in training data - 92 of top 100 predicted high-affinity variants bind tighter than trastuzumab

Bachas, S., Rakocevic, G. et al., "Antibody optimization enabled by artificial intelligence predictions of binding affinity and naturalness," 2022 pre-print in bioRxiv.



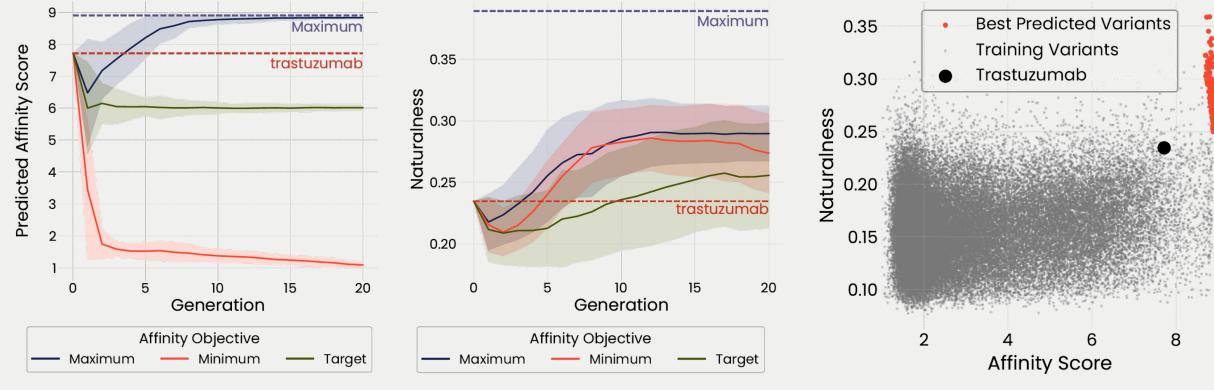
Higher naturalness improves probability of success and expression levels



Optimizing for naturalness with Absci's proprietary AI model to overcome major challenges in antibody development

CASE STUDY: OPTIMIZING HER2 BINDERS

Simultaneous co-optimization of affinity and naturalness

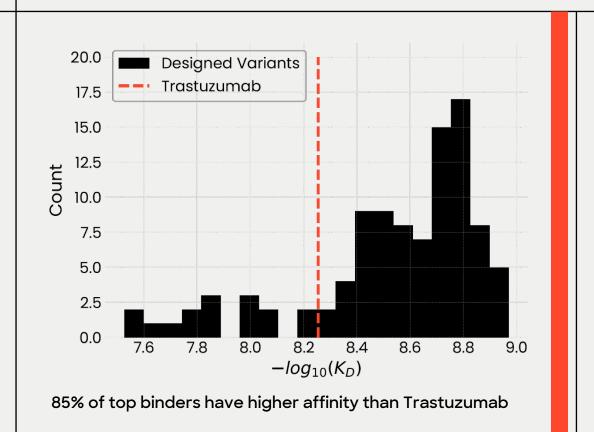


Maximize, minimize, or tailor binding affinity

At the same time, ensure sequences appear to come from humans (naturalness) Models simultaneously tuning for affinity & maximizing naturalness

Bachas, S., Rakocevic, G. et al., "Antibody optimization enabled by artificial intelligence predictions of binding affinity and naturalness," 2022 pre-print in bioRxiv.

CASE STUDY: AI-DRIVEN LEAD OPTIMIZATION 85% of Top 100 **"natural**" Trastuzumab variants exhibit higher-affinity than wild-type



- AI predicts the affinity of unseen variants from libraries generated using diverse mutational strategies and combinatorial sequence space
- AI models make predictions with actionable performance using <0.1% of the combinatorial sequence space as training set
- Naturalness is associated with developability metrics and expression titer
- Enables one-shot multiparametric lead optimization potentially accelerating time to clinic

Bachas, S., Rakocevic, G. et al., "Antibody optimization enabled by artificial intelligence predictions of binding affinity and naturalness," 2022 pre-print in bioRxiv.

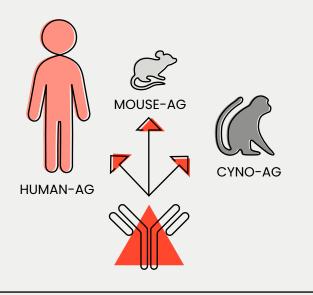
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AI-DRIVEN LEAD OPTIMIZATION

Al-optimization for dual- or multivalent biologics increases potential

PRECLINICAL DEVELOPMENT

Cross-species binding for improved success rates and speed

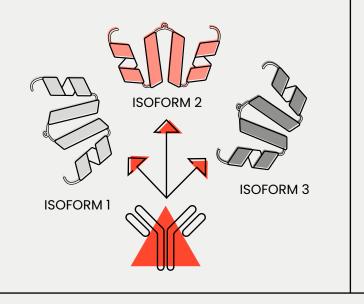


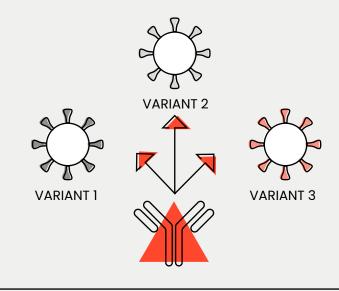
IMMUNOLOGY

Increased efficacy by simultaneous binding to multiple desired isoforms

INFECTIOUS DISEASES

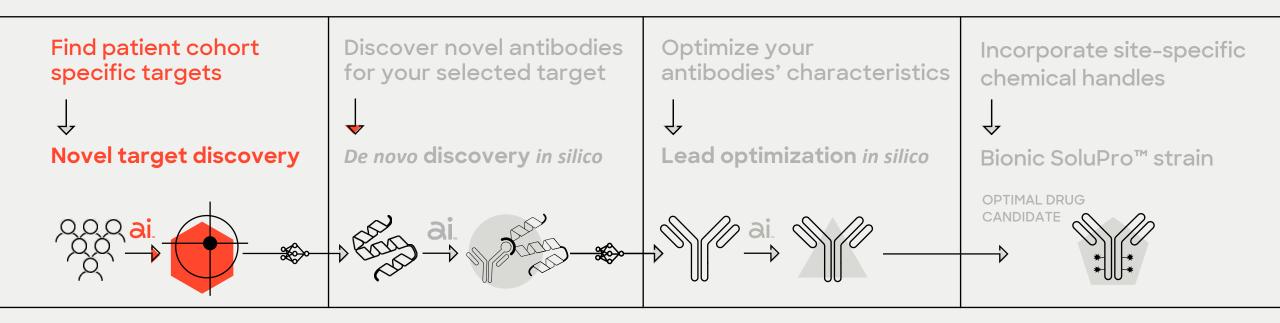
Broad spectrum antibodies with simultaneous binding to multiple viral variants





NOVEL TARGET DISCOVERY

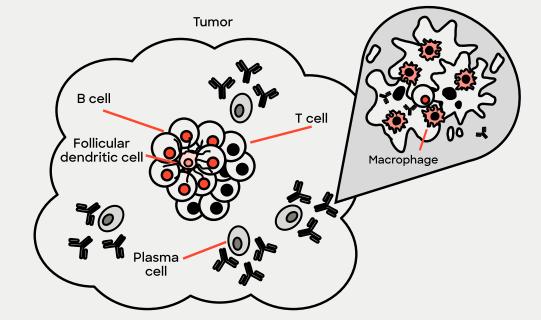
The leading AI platform for AI-enabled biologics drug creation



Leveraging exceptional immune responses to identify new p

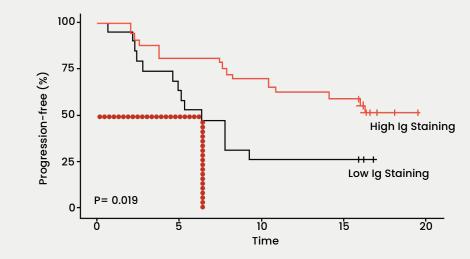
 tential cancer specific targets and therapeutics

Antibodies selected in tertiary lymphoid structures bind to cancer cells and are associated with favorable clinical outcomes



Tertiary Lymphoid Structures (TLS) are centers of immune activity (B-cell proliferation and antibody production) that develop in chronically inflamed tissues such as tumors.

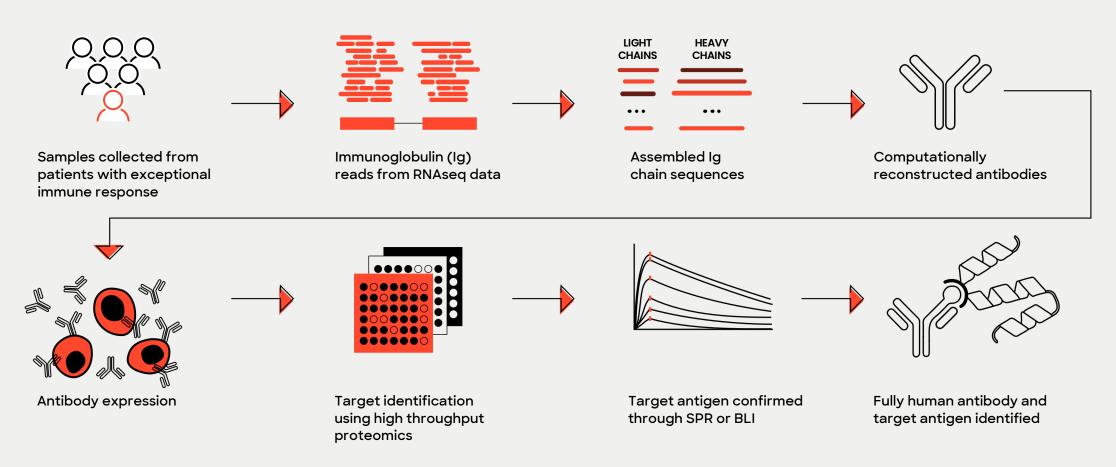
Meylan, Maxime, et al. "Tertiary lymphoid structures generate and propagate anti-tumor antibody-producing plasma cells in renal cell cancer." Immunity 55.3 (2022): 527-541.



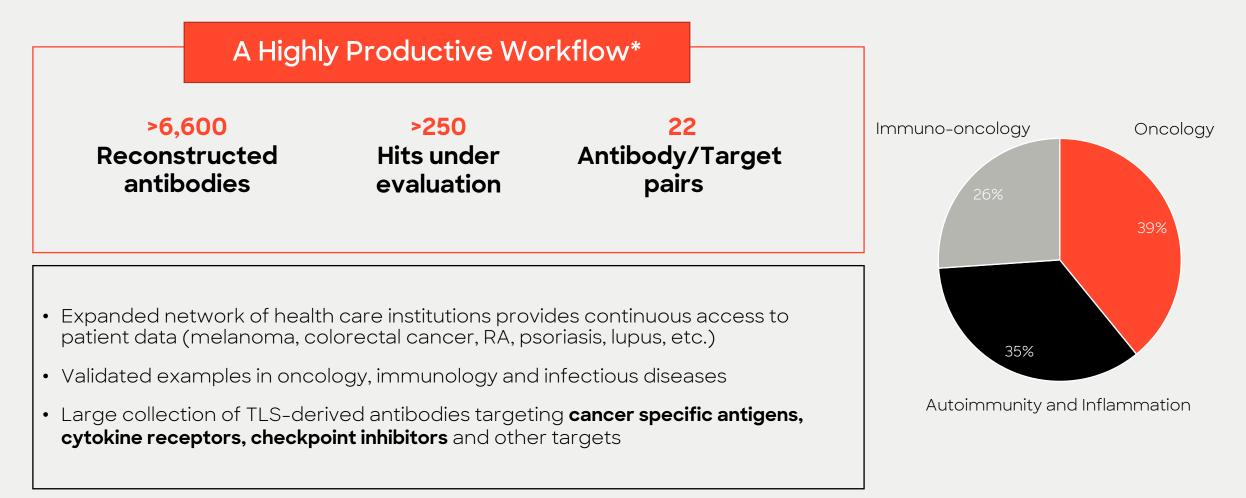
- The presence of TLS is associated with longer progression-free survival and better response to immune checkpoint inhibitors.
- Rapidly growing evidence illustrates correlation between TLSderived antibodies in the tumor microenvironment and positive clinical outcomes.
- TLS-derived antibodies have been shown to be associated with apoptosis of cancer cells in patients.

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Our integrated workflow identifies the antigens targeted by exceptional immune responses



Absci's workflow identifies antigens targeted by exceptional immune responses



NOVEL TARGET DISCOVERY

Absci partners with leading health institutions to drive novel target discovery



PARTNERING WITH TOP-CLASS HEALTH INSTITUTES

- Aster Insights
- Avera Health
- Saint John's Cancer
 - Institute Department of Translational Molecular Medicine
- University of Oxford
- Others in progress

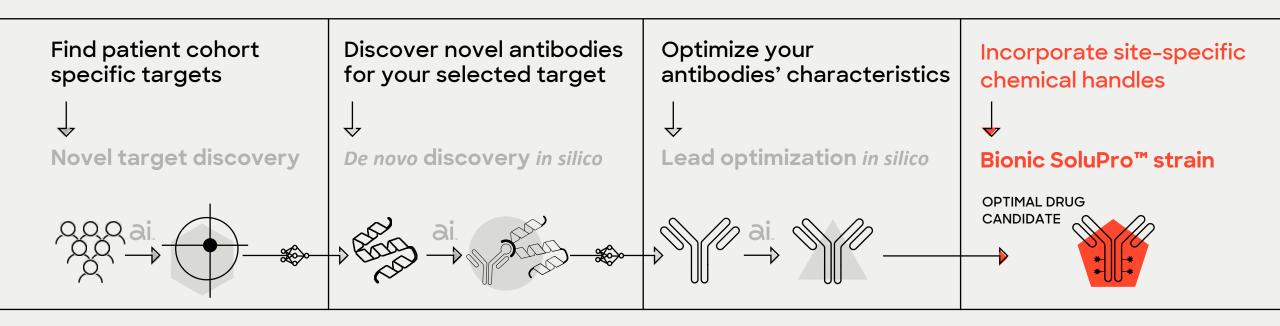


PROVIDES ABSCI WITH

 continuous funnel of data for the discovery of novel disease-relevant targets and antibodies

ABSCI'S END-TO-END PLATFORM SOLUTION

The leading AI platform for AI-enabled biologics drug creation



NON-STANDARD AMINO ACID INCORPORATION

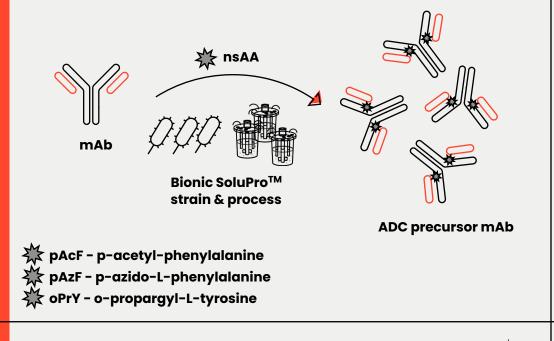
Bionic[™] protein technology: non-standard amino acid (nsAA) incorporation

Absci's high-yielding Bionic SoluPro[™] strain enables selective site-specific nsAA incorporation into difficult-to-produce biologics (proteins, enzymes, mAbs, fabs, VHHs)

Bionic[™] protein technology enables:

- Rapid assessment of payload location
- Precise control over payload location
- Uniform and homogenous Drug-Antibody-Ratio (DAR) for ADCs
- Attachment of diverse chemical moieties for novel applications

EXPRESSION OF MAB IN BIONIC SOLUPRO™ CELL LINE (ADC PRECURSOR)



NON-STANDARD AMINO ACID INCORPORATION Unlocking new molecular functionalities and application

Bionic SoluPro[™] platform

- enables site-specific non-standard amino acid incorporation into difficult-to-produce biologics
- designed for maximum incorporation efficiency
- Unlocks functionalities such as chemical modification, drug conjugation, pegylation, glycosylation

Use in wide range of applications

- development of ADCs with improved therapeutic properties (pharmacokinetic, efficacy, and safety profiles)
- half-life extension
- site-specific, homogeneous, designer glycosylation
- attachment of novel chemical moieties
- enzyme immobilization/modification

NON-STANDARD AMINO ACID INCORPORATION

Bionic SoluPro™ a specialized *E. coli* cell line for non-standard amino acid incorporation

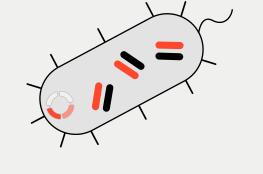


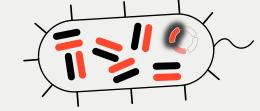
Bionic SoluPro[™] cell line

Patented *E. coli* cell line bioengineered for production of mammalian proteins and site-specific incorporation of non-standard amino acids

Semi-oxidized cytoplasm

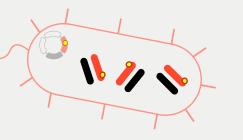
Engineered redox environment to achieve scalable, soluble protein production





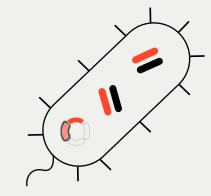
Precise expression control

SoluPro[™] cell lines achieve precise control over induction through genetic engineering of metabolic pathways and proprietary plasmid designs



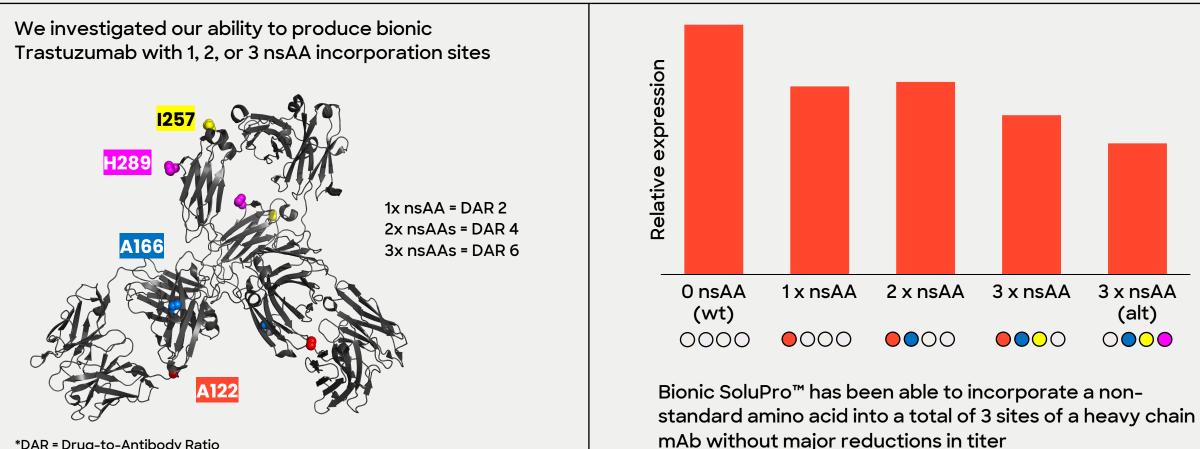
nsAA incorporation

Optimized for high-efficiency incorporation of non-standard amino acids



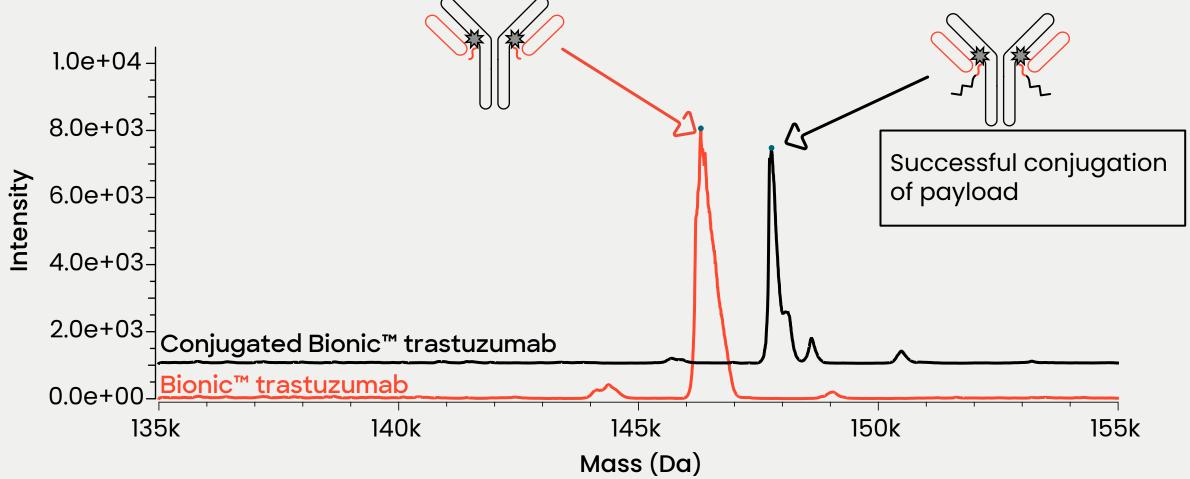
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CASE STUDY: MULTIPLE INSERTIONS OF NON-STANDARD AMINO ACIDS Increased drug to antibody ratio with the incorporation of multiple nsAAs



*DAR = Drug-to-Antibody Ratio

CASE STUDY: CONJUGATING TO NON-STANDARD AMINO ACIDS Easy conjugation producing homogenous drug substances

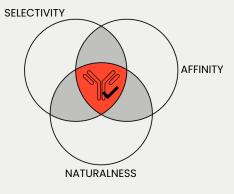


VALUE CREATION FOR PATIENTS AND PARTNERS - TODAY

Unlocking new and differentiated value drivers

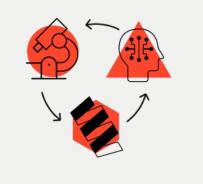
Higher Potential Biologics with Increased PoS

Multidimensional optimization in parallel creates higher quality biologics with an increased Probability of Success



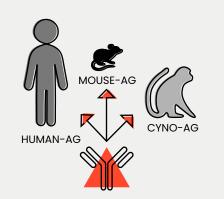
Reducing Time & Increasing Competitiveness

Drug creation process significantly shortened reducing research costs and increasing competitiveness



Novel biology: Multivalent biologics & conditional biologics

Preclinical development: Cross-species binding to improve success rates & speed



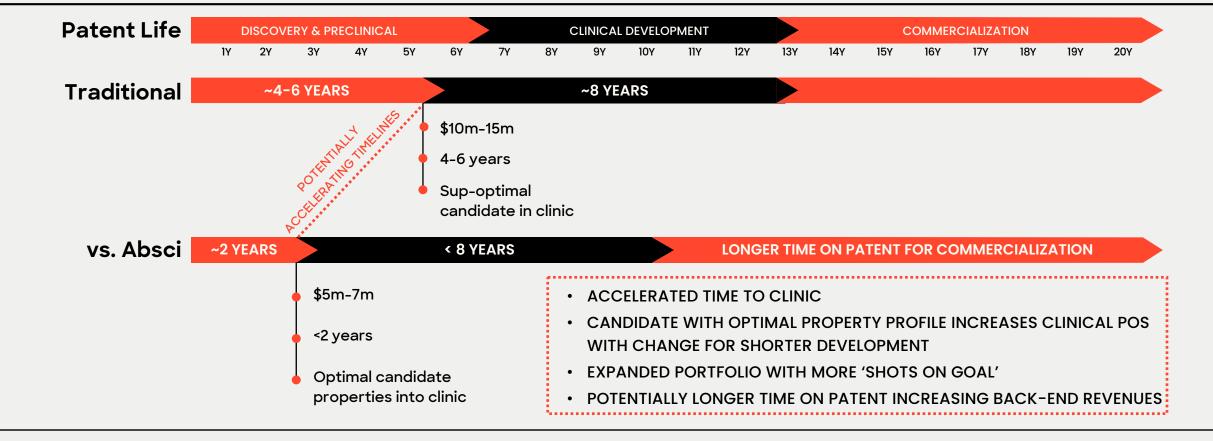
Broadening Intellectual Property Space

Al-driven drug creation generates valuable IP



BETTER BIOLOGICS FASTER

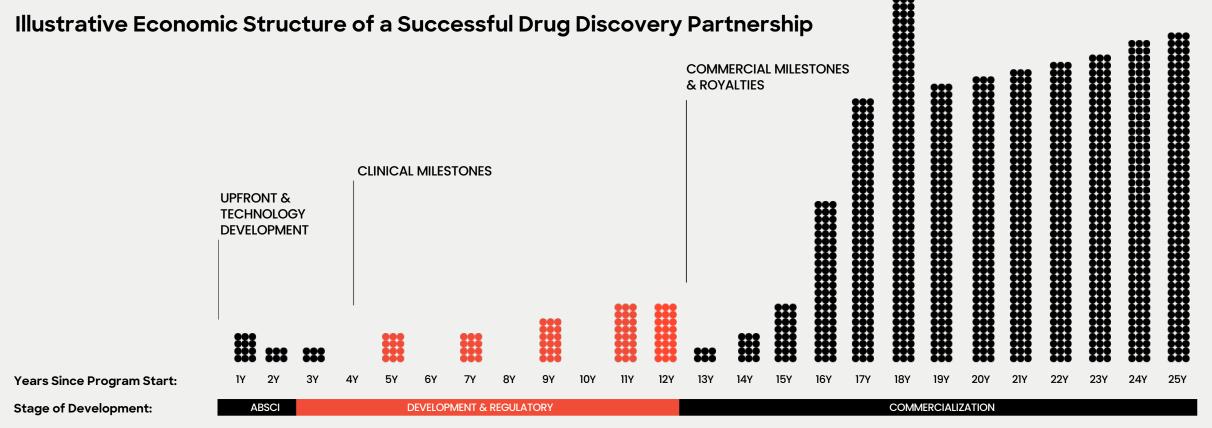
Accelerating time to clinic while increasing PoS





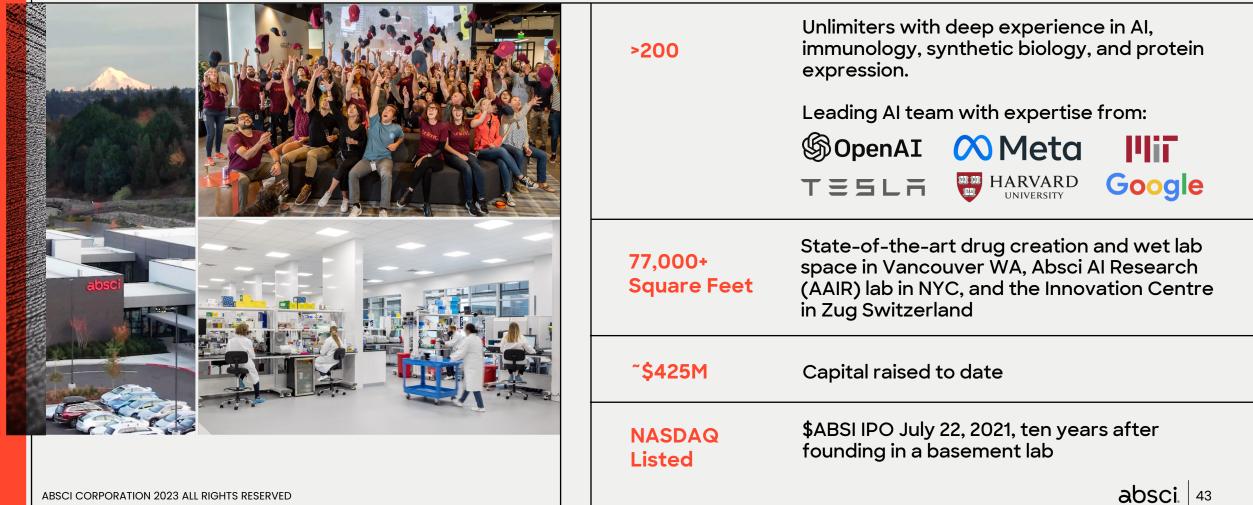
BUSINESS MODEL

Creating Compounding Value for Shareholders



*Illustrative of Discovery Partnership; assuming successful commercialization. Regulatory milestone captured in clinical development, and single digit royalty rates

Well positioned to revolutionize Al drug creation



PARTNERSHIPS

Technology validated through industry-leading collaborations



"Merck leans into AI with \$610M in biobucks for Absci drug discovery pact"

"At Merck we are continually evaluating new ways to build, expand, and refine our biologics capabilities. Absci's platform offers a compelling opportunity to design new biologic candidates and explore the expression of complex proteins."*

Dr. Fiona Marshall Former SVP, Head of Discovery, Preclinical and Translational Medicine

"Absci collaborates with NVIDIA, pioneer in AI & compute technology to accelerate vision of creating drugs *in silico*"

"Absci's powerful data generation and AI protein engineering platform is already helping the drug discovery industry, and NVIDIA is excited to help power and scale Absci's in silico technologies to achieve the best positive impact."

Kimberly Powell Vice President of Healthcare

TRAILBLAZING MANAGEMENT TEAM

The right leadership team to accomplish the Impossible



Founder & CEO Director

ANDREAS BUSCH, PHD G Chief Innovation Officer C

PHD GREG SCHIFFMAN, CPA er Chief Financial Officer SARAH KORMAN, PHD, JD Chief Legal Officer JACK GOLD Chief Marketing Officer KARIN WIERINCK Chief People Officer JOSHUA MEIER SVP, Chief Al Officer PENELOPE Chief Morale Officer

absci 45

Senior leadership bring experience from industry leaders including:



Backed by a Board of industry, platform, and scientific innovators

Board of Directors



SEAN MCCLAIN Founder & CEO Director, Absci

KAREN MCGINNIS, CPA Former CAO, Illumina



ZACH JONASSON, PHD Managing Partner, PVP

AMRIT NAGPAL Managing Director, Redmile Group



JOSEPH SIROSH, PHD

Alexa Shopping, Amazon

Vice President,



Meta

FRANS VAN HOUTEN Former CEO, Roval Phillips

Scientific Advisory Board

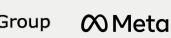


VICTOR GREIFF, PHD Associate Professor, University of Oslo



HUBERT TRUEBEL, MD, PHD Head of Development, CMO, AiCuris

Redmile Group





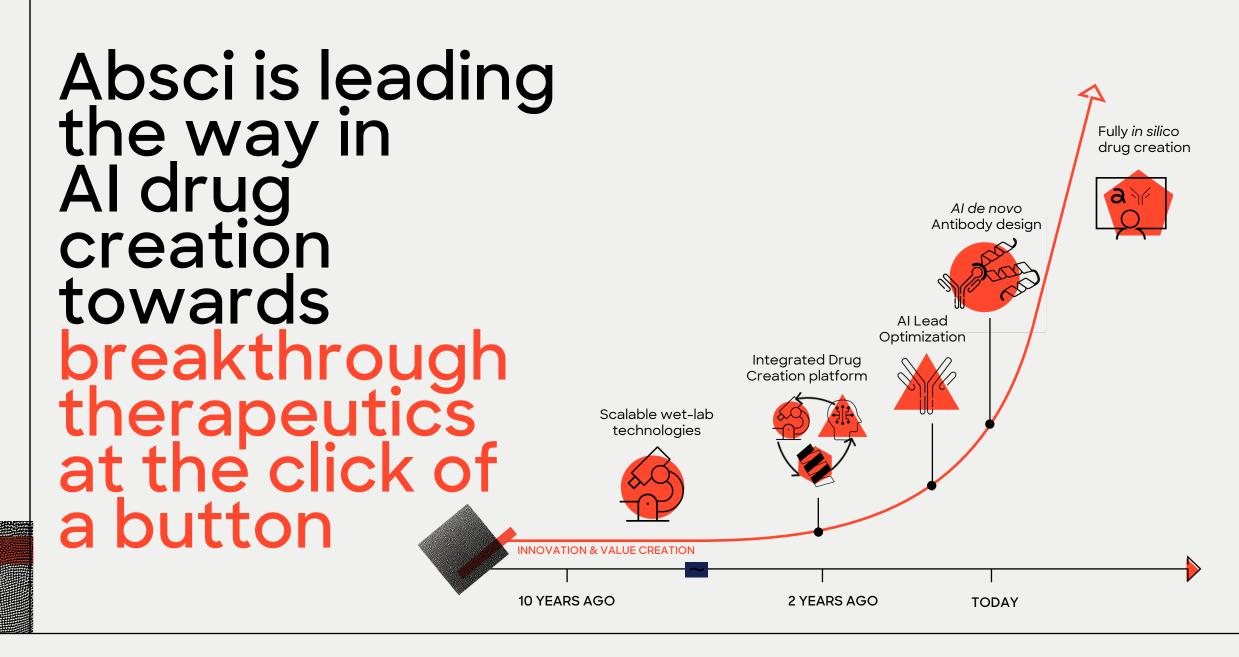








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This revolution is only just beginning.