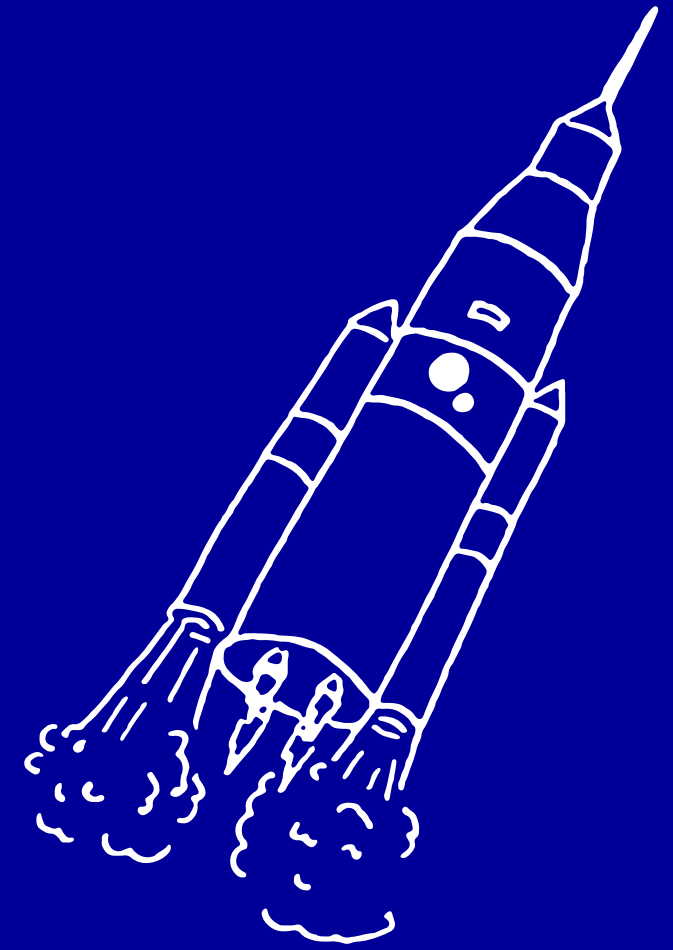


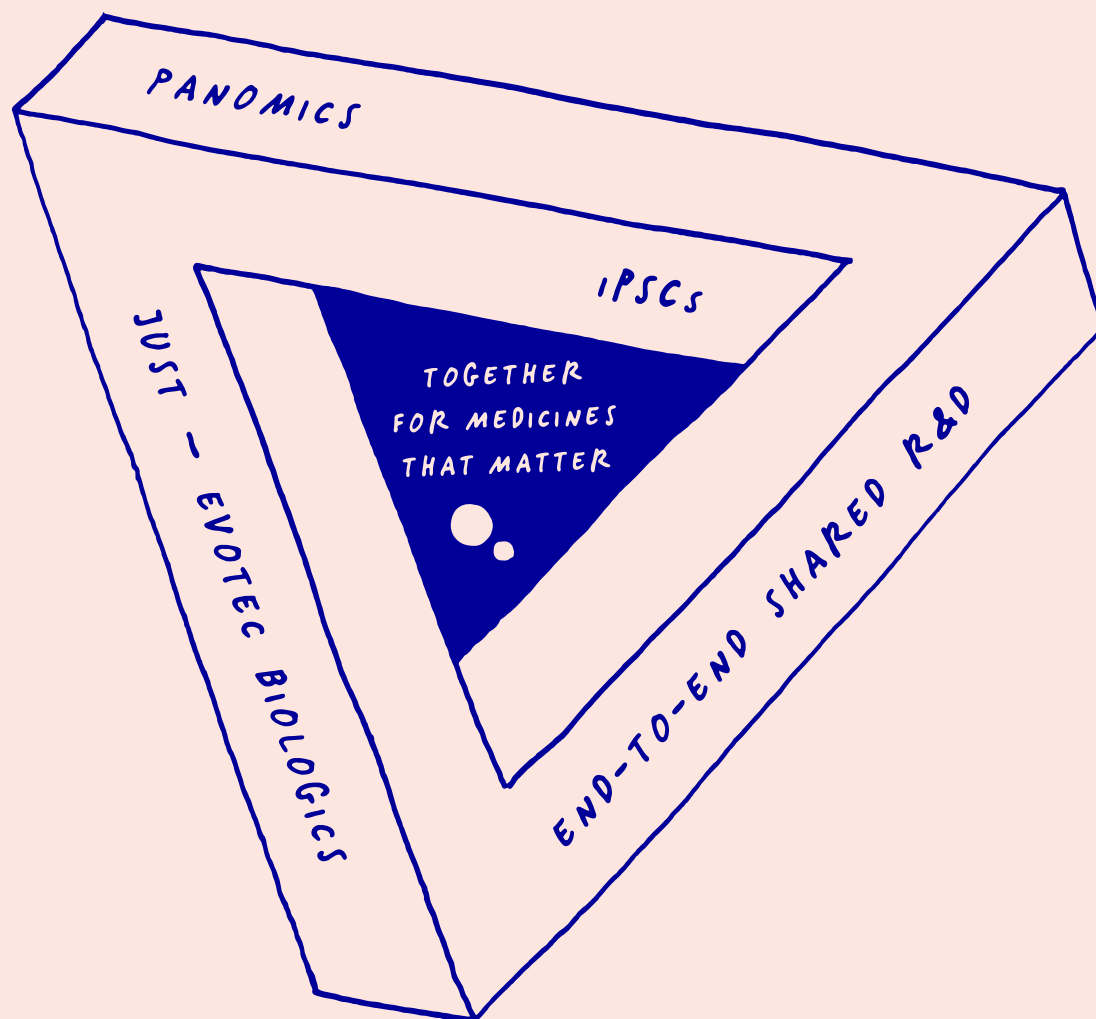
Just – Evotec Biologics

Introducing a paradigm shift in biologics





Together for Medicines that Matter



We aspire to impact patients' lives by

- **PanOmics**-driven drug discovery for deep disease understanding and effective therapies
- **IPSCs** “off-the-shelf” cell therapy based on induced-pluripotent stem cells
- **Just – Evotec Biologics**
Artificial Intelligence and continuous manufacturing for better access to biologics
- **End-to-End Shared R&D**
Integrated business-to-business platform for increased probability of success from target to the clinic



Together for medicines that matter

Game changers within business to business / partnered R&D

More precise medicine

PanOmics databases, multi-modality

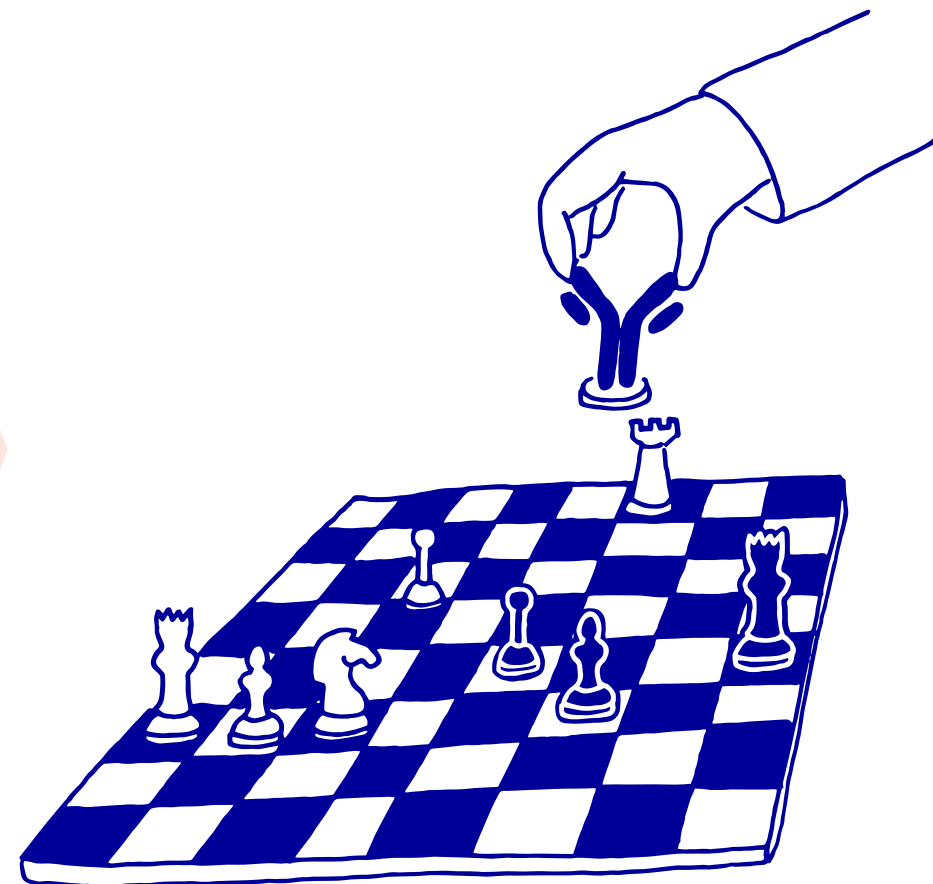
End-to-End Shared R&D

A.I./M.L. & technology convergence

*Latest technologies coming together with
drug discovery, development, safety
prediction and molecular diagnostics*

Right business model & best talents

*Collaboration – from fixed to variable costs,
with efficient access to best know-how*





Industry at a pivotal moment

A shared economy platform in R&D

Need for more precision

Most drugs still provide benefit in only 50% of patients

Need for better disease understanding

*Lifetime risk for cancer
e.g., 44% in men & 38% in women*

Need for wider access

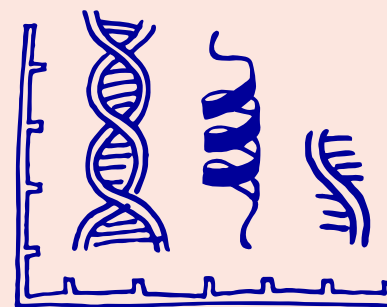
Less than 20% of world's population have access to life changing biotherapeutics

Need for better safety earlier

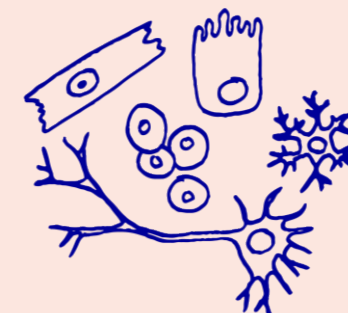
60% of all drugs still do not pass Phase I

Our focus areas

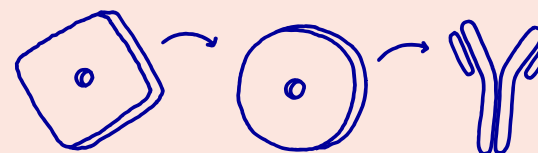
PanOmics¹



iPSCs



Just - Evotec Biologics



End-to-End Shared R&D





TOGETHER with our partners for a paradigm shift

Creating a massive impact on our industry



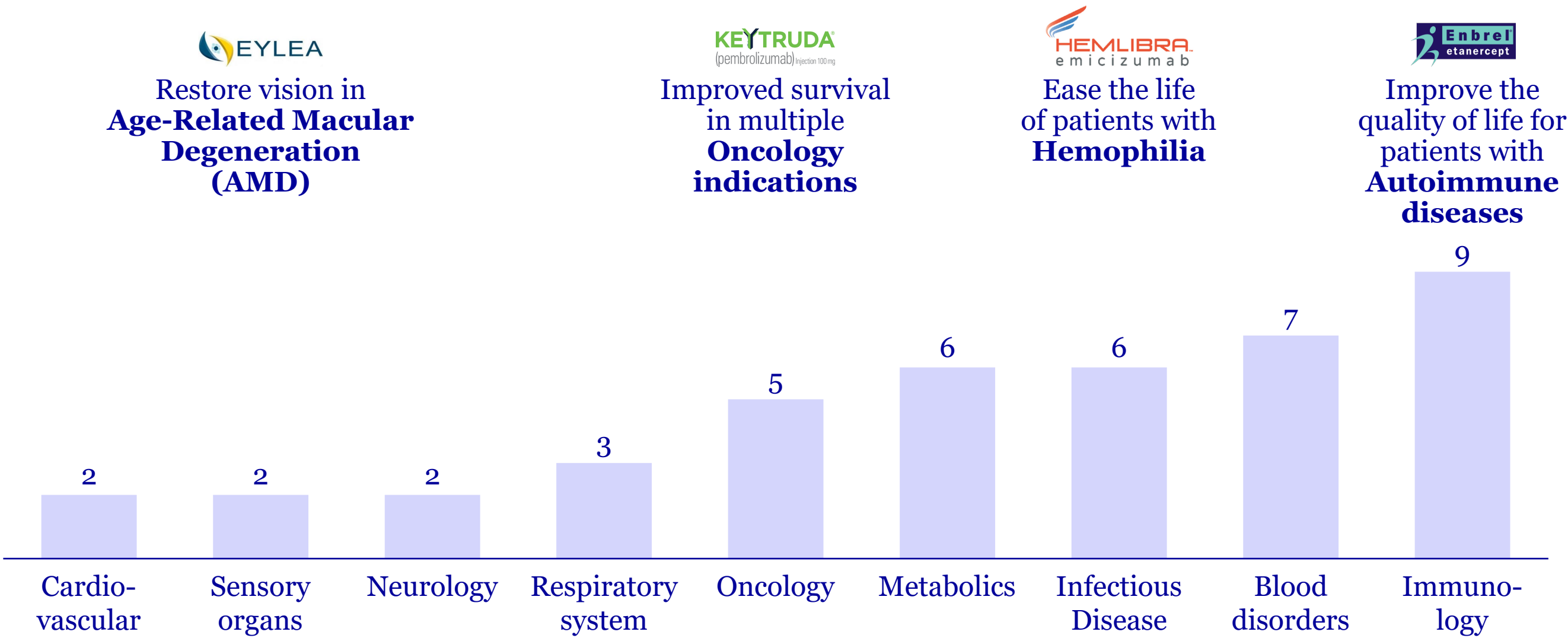
Our mission is to design and apply innovative technologies to dramatically expand global access to biotherapeutics

Together we will create a massive impact by providing access to critical biotherapeutics



Biologics have become foundational therapies ...

Antibody-based therapies within top-10 drugs in disease by value, number / selected examples





... but do these important therapies reach everyone?

Limited access to biologics exists today in many patient segments



22x

higher average price
for daily dose of a biologic
vs a small molecule drug¹

Underserved
populations



80%

of global sales of monoclonal
antibodies are only in USA,
Europe or Canada²

Underserved
regions¹



7,000

underserved rare
indications that could be
addressed with biologics³

Underserved
indications



10 months

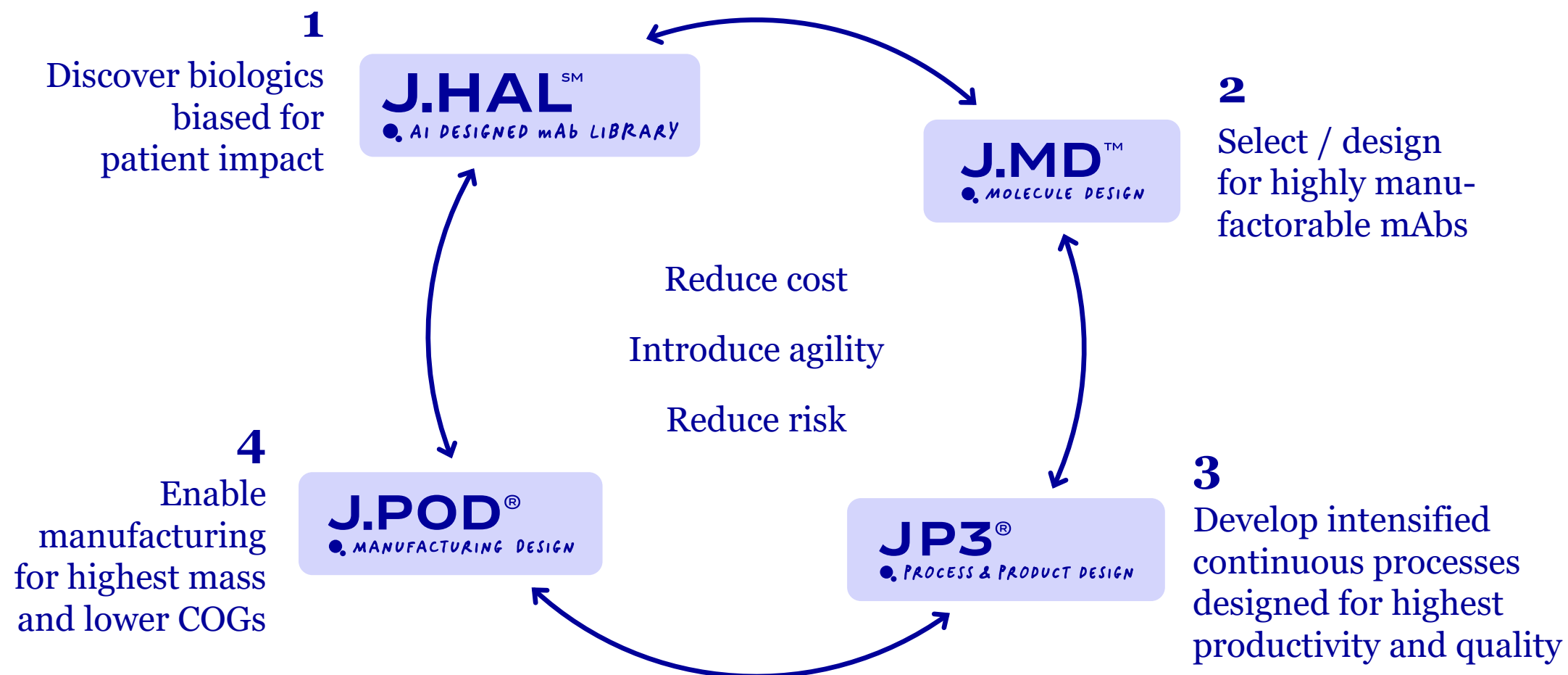
to first Ab therapy
in COVID⁴

Global health &
pandemics²



We aim to address low accessibility with J.DESIGN

Agility, reduced costs and risk for biotherapeutics





1. A complete offering to solve even the hardest discovery campaign

Generation of fully human antibodies: from traditional platforms to A.I.-driven approaches

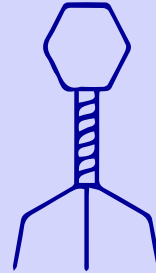
Exploration of natural immune repertoire using phage display



Key distinguishing features

- Immune library generation upon immunization or natural infection
- *In vitro* selection of rare yeasts
- No species restriction

J.HAL®, A.I.-designed phage and yeast libraries



Key distinguishing features

- Highly diverse A.I. designed human library
- Time + cost savings for therapeutic development

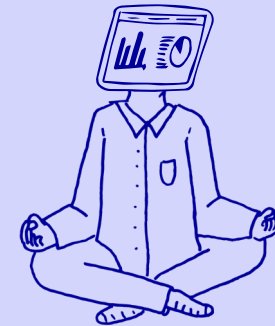
B cell technology



Key distinguishing features

- Direct screening of millions of B cells upon immunization or natural infection
- No species restriction

In silico mAB design (coming soon)



Key distinguishing features

- State-of-the-art platform to identify optimal binders *in silico*
- Fastest way to generate binders
- Initial client projects started

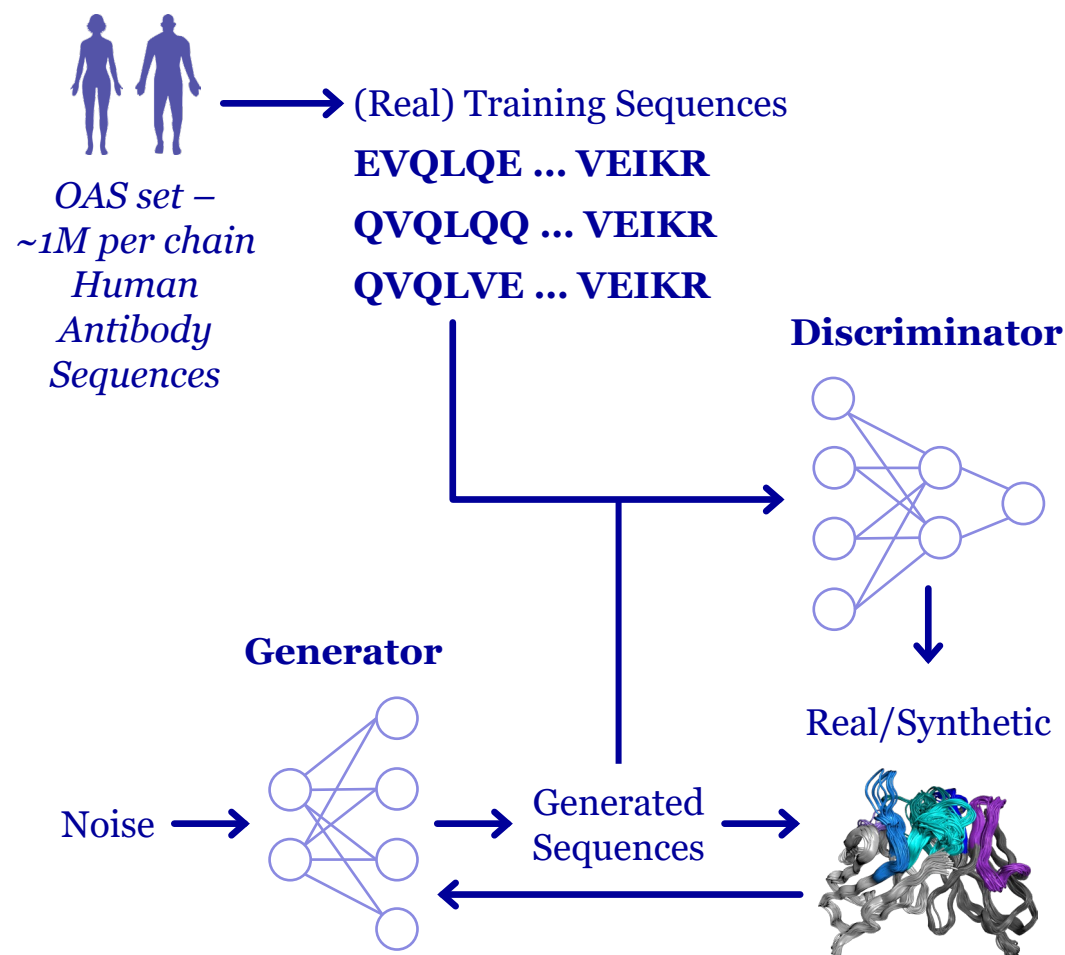


1. J.HAL[®]: Biased libraries to find the best therapeutic

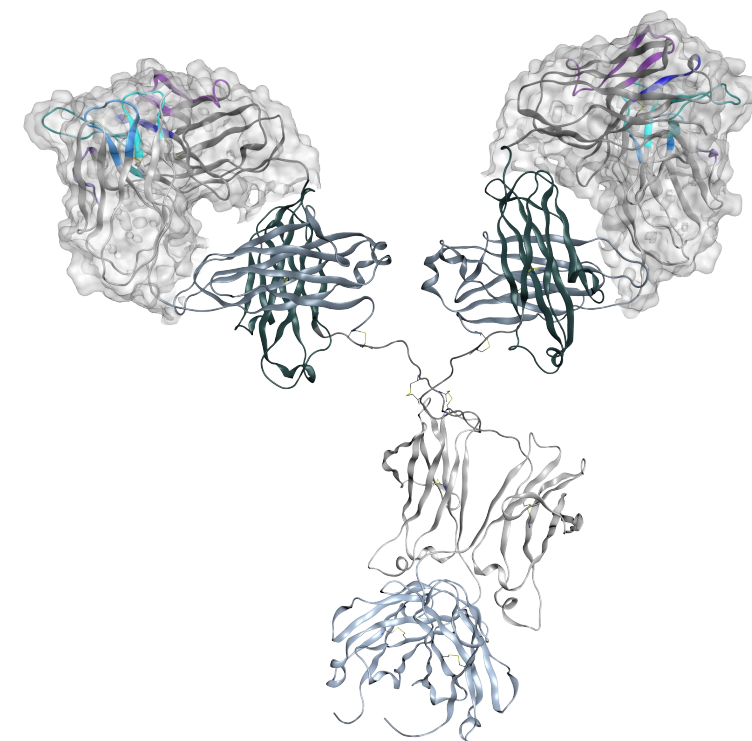
The right pharmacodynamic properties combined improved stability, titer, attributes ...

Humanoid Antibody Library (J.HAL[®])

- Large, diverse, manufacturable, and developable discovery libraries with machine-learned biasing for *in silico* discovery
- Finding the best therapeutic from the start while solving challenges of manufacturability, stability, low yield, poor PK



Real or Synthetic?



Agility ■■■ Risk ■■■ Cost ■■■



2. Selection and design of best antibody enables highest productivity

Case study: *In silico* selection of best two mAbs using J.MD™



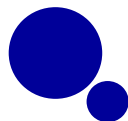
- *In silico* validation: Identify manufacturability of Ab by its sequence
- Selection for biophysical characterization
- Conformational stability
- Colloidal stability

High throughput biophysical characterization of mAbs

mAb	Conformational stability						Colloidal stability								Manufacturability		
	DSF WSS	DSF1 T1	DSF2 T2	Thermal Hold Ave	Low pH HMW	Unfold	SINS	Zenix RT	9.5% PEG	CL	KLH	dsDNA	Insulin	Formulation Stability	Easily formulated	Productivity (g/L/day)	
mAb 1														High	✓	4.0	
mAb 2														High	✓	4.1	
mAb 3														Low	✓	2.4	
mAb 4														Medium	✗	2.8	
mAb 5														Low	✗	1.5	
mAb 6														Medium	✓	3.1	
mAb 7														Low	✓	3.5	
mAb 8														Low	✗	2.0	
mAb 9														High	✓	3.0	
mAb 10														Medium	✗	1.2	

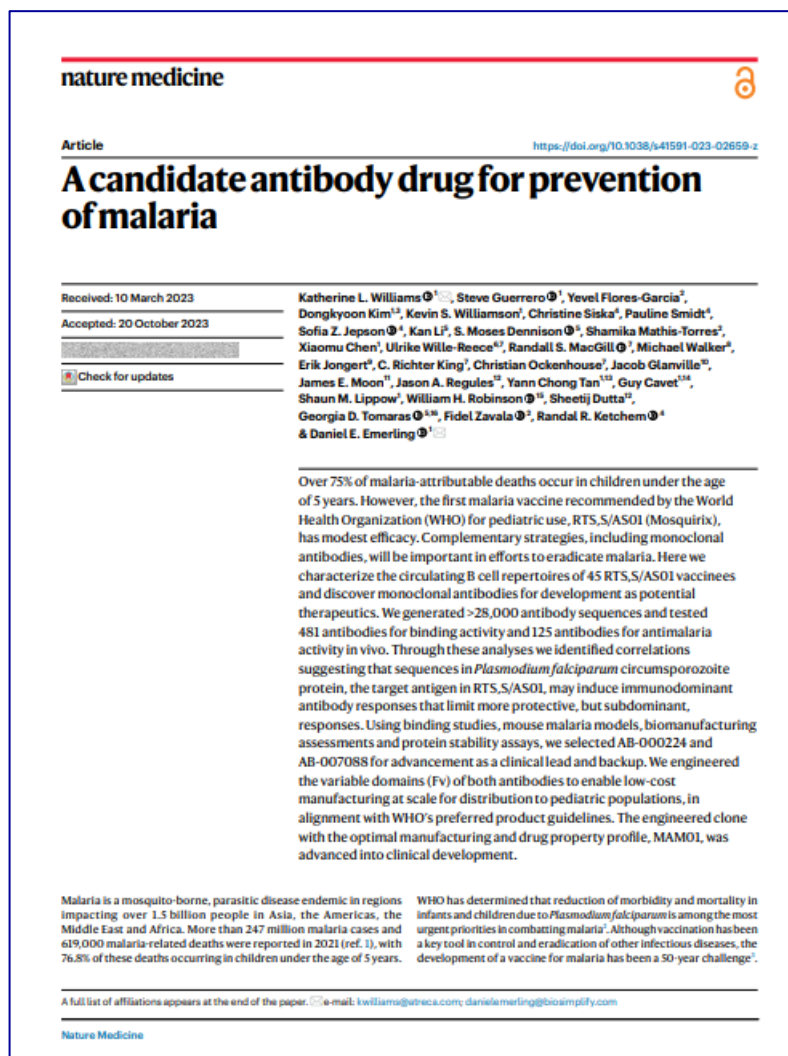
mAb 1 and 2 had best profile → chosen for cocktail

Agility ■■■ Risk ■■■ Cost ■■■ No violation Violation Undefined



2. Publication in Nature Medicine journal validates Molecular Design suite

A candidate antibody drug for prevention of malaria | Nature Medicine



Molecular Design (J.MD™)

- Team supported lead candidate selection of anti-malaria antibodies by ranking a panel of candidates for developability using our proprietary Abacus tool
- Designed optimized variants of lead candidates for improved developability properties informed by stability violations found with Abacus
- Created stable pools to generate material for biophysical characterization and activity assays
- Identified best-producing clonal cell line, expressing the candidate in continuous-perfusion bioreactors at twice the original titer
- Advanced candidate into GMP production to support early phase clinical studies use in pediatric populations living in Low to Middle Income Countries

[Link: A candidate antibody drug for prevention of malaria | Nature Medicine](#)



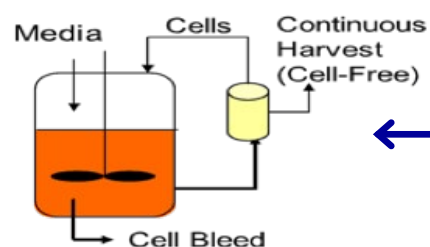
3. JP3®: Continuous process development based on robotics and M.L.

Intensified processes can be rapidly developed using high-throughput technologies and M.L.

Cutting edge high throughput process development

- Just – Evotec Biologic's optimized proprietary cell lines and vectors or partner cell lines and vectors
- Accommodates an array of molecules and process formats: intensified fed batch, continuous perfusion
- Custom media tuned for productivity
- High density perfused culture conditions
- Connected downstream processing
- High resolution analytical methods
- Highly stable drug product formulation conditions
- Perfusion platform yields are generally 2-4+ grams/L/day

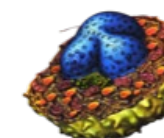
Scale-down system



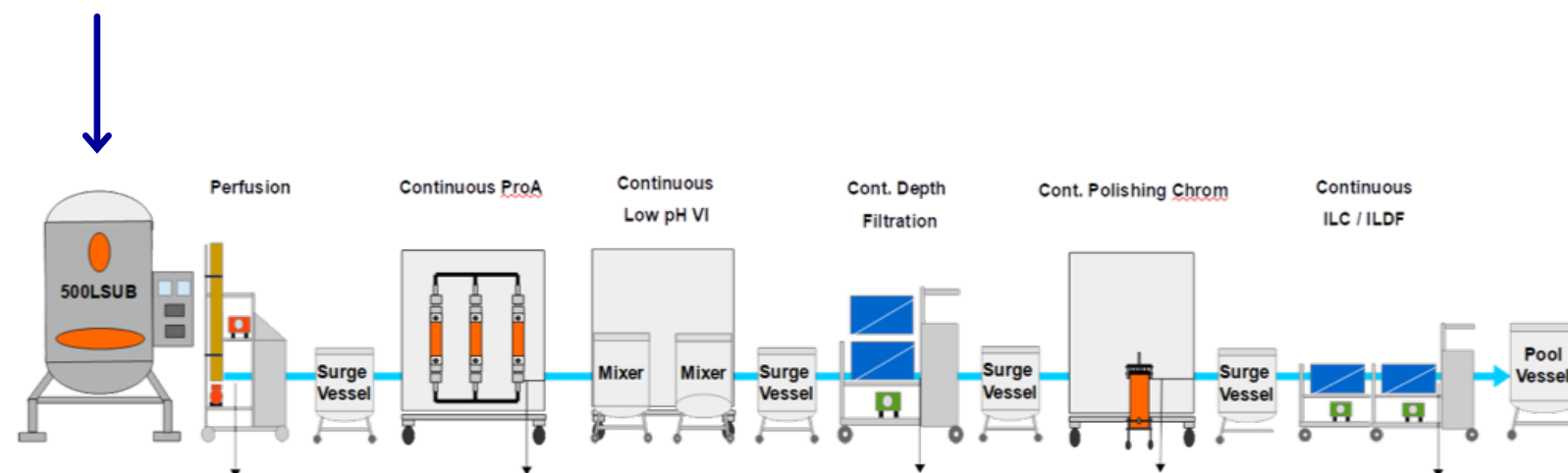
Robotics



Cells



DNA



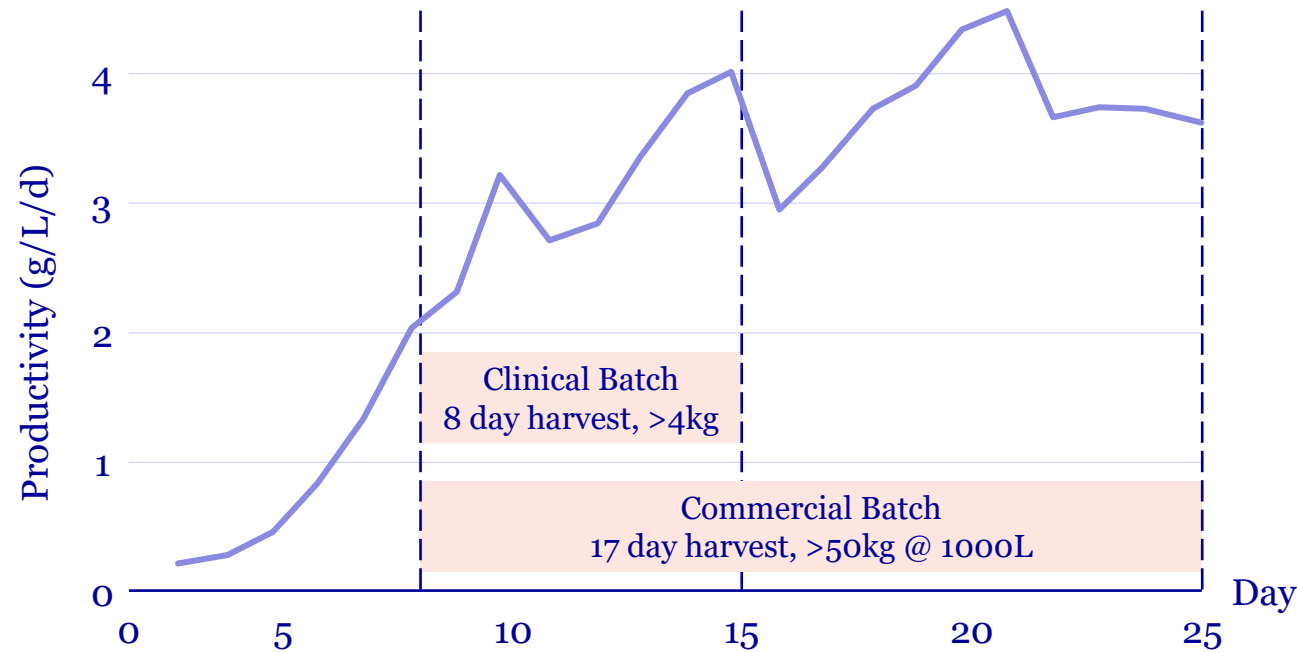
Agility ■■■ Risk ■■■ Cost ■■■



4. Continuous harvest outperforms fed batch by 10x

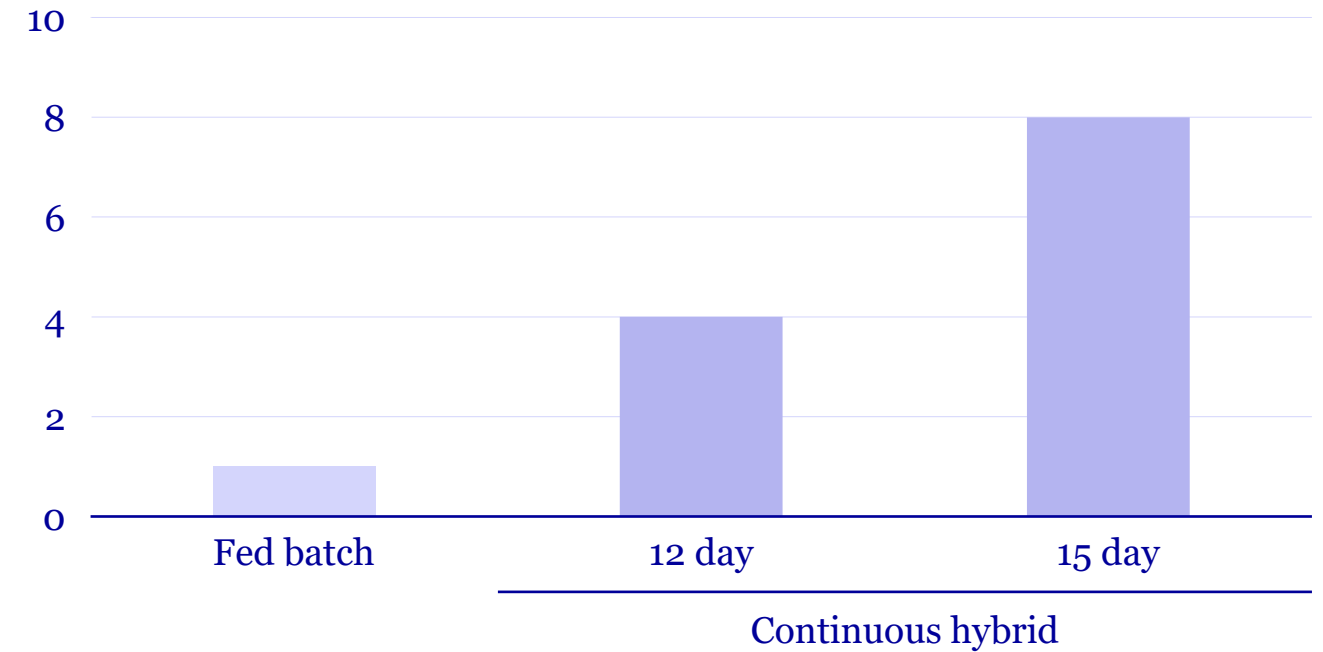
Example: Perfusion and continuous manufacturing compared to traditional fed batch

Productivity vs. Day



- 3L model system gives high confidence in scale-up
- High productivity: 3-4 grams product / L / day

Comparison of 1 x 500L Run in kg DS per 500L Bioreactor



- Total of 18kg and 18.3kg to date (5 x 500L runs)
- Extending culture duration to 15 day increases mass produced

Agility ■■■ Risk ■■■ Cost ■■■



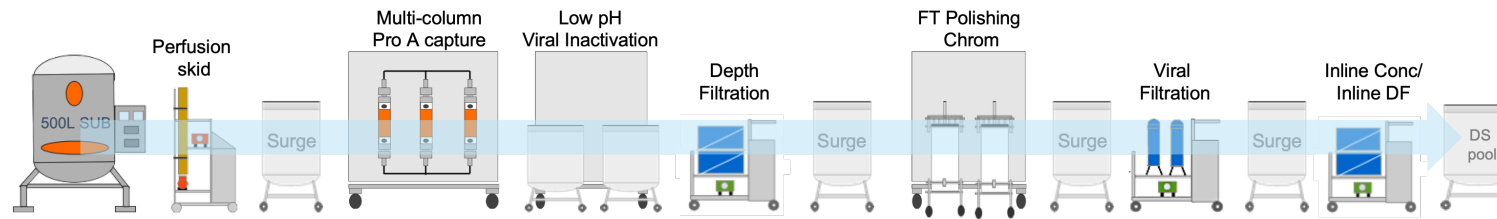
4. Highly intensified processing yields lowest possible COGs

The key to start the paradigm shift/leaving rudimental ways to become more efficient

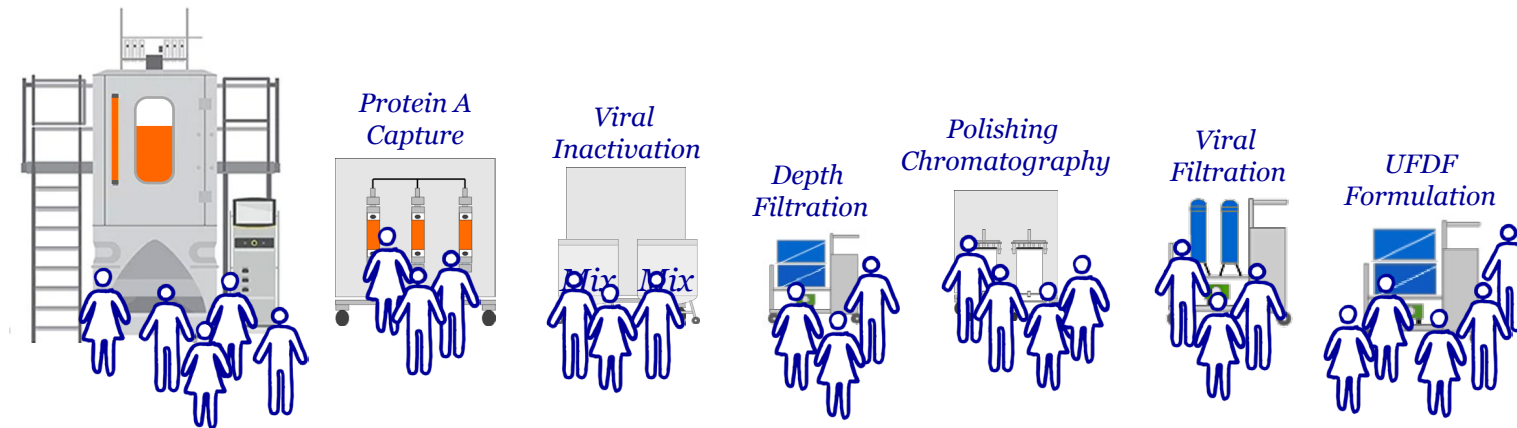
Fully end-to-end continuous process for commercial

>25-day production

Just
EVOTEC BIOLOGICS



Traditional fed batch



COGs

-75%

Commercial
COGS
<50 US\$/g

Traditional
CDMOs

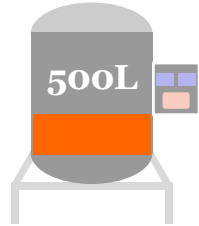
Just – Evotec
Biologics

Agility ■■■ Risk ■■■ Cost ■■■



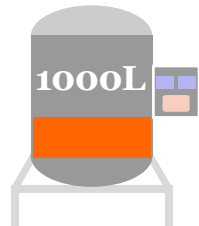
4. No need to scale up from clinical to commercial

Bioreactor duration can be extended with steady-state continuous perfusion technology



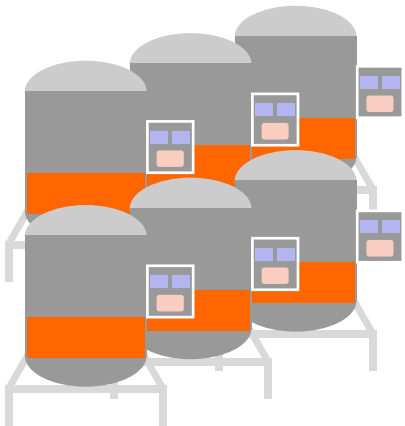
15-day process

Early-stage clinical trial
5-8 kg drug substance per run



25-day process

Late-stage clinical trial
35-38 kg drug substance per run



25-day process

Commercial
2,000 kg drug substance per year

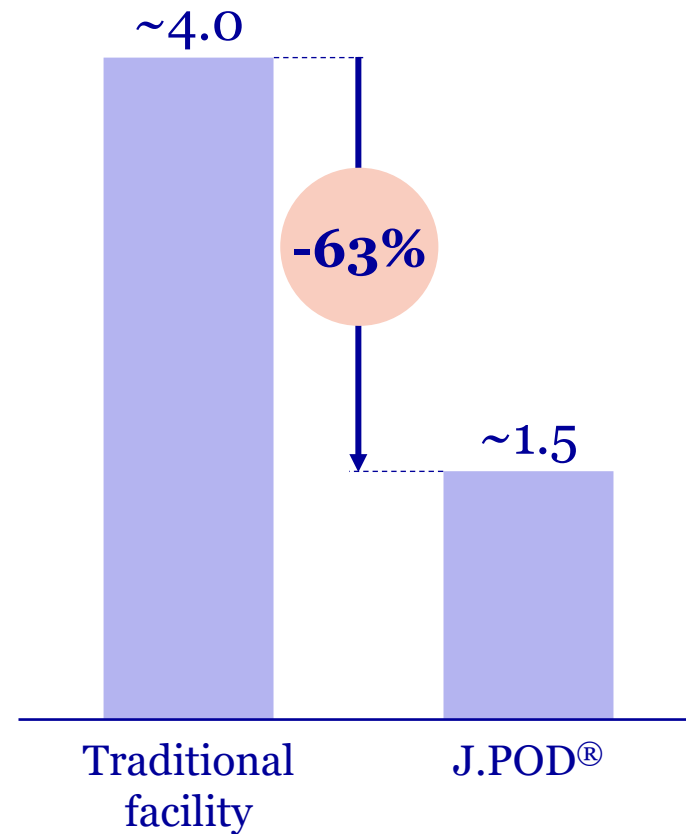
Agility  Risk  Cost 



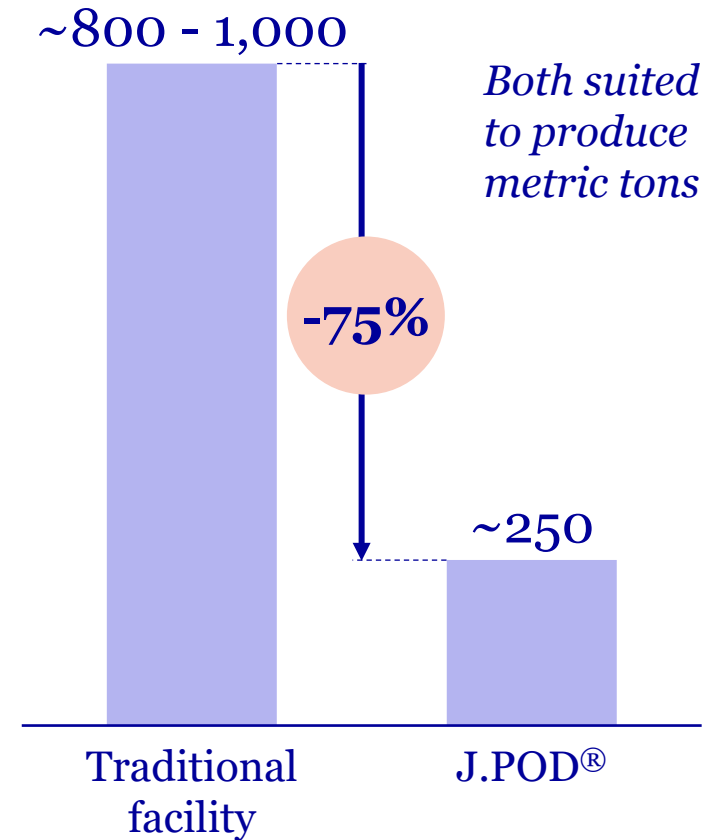
4. J.POD[®]: Introducing continuous manufacturing to mAb production

Disrupting the industry by introducing continuous manufacturing plus environmental benefits

Time to set up a J.POD[®] is short, Years



Cost of a J.POD[®] facility US\$ m



- Reduced cost and time to set up facility
- High ESG standards with small facility footprint and process efficiencies, yield significantly reduced water and power usage





We are leading in continuous manufacturing

We were working on continuous manufacturing from early on

Fed batch

Intensified fed batch and/or some perfusion

Continuous hybrid

Fully continuous capability

[RESILIENCE

 Rentschler
Biotechnologie

 Catalent
BIOLOGICS

 Lonza

 eurofins

 SAMSUNG
BIOLOGICS

 AGC Biologics

 EVAXION

 AbCellera

 康龙化成
PHARMARON

 AVID
BIOSERVICES

 KBI
BIOPHARMA

 polpharma
biologics

 ThermoFisher
SCIENTIFIC

 WuXi Biologics
Global Solution Provider

 Boehringer
Ingelheim

 FUJIFILM
Di-synth
biotechnologies

 Just
EVOTEC BIOLOGICS

 MERCK



J.DESIGN enables accessibility

Key hurdles are overcome by all four aspects of J.DESIGN

Critical factors preventing access

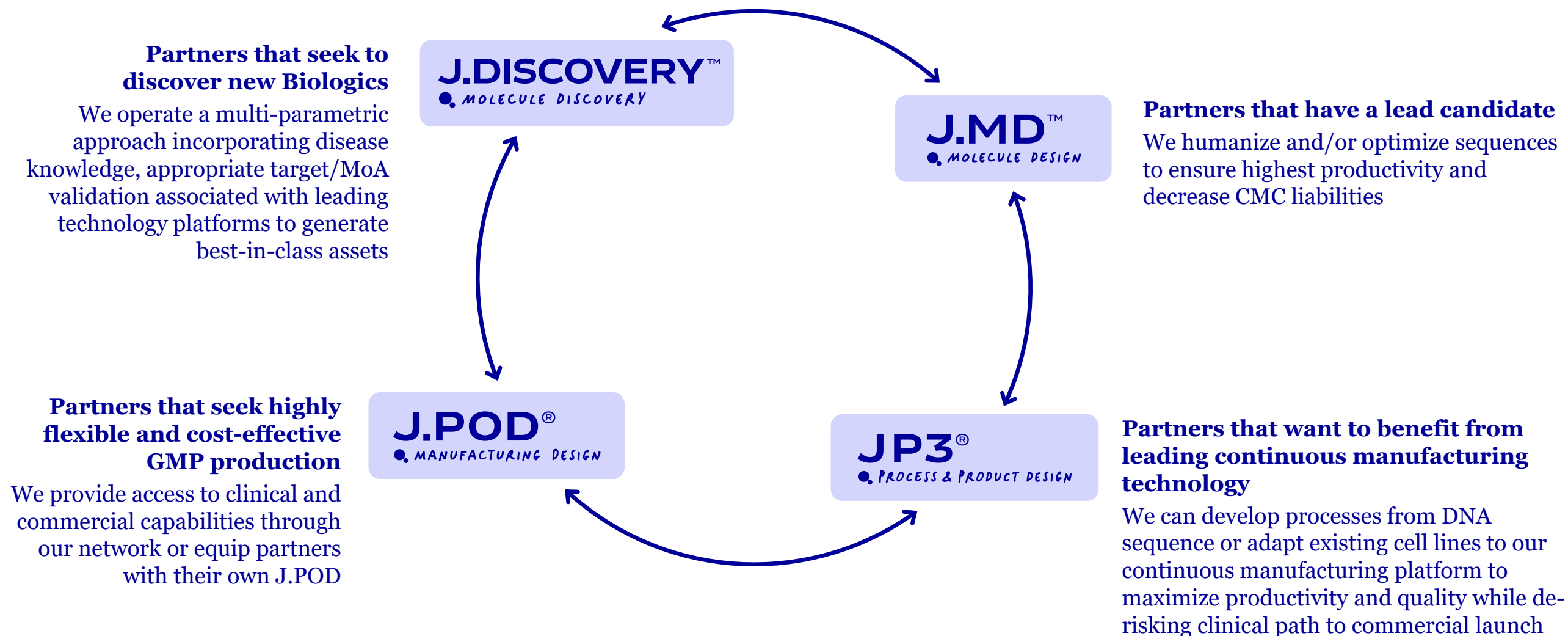
J.DESIGN		Cost			Agility			Risk	
1	J.HAL SM AI DESIGNED mAb LIBRARY	✓	✓	✓	✓	✓	✓		
2	J.MD TM MOLECULE DESIGN	✓			✓	✓	✓	✓	✓
3	JP3 [®] PROCESS & PRODUCT DESIGN	✓			✓	✓			
4	J.POD [®] MANUFACTURING DESIGN	✓	✓	✓	✓	✓	✓	✓	✓

Technology to unlock access



Our partnering landscape and access points

From preclinical to commercial – many ways to drive the paradigm shift together





We are driving the paradigm shift with a distinct value proposition

Accelerating the paradigm shift in biologics day-by-day

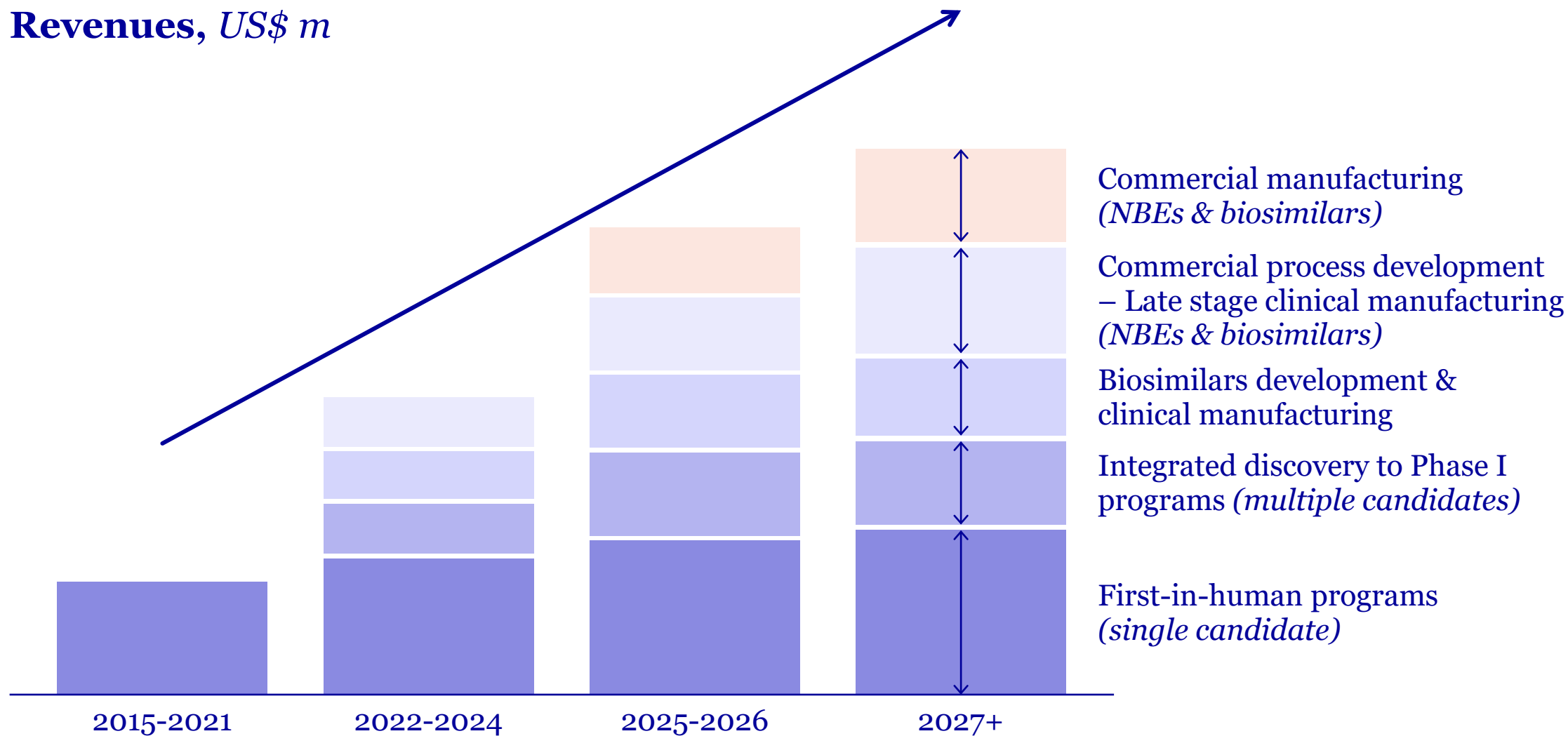
From	To	Just ● EVOTEC BIOLOGICS	Others
Large stainless steel bioreactors	Flexible & agile capacity	●	◐
Facility cost >US\$ 500 m	Facility cost << US\$ 500 m	●	○
Fed batch process operated in separate upstream & downstream	Fully automated and integrated platform operating continuous process	●	◐
Fixed cost focus	Variable cost focused	●	○
COGS > 150 US\$/g in median across industry	Targeted COGS <50 US\$/g ¹ at Just – Evotec Biologics	●	○



How we expect to evolve and accelerate our partnering portfolio

Where we stand today and where we want to go with our partners

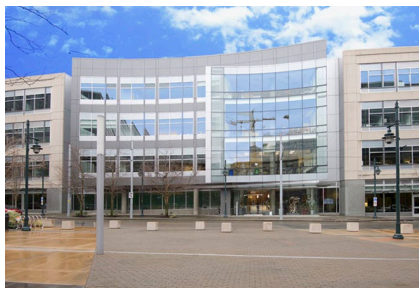
Revenues, US\$ m





An expanding J.POD[®] manufacturing network to meet global needs

Present state



J.PLANT Seattle, Washington, US

- Discovery and Process Development
- 500L SUB
- Phase I – Clinical
- Over 34 runs
- 100% success



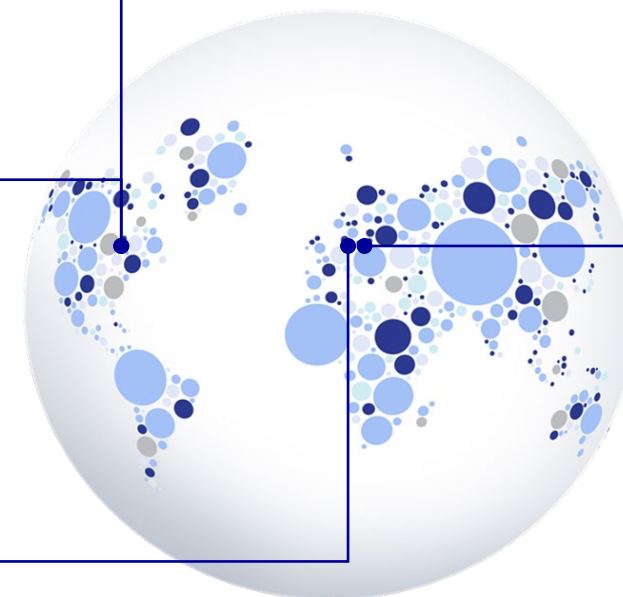
J.POD[®] Redmond, Washington, US

- Process Development
- 500L & 1,000L SUB
- Phase I – Commercial
- First cGMP run Oct 2021
- Capacity: 2,5 t/yr



J.POD[®] Toulouse, France, EU

- Process Development
- 500L & 1,000L SUB
- Phase I – Commercial
- Groundbreaking 2022, Expected CQV 2024
- Capacity: 2,5 t/yr



Cloning of J.POD[®] facilities (option)

Just-Evotec Biologics
“enables” from facility
design to technology

Proximity to key markets



J.POD[®] technology can be quickly
established in other countries/regions



Experienced leadership team dared to dream

>500 combined years of expertise

Team (current role and experience)

Linda Zuckerman
PhD
EVP Global Head of Biotherapeutics
20 years



Valerie Alvarado
VP Capital Projects
25 years



Randal Bass
PhD
EVP Process Design & Biotherapeutic Operations
20 years



Philip Boehme
MD, PhD, MBA
EVP Partnering & Transformation
10 years



Ben Castro
SVP Manufacturing Operations
26 years



Lisa Connell-Crowley
PhD
SVP Process & Product Design
23 years



Jo Beth DeFreitas
SVP Global Biotherapeutics Quality
32 years



Jean-Xavier Gaillat
VP Quality, Toulouse
20 years



Vasant Gandhi
PhD, ESQ
VP Corporate Development
24 years



Eva Gefroh
VP Technical Operations
24 years



Ron Gillespie
VP Process & Product Design
23 years



Jeremy Gross
SVP Global IT & Digitalization
30 years



Jon Gunther
PhD, MBA
VP Business Development
15 years



Zahia Hannas
PhD, Executive MBA
VP Process & Product Design Europe
20 yrs Industry / 10 yrs Academic Research



Kevin Ingham
VP Manufacturing & Site Head
J.POD Redmond, Washington
20 years



Randal R. Ketchem
PhD
SVP Discovery & Molecular Design
25 years



Krista Lewis
VP Human Resources
20 years



Charles Maher
VP Manufacturing & Site Head
J.POD Toulouse, France
8 years Pharma / 32 years Management



Dennis Miller
PhD
SVP, Product Development Leader
Portfolio & Alliance Management
30+ years



Luis Morales-Trevino
VP Facilities & Engineering
33 years



Jamie Morrison
VP Global Quality Control
25+ years



Dan Rasmussen
MBA
SVP Finance
18 years



Magnus Schroeder
PhD
VP Process & Product Design
19 years



Caren Tidwell
PhD
VP Grants and Contracts
28 years





#RESEARCHNEVERSTOPS

*Philip Boehme, MD, PhD, MBA
EVP, Head of Partnering and Transformation Just – Evotec Biologics*

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Call & text anytime
philip.boehme@evotec.com*
