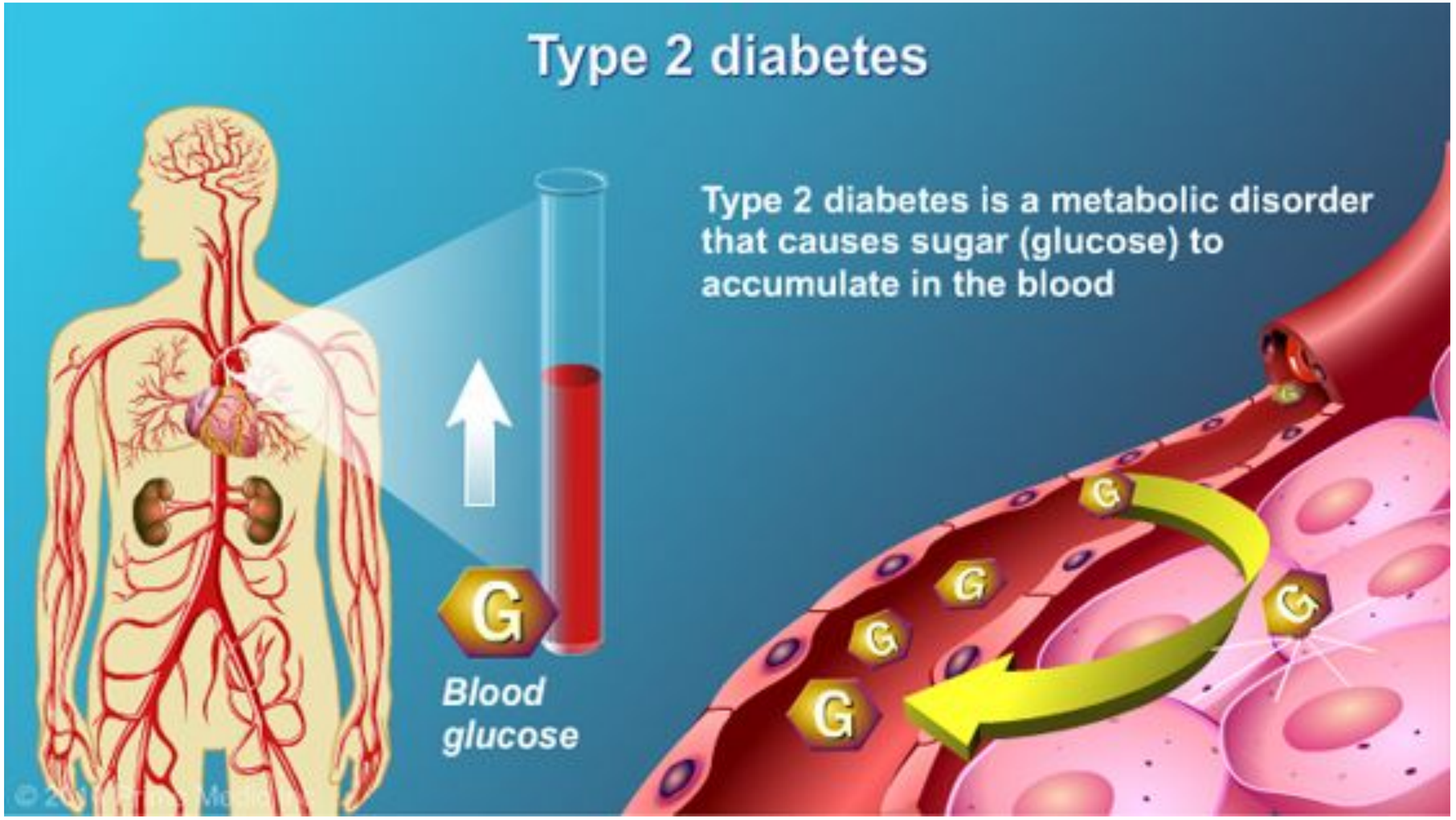
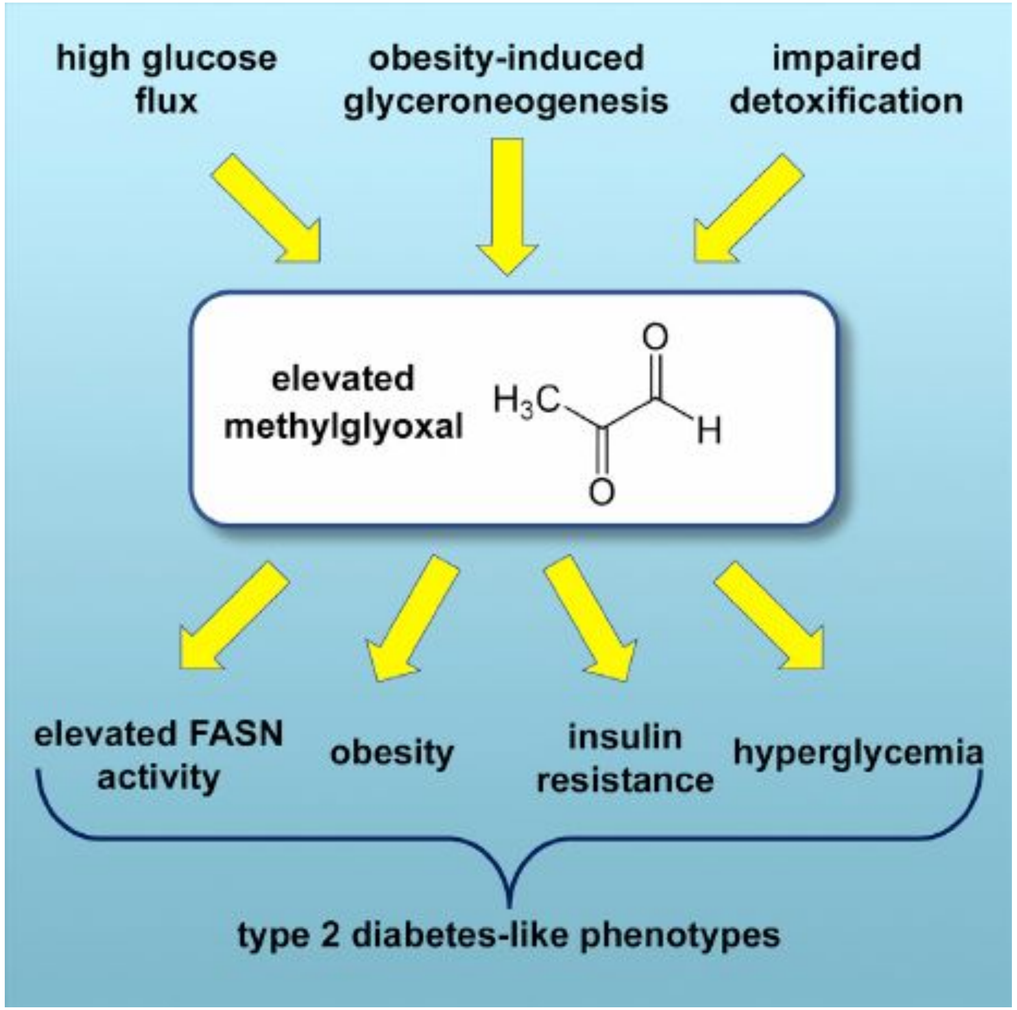

hack-age

Problem

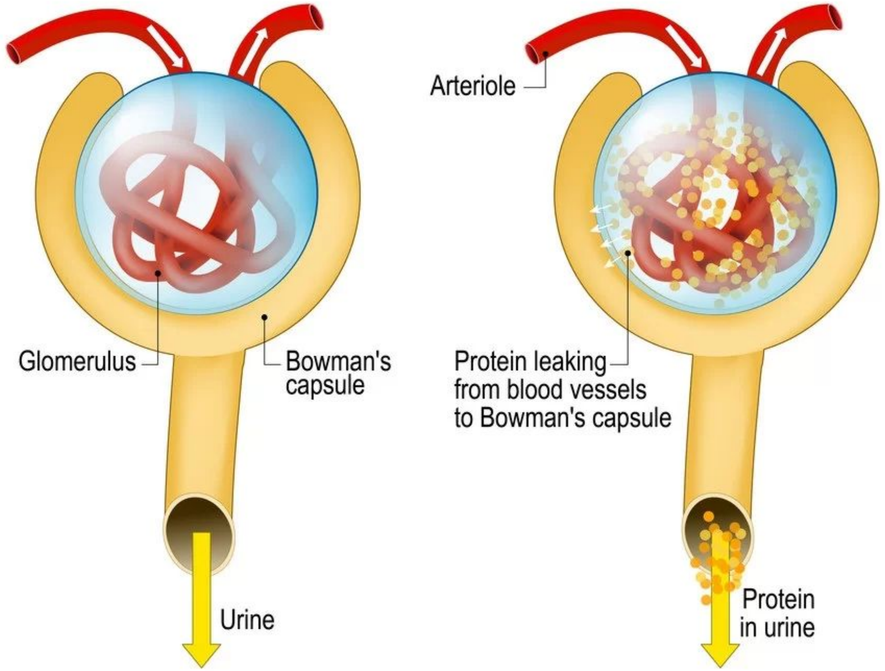

Type 2 diabetes
Type 2 diabetes is a metabolic disorder that causes sugar (glucose) to accumulate in the blood
G
Blood glucose
G
G
G
G
G

Problem: advanced glycation end products



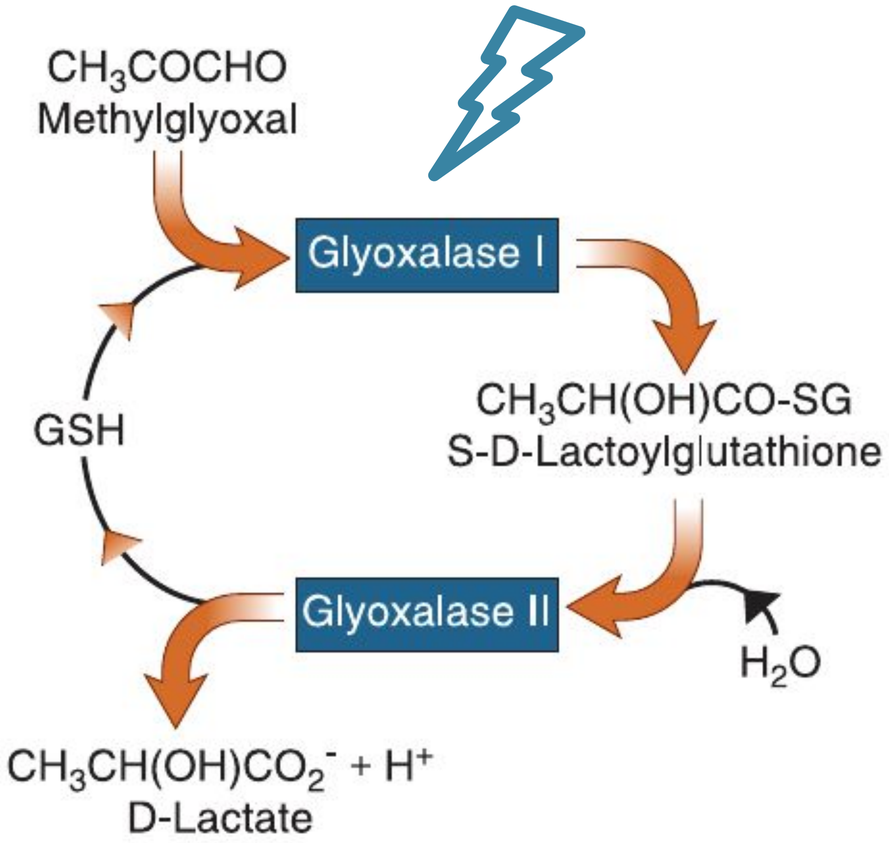
↑ AGEs

Diabetic nephropathy



30% of diabetic patients

Solution: engineered glyoxalase I



- DKD is characterized by ↓ Glo1:
  - nephropathy in Glo1-deficient mice
  - ↑ MGO in diabetic patients
- Overexpression of Glo1:
  - alleviates nephropathy in experimental models

Engineered Glo1 enzyme more efficient at removing toxic methylglyoxal in diabetic kidneys.

Market opportunity: diabetic nephropathy

1.4 million new cases among people ages 18 and older in 2019.

DIABETES

DIABETIC KIDNEY

Diabetic kidney disease is the leading cause of end-stage kidney disease in developed countries.

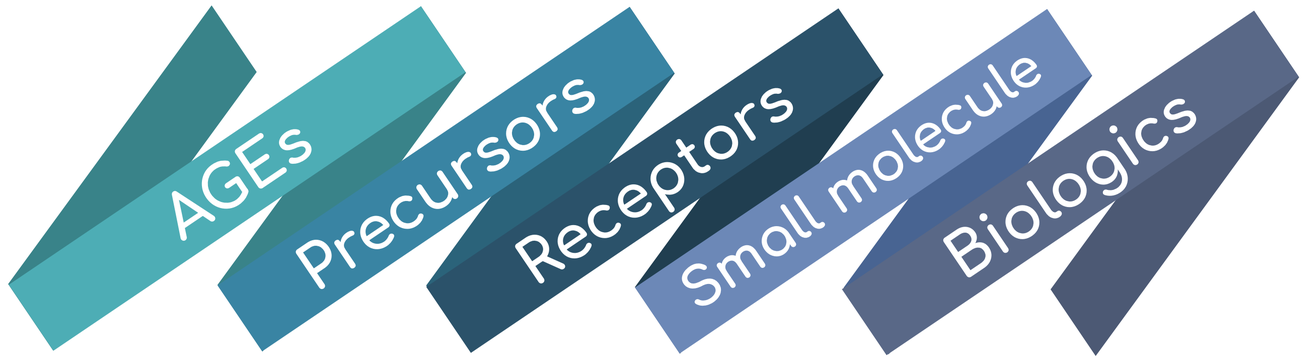
4.3% CAGR forecast from 2022 to 2028.

GROWTH

MARKET

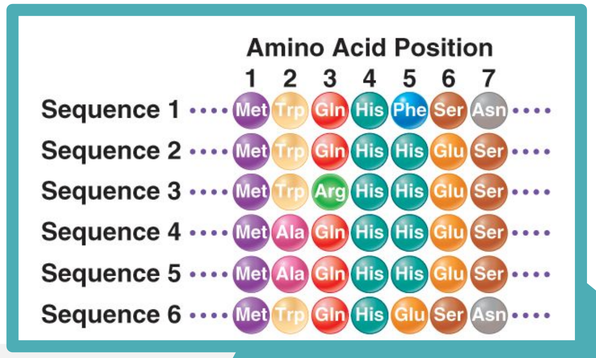
The global diabetic nephropathy market estimated to rise from USD 2.49 billion in 2021 to USD 3.34 billion by 2028.

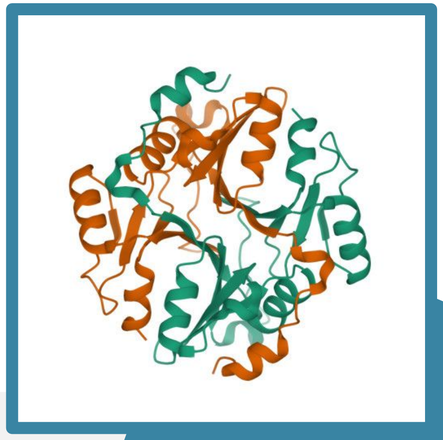
Competitors

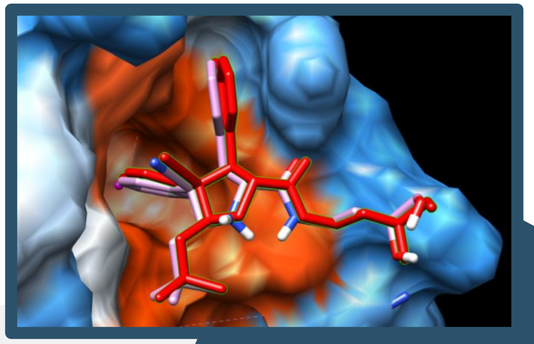


	AGEs	Precursors	Receptors	Small molecule	Biologics
hack-age		✔			✔
Revel / LentoBio	✔			✔	✔
Praetego		✔		✔	
RAGE Biotech / VTV Therapeutics			✔	✔	✔
AGE Breaker / Juvify	Supplements				

Technology: directed evolution platform







EVOLUTION

CONFORMATION

DOCKING

DIRECTED EVOLUTION MODULE

Input: amino acid sequence
Output: modified sequence

PROTEIN 3D CONFORMATION PREDICTION MODULE

Input: modified sequence
Output: PDB file

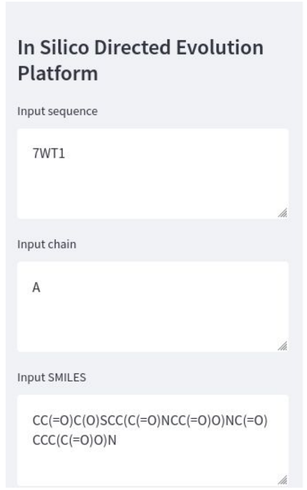
DOCKING MODULE

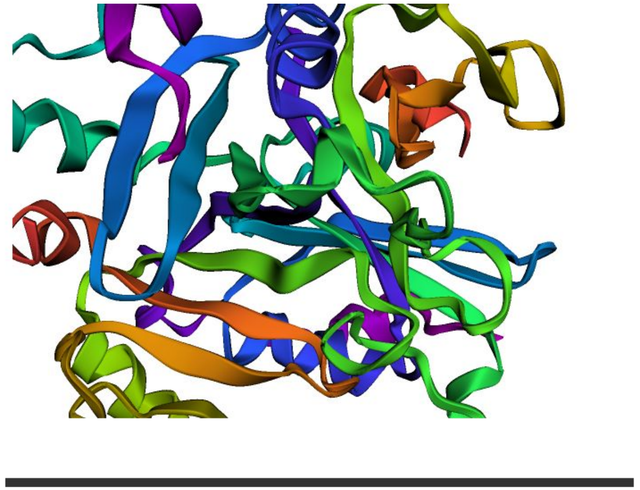
Input: PDB + substrate as SMILES
Output: binding energies

Platform demo

https://hack-age.streamlit.app/in_silico_platform

1





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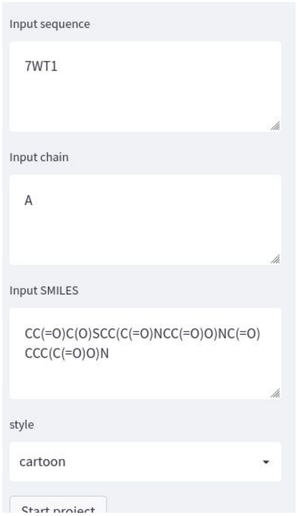

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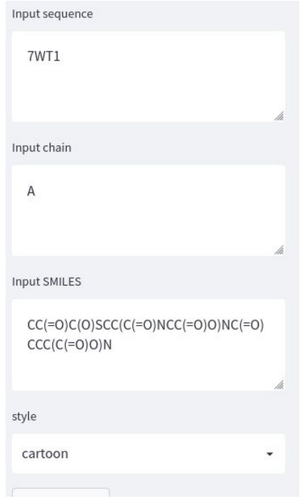
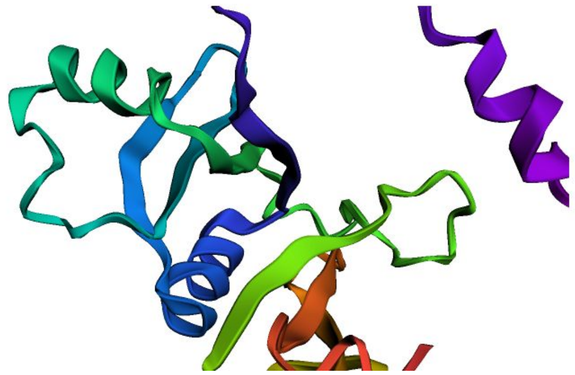


Mutated protein structure predicted by ESMFold



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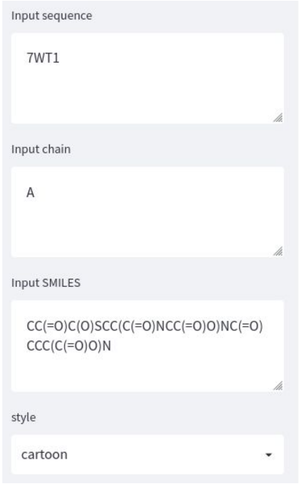


Amino acid sequence for selected protein

MAEPQPPSGGLTDEAALSCCSDADPSTKDFLLQQTMLRVKDPKKSLDFYTRVLGMTLIQKCDFPIMKFSLYFLAYEDKND
IPKEKDEKIAWALSRKATLELTHNWGTEDDETQSYHNGNSDPRGFGHIGIAVPDVYSACKRFEELGVKFVKKPDDGKMK
GLAFIQDPDGYWIEILNPNKMATLM

Generate mutations

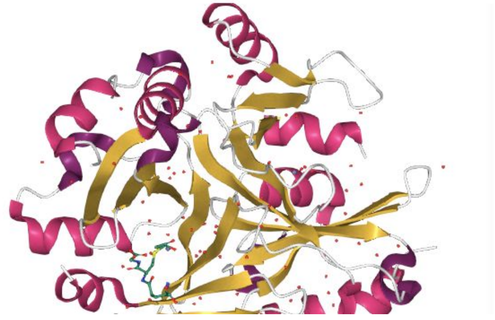
Amino acid sequence for mutated protein

Mutated amino acid sequences for selected protein

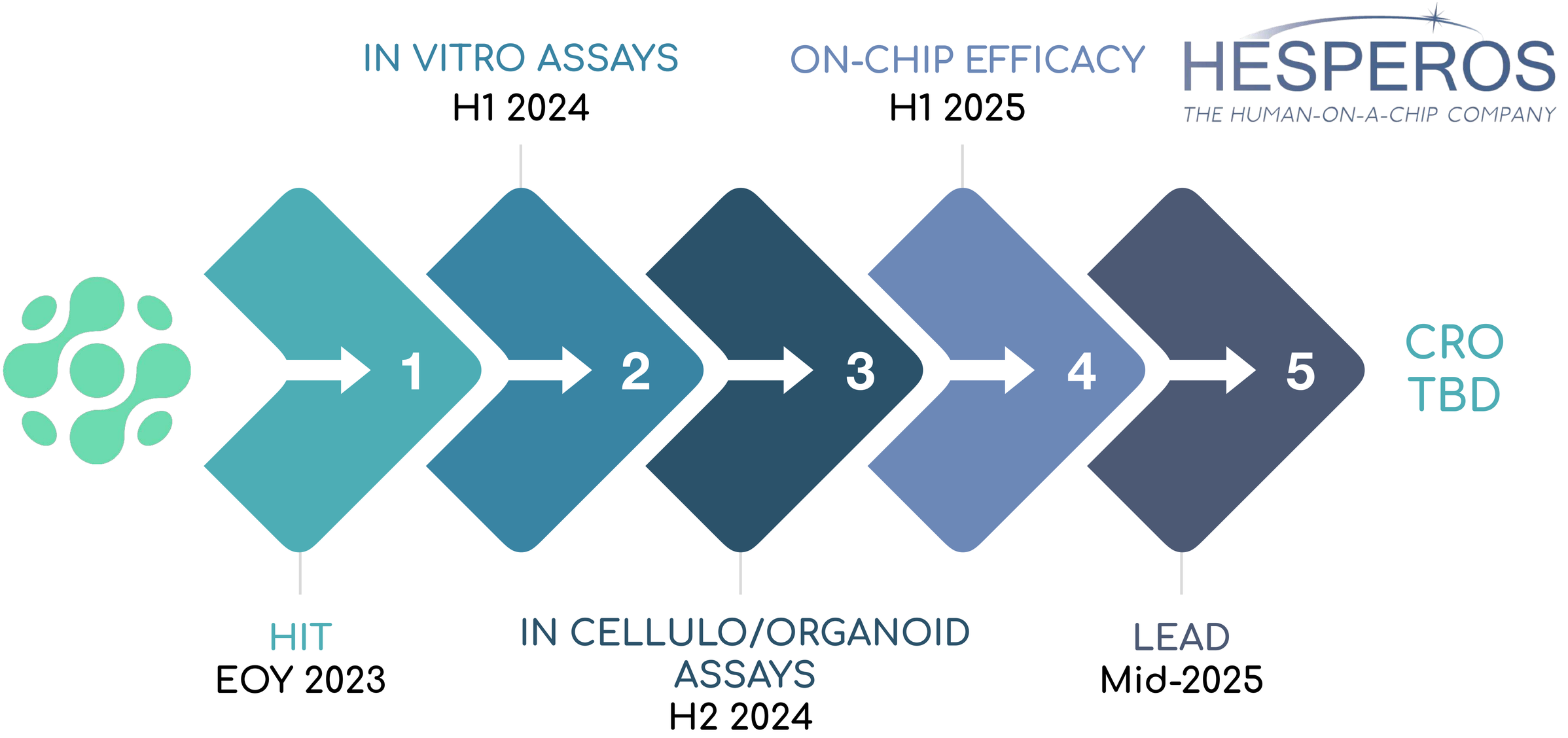
MAEPQPPSGGLTDEAALSCWSDADPSTKDFLLQQTMLFVKDPKKSLDFYTRVLGMTMAQKCDFPIMKFSLYFLAYEDK
NDIPKEKDEKIAWALSRTATLELTHNWGTEDDETQSYHNGNSDPRGFGHIGIAVPDVYSACKRFEELGVKFVKKPDDVK
MKGLAFIQDPDGYWIEILNPNKMATLM

Make docking

Protein-Ligand docking results using DiffDock solution

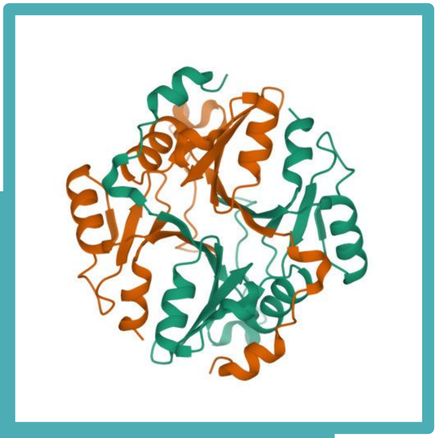


(Pre-)clinical strategy and timeline

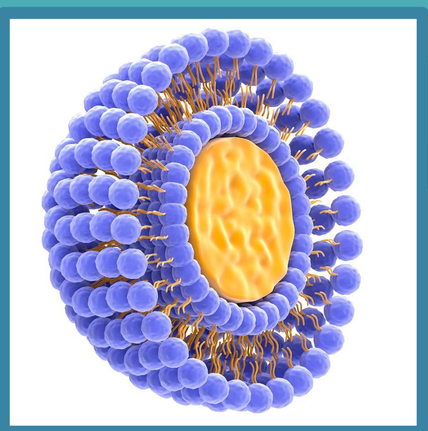


IP strategy

01 Engineered Glo1



02 Delivery method



03 Glutathione supplementation

Team

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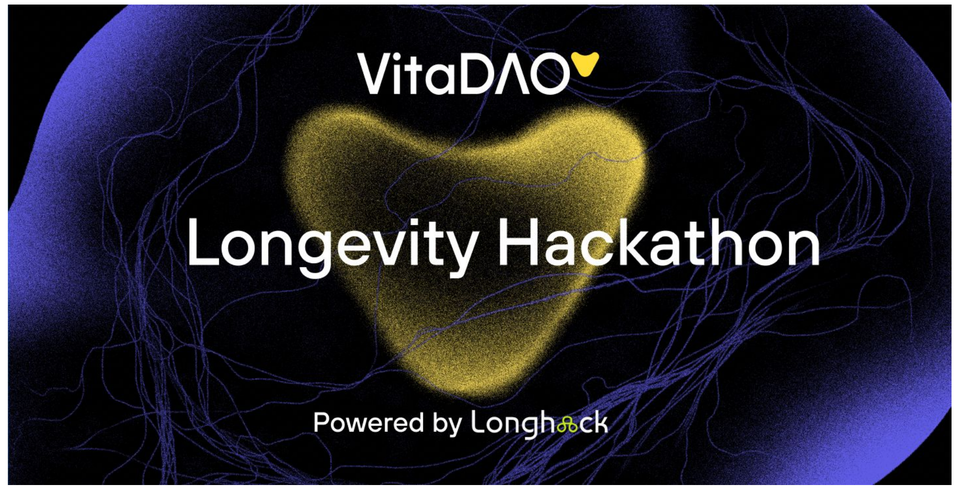
Eleanor, COO

Mentors
Helena Slama, M.D.
Pritam Kumar Panda



We hack age.