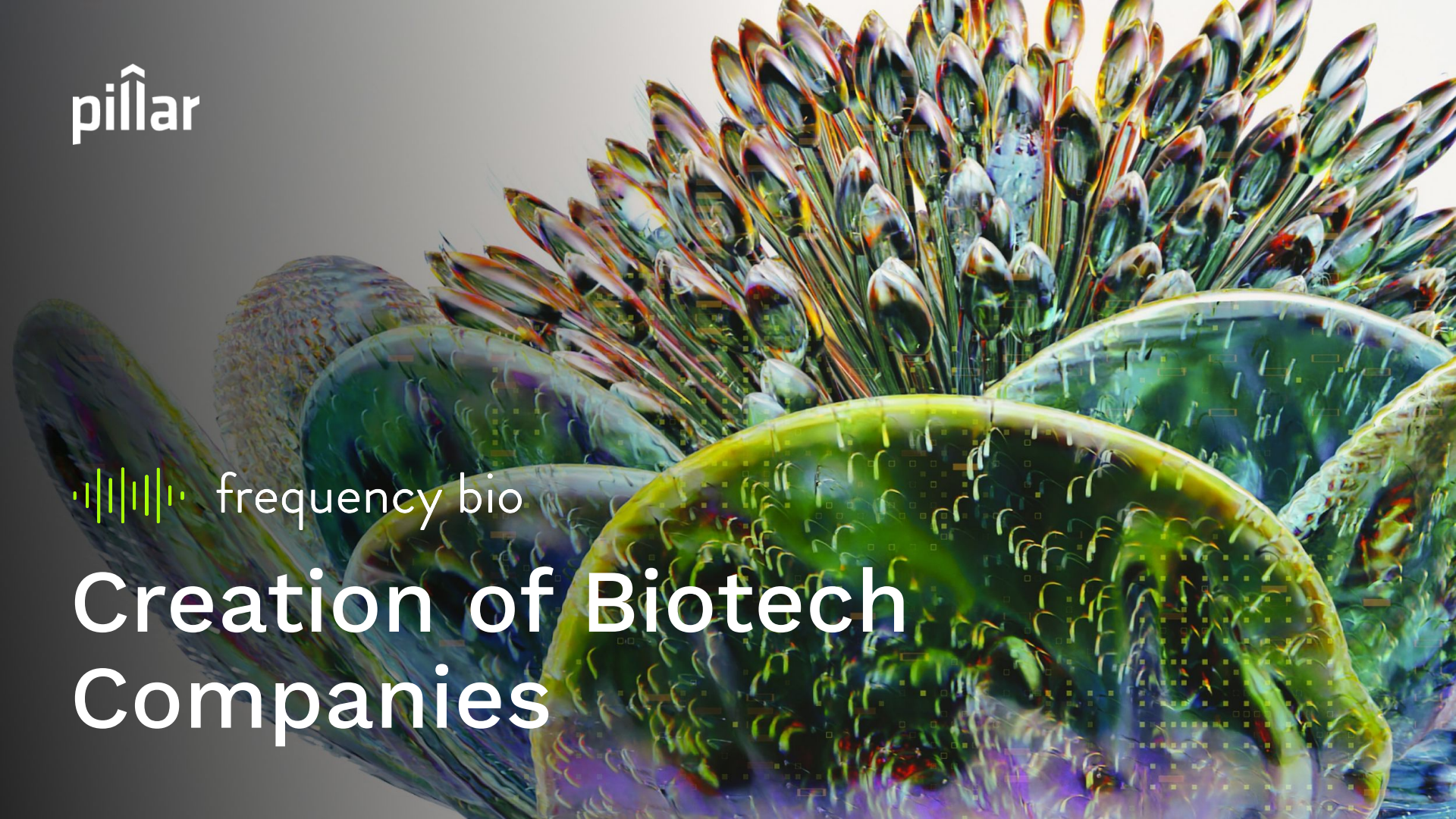
pillar



frequency bio

# Creation of Biotech Companies

# Agenda:

How does one create a biotech company?

- Basics of drug development
- Funding stages
- Types of company creation
- Origination of idea
- Intellectual property
- Evaluating and discharging risk
- Case study: Amylon

# How does one create a biotech company? **It all starts with an idea.**


What if we prevented protein aggregation instead of removing it?

THYMMUNE

What if we could regrow the thymus?

ASIMOV

What if we could program genetic circuits into cells?


What if we could use AI to diagnose cancer?

# 2 types of company creation

## VENTURE CREATION

Flagship Pioneering

THIRD ROCK

4:59 INITIATIVE

## FOUNDER-LED CREATION

Academia

Industry

Independent

THYMMUNE

VERTEX

REGENERON

# The basics of drug development:


**Preclinical**

**In vitro**

**In vivo**

**IND enabling studies/ Safety studies**

**Clinical**

**Phase I:** Safety

**Phase II:** Safety and early efficacy

**Phase III:** Efficacy

# We typically classify a company stage by the round of funding that it's in:

Incubation of idea

Academia

Company

Independently


Company creation

Pre-seed: 0.5-2M

Seed: 5-10M

Series A: 30-50M

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IPO 100-250M

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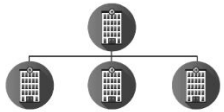


# Origination of idea

## ACADEMIA

- Professor + PhD student
- Student becomes founder
- Professor becomes co-founder

## INDUSTRY

- Being in a company often exposes points of improvement
- Experience gained gives people the confidence to start on their own
- Successful exit inspires someone to start something new

## INDEPENDENT

- Personal mission (family member that is sick)
- Natural entrepreneur
- Great idea

# Intellectual Property

## ACADEMIA

- IP often originates in academia
- Licensing will go through the tech transfer office
- University will take equity and royalties

## INDUSTRY

- When you work for a company, your inventions that are relevant to the company will be owned by the company. From there you can:
  - Spin out a company
  - License the IP from the company
  - Buy the IP from the company

## INDEPENDENT

- It’s all yours - go forth and invent!

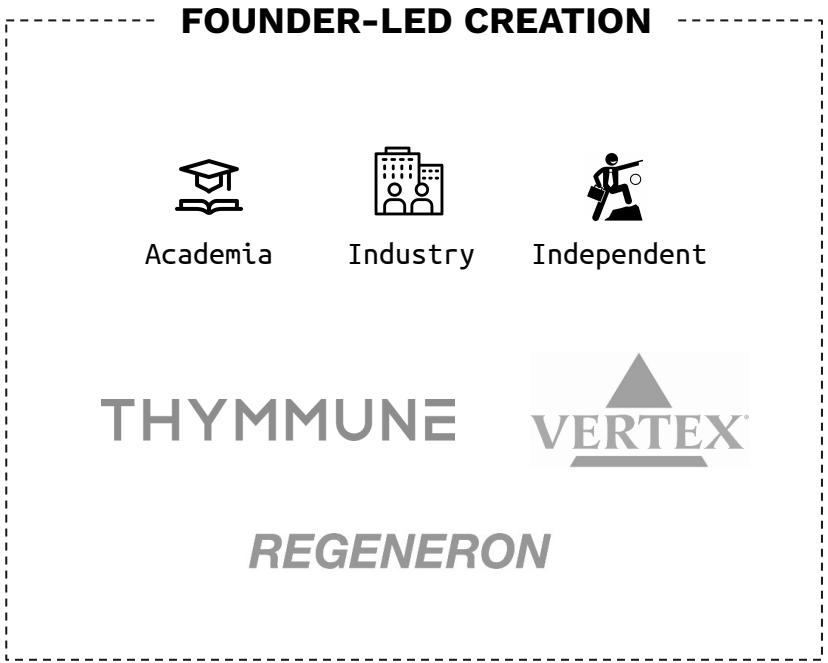
# How do we create value? Discharging risk

| BIOLOGICAL RISK | TECHNICAL RISK | CLINICAL RISK | TEAM RISK | MARKET RISK |
|---|---|---|---|---|
| Do we understand the biology of underlying disease? Do we understand the target that we are modulating? | Do we know how the therapeutic technology works? | Is the clinical paradigm already established? | Is the team able to execute on the strategy? | Are there enough patients to provide a sufficiently large market? |

# Drug development is all about discharging risk:

| BIOLOGICAL RISK | TECHNICAL RISK | CLINICAL RISK | TEAM RISK | MARKET RISK |
|---|---|---|---|---|
| Do we understand the biology of underlying disease? Do we understand the target that we are modulating? | Do we know how the therapeutic technology works? | Is the clinical paradigm already established? | Is the team able to execute on the strategy? | Are there enough patients to provide a sufficiently large market? |

# 2 types of company creation



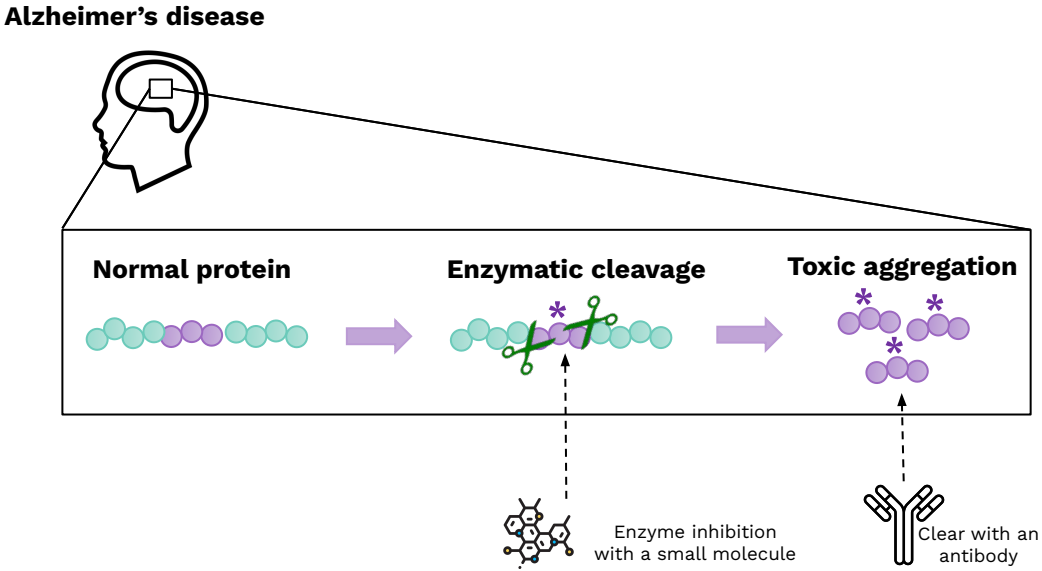
Amylon

# Case study: Amylon

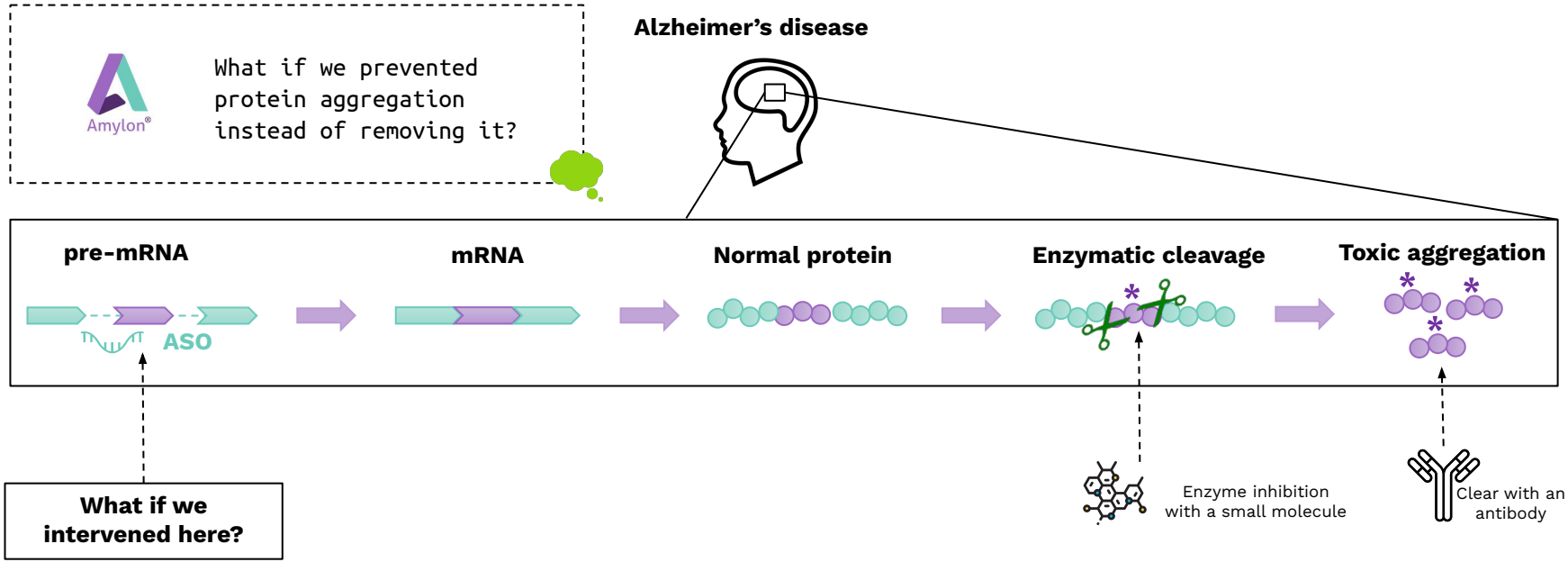
# How does one create a biotech company? **It all starts with an idea.**

Amylon®

What if we prevented protein aggregation instead of removing it?



# How does one create a biotech company? **It all starts with an idea.**



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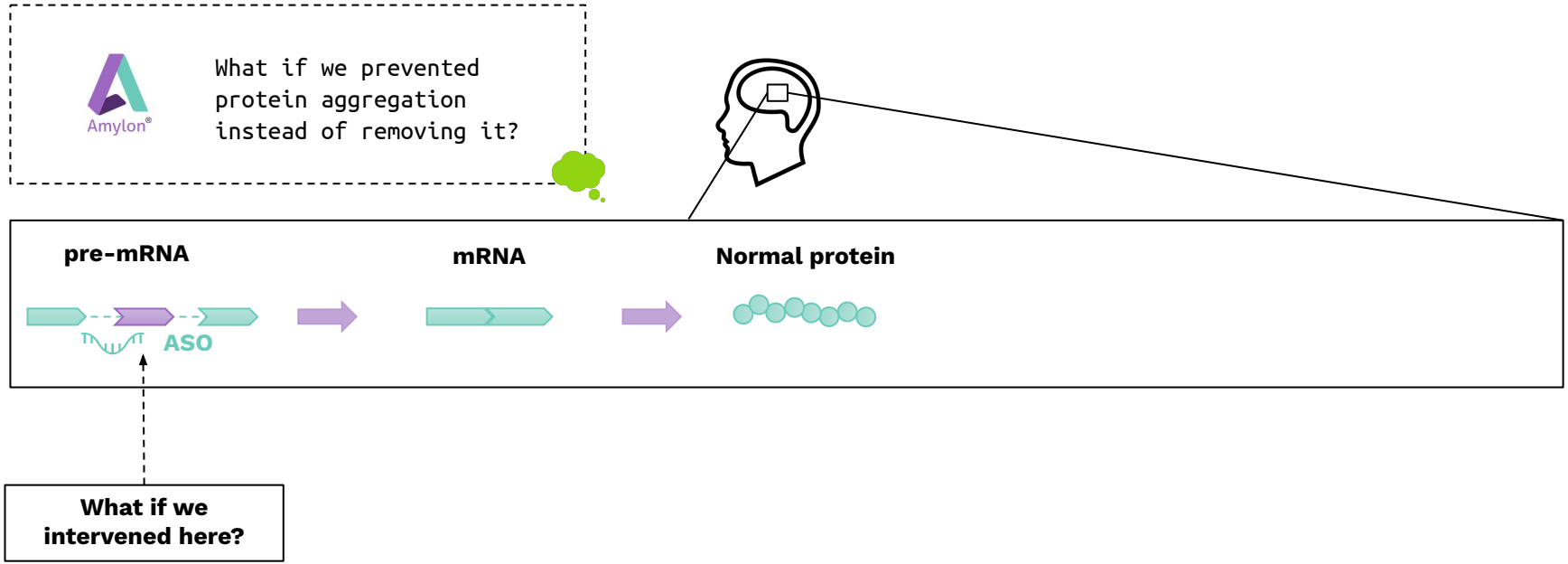

# Origination of idea

**INDUSTRY**

- Access to technology
- Resources to run experiments
- Experts to consult with
- Credibility that came with being part of a public company

ProQR®

**ProQR Therapeutics NV**
2 yrs 10 mos
Leiden

**Innovation lead CNS**
May 2015 - Sep 2017 · 2 yrs 5 mos

**Research Intern**
Dec 2014 - May 2015 · 6 mos

Amylon®

**Founder & CEO**
Amylon Therapeutics
Sep 2017 - May 2022 · 4 yrs 9 mos
Leiden, the Netherlands

# Intellectual Property

**INDUSTRY**

- When you work for a company, your inventions that are relevant to the company will be owned by the company. From there you can:
  - Spin out a company
  - License the IP from the company
  - Buy the IP from the company

ProQR®

Antisense oligonucleotides for use in treating alzheimer's disease

Abstract

Theinvention relates to oligonucleotides suitable for use in treating human disease. More in particular the inventionrelates to antisense oligonucleotides suitable for the treatment of Alzheimer's disease.

**Inventor:** Thomas Petrus Gerardus DE VLAAM, Tsinatkeab Tadesse HAILU, Zhana KARNEVA

**Worldwide applications**

2016 · US WO CA EP NZ AU 2022 · AU

**Application PCT/EP2016/074814 events**

2016-10-14 • Application filed by Proqr Therapeutics Ii B.V.

2016-10-14 • Priority to CA3000046A

2017-04-20 • Publication of WO2017064308A1

Amylon®

**LICENSE AGREEMENT**

**between**

**PROQR THERAPEUTICS II B.V.**

**as Licensor,**

**and**

**AMYLON THERAPEUTICS B.V.**

**as Licensee**

Incubation of idea

Academia

Company

Independently


Company creation

Pre-seed: 0.5-2M

Seed: 5-10M

Series A: 30-50M

Series B /Crossover 50-100M

IPO 100-250M

**Preclinical**

**In vitro**

**In vivo**

**IND enabling studies/ Safety studies**

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**Phase I:** Safety

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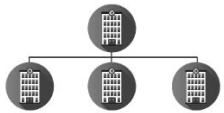
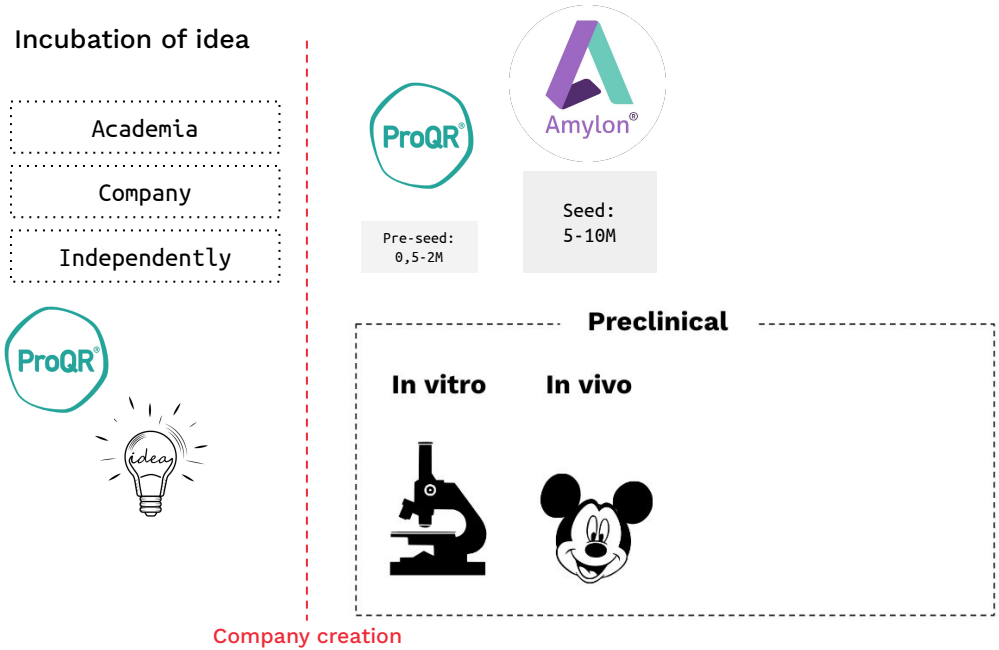


# What are the deliverables for each round of funding?



# Pre-seed deliverable:

Incubation of idea

Academia

Company

Independently

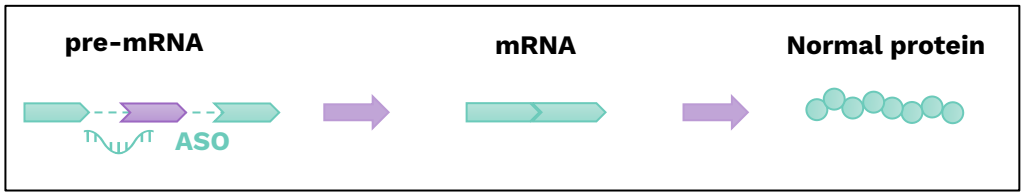
ProQR

Pre-seed:
0,5-2M

ProQR


In vitro

Company creation

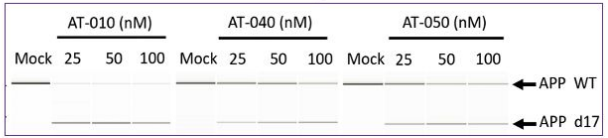



## ASOs induce Exon 17 splice skipping in vitro

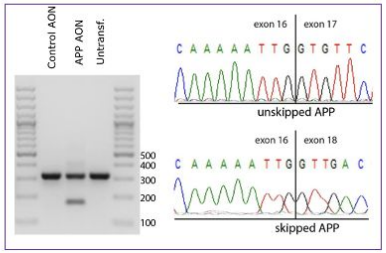
APPΔ17 observed in both mRNA and protein

- Human SK-N-SH neuroblastoma cells
- 48 hour treatment
- APP mRNA analysis by PCR
- APP protein detection by Y188 C-terminal Ab

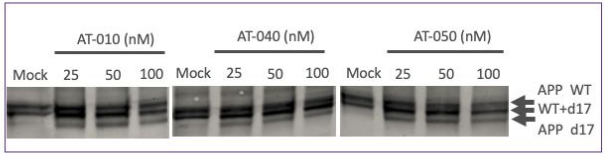
mRNA skip




In frame splice fusion




Protein skip




10

# Seed deliverable:

Incubation of idea

Academia

Company

Independently

ProQR


ProQR

Pre-seed:
0,5-2M

Amylon®

Seed:
5-10M

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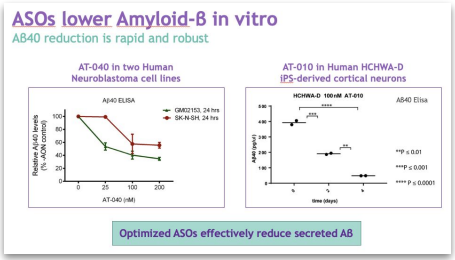
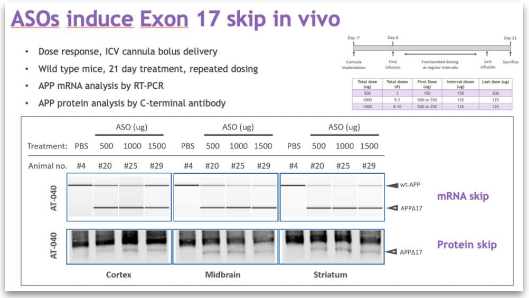
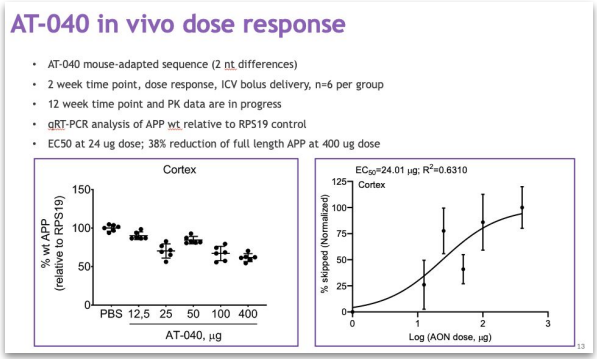
**In vitro**

**In vivo**

Company creation



# What do you need for the series A?

Incubation of idea

Academia

Company

Independently

ProQR


Company creation

ProQR

Pre-seed:
0,5-2M

Amylon®

Seed:
5-10M

Series A:
30-50M

Series B
/Crossover
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IPO
100-250M

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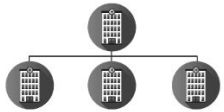
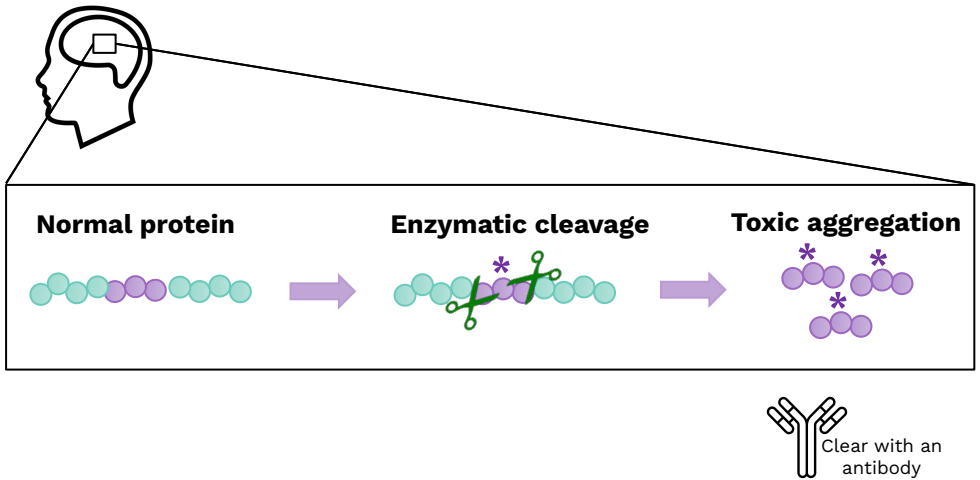


# Development strategy

**Alzheimer's disease**



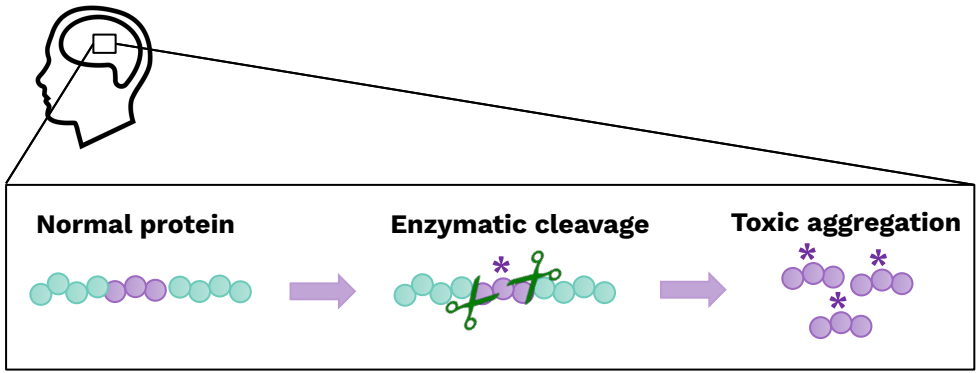

## Alzheimer's

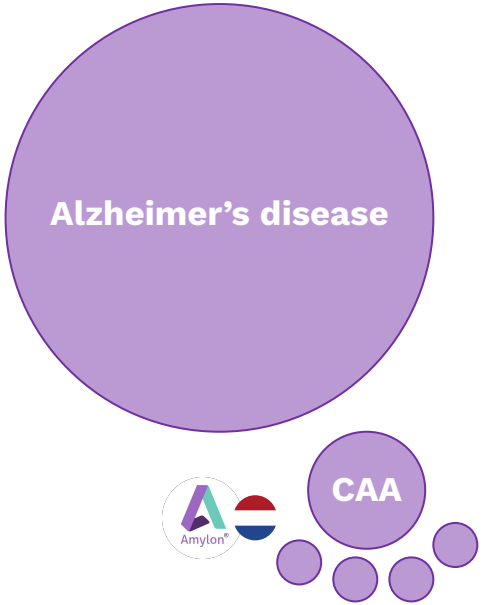
~55M patients worldwide


Legembi trial statistics:
Total number of patients >3000
>300 clinical sites
>2B dollars in cost

# Development strategy

**Alzheimer's disease**



# Development strategy

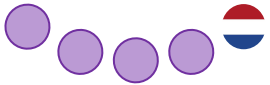
**Phase 1**

Do a small safety study in the Netherlands


**Phase 2**

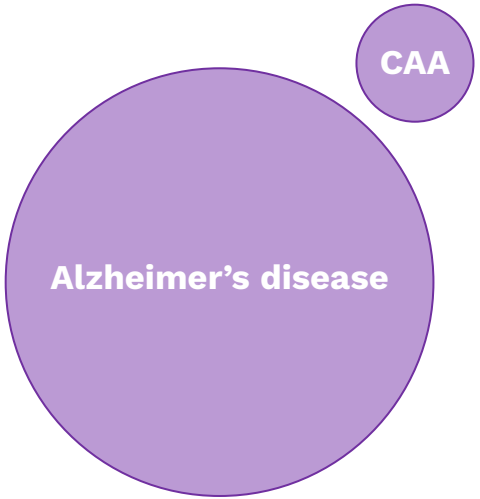
Do a large safety study worldwide


Do a small efficacy study for early access



**Phase 3**

Do a large efficacy study worldwide



Incubation of idea

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ProQR


Company creation

ProQR

Pre-seed:
0,5-2M

Amylon

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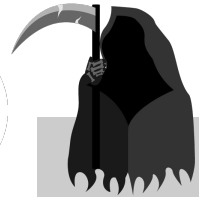

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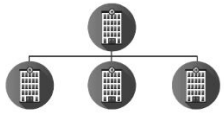


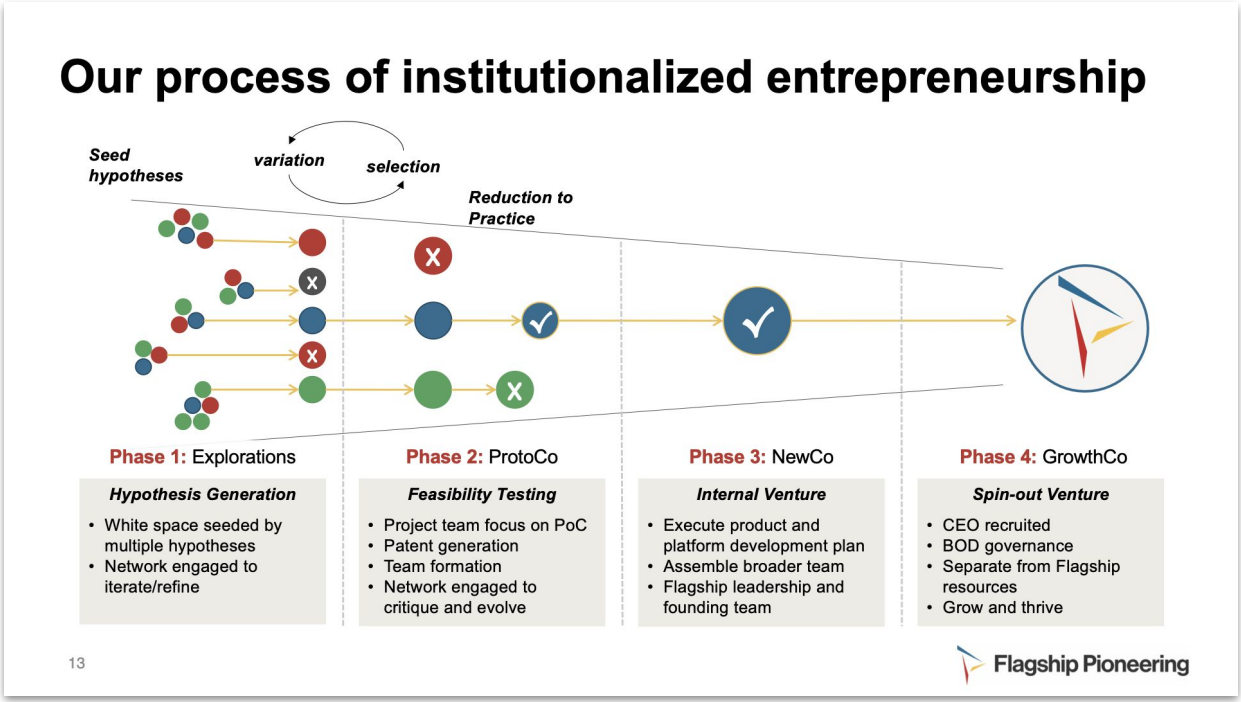
# 2 types of company creation

**VENTURE CREATION**

# How does venture creation work?

## Venture creation

- You come up with **your own ideas**
- Academics can be co-founders but not always
- Focus on **moonshot** ideas
- You are often **in charge** of a **wide range of things**
  - “responsible for developing the science, business strategy, and intellectual property behind new platform companies.”
- Companies are **funded internally**; no need to fundraise in early stages



# Venture creation vs Founder-led

## Venture creation

Pros:

- **Capital**
- **Infrastructure**
- **Support system**
- **Brand/reputation**
- **Less risk**
- **Flexibility**

Cons

- You lack:
  - **Autonomy**
  - **Control**
  - **Culture**
- More subject to trends and markets
- Seclusion

## Founder-led

Pros:

- **Autonomy**
- **Control**
- **Culture**
- **You don't need credibility/reputation/track record**

Cons

- You have to:
  - **Raise capital**
  - **Build infrastructure**
  - **Build support system**
- Harder to change directions
- More uncertainty

# End for questions

# The basics of drug development:

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**In vitro**

**In vivo**

**IND enabling studies/ Safety studies**

## Clinical

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**Phase II:**
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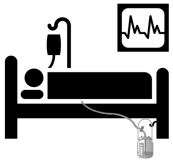
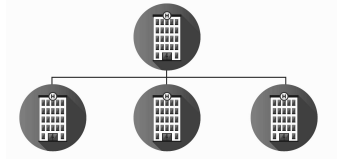


**Phase III:**
**Efficacy**



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