



# HCSPharma

*The game changer in Drug Discovery to speed up the development phases.*

Nathalie MAUBON - PhD : CEO / CSO ([nathalie.maubon@hcs-pharma.com](mailto:nathalie.maubon@hcs-pharma.com))

Zied SOUGUIR - PhD : CIO (BIOMIMESYS inventor)

Elodie VANDENHAUTE - PhD : COO

# COMPANY PURPOSE

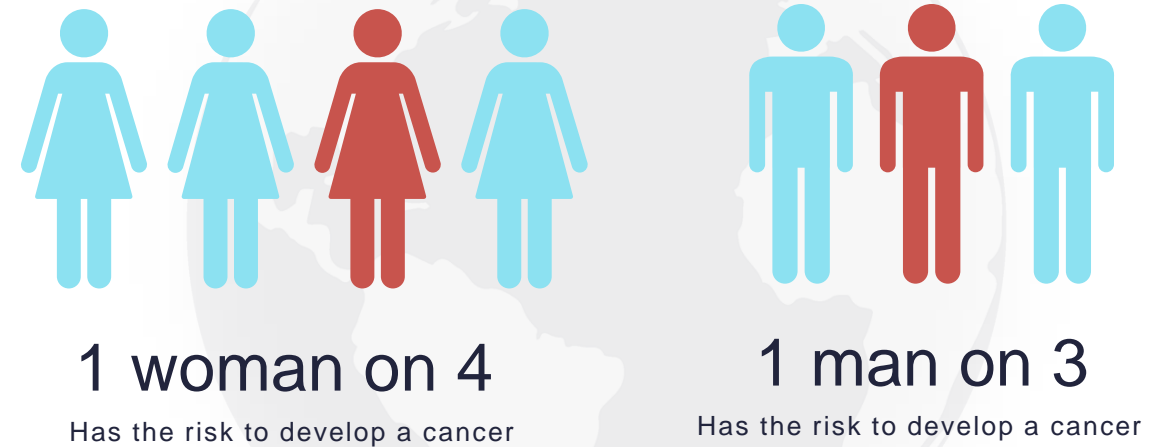
## In 2018

18 millions  
new cases of cancer

Breast cancer :  
2 millions new cases/year

Liver cancer :  
800.000 new cases/year

10 millions  
deaths due to cancer



Lack of effective therapy in oncology field

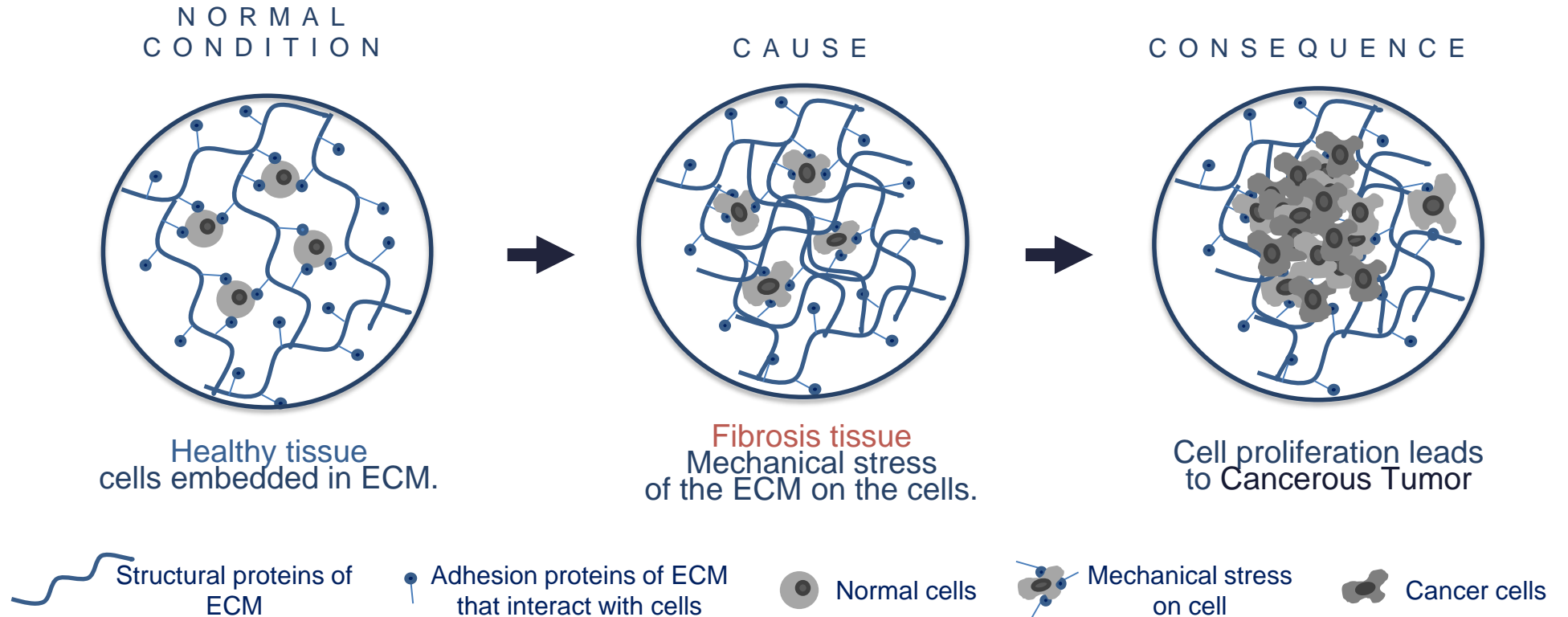
35% of all R&D program are in oncology but highest failure rate : 97%

# PROBLEM & SOLUTION

*In vivo.*

For all solid cancer, the first step of the disease is the modification of ECM due to activation of myofibroblasts.

ECM : Extra-Cellular Matrix.



## Problem

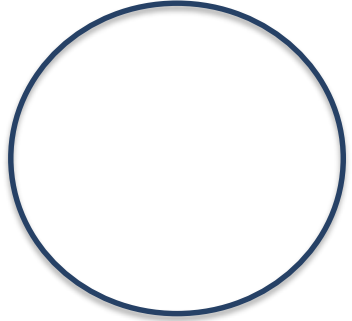
Currently, cancer therapy (drug or immuno-therapy) kills cancer cells. If we do not suppress the cause (ECM modification), **cancer restarts.**

## Solution

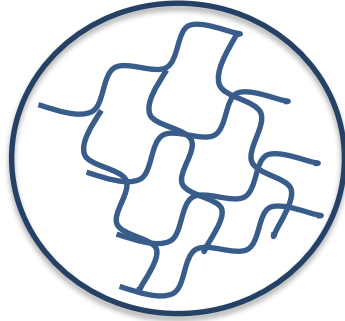
We need to find **therapy** that kills cells and **modifies the ECM composition.**  
We need to reproduce faithfully the cancerous tumor with all cells & modified ECM.

# OUR ADDED VALUE

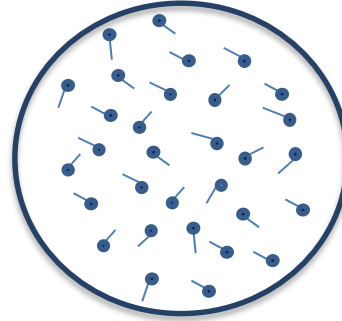
Scaffold-free



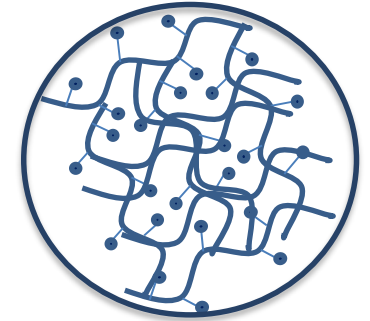
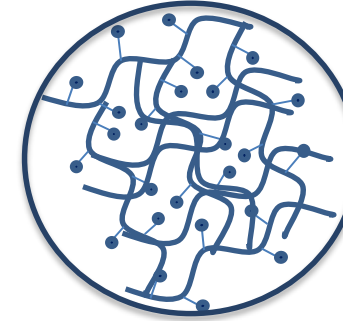
Solid Scaffold



Hydrogel



Hydroscaffold™: solid scaffold + hydrogel behavior



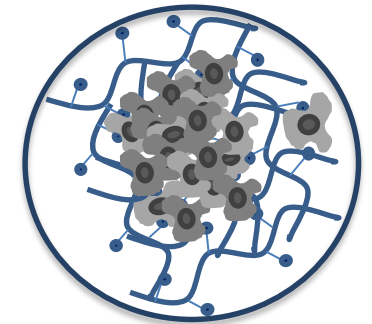
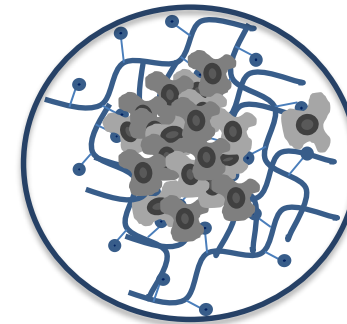
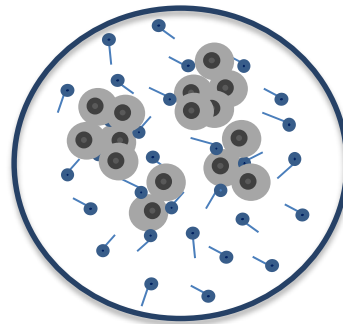
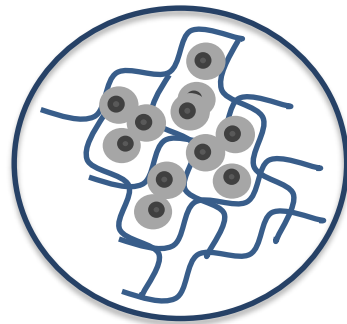
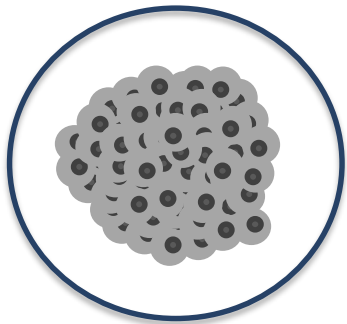
3 D S Y S T E M

Bio MIMESYS®

I N V I V O

## What makes difference ?

BIOMIMESYS is a unique hydroscaffold that faithfully reproduce the ECM of any type of healthy or pathologic organ with all biological and physicochemical properties.  
We reproduce faithfully the cancerous tumor within an organ with all cells & **cancerous ECM**.



I N V I T R O M O D E L C U R R E N T L Y U S E D

Bio MIMESYS®

I N V I V O

# ADDED VALUE WITH OUR SOLUTION



## Today with current 3D cell culture



 3 % success of new anti-cancer drugs in clinical trials.

 \$2B investment to develop a new anti-cancer drug.

 12 years of R&D to develop a new anti-cancer drug

## Tomorrow with **BioMIMESYS®**



 90 % success of new anti-cancer drugs in clinical trials.

 \$296M investment to develop a new anti-cancer drug.

 6 years of R&D to develop a new anti-cancer drug



**Success  
rate**



**R&D cost**

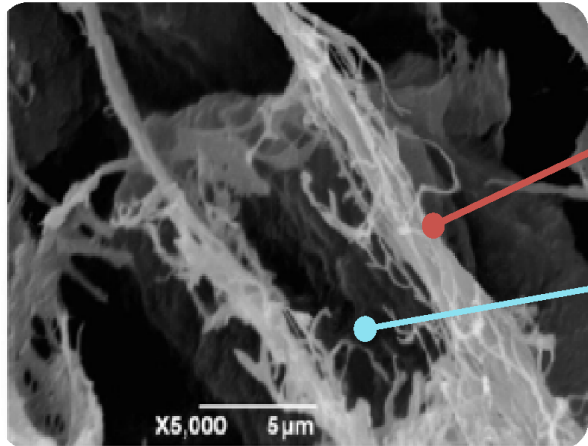


**R&D time**

# RESULTS: LONGER-TERM MAINTENANCE OF CELLS *IN VITRO*

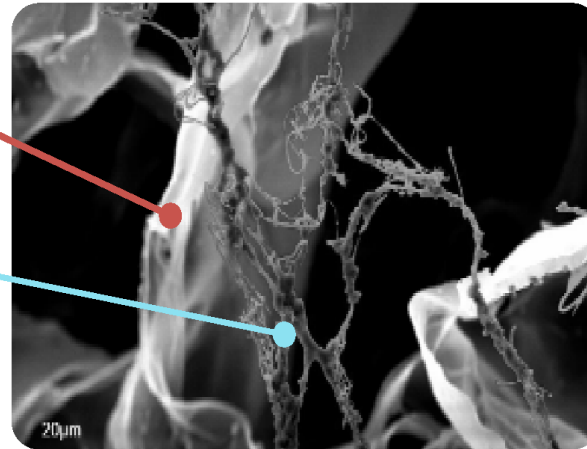
## *In vivo*

Decellularized Adipose Tissue ECM



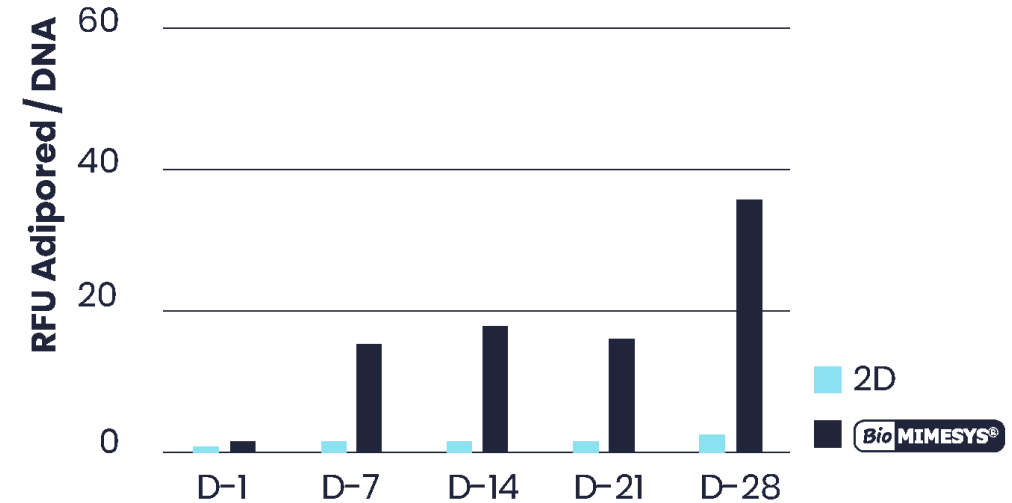
## *In vitro*

With **Bio MIMESYS®**



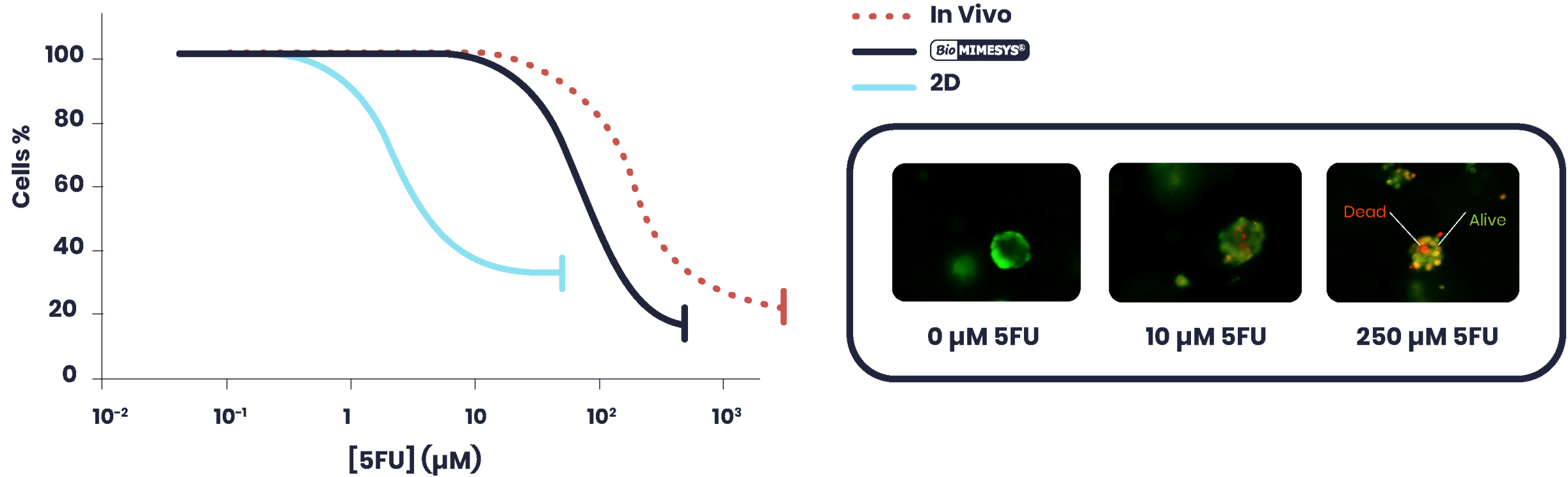
HA + Collagen I & IV + RGDS + Galactosamine  
E = 0,6 kPa

## TG accumulation



- ✓ The structure of ECM is the same as in the in vivo ECM (decellularized human tissue)
- ✓ longer-term maintenance of cellular differentiation and functionality compared to 2D cell culture: several weeks/months instead of several days.

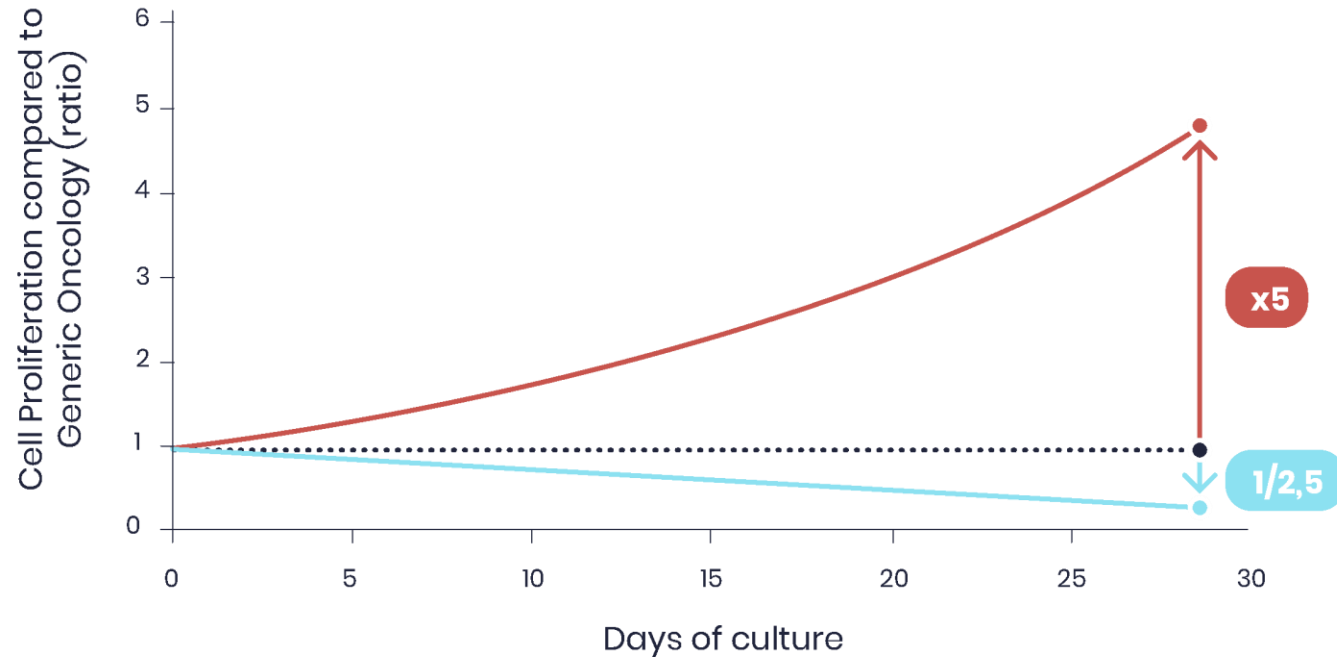
# RESULTS: *IN VITRO* / *IN VIVO* CORRELATION IMPROVED



- ✓ Anti-cancer drug (such as 5-Fu) efficacy to kill cells is higher in 2D cell culture compared to in vivo and 3D using BIOMIMESYS
- Efficacy analysis should be performed in 3D cell culture including cells & organ-specific ECM by using BIOMIMESYS

# IN VITRO RESULTS: EFFECTS OF ECM ON CELLS

## Cell proliferation assay of MDA-MB-231 (breast cancer cells)



### 3 different matrix :

..... Generic Oncology  
(HA + Col 1, 1 kPa)

— Oncology 10 kPa  
(HA + Col1, 10 kPa)

— HA + Laminin, 10 kPa

### Results :

Stiffness by **Collagen**  
structural proteins :  
**Cell proliferation x 5**

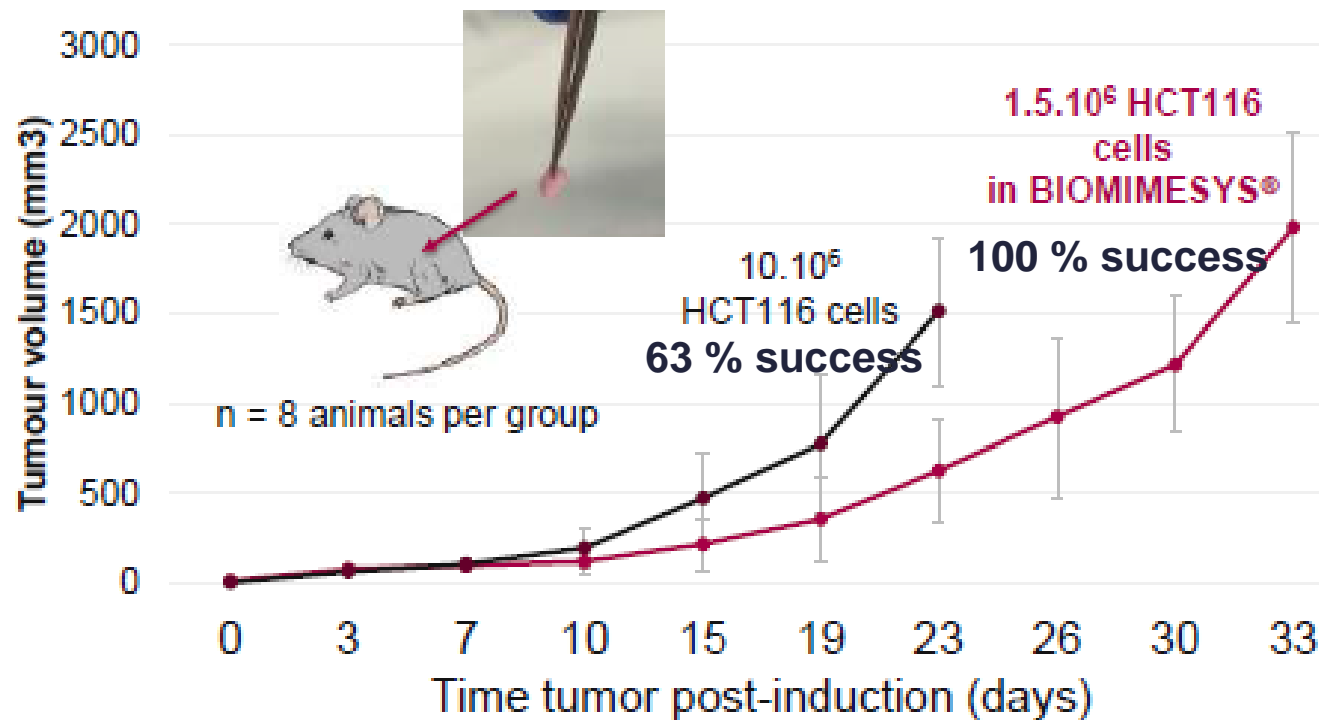
Stiffness by **Laminine**  
adhesion proteins :  
**Cell proliferation / 2,5**

- ✓ ↗ stiffness (1 to 10 kPa) by ↗ structural proteins => ↗ cell proliferation (x5)
- ✓ ↗ stiffness (1 to 10 kPa) by ↗ adhesion proteins => ↘ cell proliferation (/2.5)
- Targeted fibroblasts to increase adhesion proteins in ECM **stop the cell proliferation into the tumor**

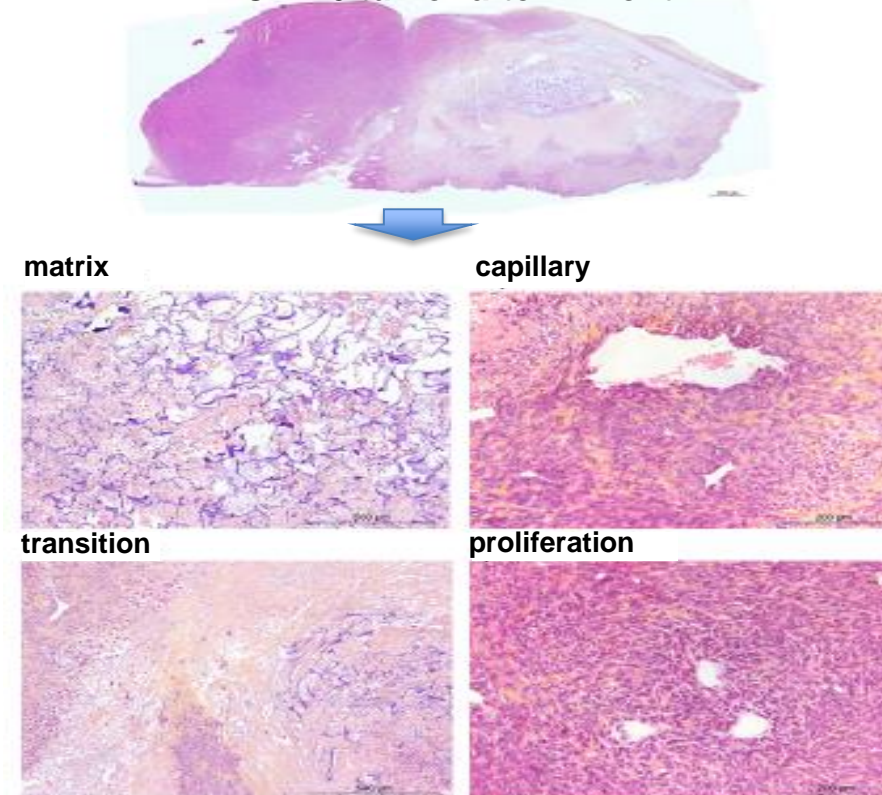


# IN VIVO RESULTS: IMPROVE PDX DEVELOPMENT

## Sub-cutaneous implantation in Swiss nude mice



## HCT116 tumor after 1 month

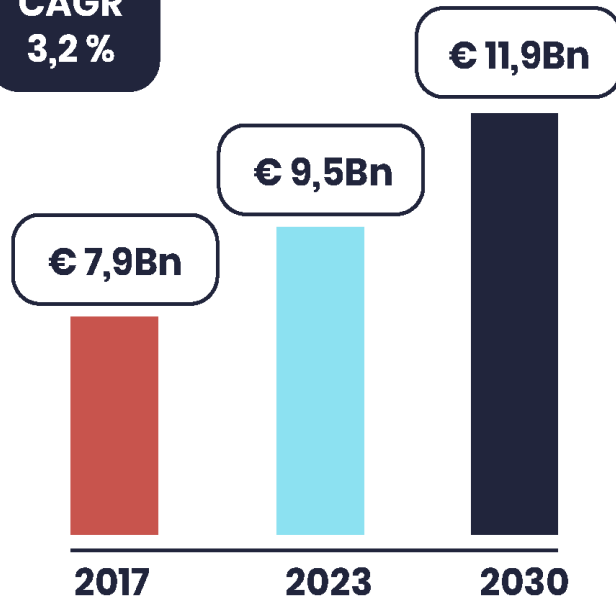


- ✓ 100% graft success with BIOMIMESYS vs 63% in classical way
- ✓ 7 times less cells can be used to reach the same tumor volume with BIOMIMESYS
- **use less cells and mice for PDX development** (proliferation assay of patient tumor cells directly in BIOMIMESYS is ongoing)

# MARKET OPPORTUNITY

## In vitro pre-clinical service market dedicated to oncology

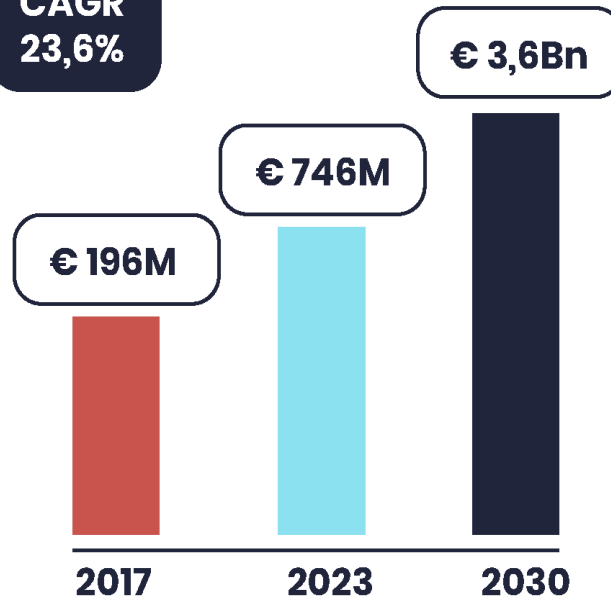
**CAGR**  
**3,2 %**



A steadily growing in vitro pre-clinical research studies in oncology market.

## 3D cell culture market dedicated to oncology

**CAGR**  
**23,6%**



A higher growing 3D cell culture consumables for oncology market.

## Key Drivers



Increasing incidence of cancers.



Availability of funding for cancer research.



Growing focus on 3D cell culture development.



Better representation of tumor complexity.



Towards replacement of animal testing in R & D.

# COMPETITORS

Hydrogel  
(cells-matrix interaction)

CORNING ThermoFisher SCIENTIFIC MERCK Stem Pharm

Lonza Manchester BIOGEL  
ECTICA TECHNOLOGIES QGel

CORNING greiner BIO-ONE PerkinElmer

StemTek THERAPEUTICS insphero

Hydroscaffold

HCSPharma

Bio MIMESYS®

kuraray

REPROCELL

ELECTROSPINNING COMPANY Cellevate

Scaffold-free

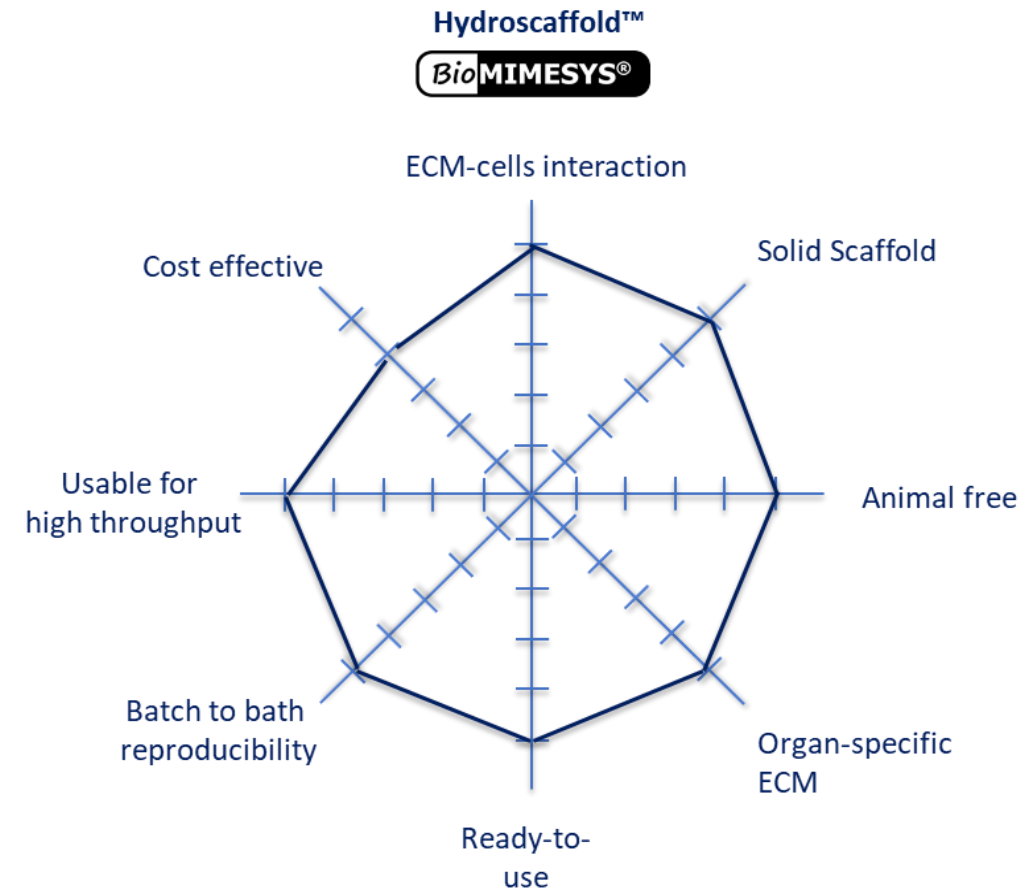
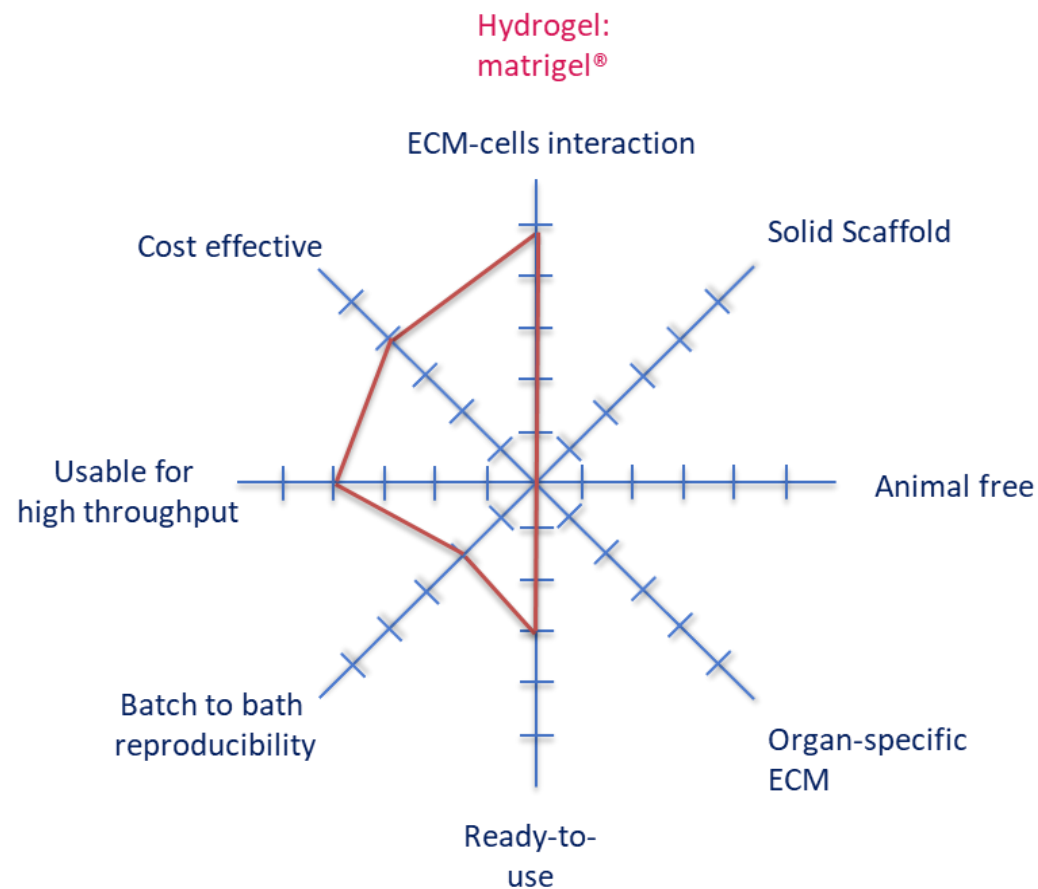
Solid Scaffold

USA

Europe

Asie

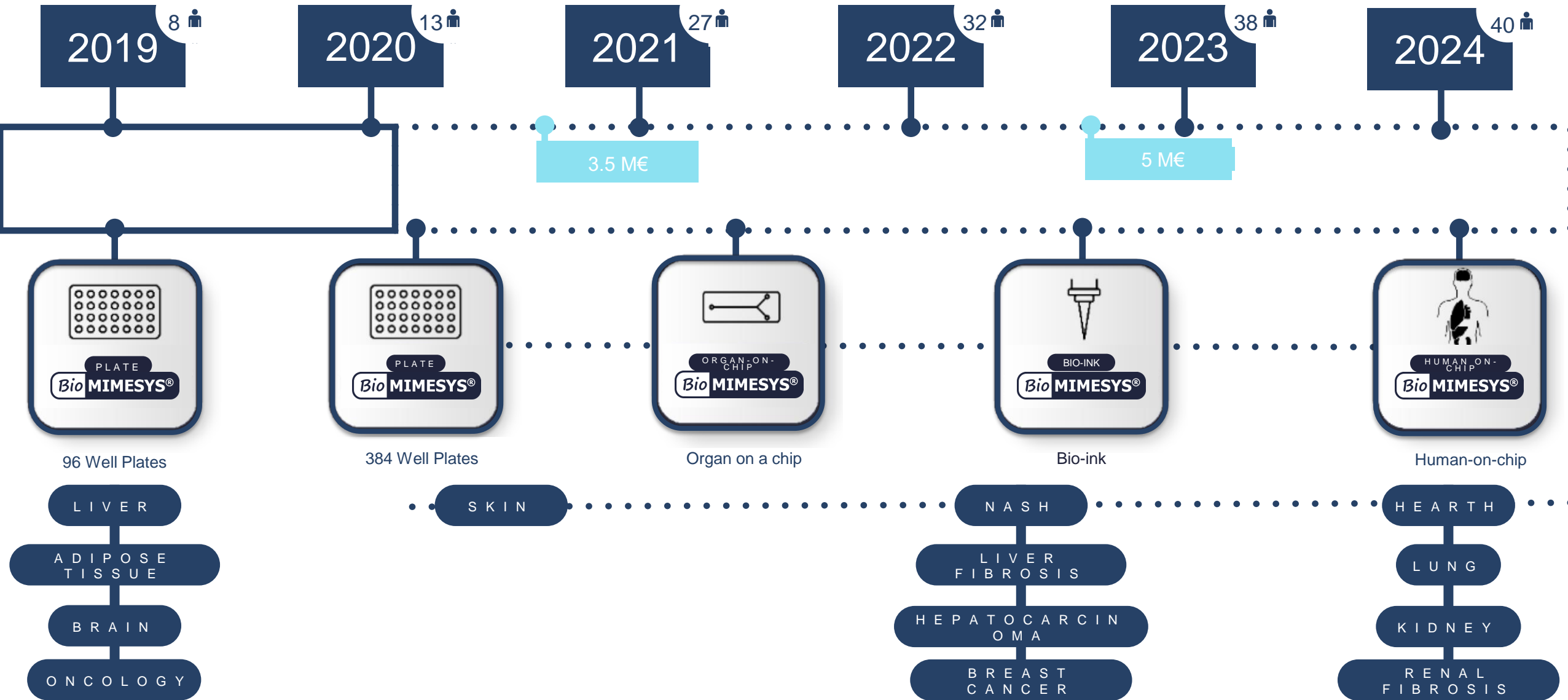
# MAIN COMPETITOR IN ONCOLOGY FIELD



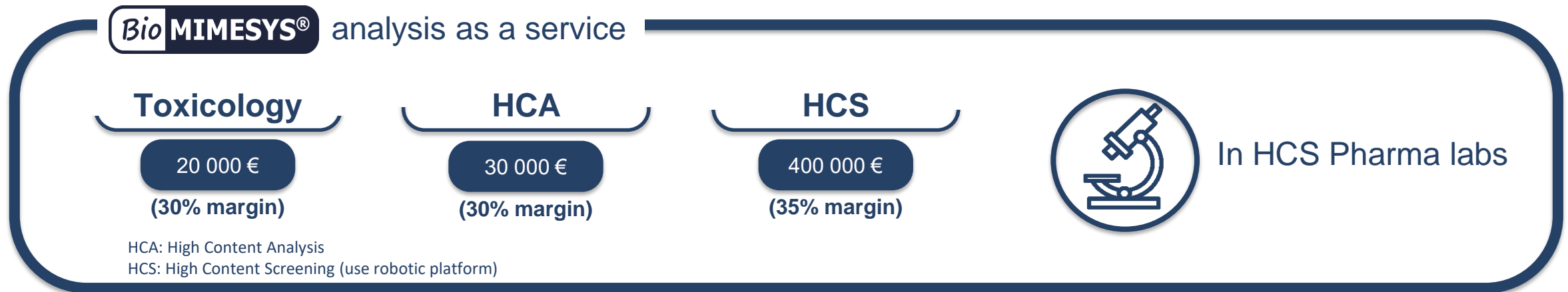
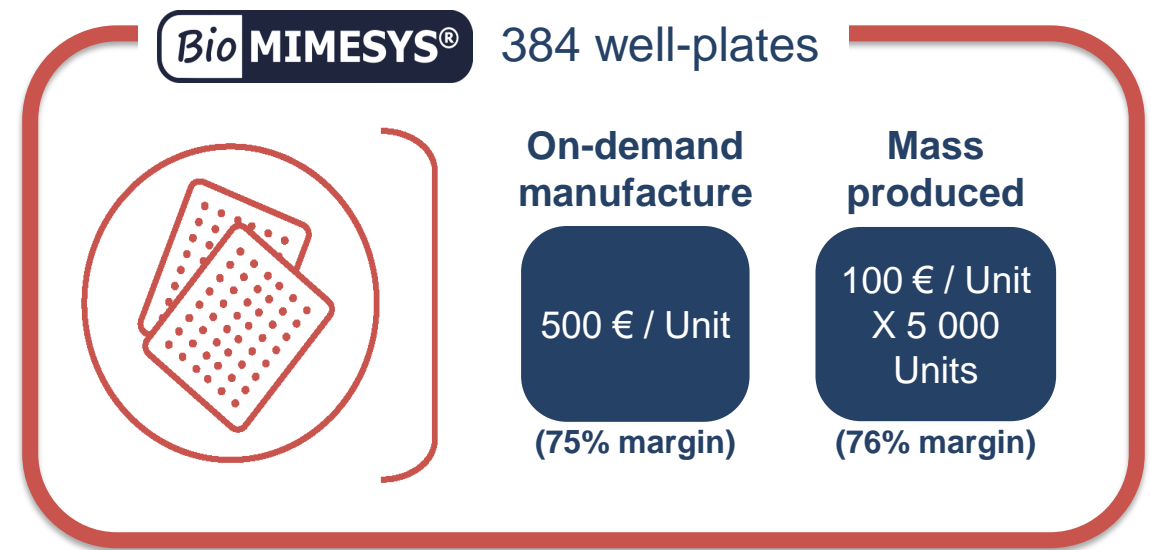
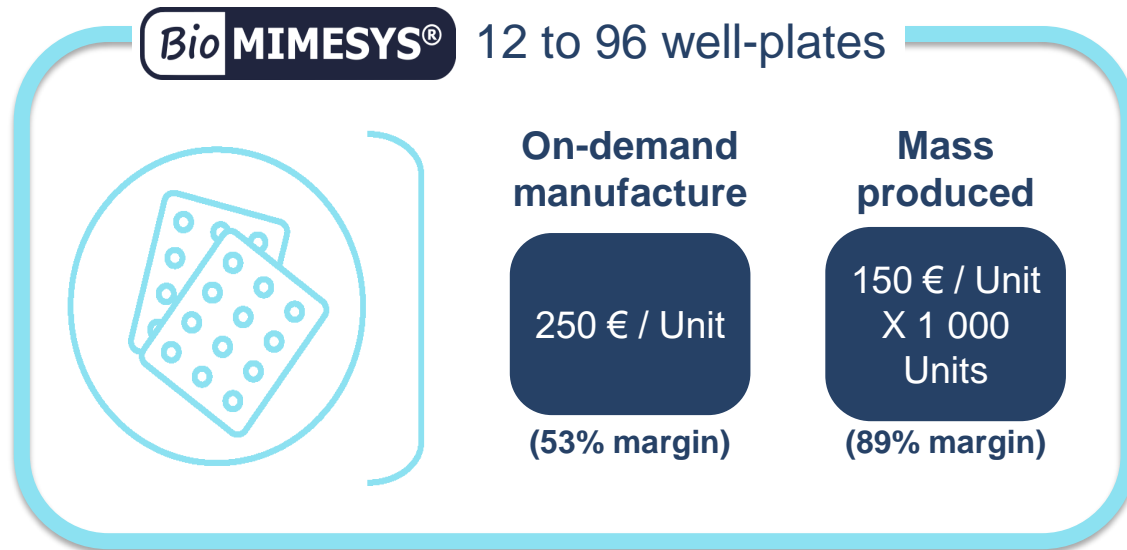
## Advantages.

- Compared to matrigel, commonly used in oncology field, BIOMIMESYS is
- animal free
  - reproduce the mechanical stress on cells with solid scaffold in oncology field
  - Ready-to use: cells of interest are simply deposited on the hydroscaffold
  - Organ-specific
  - Batch to batch reproducible

# ROAD MAP



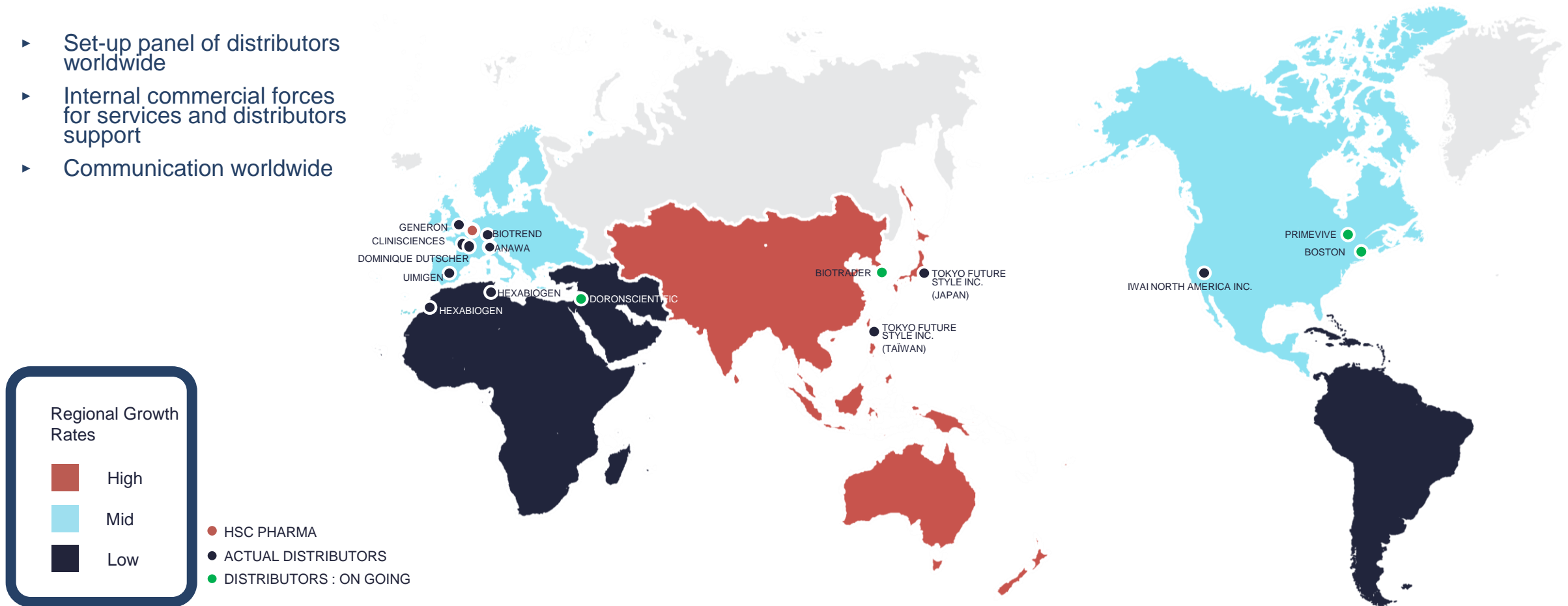
# BUSINESS MODEL



# COMMERCIALISATION & MARKETING STRATEGY

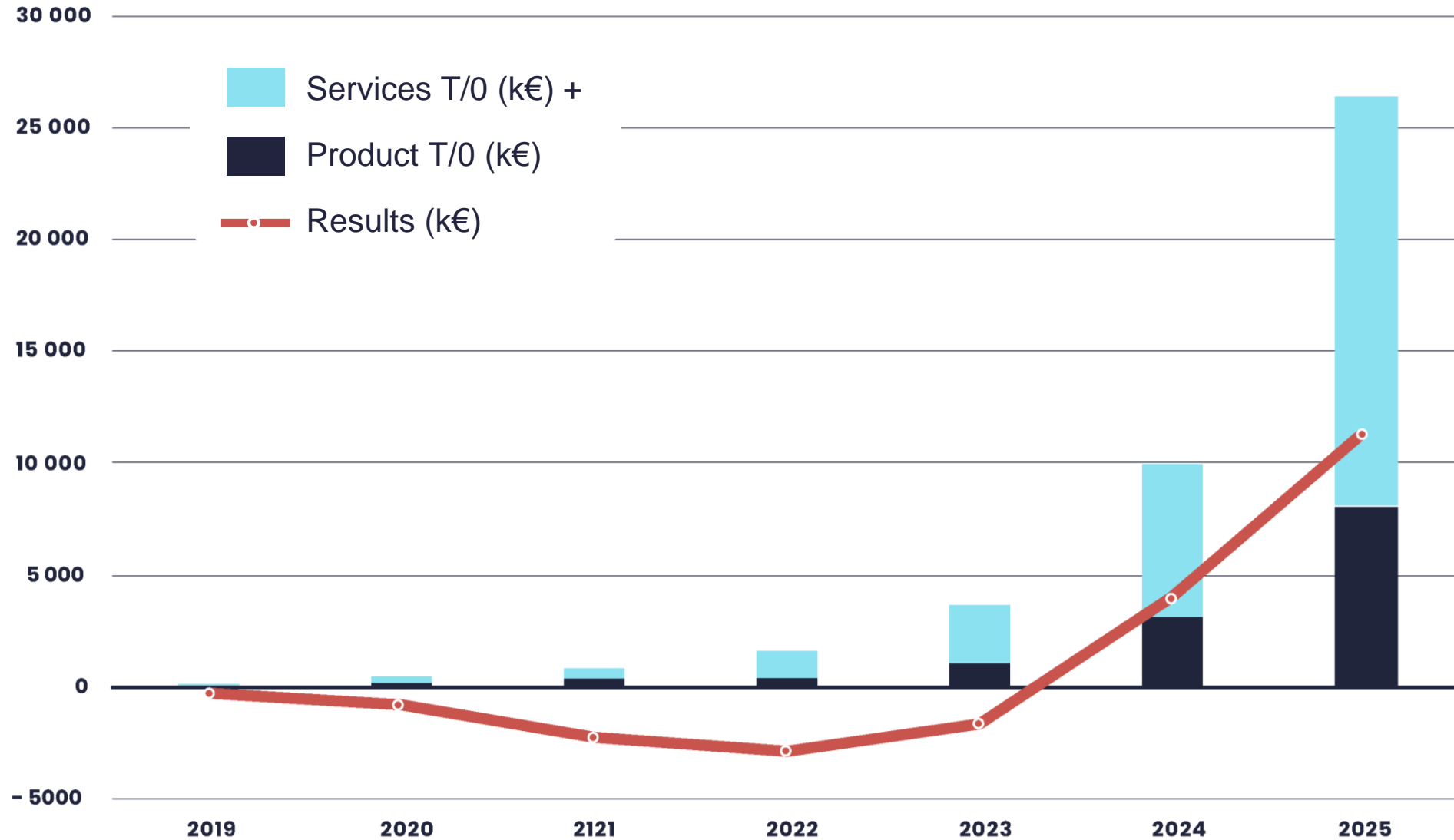
## 3D Cell Culture Market Growth Rate by Region (2019 - 2024)

- ▶ Set-up panel of distributors worldwide
- ▶ Internal commercial forces for services and distributors support
- ▶ Communication worldwide



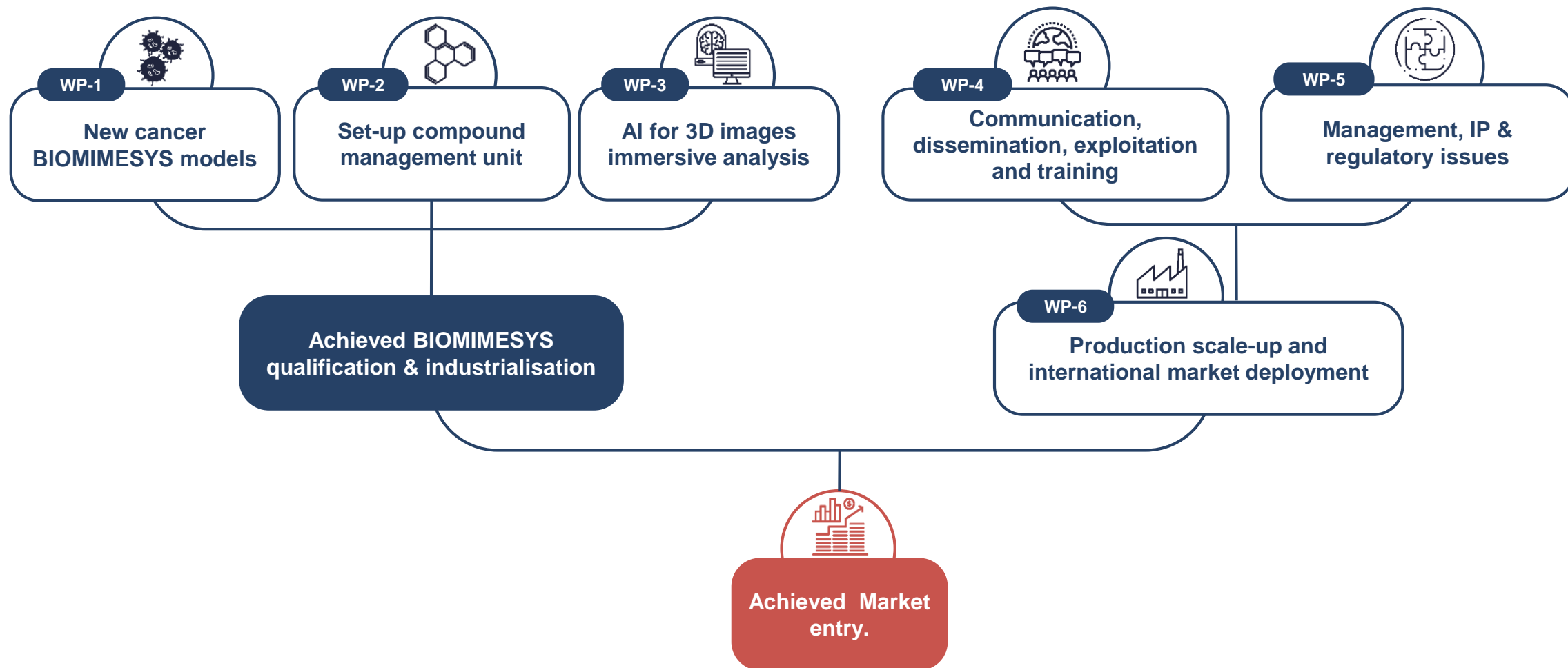
Source :  
Mordor Intelligence

# FINANCIAL PROJECTION

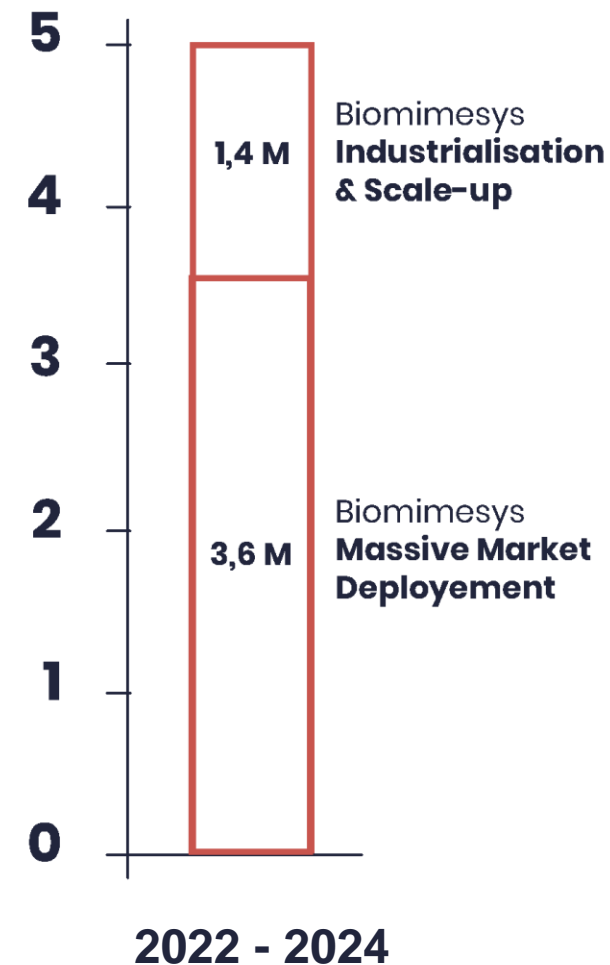
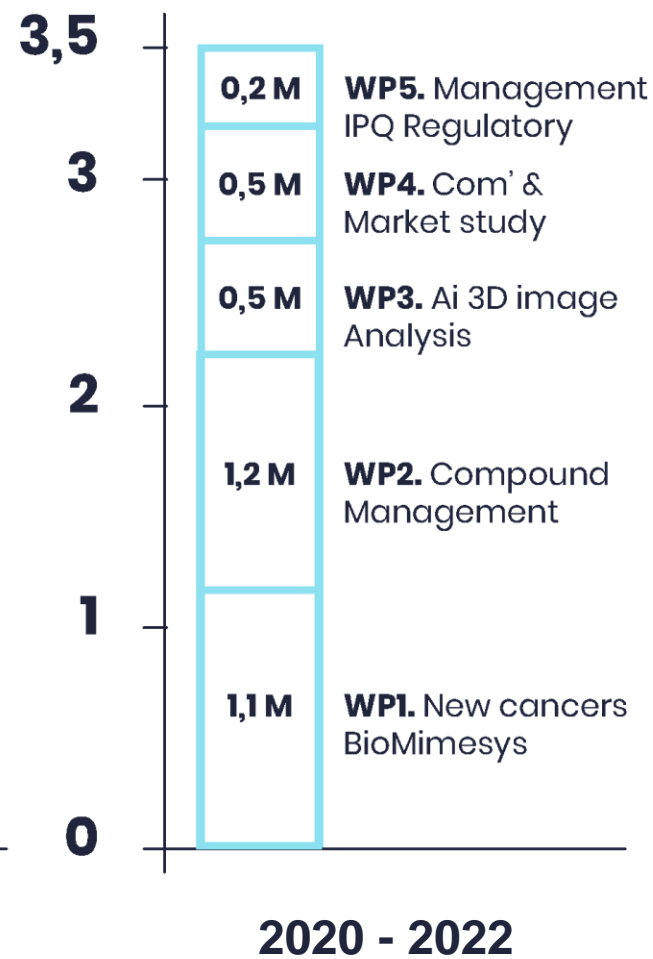
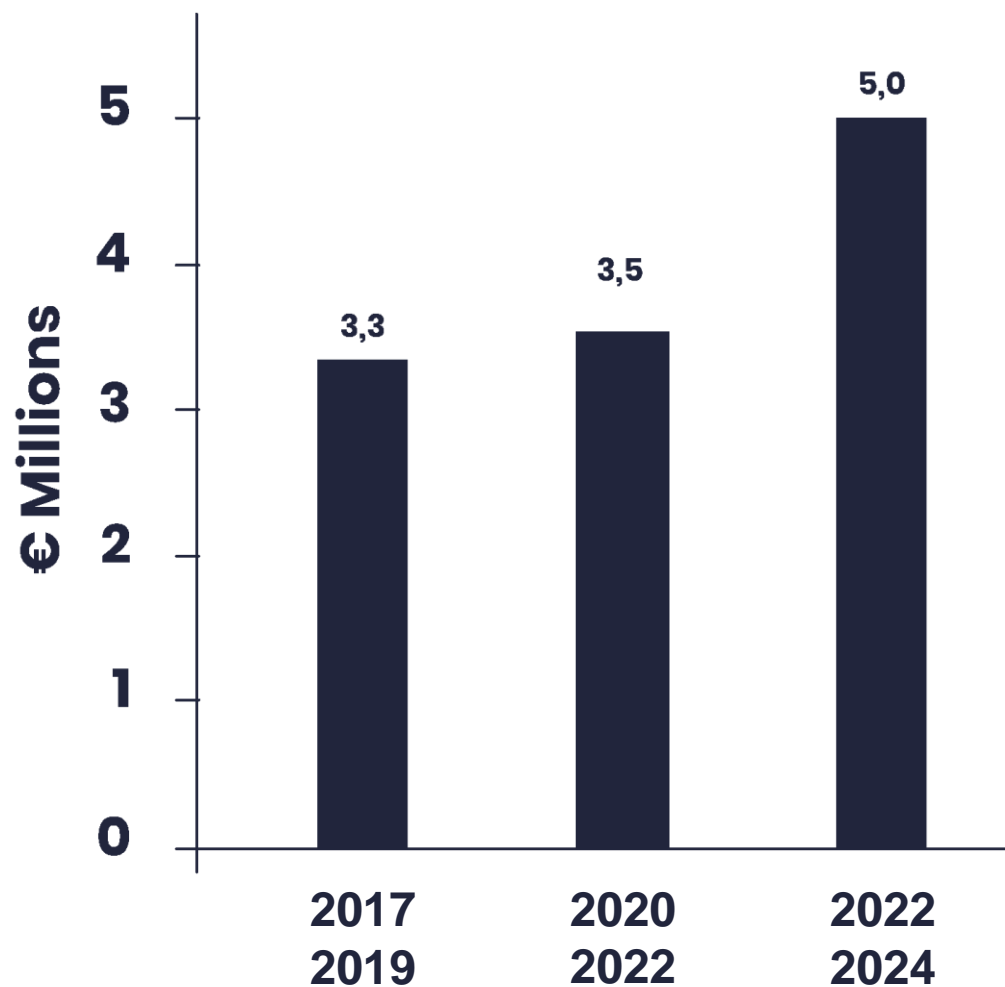




# ONCOMATRICES PROGRAM



# FINANCING



# TEAM

## OPERATIONS



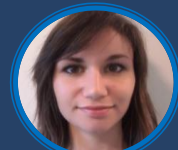
Marie LESAFFRE,  
**Technician,**  
*head of cell culture lab*



Océane GUYOT, **Technician,**  
*Cosmetology cell culture team*

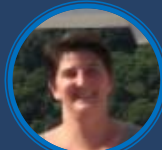


Méryl ROUDAUT, **PhD Student,**  
*Dev of liver organoid derived iPSC models*



Véronique De CONTO,  
**PhD Student,**  
*Dev of brain models*

## EXECUTIVE TEAM



Nathalie MAUBON, PhD  
**CEO & CSO**  
*22 y. of exp in R&D in pharmaceutical research*



Zied SOUGUIR, PhD  
**CIO**  
**BIOMIMESYS®** inventor  
*17 y. of exp in R&D in biomaterials*



Elodie VANDENHAUTE, PhD  
**COO**  
*10 y. of exp in R&D in cellular biology*



Grégory MAUBON, PhD  
**CDO**  
*22 y. of exp in IT / digital field*

## TO HIRE AFTER FOUND RAISING



Alexandre Fouassier  
**CBO**  
*24 y. of exp in BD in cellular products*



Sandrine Villoin  
**Business Developer**  
*22 y. of exp in BD in CRO*

## ADVISORY BOARD



Joseph CHOU,  
**>30y. of exp in entrepreneurship and BD**  
*Tokyo Future Style*



Kazuto Suzuki  
**>20 y. in BD**  
*Iwai America*

## Experts in Pharmaceutical Industry



Fabienne BERTHET, PhD  
**>15 y. of exp in IP and BD in Healthcare**



Patrick SQUIBAN, MD  
**34 y of exp as Medical Director in pharma & biotech**



Adrien PASTOR, MBA  
**Senior Brand Marketing Manager International in pharma & biotech**

## SCIENTIFIC BOARD



Karim SI-TAYED, PhD  
**Ips expert**



Pr Romeo CECHELLI, PhD,  
**BBB expert**



Pr Dominique COLLARD, PhD  
**BioMEMS expert**



Pr David DEVOS, MD  
**PhD, neurologist**



Samuel MEIGNAN,  
PhD, **oncology expert**



Karine HANNEBICQUE,  
MD PhD, **oncologist**

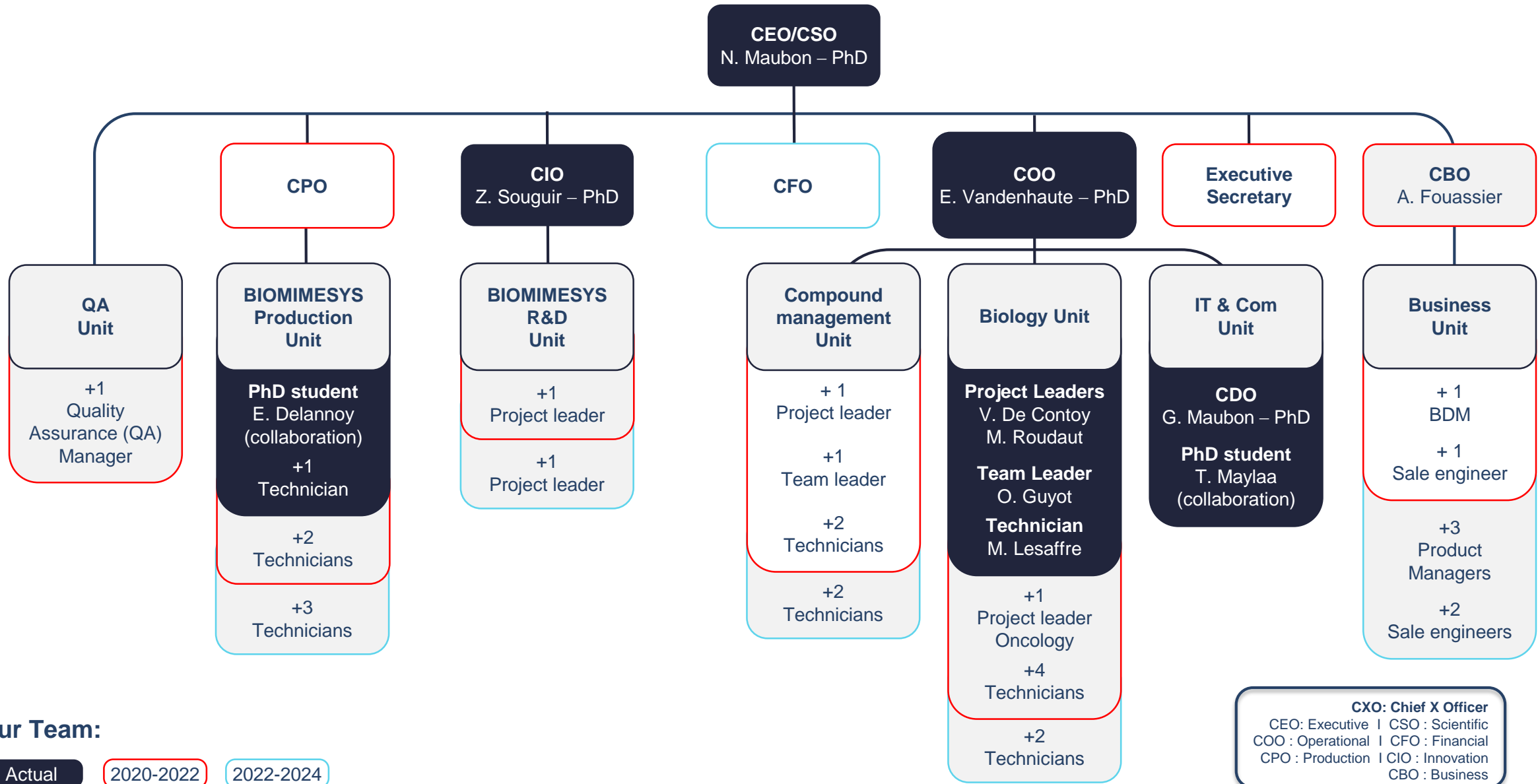


Georg HAASE, PhD  
**Neurology & ips expert**



Pr John Lo, PhD  
**Hepatic infection & liver disease expert**

# THE TEAM BY 2024



# CONCLUSION

*« Yes ! Our company will revolutionize the global pharmaceutical industry. »*

They already trust us :



+  $\beta$  tester for 384-well plates

CLARIANT

L'ORÉAL  
Research & Innovation

GALDERMA

LVMH  
MOËT HENNESSY • LOUIS VUITTON

LESAFFRE

bcb<sup>®</sup> Life Sciences  
Traced & Innovative Amino Acids

BIOTECHNOLOGIES  
GREENTECH

NUTRINOV

for a better life  
olmx Group

ROQUETTE  
Offering the best of nature™

CCPA-G  
GROUPE

Iwai

Iwai North America Inc.

cliniSciences



Tokyo Future Style, Inc.



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