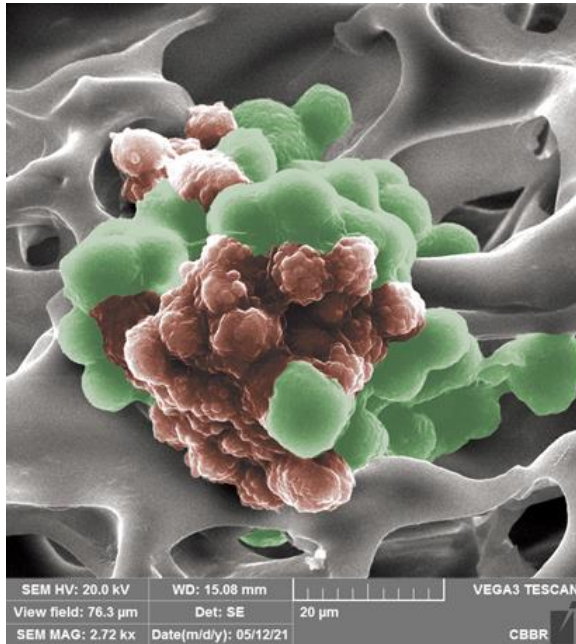




Biotech & Materials engineering Using IP for Leapfrog Strategy



Creating & implementing breakthrough technologies



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ChatGPT – thought process



- Step 1 - Intellectual property - creations of the mind

- Step 2 - Intellectual property rights - patents, trademarks, copyrights, trade secrets, industrial designs. **These rights give creators control over how their creations are used and marketed.**
- **Intellectual property is essential for innovation and economic growth, as it encourages investment in research and development.** Ensure that individuals/companies are rewarded for their creative efforts, thus incentivizing further innovation.



Our World: Materials Age Challenges

- Equitable healthcare
- Reliable energy
- Clean water
- Food security
- Mitigating climate change



NASA, Photo No. AC17-148-22730



**Need:
Powerful
tools for
radical
changes.**

Need: to create ecosystem

Biotech Companies

ChatGPT

11:41

- Company that specializes in developing and producing products based on biological processes or using living organisms, such as bacteria or genetically modified cells.
- Focus on developing new drugs, vaccines, and medical devices to improve human health, agriculture and environmental solutions.
- These companies often require significant investments due to the high cost of research and development and regulatory compliance.

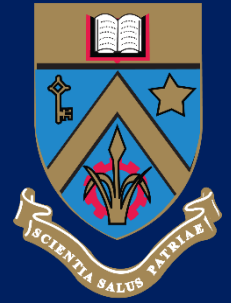
Current situation

- Fintech startups have better chances of raising funds because they bring revenue faster.
- Investors are not willing to give entrepreneurs time to grow their business.
- Nordic, US, Europe - investors understand that it takes time to grow a successful business.
- **Entrepreneurship requires a positive mindset and consistency to reach your goal.**
Entrepreneurs have to be ready, because you will face challenges along your journey.
- Entrepreneur receives a lot of rejections & challenges, mentally strong and believe in yourself and your idea.



Center for Biomedical and Biomaterials Research (CBBR)

'Spin-off' center of UoM Faculty, established 2011



Building Intellectual Capital
Training of PhDs & PostDocs

Research & Innovation Thrusts
Design and Engineering of Smart Materials

Collaboration Industry
High-end Analytical services
Problem solving
Biotech & Materials
Engineering projects

Discover, Innovate, Solve

4 QUALITY EDUCATION
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
17 PARTNERSHIPS FOR THE GOALS



Institutional Autonomy
Academic Freedom
Integrity

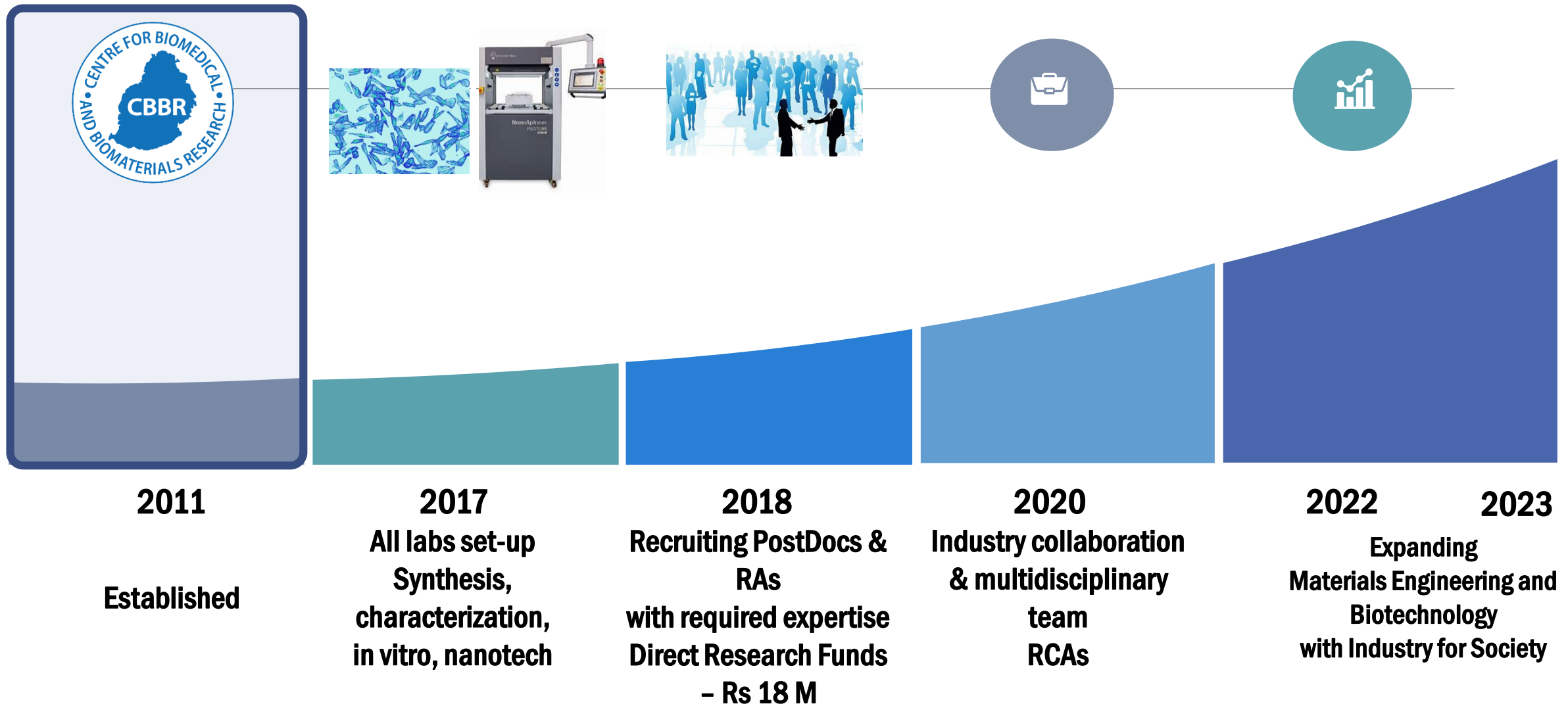
Respect
Responsibility
Equity

We live our values

www.uom.ac.mu



CBBR 11-YEAR HISTORY

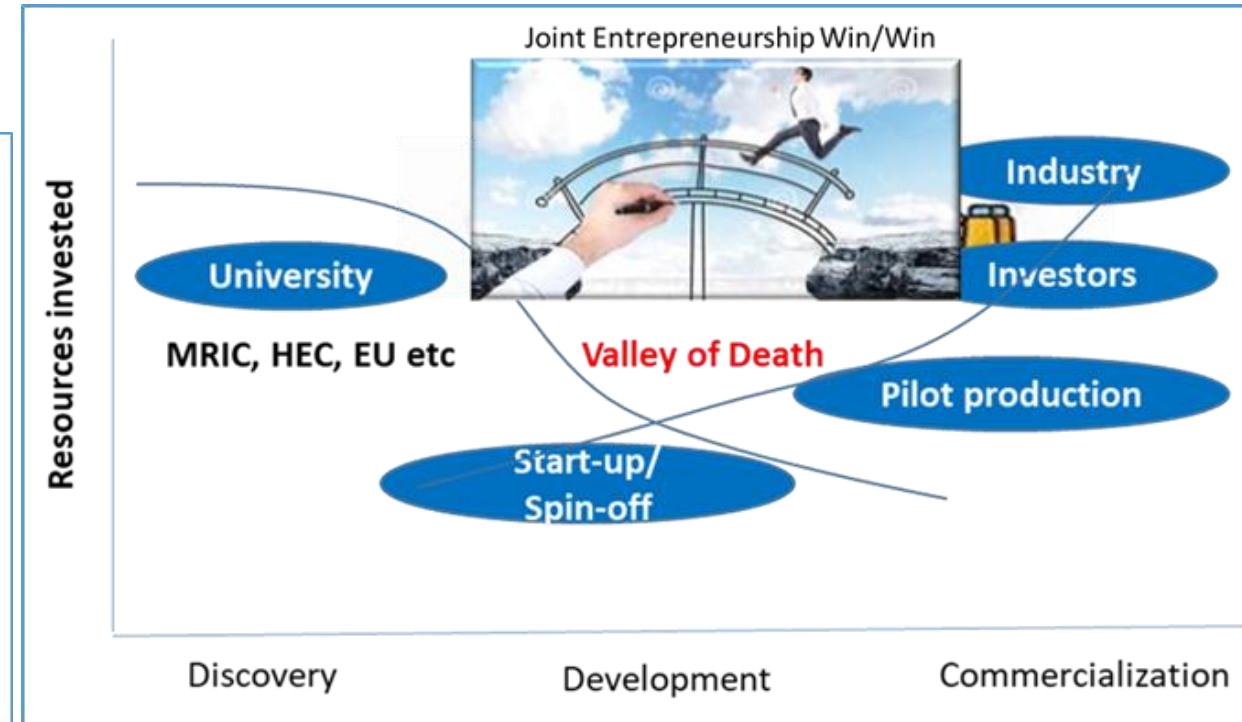
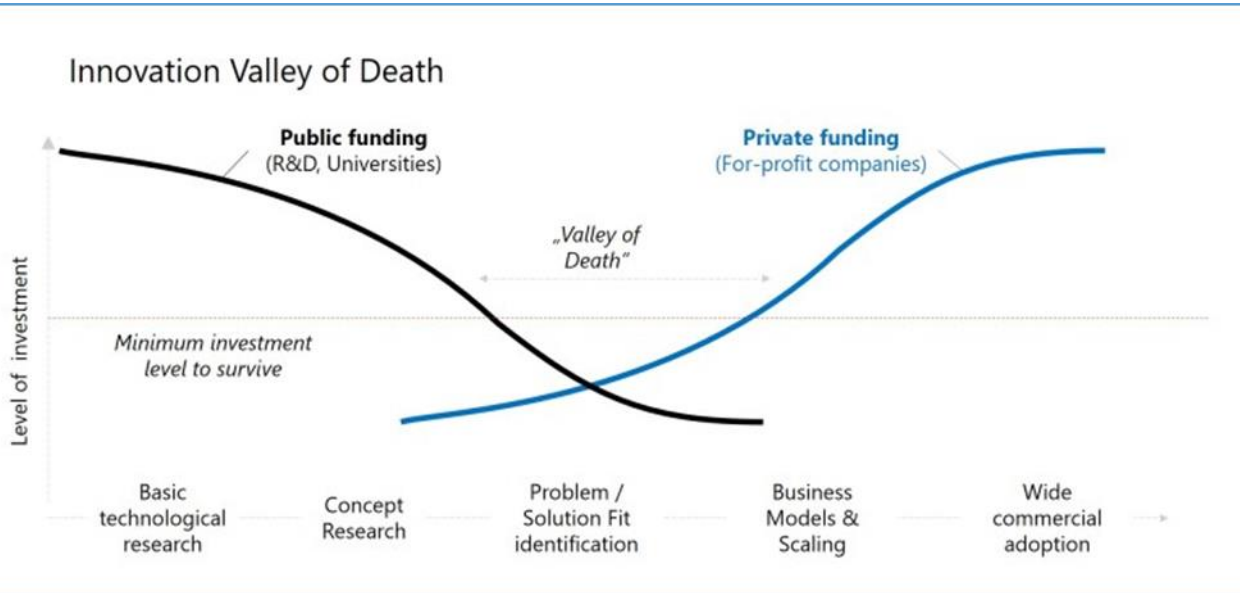
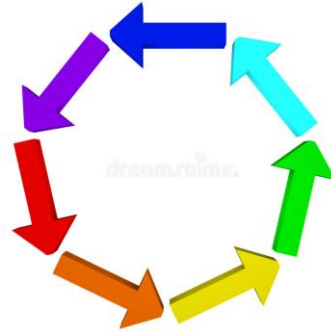


Leapfrog Future – breakthrough technologies

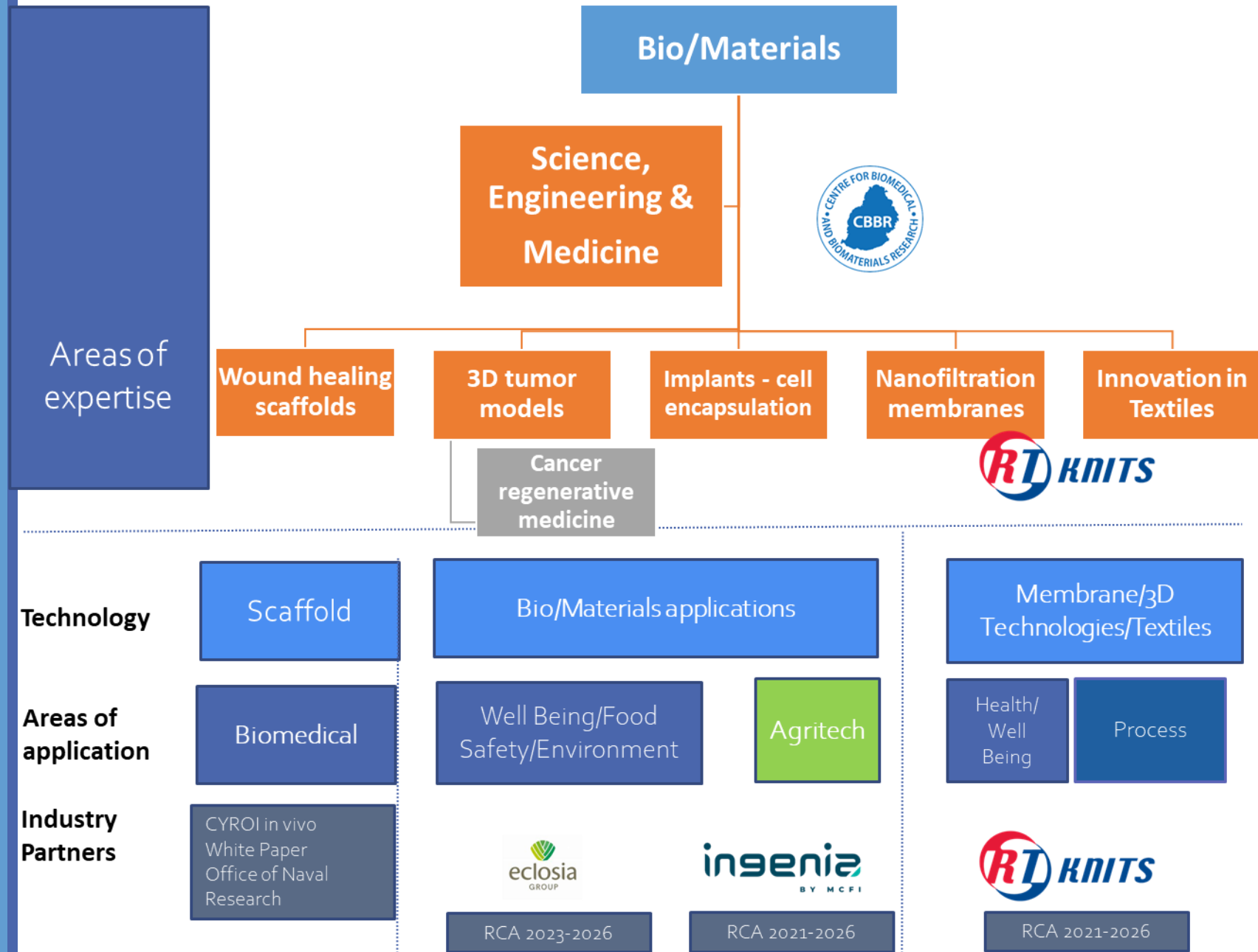
Technical Excellence to Startup to Scale-up Nation

How to start the machinery -

Intellectual property is essential for innovation and economic growth, as it encourages more investment in research and development.



Diversify our Core Science & Engineering Business



Program Status

Program Indication	ID #	Preclinical development	Phase 1	Phase 2	Phase 3	Commercial
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Self Healing Injectable Hydrogel

Biomaterials Nanofibers

Biohydrogels

NextGen TE

Program Indication	ID#	Biological testing/Field Trial	Upscaling	Commercial
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Non-medical Nanomaterials

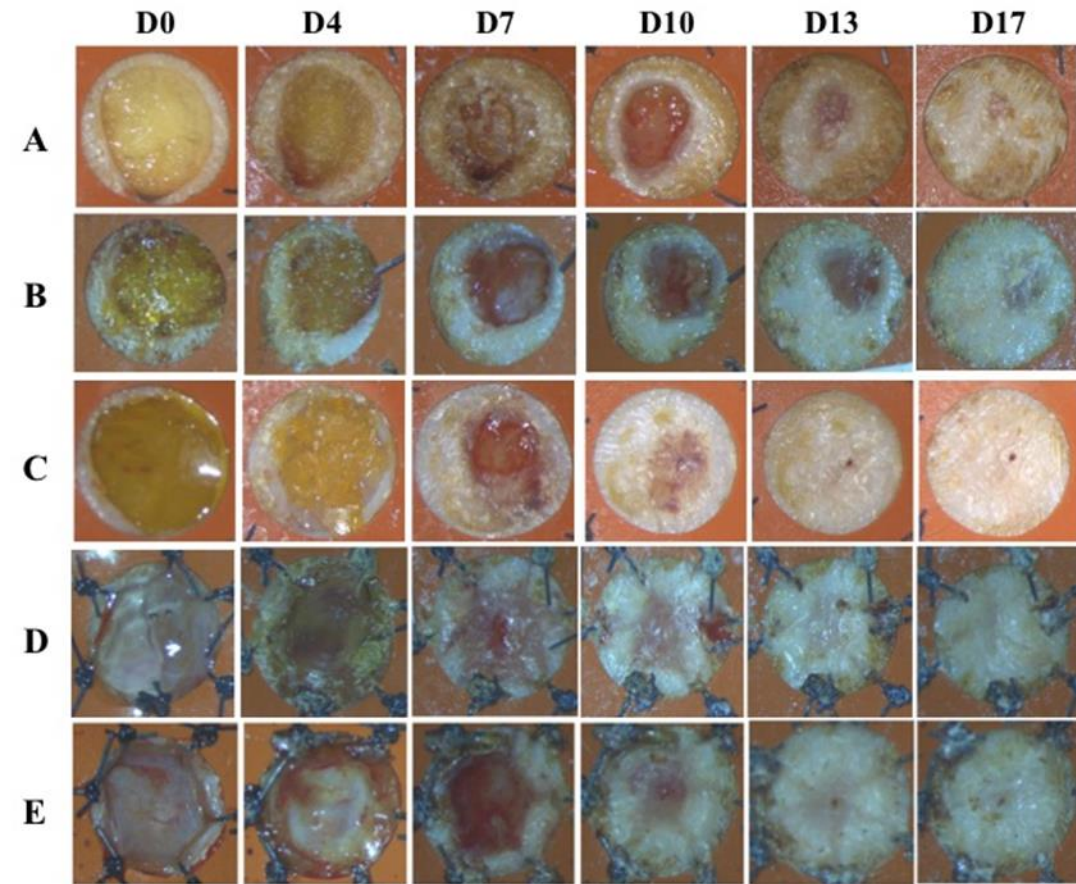
Nanofibers 99.999% anti-viral & anti-bacterial air filtration

Industrial BioMaterials Engineering

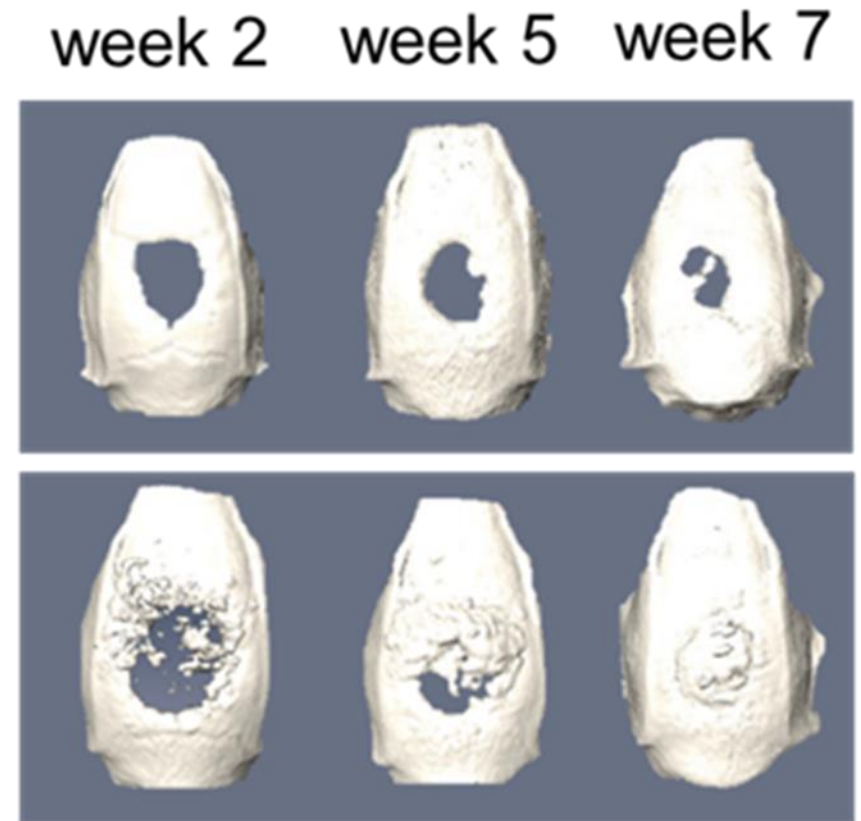
Industrial process development

Scarless tissue regeneration after a wound

Full thickness skin wound

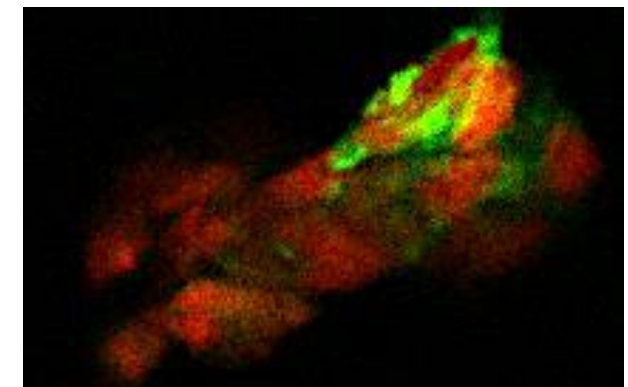
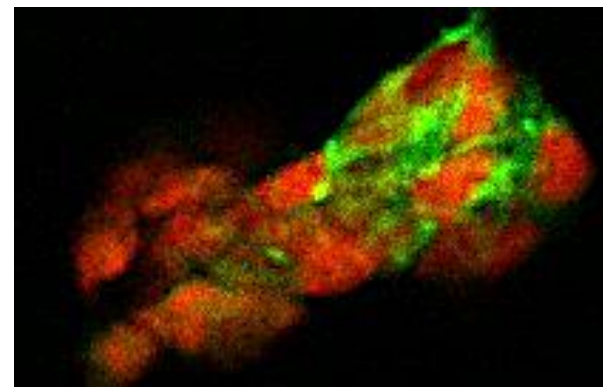
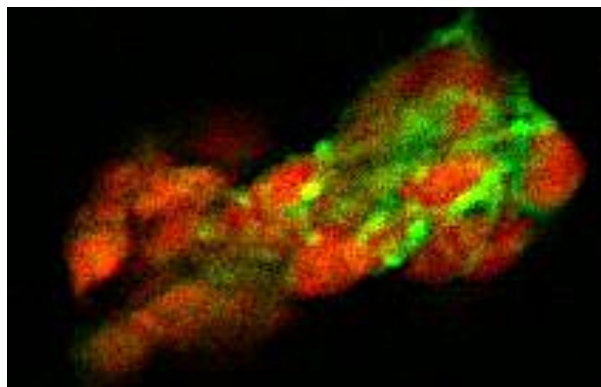
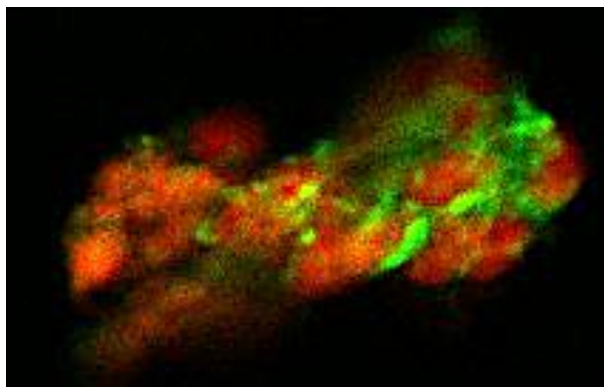
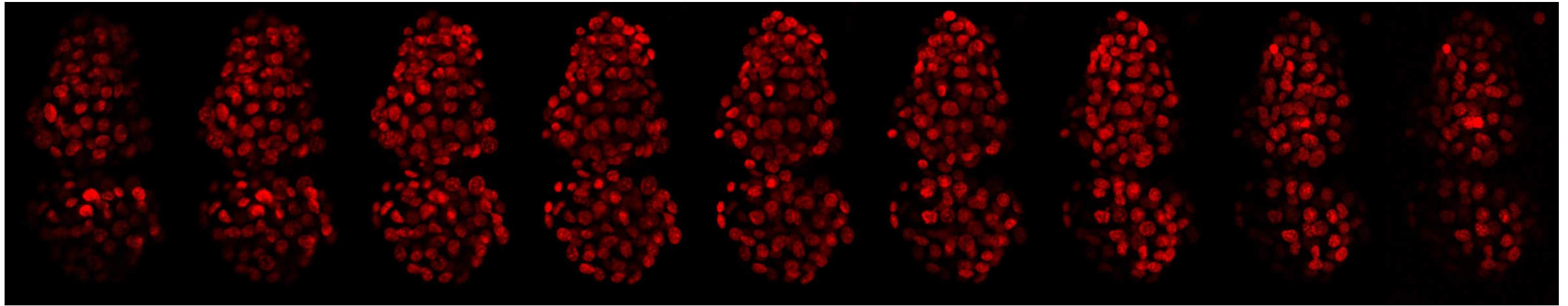


Cranial defect



Cell encapsulation for subcutaneous implants for insulin production

Beta-TC-6 cell line spheroids isolated from the pancreas of a mouse encapsulated into scaffolds



20/43

25/43

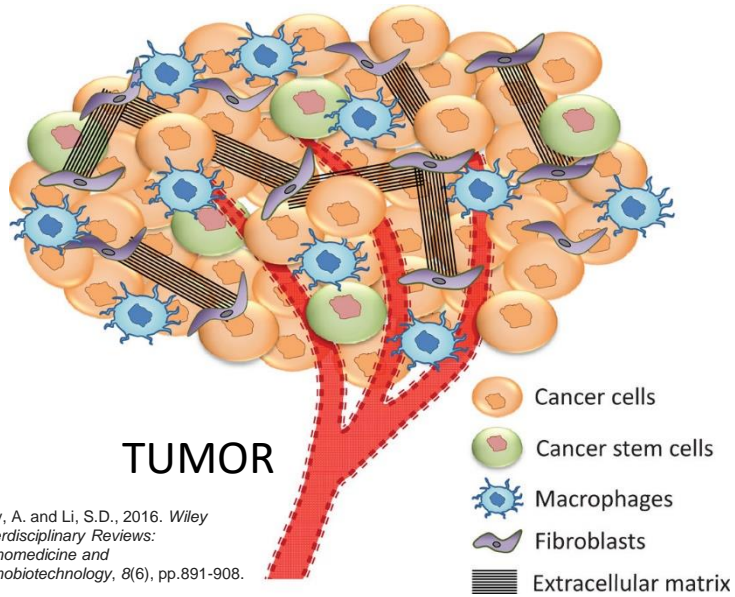
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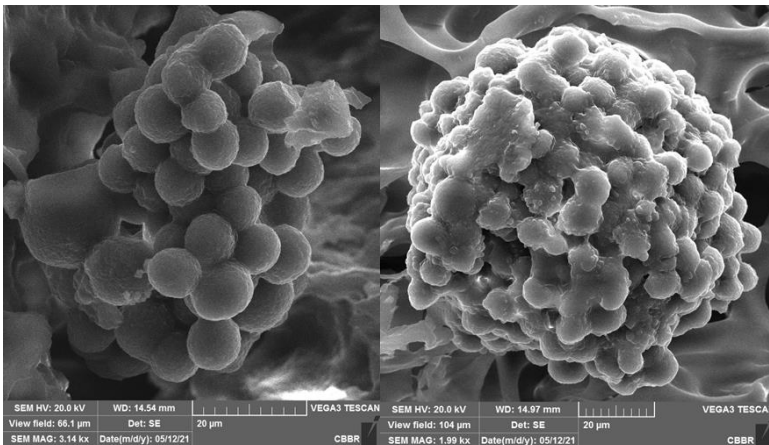
SiR Hoescht DNA_610-6 JASP Actin

(CBBR & Max Planck Institute for Medical Research, Germany)

Cancer regenerative medicine



CBBR Tumor spheroids for drug screening



Cancer cells

Fibroblasts + cancer cells

CBBR, University of Mauritius & Wits Advanced Drug Delivery Platform, University of Witwatersrand, South Africa

(A)



Tumour reduction approx. 7% of treatment compared to the control with 11% increase in tumour volume after 96 hours.

AI/machine learning to accelerate process development since 2020

Experimental data

Polymeric nanofibrous scaffolds for tissue regeneration
+
in vitro inflammatory responses in cell culture



Physico-chemico-biological parameters

pore diameter
fiber diameter
water contact angle
Young's modulus
ruffling index



Model training evaluation/validation



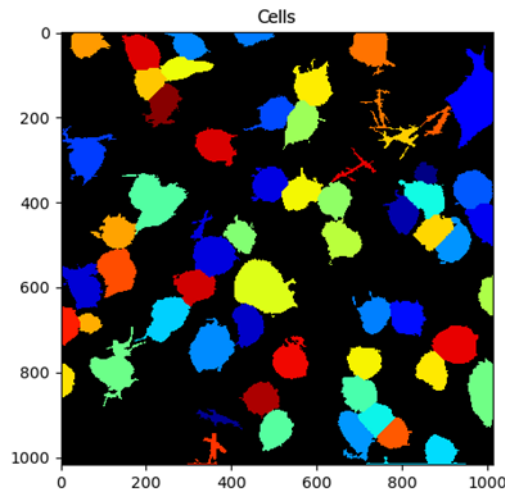
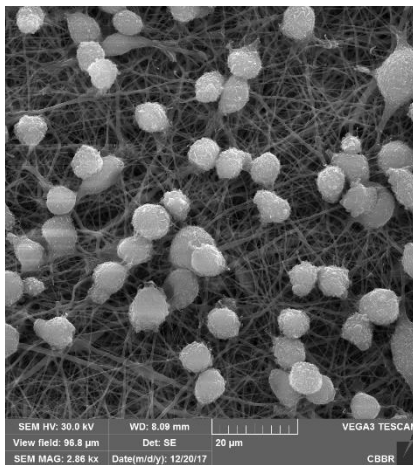
input
physico-chemico-biological parameters

Y

output
expression levels of inflammatory responses (*in vitro*)

Inflammatory responses
Material performance
Scaffold performance

R. Soc. Open Sci. 7: 201293. <https://doi.org/10.1098/rsos.201293>, December 2020



Predict Inflammation responses through image processing



***Creating & implementing
breakthrough technologies***

Current Researchers

Biomaterials, Drug Delivery and Nanotechnology (BDDN) Unit (approx. 80% Industry funded)

Prof Archana Bhaw-Luximon

Dr Nowsheen Goonoo

Dr Itisha Chummun Phul

Mr Devesh Bekah

Dr Yash Boyjoo

Ms Tejaswini Petkar

Dr Abha Jodheea-Jutton

MPhil/PhD

Mr Avin Ramanjooloo, Mr Akash Nundloll

Ms Lakshmi Sujeeun, Ms Laetitia Hüet

CYROI, La Réunion, Pre-Clinical Trials Team

Dr Fanny Gimié (Veterinary and President Ethics Committee, La Réunion)

Dr Colette Cordonin (Biochemist), Mr Imade Ait Arsa (Biochemist engineer)

University of Witwatersand, South Africa – Pre-clinical/Pharmacy team: Prof Yahya Choonara, South African NRF Research Chair and Director, Wits Advanced Drug Delivery Platform (WADDP)

Industry Partners

Mr Kendall Tang, CEO RT Knits Ltd

Mr Yannis Fayd'Herbe, MD, Ingenia Ltd

Mr Thierry de Speville, Avipro/Eclosia Group

Biotech Strategy Mentors: Mrs Isabelle de Melo, Mo Angels, Kendall Tang, RT Knits
Prof Robert Langer & Prof Ram Sasisekharan, MIT