BIOCHEMICAL ENGINEERING

Bioprocessing Strategies for Cost-Effective and Sustainable Cultivated Meat Production

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2nd CARMA conference, 9th of September 2025

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POSTER #21

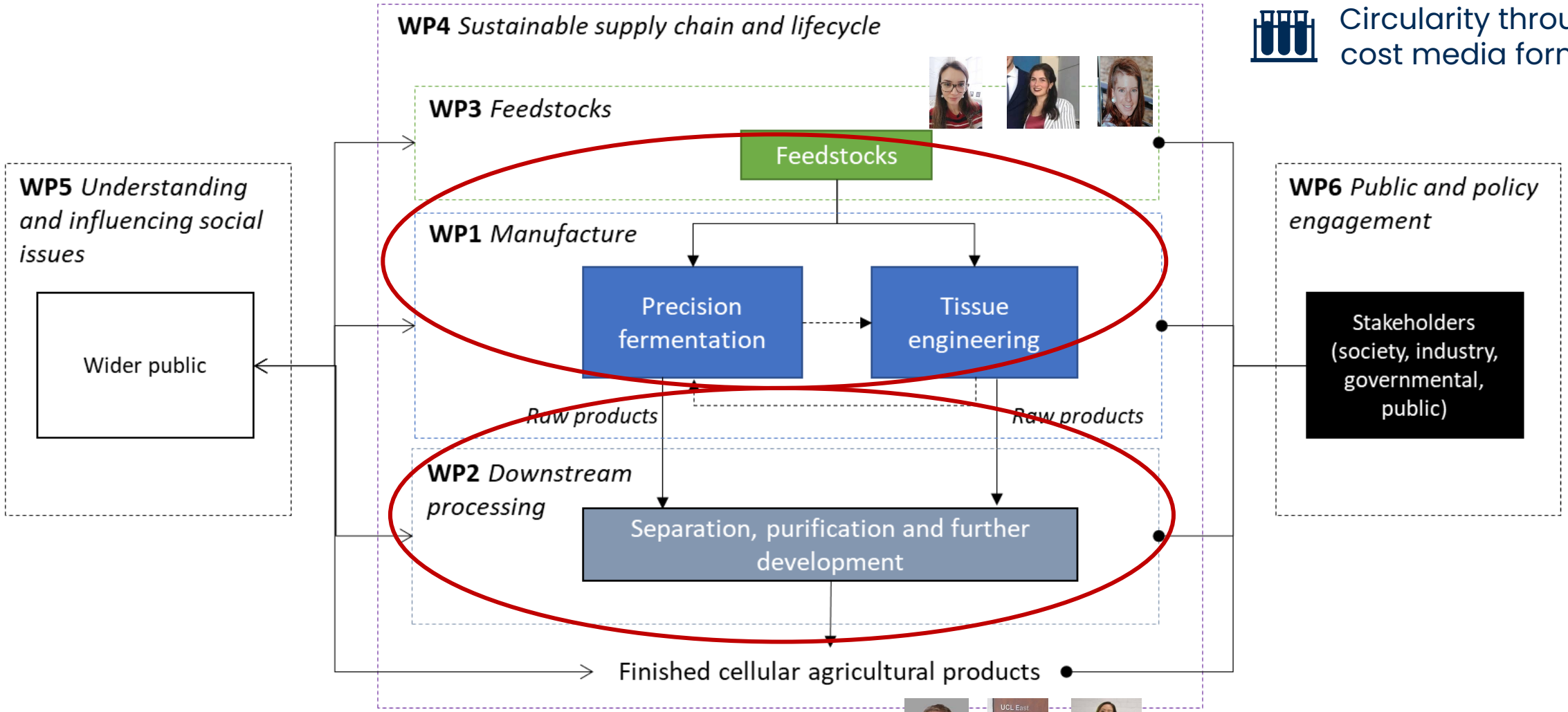
POSTER #8

POSTER #16

CARMA research plan

Bioprocess development for enhancing cell yields

Circularity through lower cost media formulations



Bioprocess development for enhancing cell yields

Microcarrier screening (1)

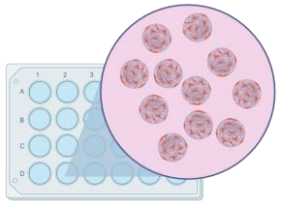
Dr Maria Laura Vieri
PDRA

Static culture (24-well plates)

C2C12 myoblasts

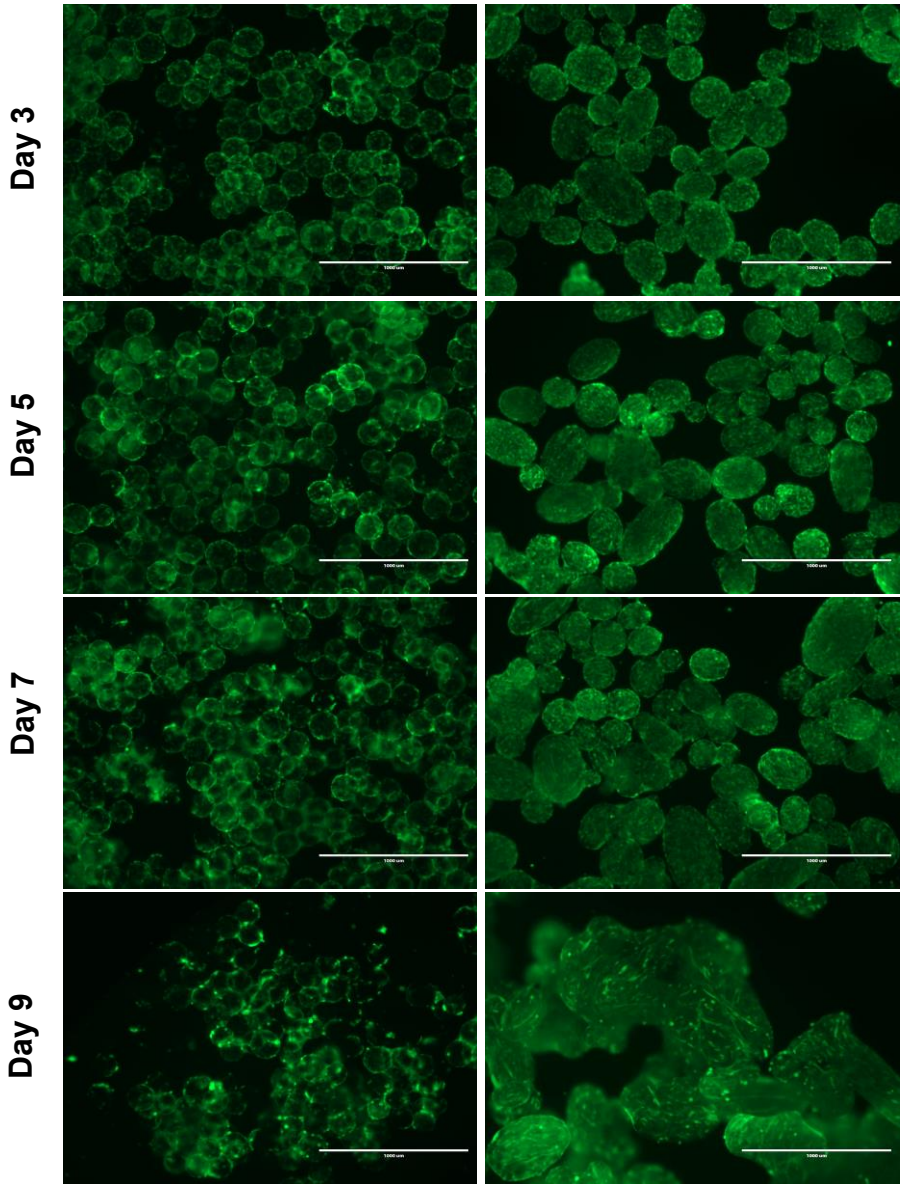
Cytodex-3

Cultispher-S

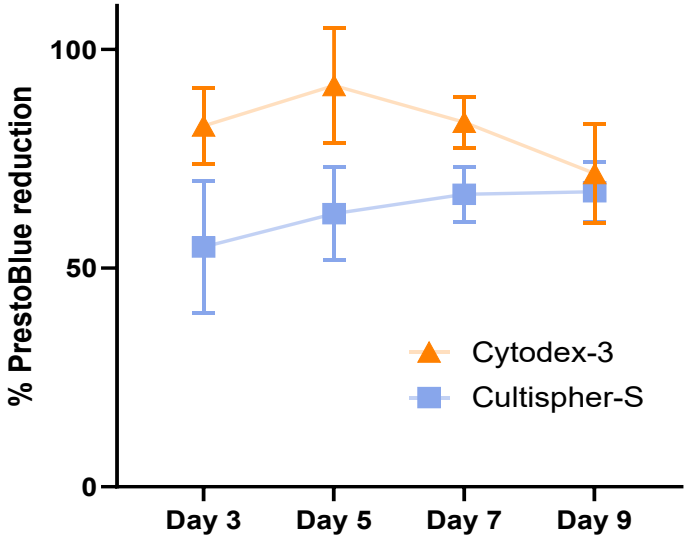


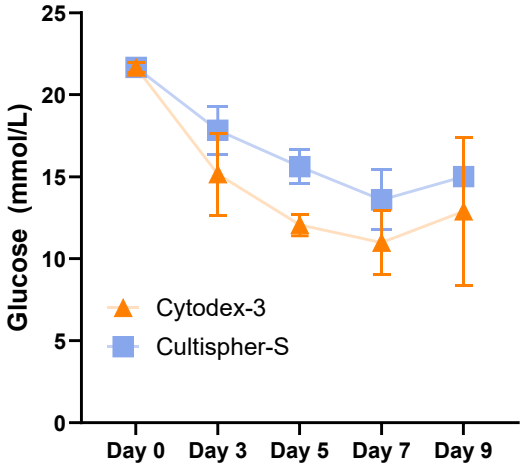
Imaging
PrestoBlue
Lactose/Glucose

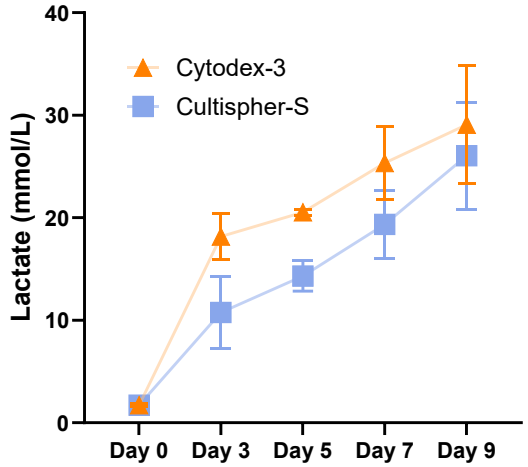
Characteristics	Cytodex 3	Cultispher-S
Material	Functionalised dextran	Crosslinked gelatin
Porosity	Microporous	Macroporous
Protein coating	Collagen	None
Transparency	Yes	No
Dissolvable	No	Yes, with dispase



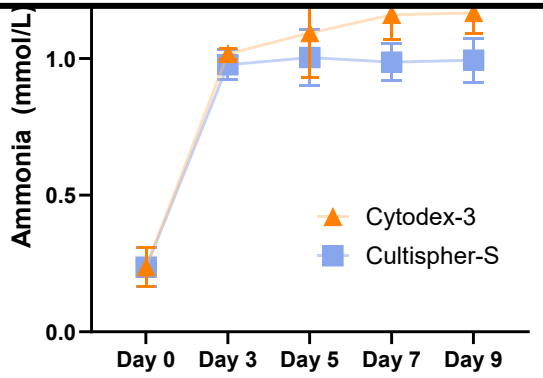
Microcarrier screening (2)

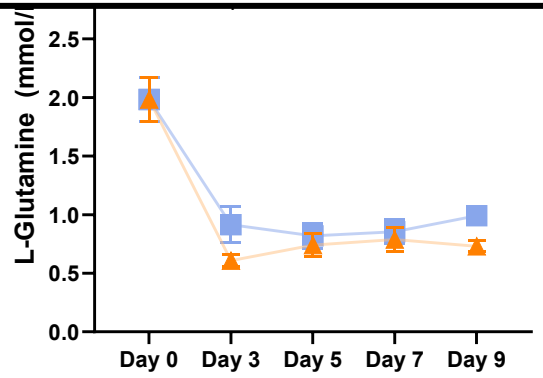


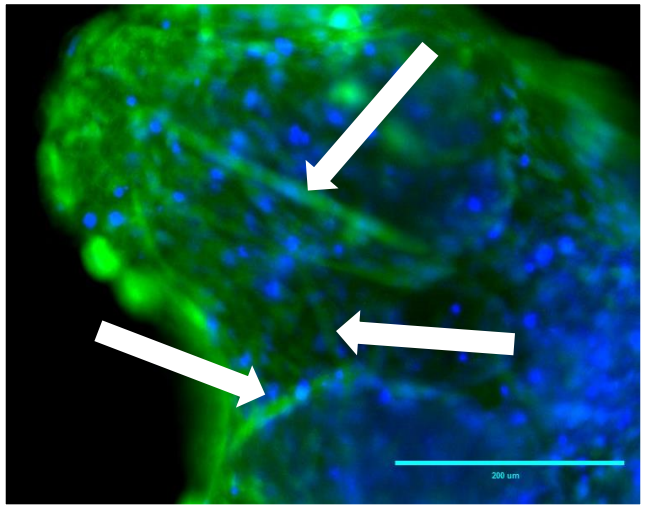




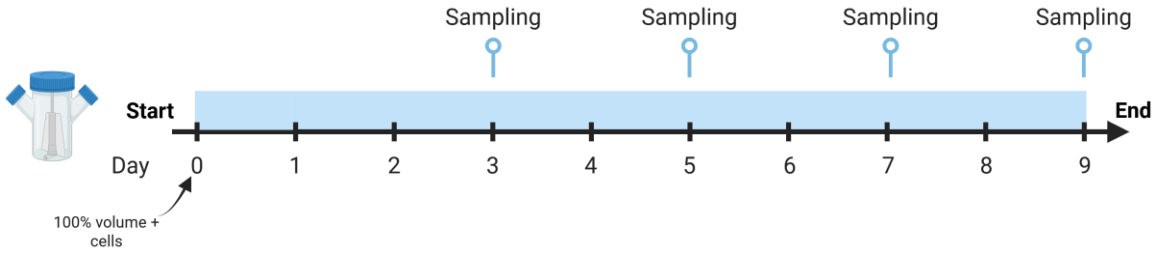
Based on its characteristics and the ability to support myogenic differentiation, Cultispher-S was selected as the microcarriers for bioprocess development

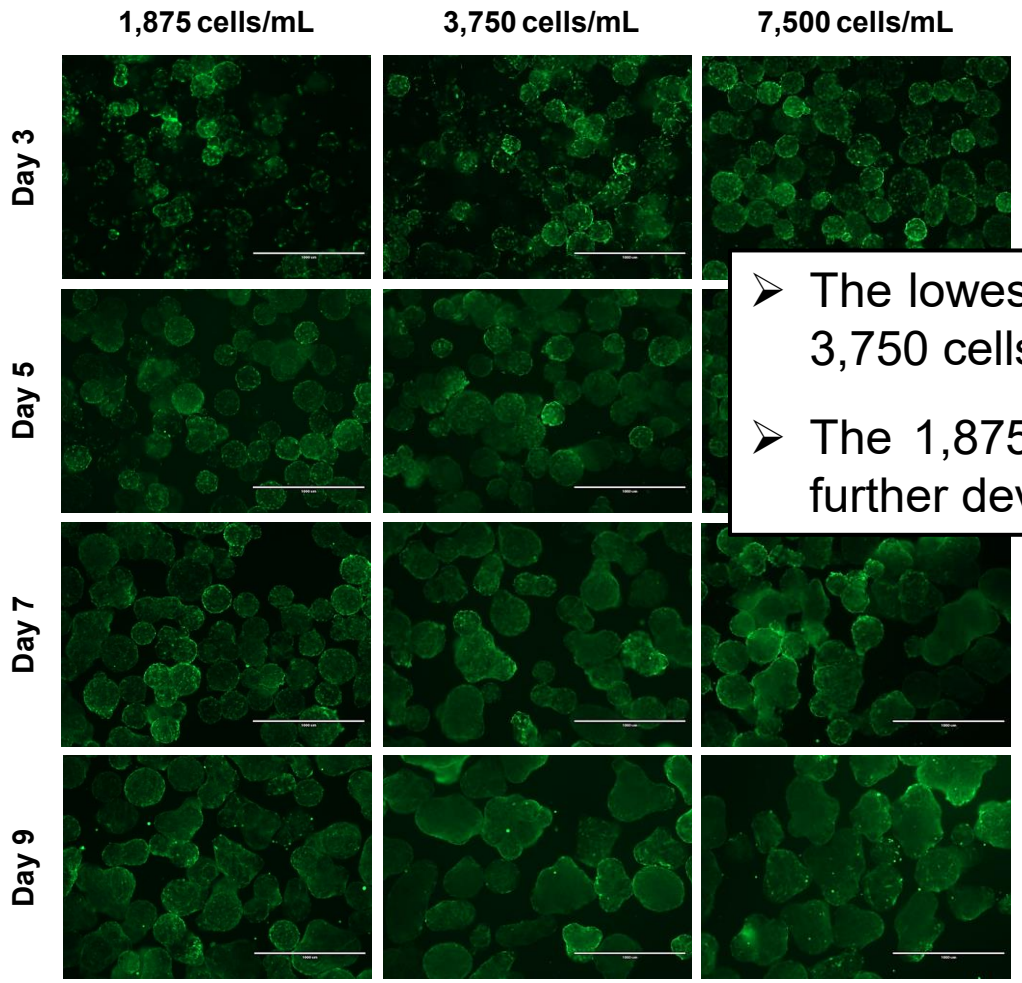


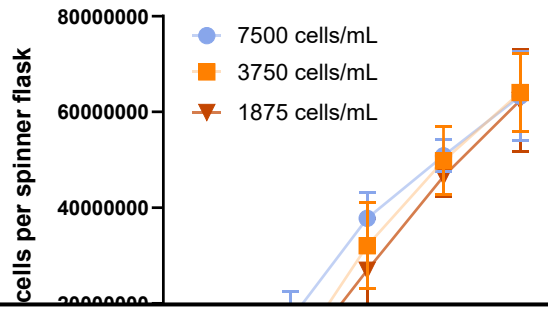


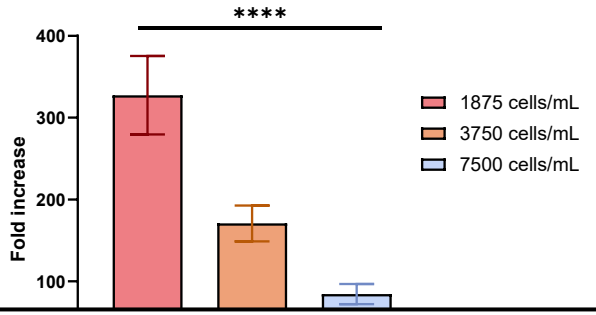


Cell seeding density testing (1)

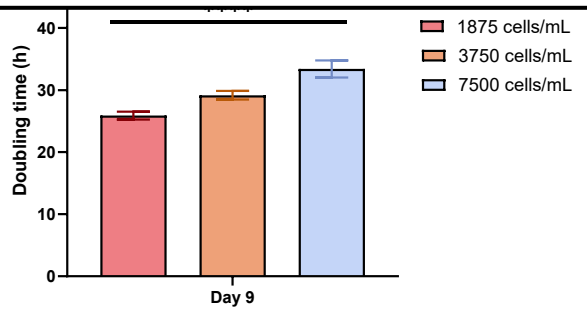


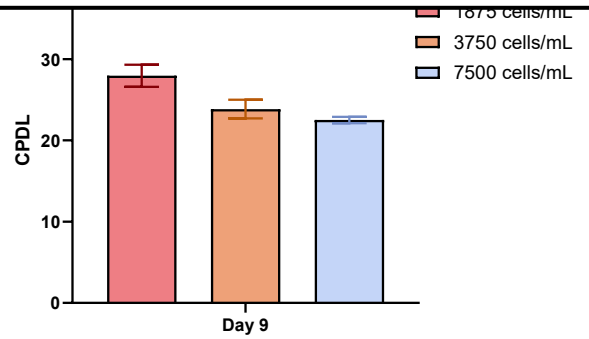




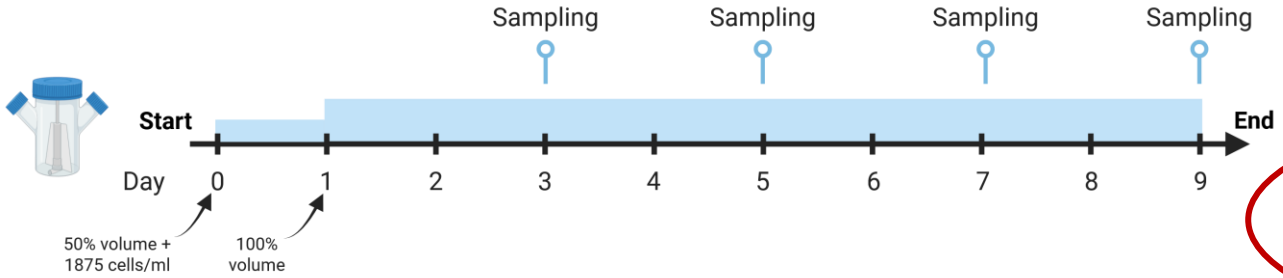


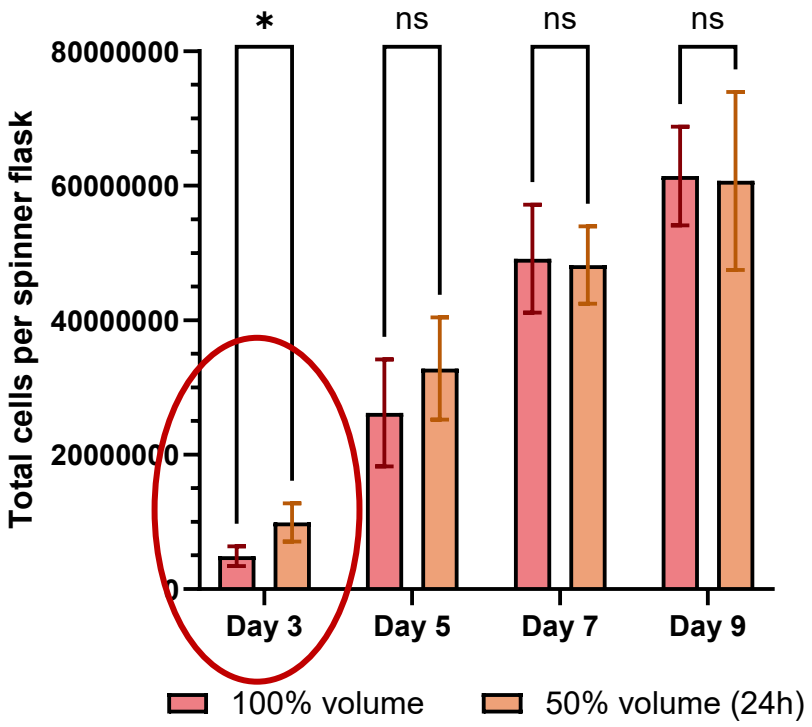
- The lowest seeding density tested gave a fold increase of 1.9x higher than 3,750 cells/mL and 3.88x higher than 7,500 cells/mL.
- The 1,875 cells/mL seeding density was chosen as optimal and used for further development.

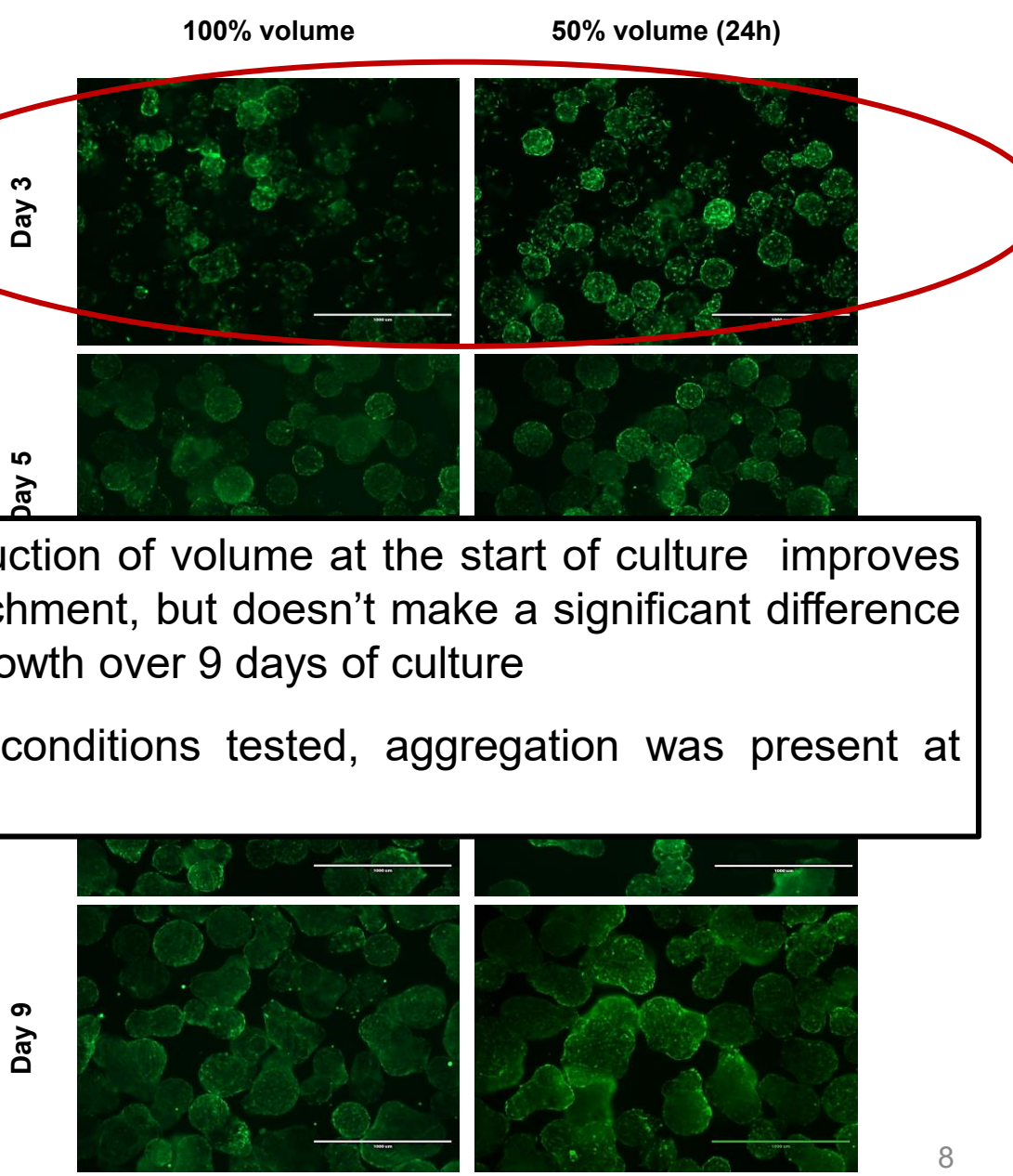




Strategies to improve cell attachment



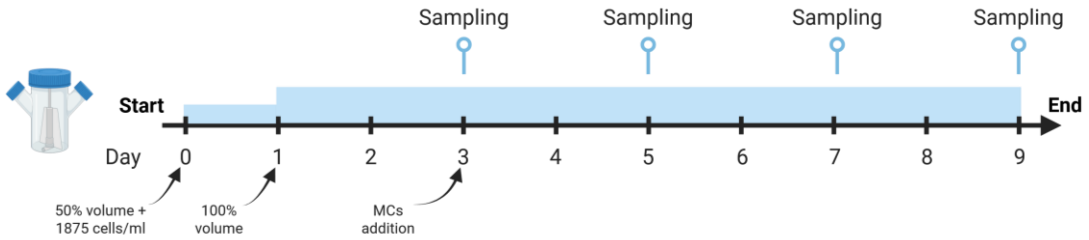


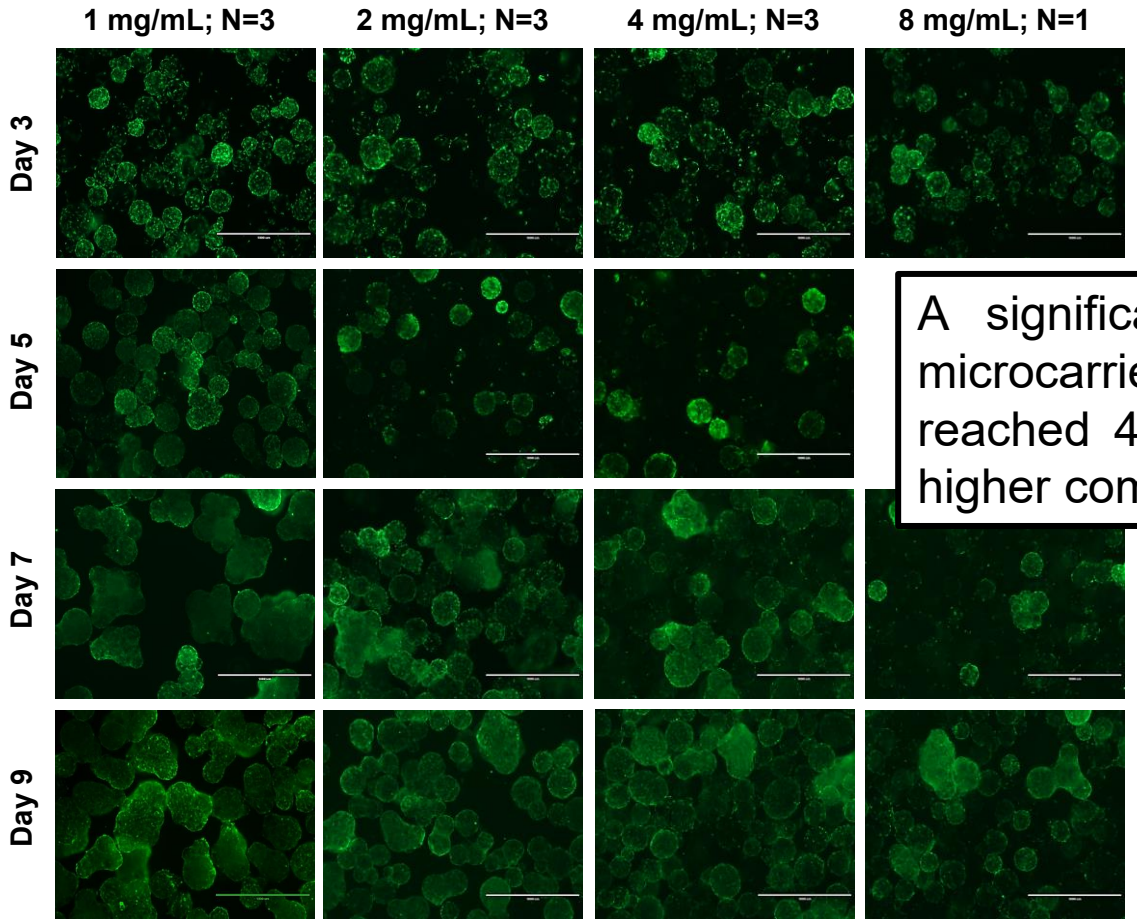


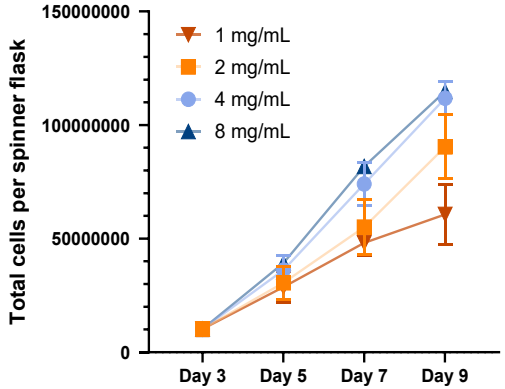
1) The reduction of volume at the start of culture improves cell attachment, but doesn't make a significant difference in cell growth over 9 days of culture

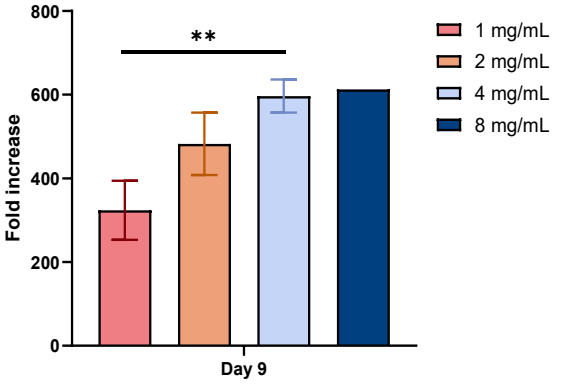
2) In both conditions tested, aggregation was present at Day 5.

Microcarrier addition strategy

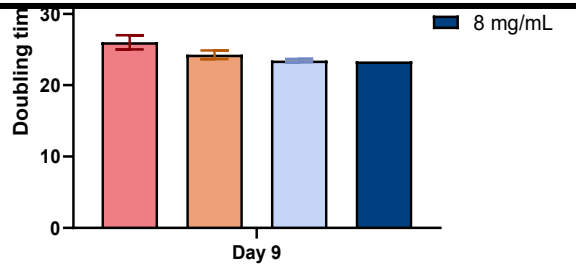


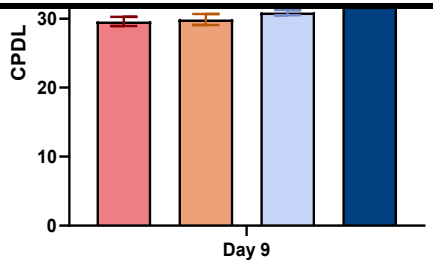






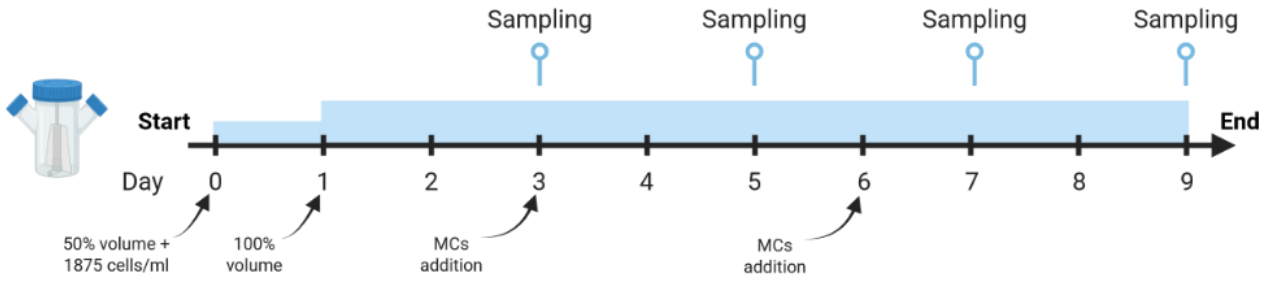
A significant fold increase was obtained through the addition of microcarriers at Day 3, particularly when the total MC concentration reached 4 mg/mL (1.84x higher compared no MC addition and 1.23x higher compared to 2 mg/mL)

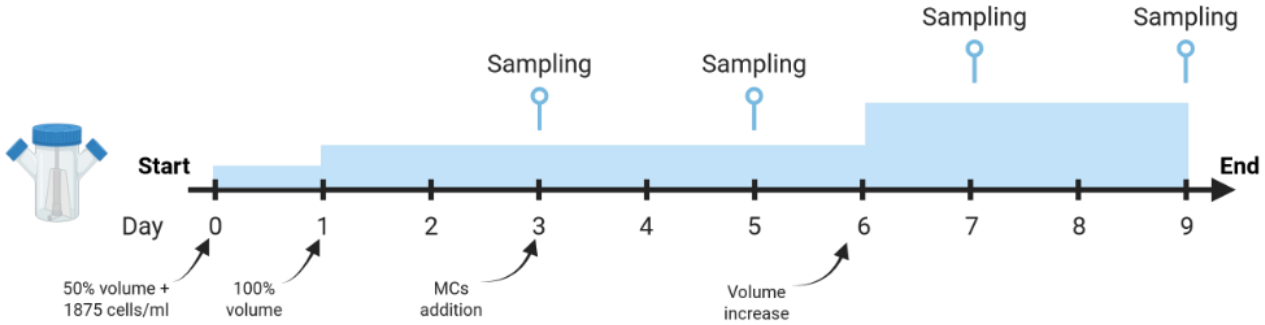


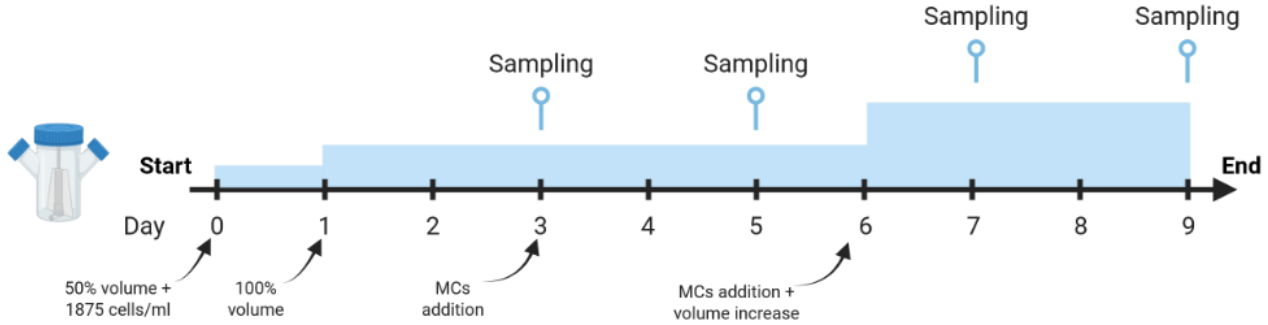


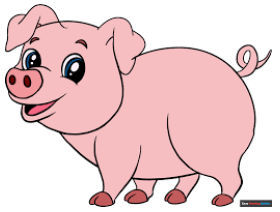
What's next?

Several follow-up bioprocessing strategies to enhance cell yield



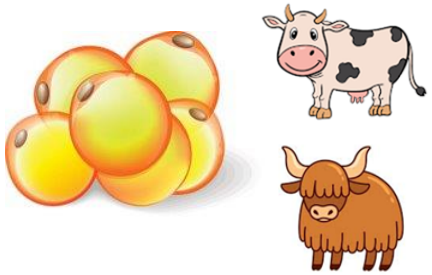




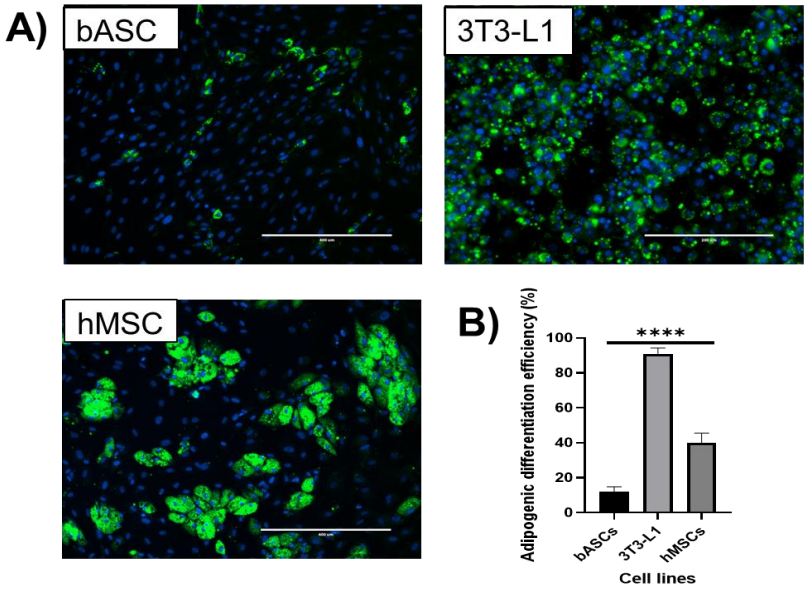


Bioprocess development for scalable cultivated fat

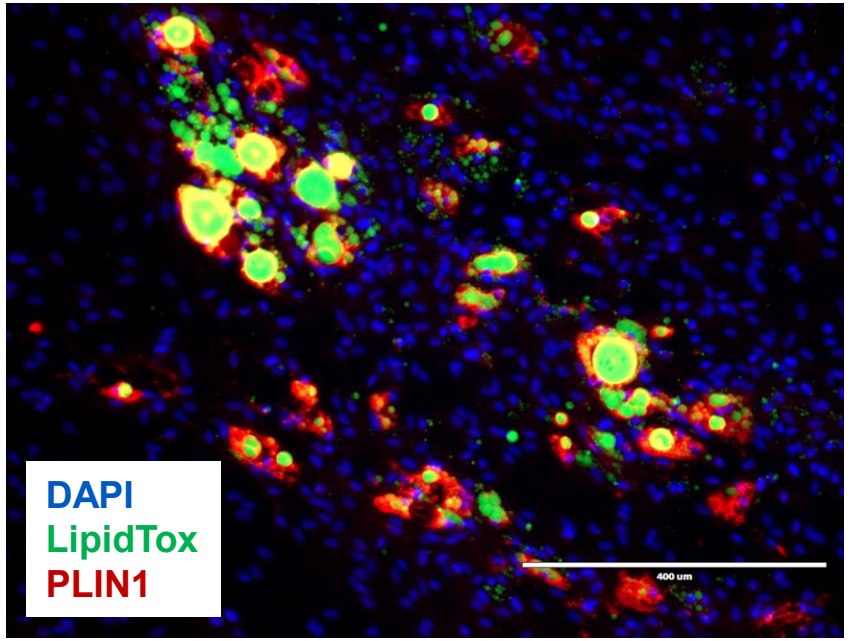
Joana Furtado
Year 1 PhD

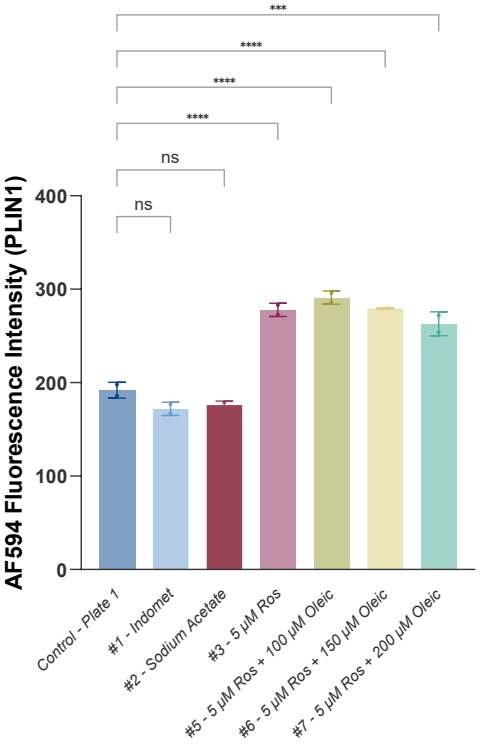


POSTER #8



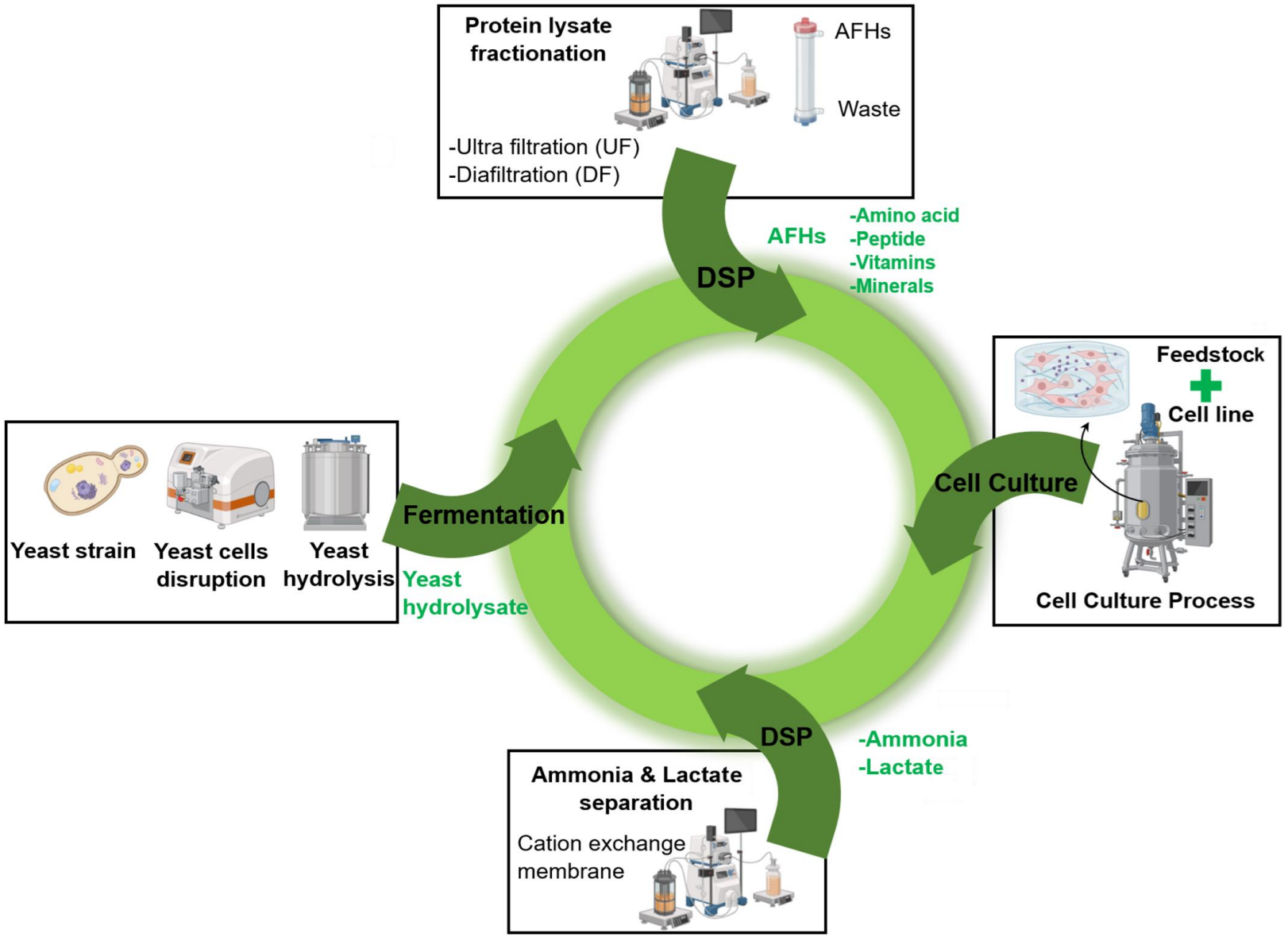
A) LipidTox (green) and DAPI staining (blue) and B) Adipogenic differentiation efficiency (%) of different cell types (bASCs, 3T3-L1 and hMSCs) when using StemPro Adipogenic differentiation medium.





Circularity through lower cost media formulations

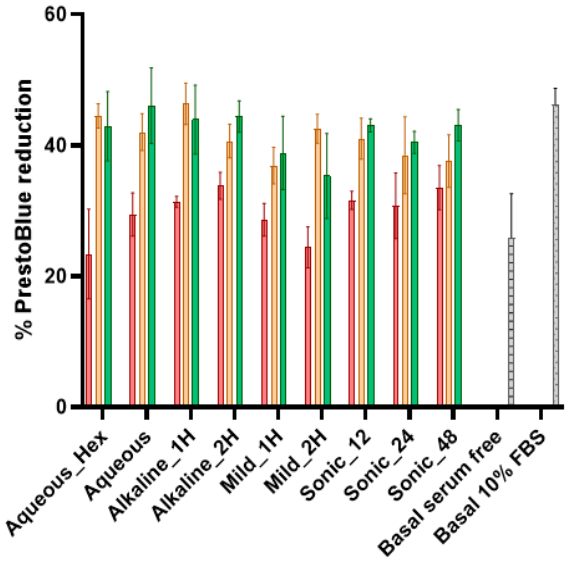
Achieving circularity (WP2)

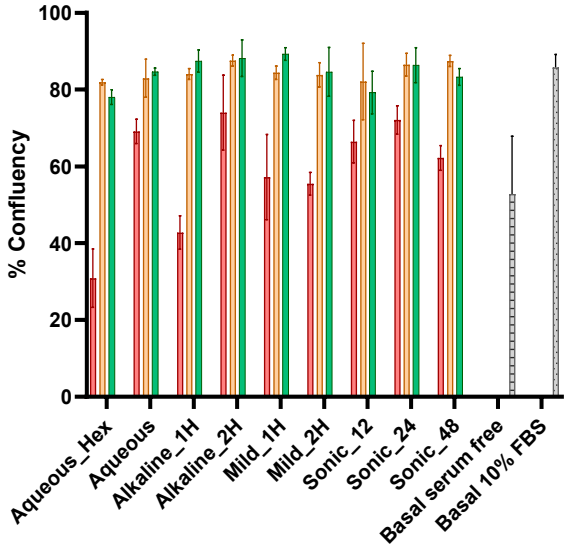


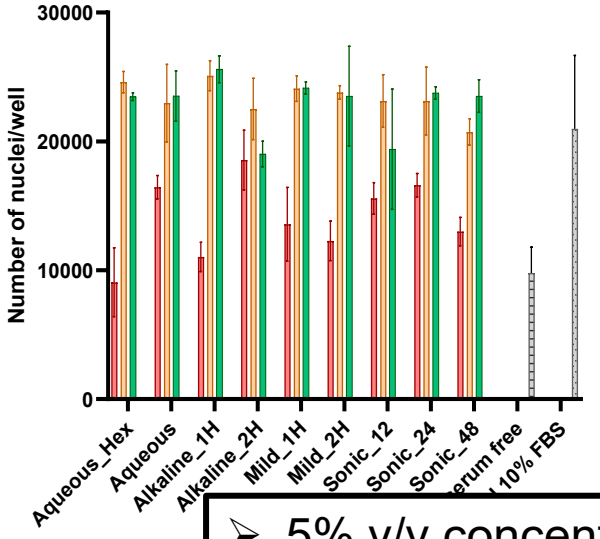
POSTER #21

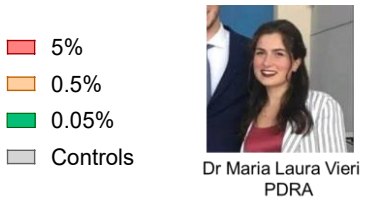
Preliminary testing of yeast extracts

10% FBS









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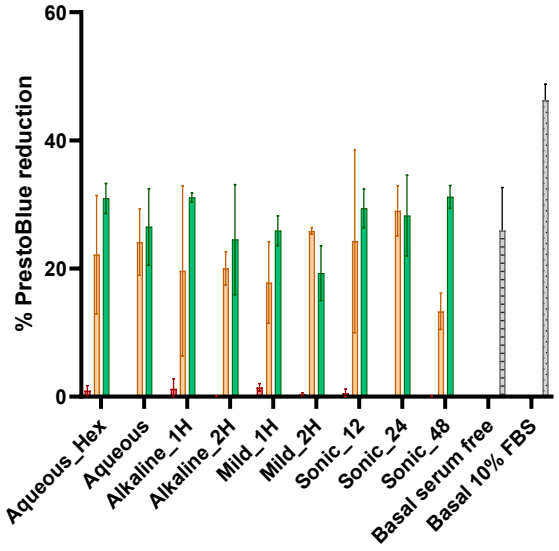
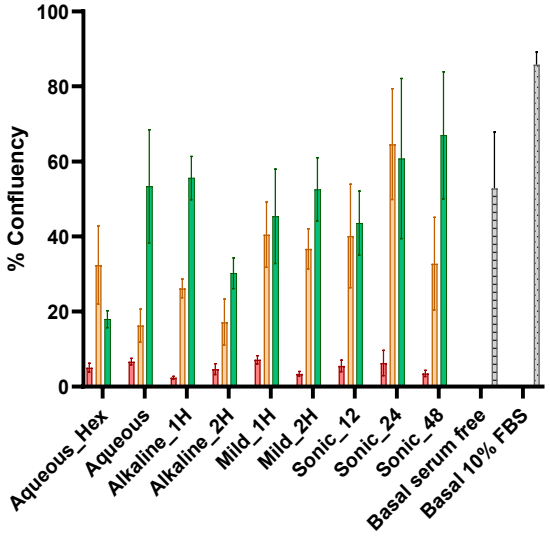
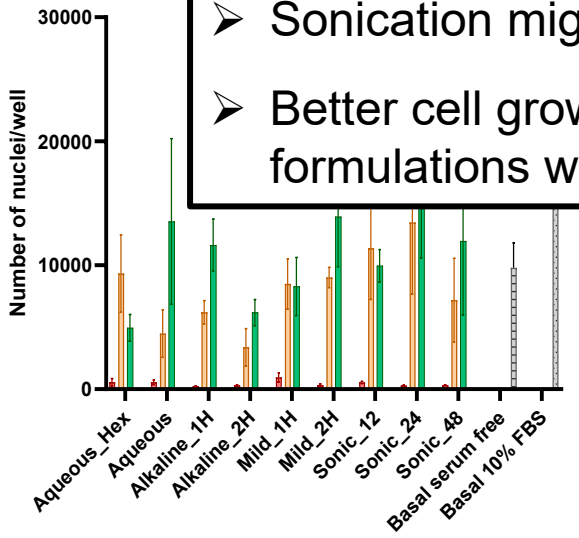
William Gordon-Petrovskii

No Serum

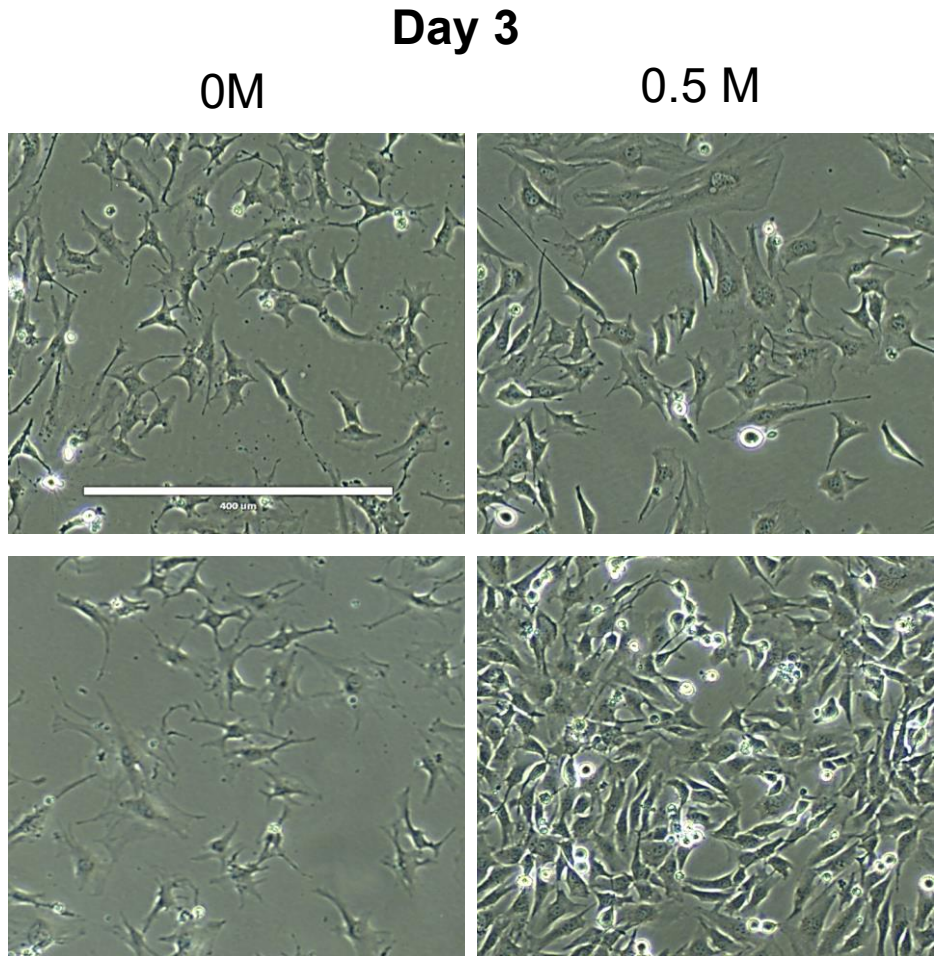






- 5% v/v concentrations were cytotoxic.
- Sonication might be promising.
- Better cell growth was obtained in the formulations with 10% FBS.

Preliminary testing of yeast lysates and hydrolysates



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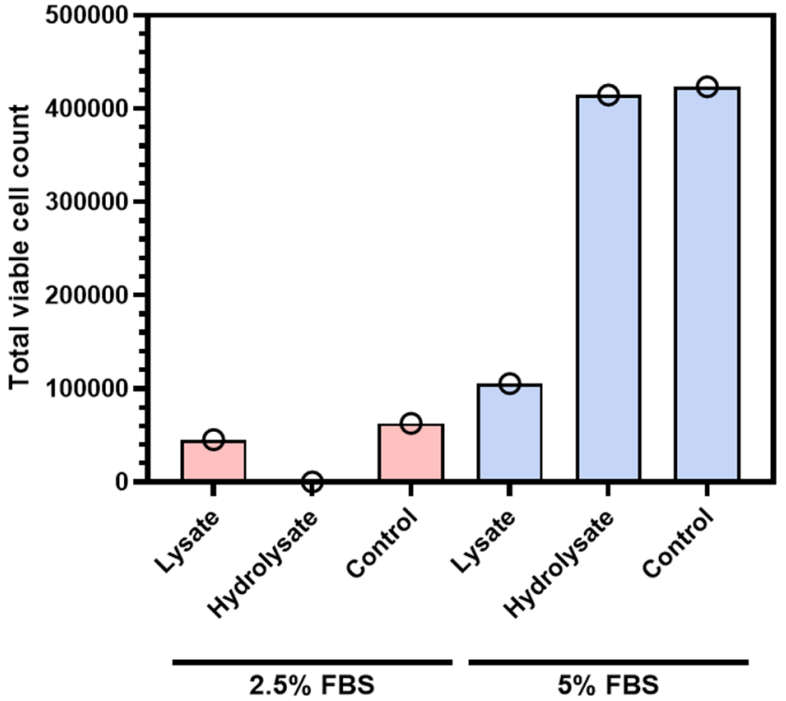

Cultivation of the C2C12 cell line in media supplemented with a 'whole' yeast lysate or a yeast hydrolysate (prepared by alkaline hydrolysis using 0.5M NaOH). Medium contained either 2.5% FBS (Red bars) or 5% FBS (Blue bars).

Acknowledgements

CARMA
CELLULAR AGRICULTURE MANUFACTURING HUB

UK Research and Innovation

UNIVERSITY OF BATH

UCL

University of BRISTOL

Royal Agricultural University

1872 PRIFYSGOL ABERYSTWYTH UNIVERSITY

UNIVERSITY OF BIRMINGHAM

Thank you!