



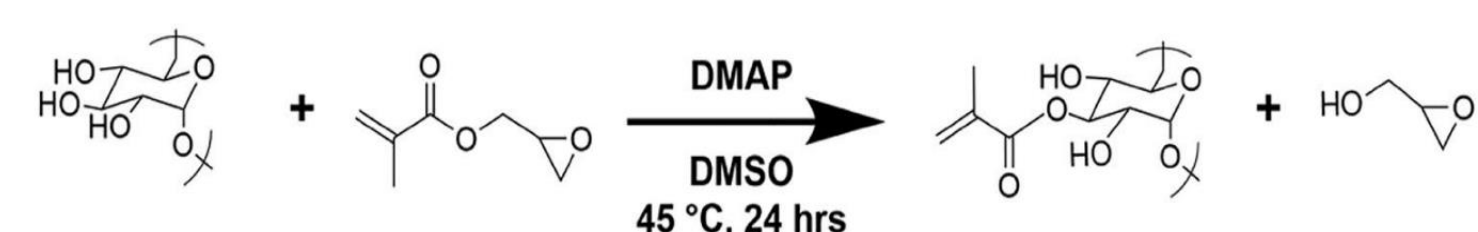
Assembly of Cell Aggregates within Biomaterials

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Introduction

- Aggregates were chosen for our experiment because they have a 3D environment which is better at **mimicking in vivo conditions** (collective cell migration and better cell to cell interaction for physiological conditions like tissue remodel, wound healing, cancer metastasis).
- Pluronic coated cone shaped PDMS molds were used to maximize the amount cells that could travel to the bottom of the well after centrifusion and **interact with each other to form the aggregates**.
- Dextran is a FDA approved **synthetic** biomaterial. Methacrylated Dextran undergoes photopolymerization reaction that forms the crosslinked network AKA the hydrogel.

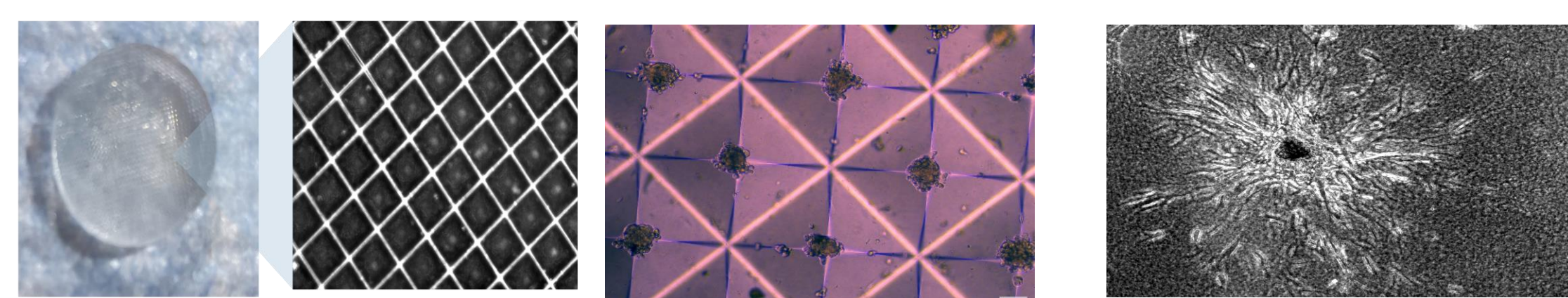
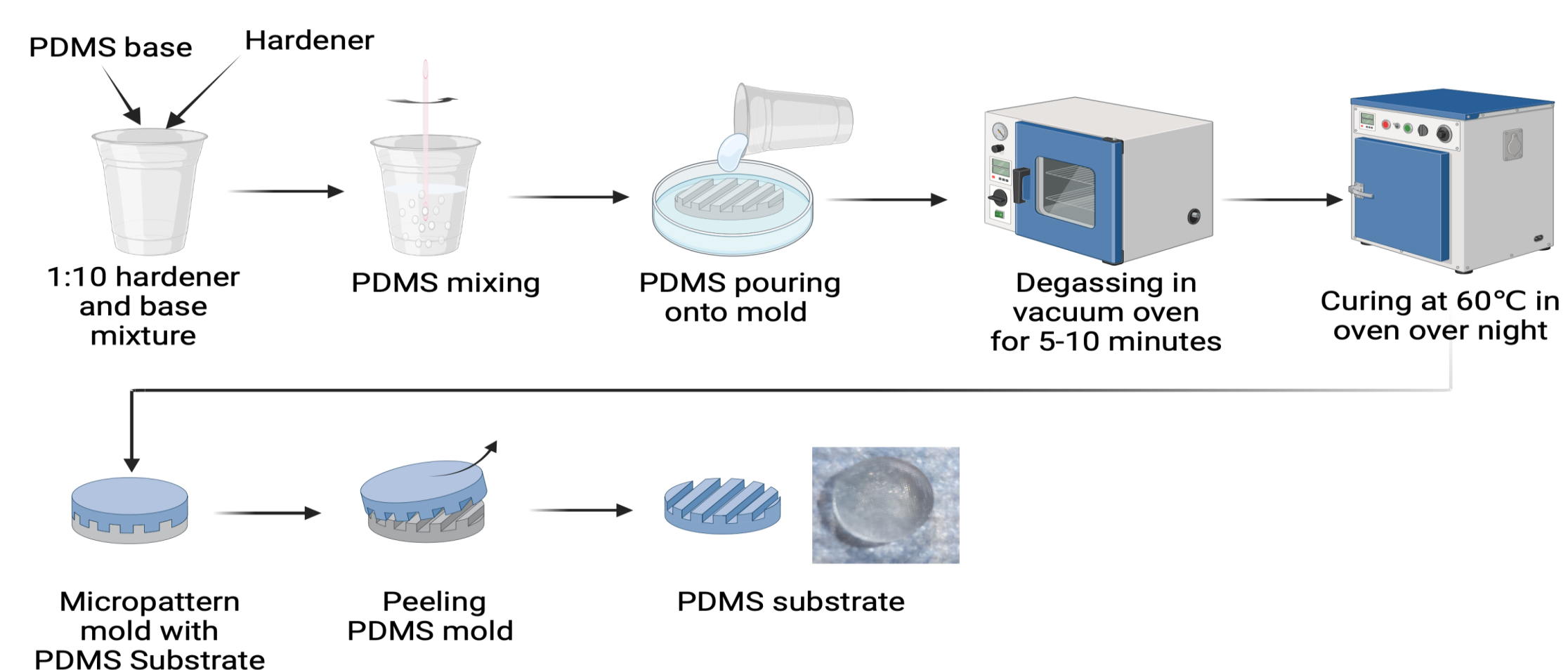


- We observed cell migration within 2D and 3D dextran hydrogel, 3D is **more physiologically relevant** and mimics the biological platform better.

Methodology

- PDMS Mold fabrication
- Making Aggregates
- DexMA Synthesis and material Characterization
- 2D and 3D hydrogel making, photo polymerization reaction was used to make Dextran hydrogels, photo initiator Irgacure, RGD peptide was used for cell attachment

PDMS mold formation for AggreWells

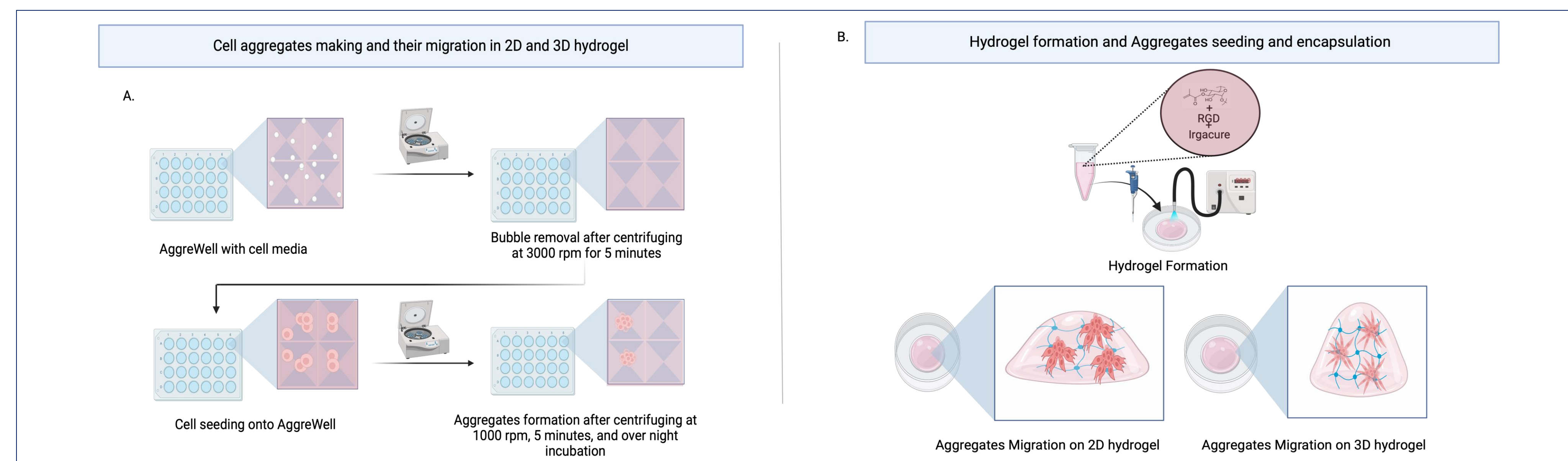


PDMS Mold

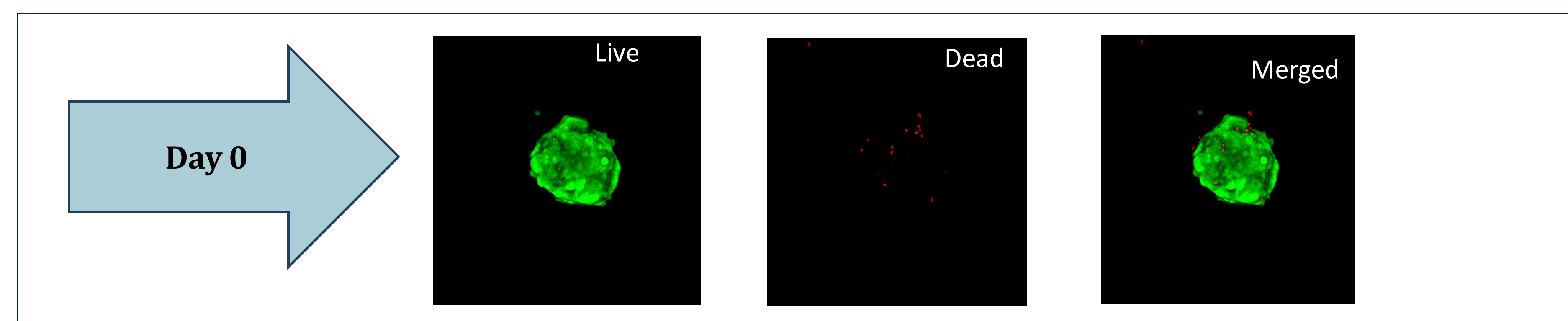
Aggregates on AggreWells

Cell migration from aggregates within biomaterials (FN)

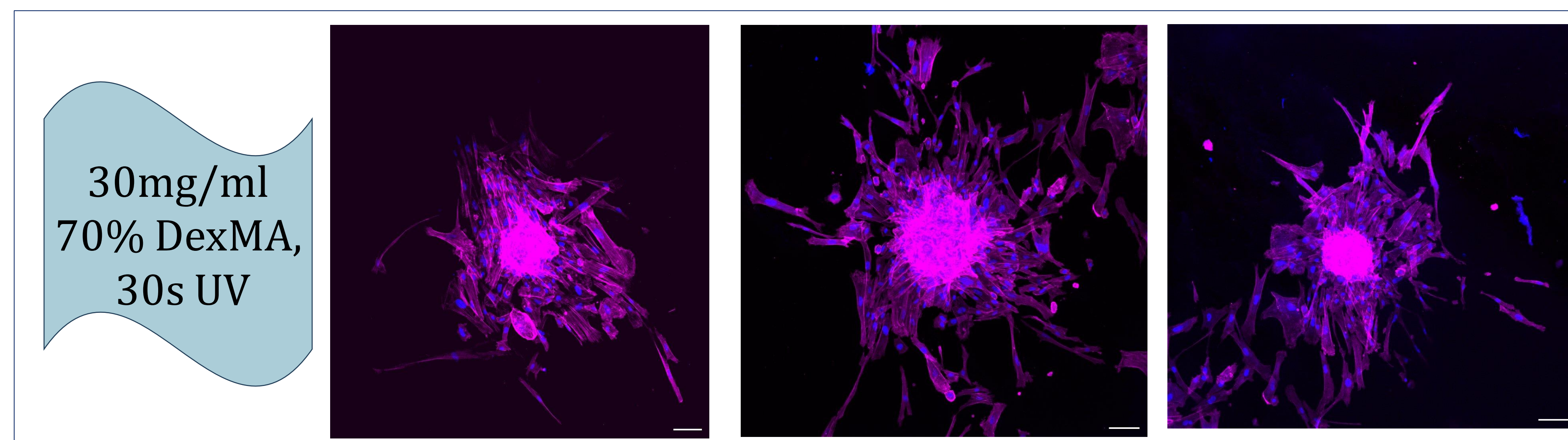
2D and 3D hydrogel fabrication with aggregates



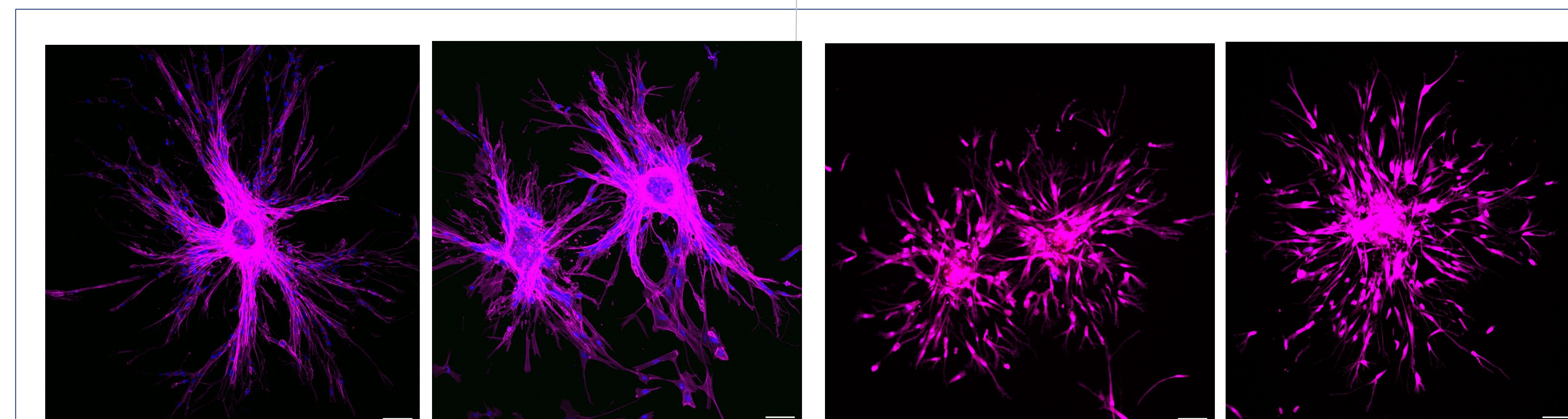
Live Dead Staining



Confocal images of 2D Aggregates

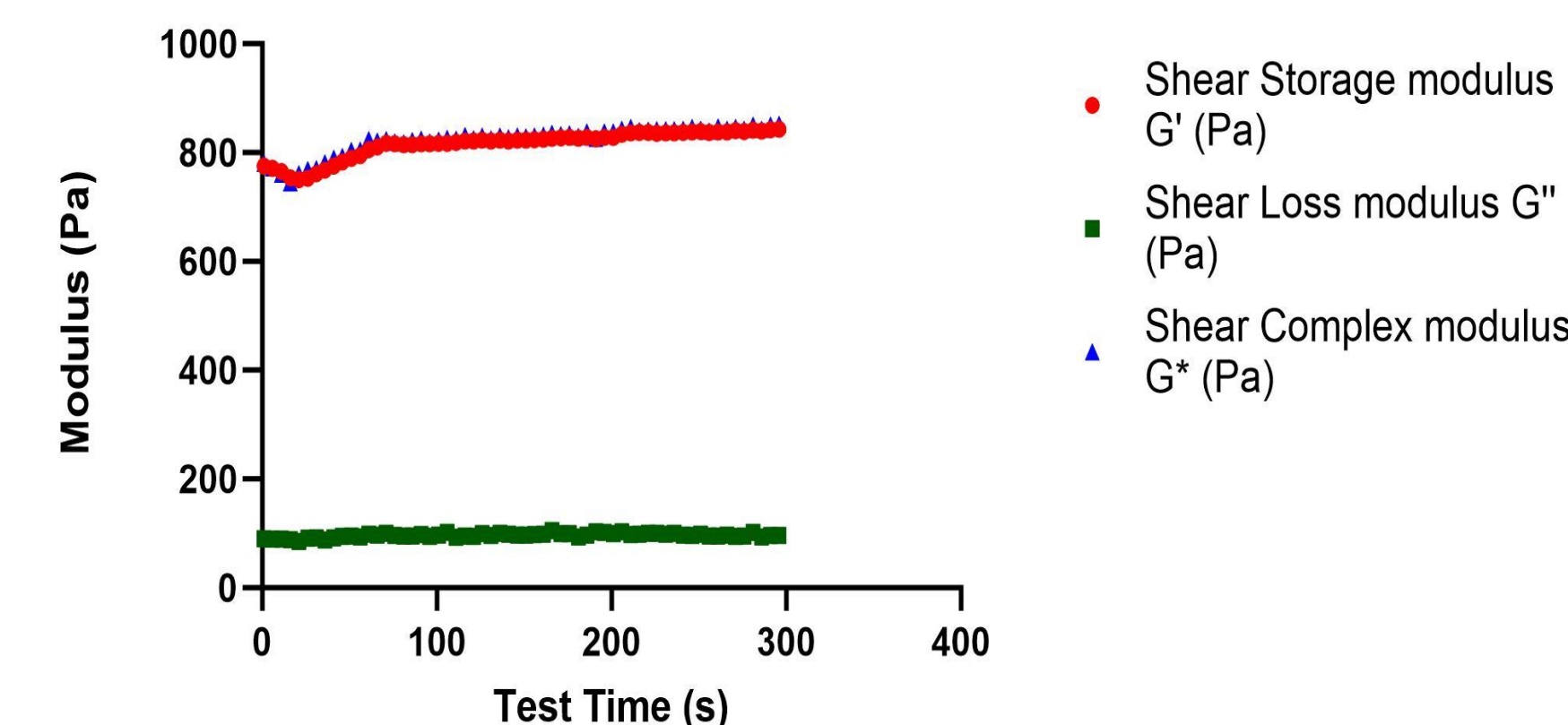


Confocal images of 3D Aggregates

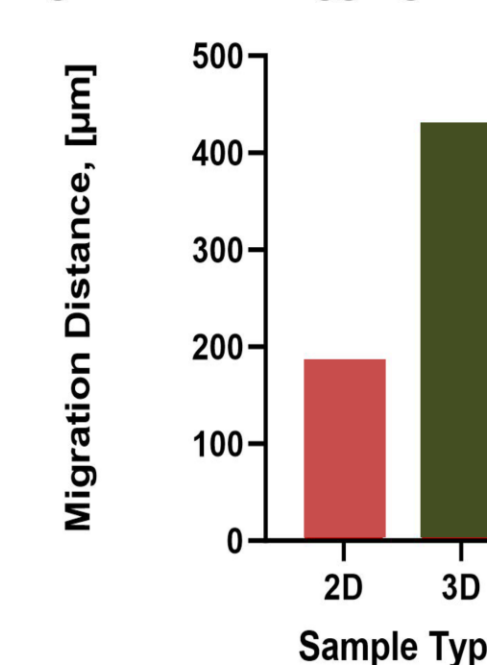


Quantitative Comparison

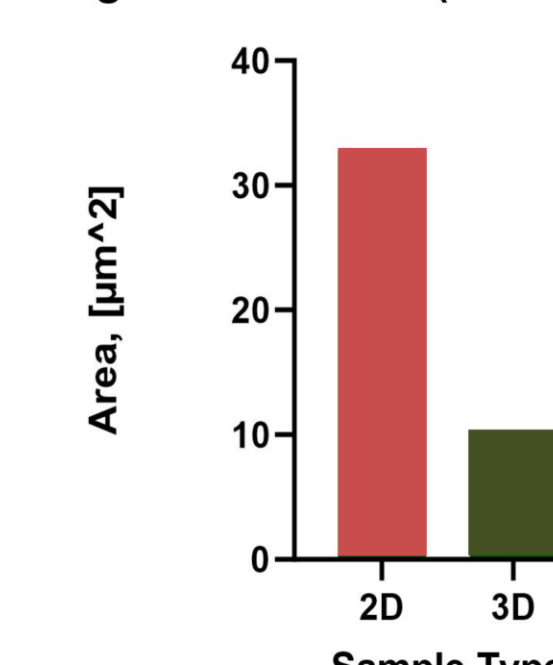
Mechanical Chartacterization



Cell migration from aggregates (2D vs 3D hydrogel)



Migrated cell area (2D vs 3D hydrogel)



Conclusions & Future work

Conclusion

- Aggregates within 3D hydrogels recapitulated physiological aspects more accurately.
- Synthetic biomaterials help tuning mechanical properties, hence make sure of collective cell migration.

Future Work:

- Multicellular aggregates (such as HDFs+ HUVECs) assembly observation for more accuracy.
- Cancer cell inducing for tumor microenvironment analysis within microfluidic device

Acknowledgements

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References

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