The Characterisation of the Difference between Human and Mouse Pancreatic Cells under Biomechanical Stress

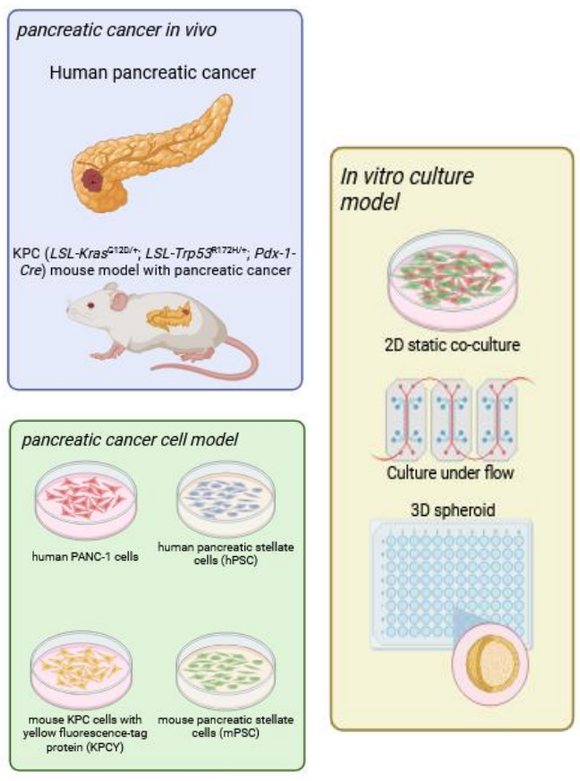
Alfin Alexander[1,2], Alicja Wilczyńska-Obszańska[1,2], Monika Jakubowska[1]

[1] *Molecular Mechanisms of Diseases, Małopolska Center of Biotechnology, Jagiellonian University in Kraków, Poland*
[2] *Doctoral School of Exact and Natural Sciences, Jagiellonian University in Krakow, Poland*

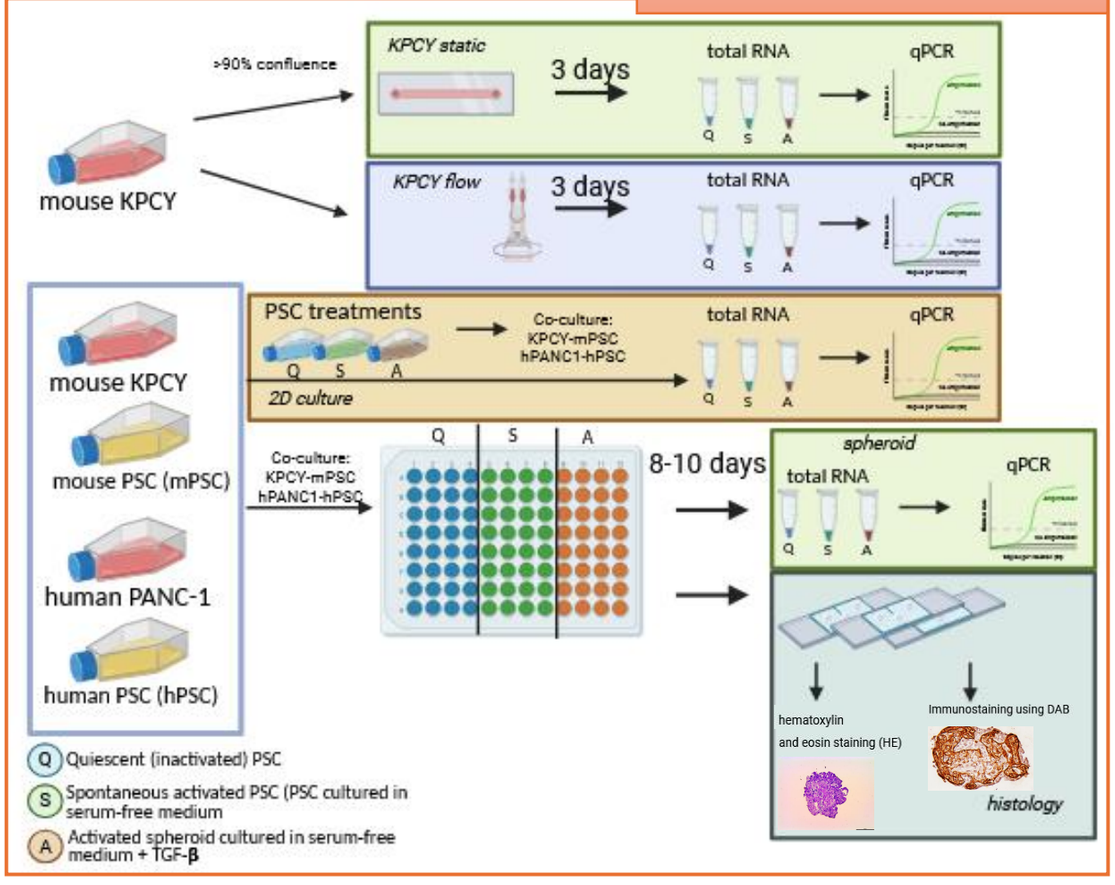
NKT LAB
Molekularne mechanizmy chorób

INTRODUCTION

Pancreatic cancer remains known as a cancer with a high mortality rate [1, 2] due to late diagnosis and high resistance to the conventional therapies [3, 4]. While numerous preclinical models of pancreatic cancer have been developed, the implementation of the studies for patient benefit are still challenging [5]. While the 3D models of pancreatic cancer have been available [6, 7, 8], the differences between each model are remain unknown. In addition, the biomechanical stress in pancreatic cancer model are still rarely studied, despite pancreatic cancer are constantly exposed to the mechanical stress *in vivo* [9. 10]. This research is aimed to explore the distinct features of human and mouse pancreatic cancer cell lines co-cultured with primary stromal cells under presence of mechanical stress.

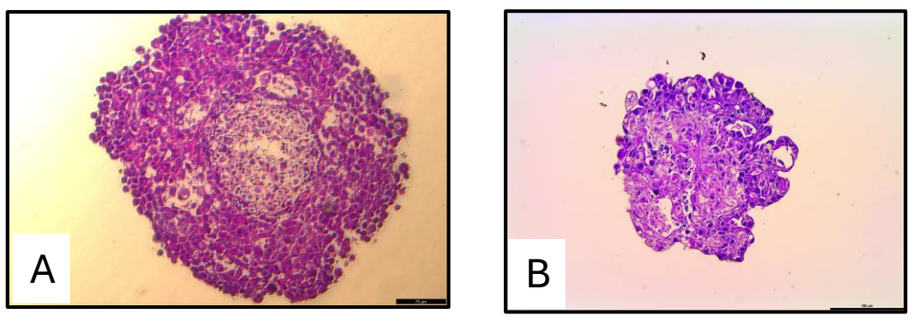


METHOD



RESULTS

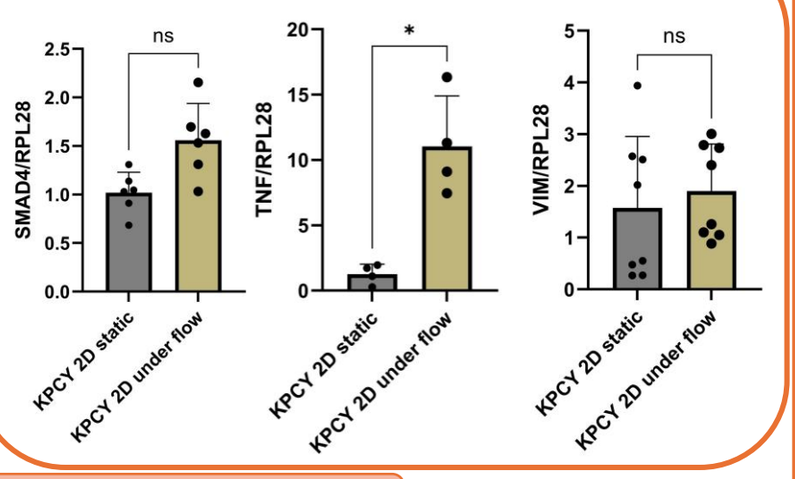
Cell organization of human- and mouse-derived pancreatic cancer spheroid model



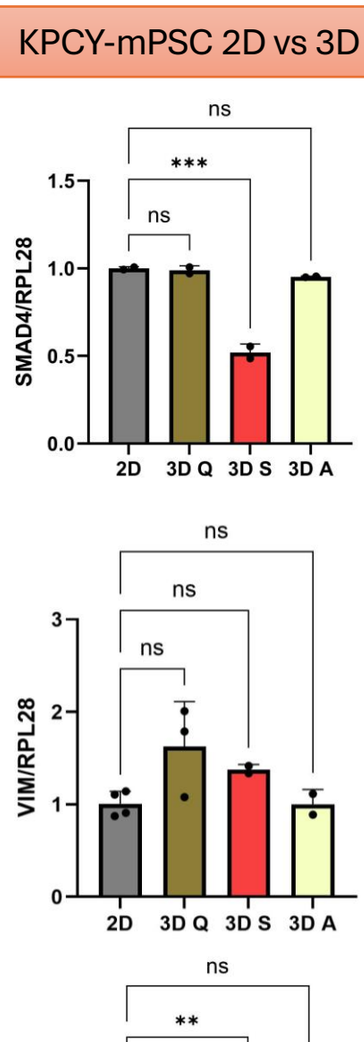
The pancreatic cancer spheroid model from human cells (PANC-1 and hPSC) demonstrated clear compartmentalization into the inner and outer layer (A). Meanwhile, the same formation is not presented in the mouse-derived pancreatic spheroid model (KPCY and mPSC) (B).

The expression of the pancreatic cancer-related genes are affected by the biomechanical stress

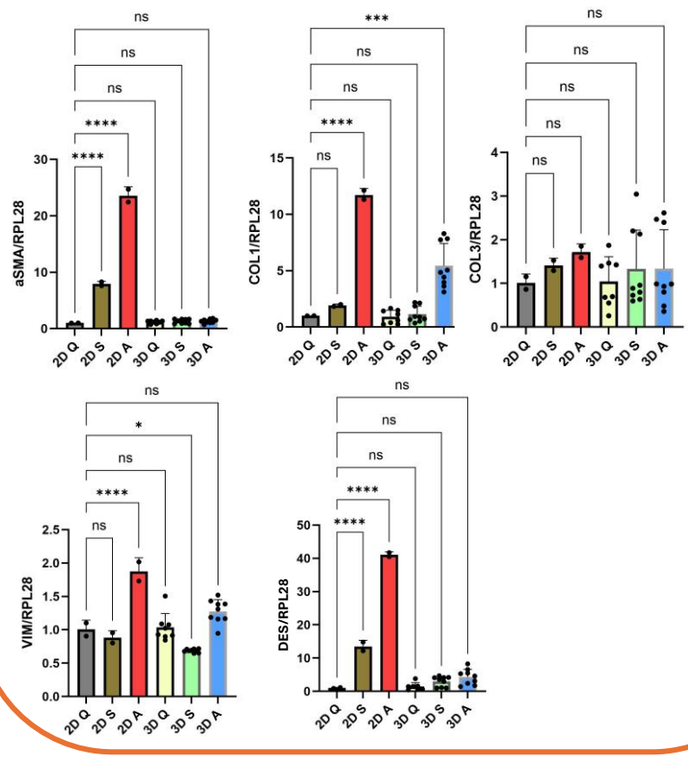
KPCY 2D static vs flow



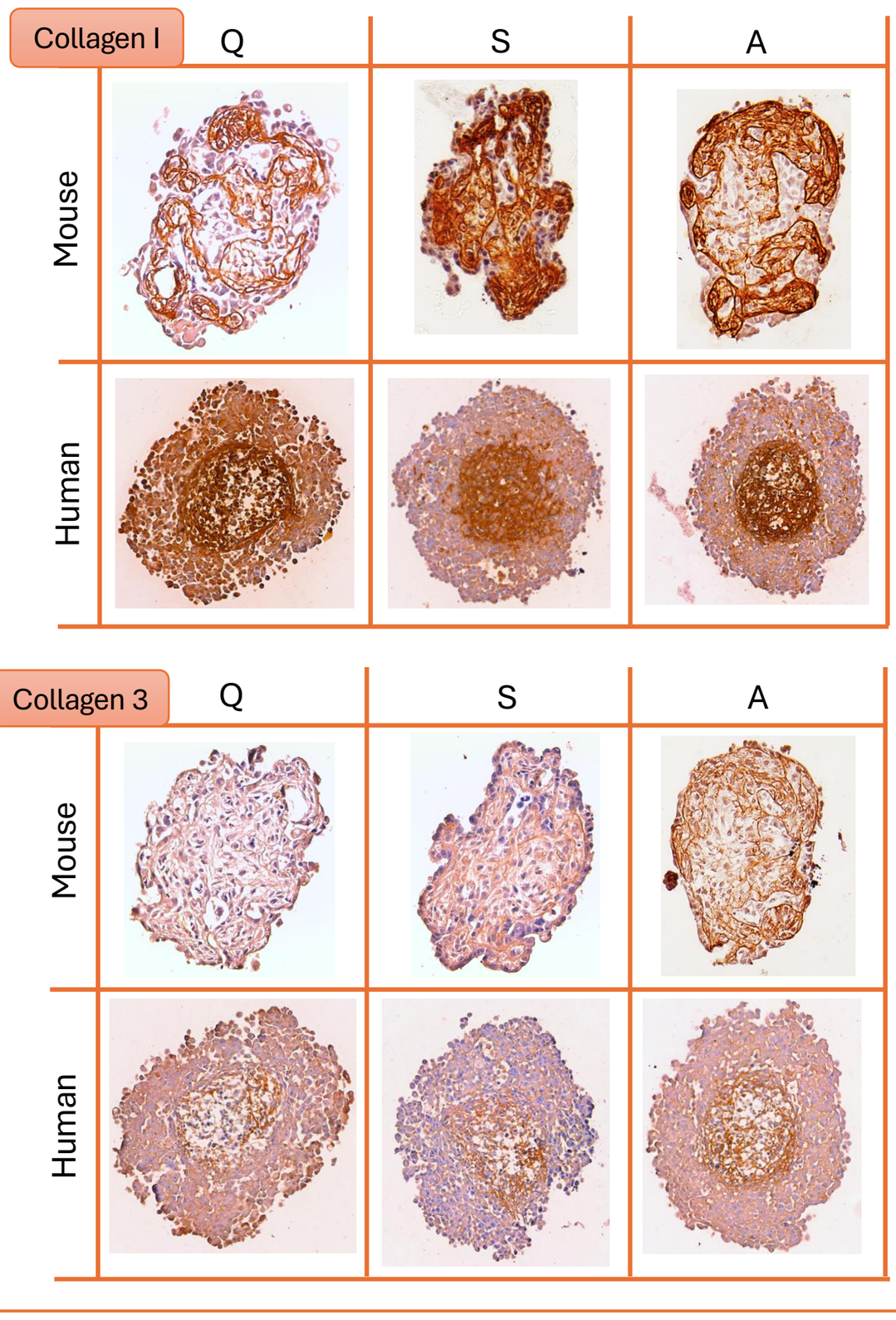
KPCY-mPSC 2D vs 3D



PANC1-hPSC 2D vs 3D



The distribution of the collagens in human- and mouse-derived pancreatic cancer spheroid model



Conclusions

1. PANC1-hPSC, but not KPCY-mPSC, spheroid model showed the distinct compartmentalization (inner and outer layer).
2. Collagen I and 3 are concentrated in the inner layer of PANC1-hPSC spheroid, but not in KPCY-mPSC.
3. The exposure to the mechanical stress (culture in flow or 3D compression) alter some genes expression in mouse- and human- pancreatic cancer cells.

Acknowledges

The research is funded by the grant from NCN Sonata-Bis 12 No. 2022/46/E/NZ4/00441 on behalf of Dr Monika Jakubowska.

The illustrations are created by using biorender.com.

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