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Poster Abstract Form

The Influence of Mechanically Activated Ion Channels in Pancreatic Cancer

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Introduction

The pancreatic stroma is comparatively stiffer to other cancer types. Increasing stiffness in the tumour microenvironment correlates to greater metastasis. We do not know how cells detect and respond to these physical forces in pancreatic cancer. Cells can use Mechanically-Activated (MA) Ion Channels to sense changes in stiffness as if they were physical/mechanical forces. We assessed the influence and activity of MA ion channels in 3 pancreatic cancer cell lines to understand their behaviour in changes of cellular environmental stiffness.

Methods

- RT qPCR was used to measure the transcription levels of MA ion channels in pancreatic cancer cell lines
- Patch clamp electrophysiology was used to measure currents produced in response to mechanical inputs

Results

QPCR results found robust levels of MA ion channels TRPV4, TRPV2, ELKIN1 and PIEZO1 in unique concentrations in the pancreatic cancer cell lines BXPC3, MIA-PaCa-2 and PANC-1.

When indenting the cell with a glass probe to simulate a physical force we found that all cell lines produced robust mechanically evoked ionic currents. MIA-PaCa-2 cells produced a unique response comparative to other cell lines. Cell current responses were also positively correlated to substrate deflections. When then increasing substrate stiffness, PANC-1 mechanically-evoked currents were reduced, MIA-PaCa-2's were increased and BXPC3's remained, highlighting differences between cell lines.

Conclusion

All pancreatic cancer cell lines tested contained significant amounts of several MA ion channels in varied concentrations. Each cell line produced strong currents in response to physical forces. Increasing substrate stiffness altered the mechanically evoked currents, thereby implying that MA ion channels may influence the sensing of changing pancreatic tumour stiffness