BioMEMS – Translational research

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In vitro model for monitoring of cancer cell invasion into tissues

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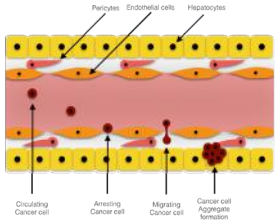
Keywords: **cancer, liver, co-culture**

Context

Overall goal: Develop a physiologically-relevant model for pancreatic cancer adhesion and migration in the liver.

Status of consensus problems:

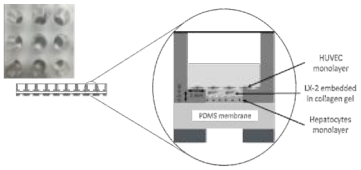
- Need of *in vitro* models to supplement *in vivo*'s.
- Lack of complexity of current *in vitro* models.



Extravasation process in the liver microvasculature

Objectives

- Develop a physiologically-relevant model of the liver microvasculature.
- Quantify the adhesion of cancer cells and the effects of co-culture of different liver cells.
- Include the model in a microfluidic biochip.

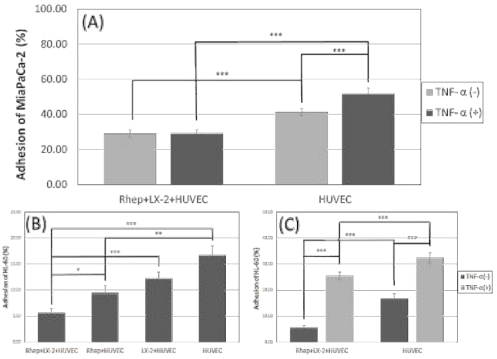


Established co-culture model [2]

Results

Co-culture of HUVECs with pericytes and hepatocytes exhibited a lower inflammatory state and a liver phenotype compared to the conventional HUVEC monoculture. The adhesion of pancreatic cancer cells and promyeloblastic cells was found to be lowered in co-culture.

In addition, the system exhibited an autoregulation of the inflammatory events triggered by TNF-α. In monoculture, ICAM-1 expression was strongly upregulated while it was simply less upregulated in co-culture. Simultaneously, adhesion of pancreatic cancer cells was the same in co-culture after stimulation and adhesion of promyeloblastic cells still significantly lower.



Adhesion of pancreatic cancer cells and promyeloblastic cells after inflammatory stimulation [2]

Perspectives

- Development of more physiologically-relevant *in vitro* models.
- Inclusion of the model in microfluidic biochips.
- Real-time monitoring of the cancer extravasation events.

Achievements

[1] Danoy *et al.* Best Poster Award, TERMIS-AP 2016

[2] Danoy *et al.* Integrative Biology (2017)

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