

Biele krvinky, pochodom v chod!

Absolvenská prednáška

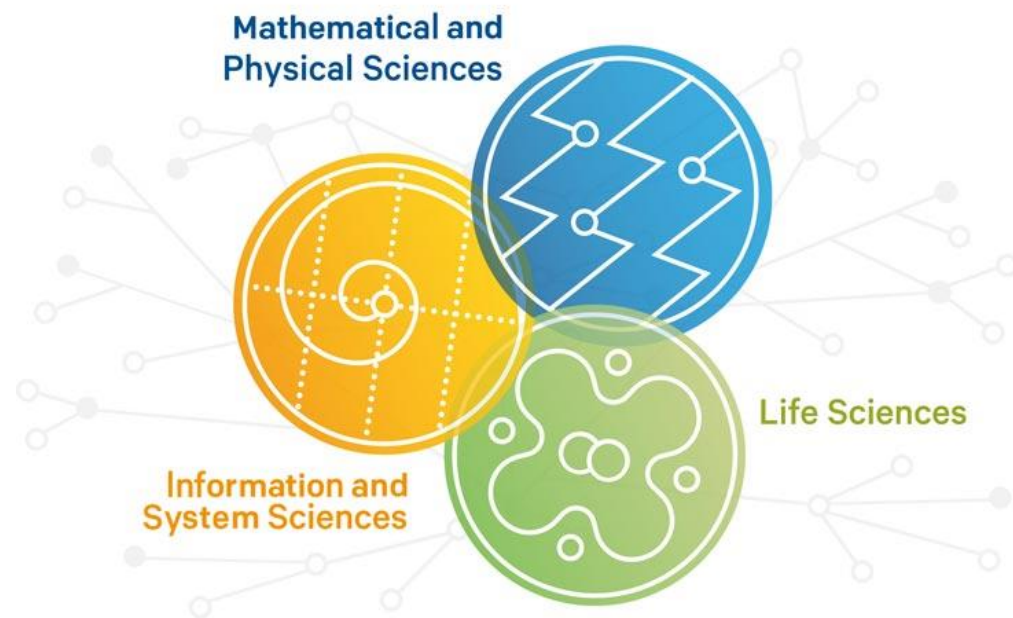
Nikola Čanigová

28.1.2020

Cesta na IST



Interdisciplinarita a základný výskum



Typický deň na IST

- Labák
- Bunkové kultúry
- Mikroskopy



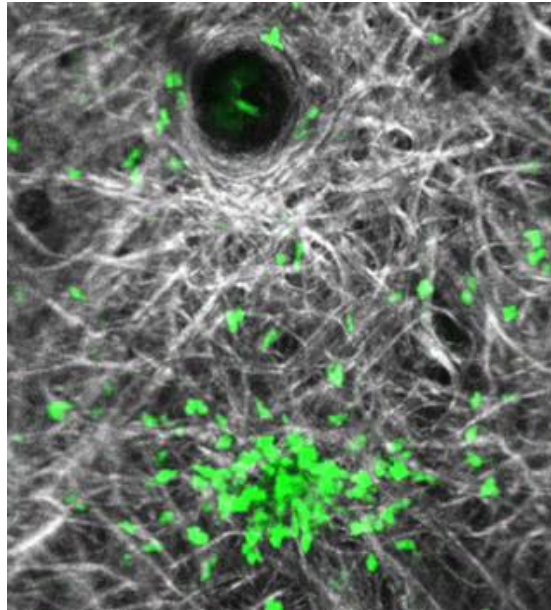
Pohyb buniek

Vývin



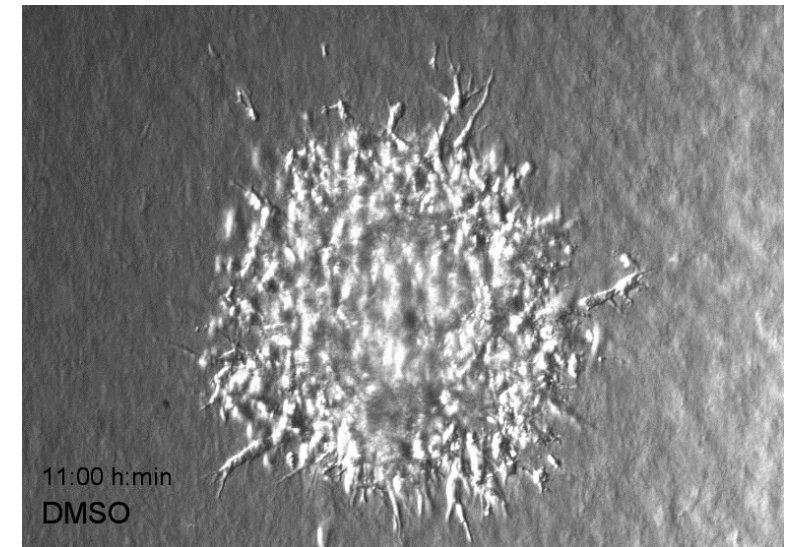
rybie embryo

Imunita



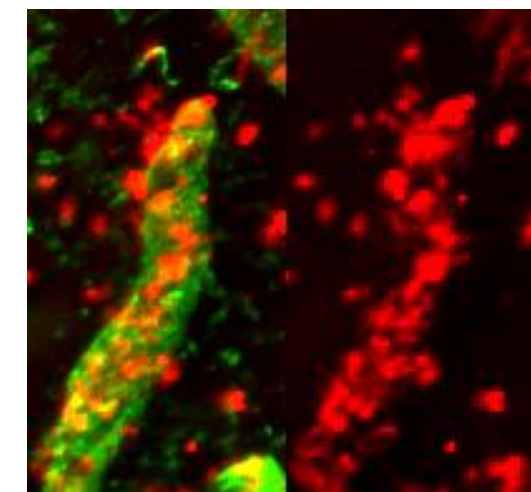
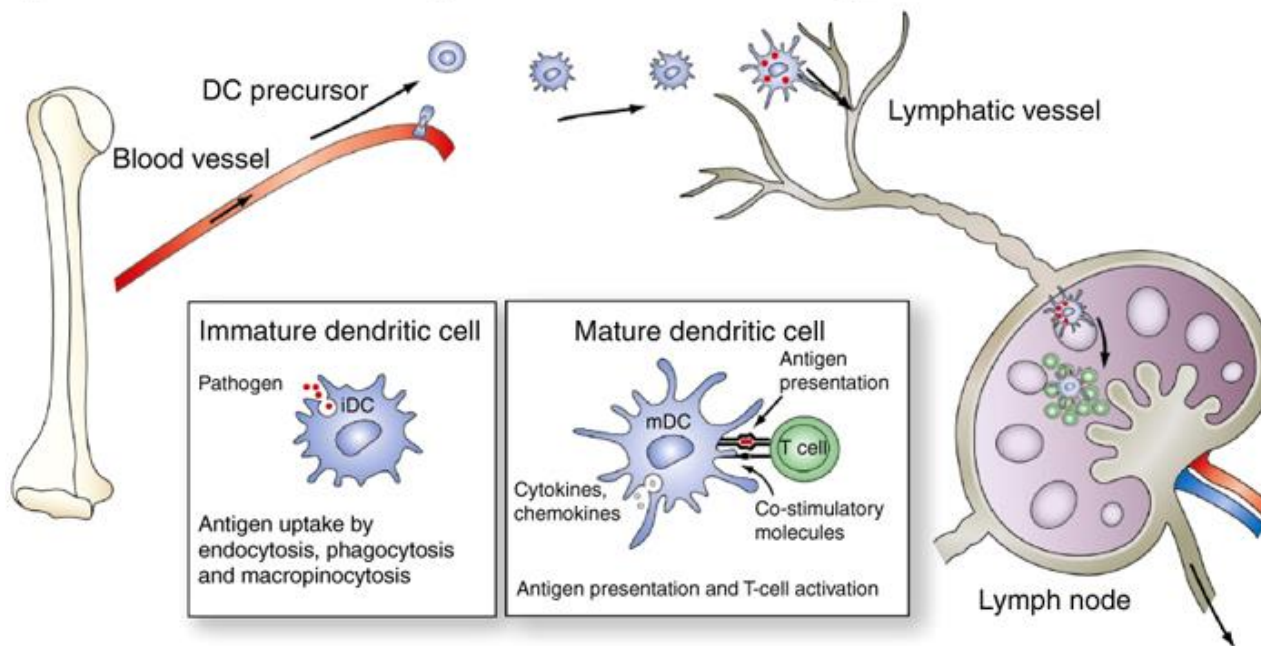
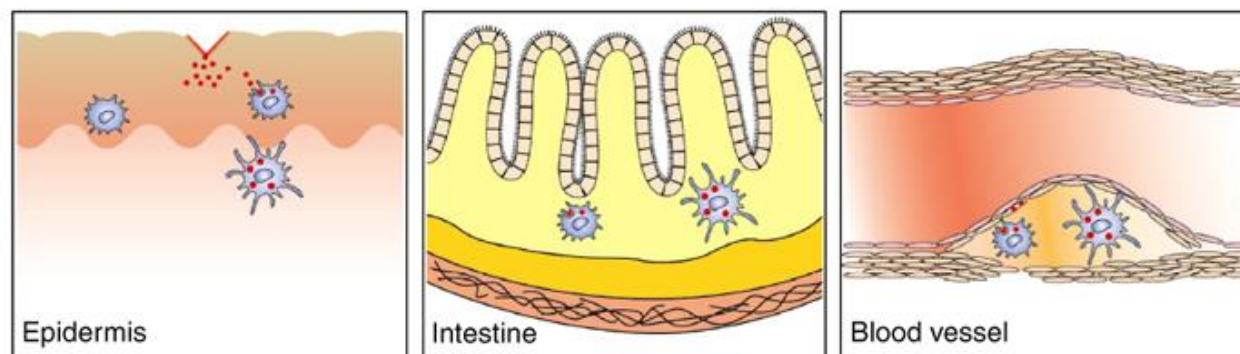
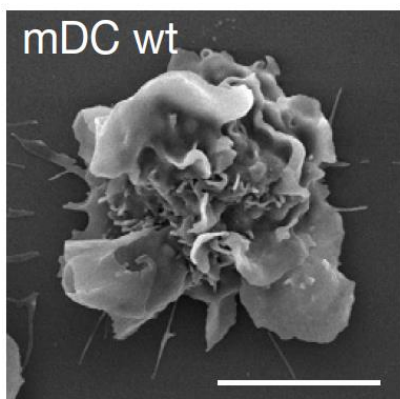
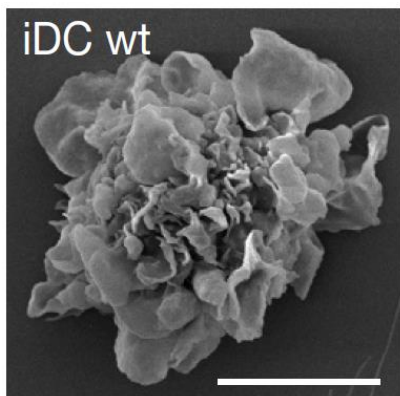
neutrofily

Ochorenia



rakovinové bunky

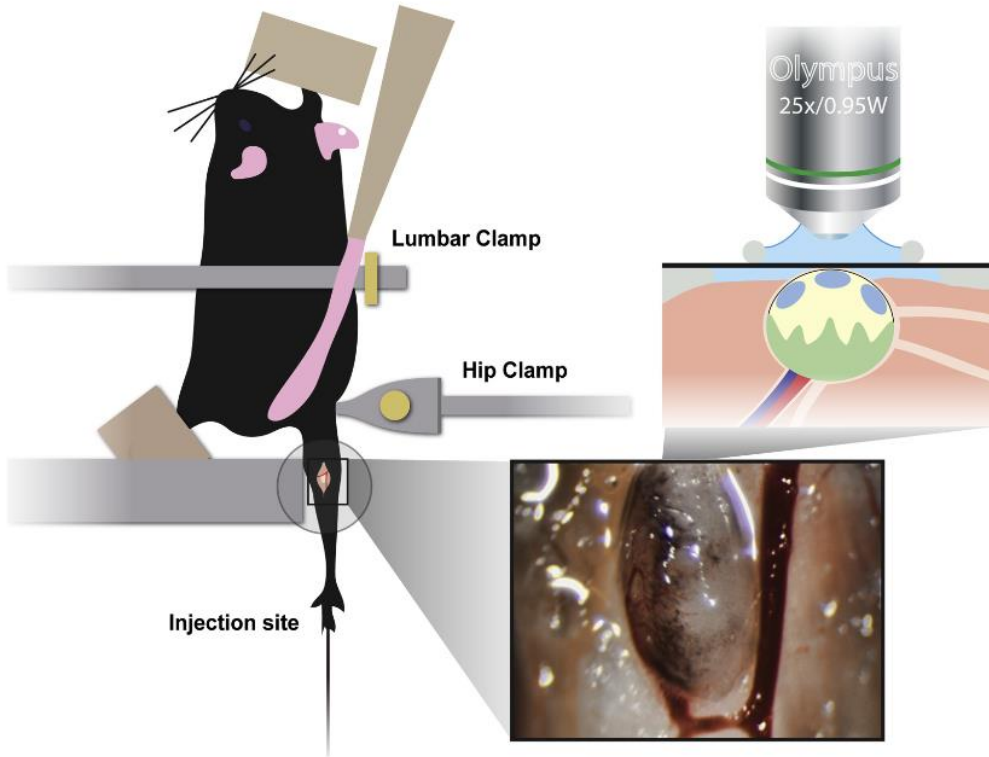
Dlhá životná púť dendritických buniek



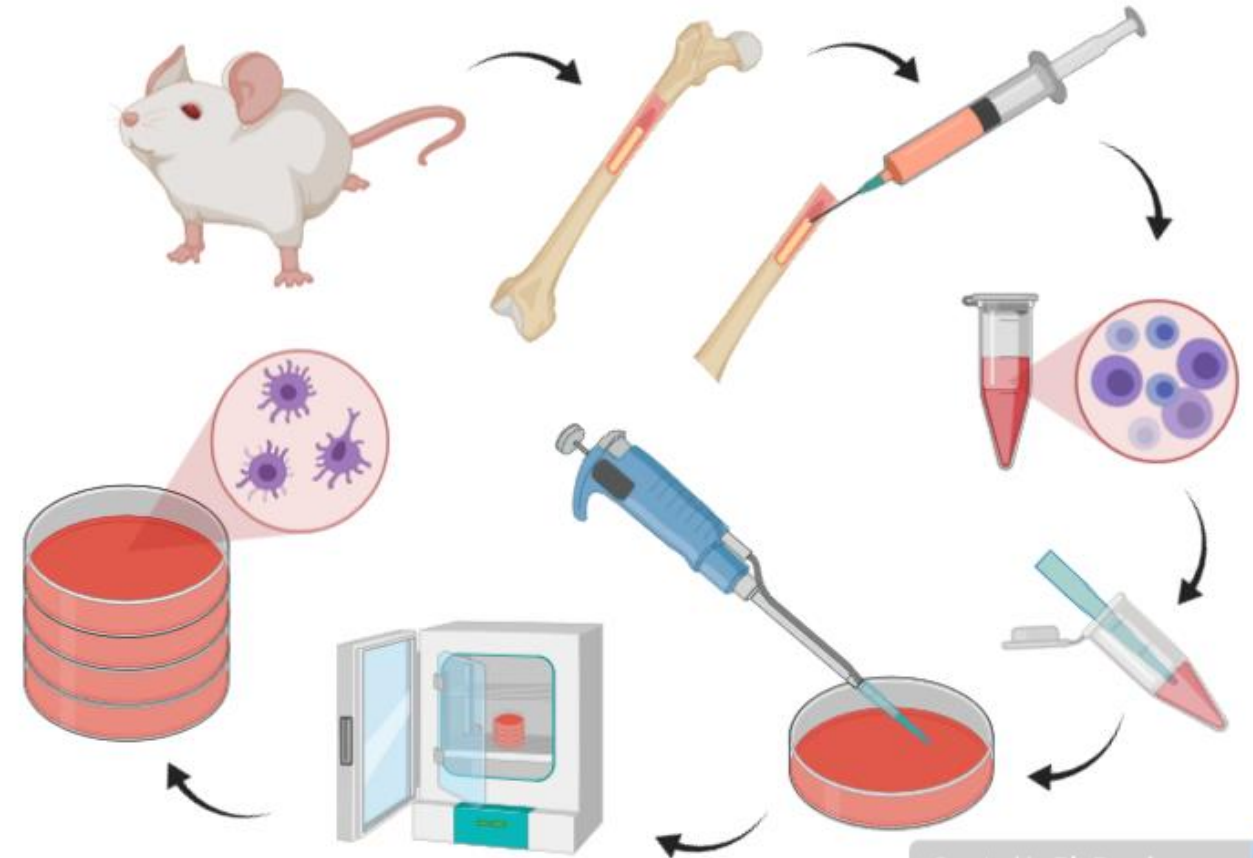
Lymfatické cievy
Dendritické bunky

Ako študujeme dendritické bunky?

In vivo



In vitro



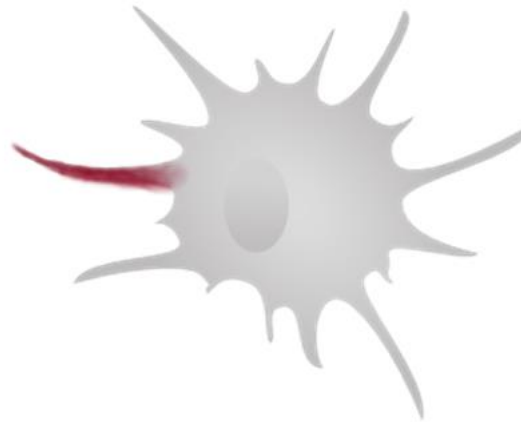
Created in BioRender.com 

Tri základné predpoklady pre pohyb buniek

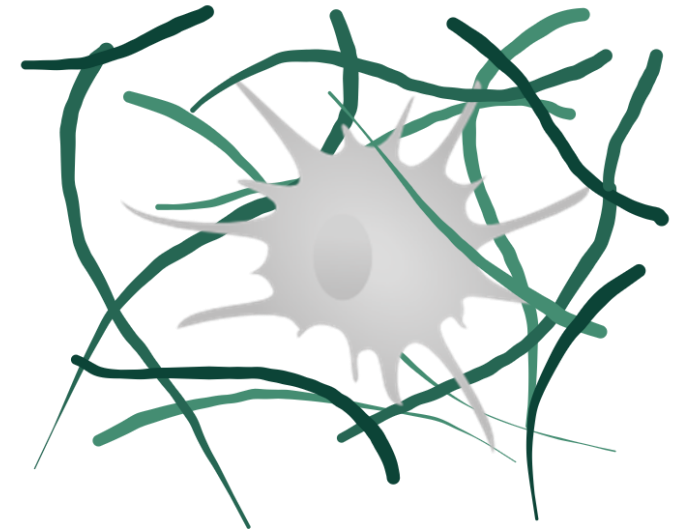
Vnímanie smeru



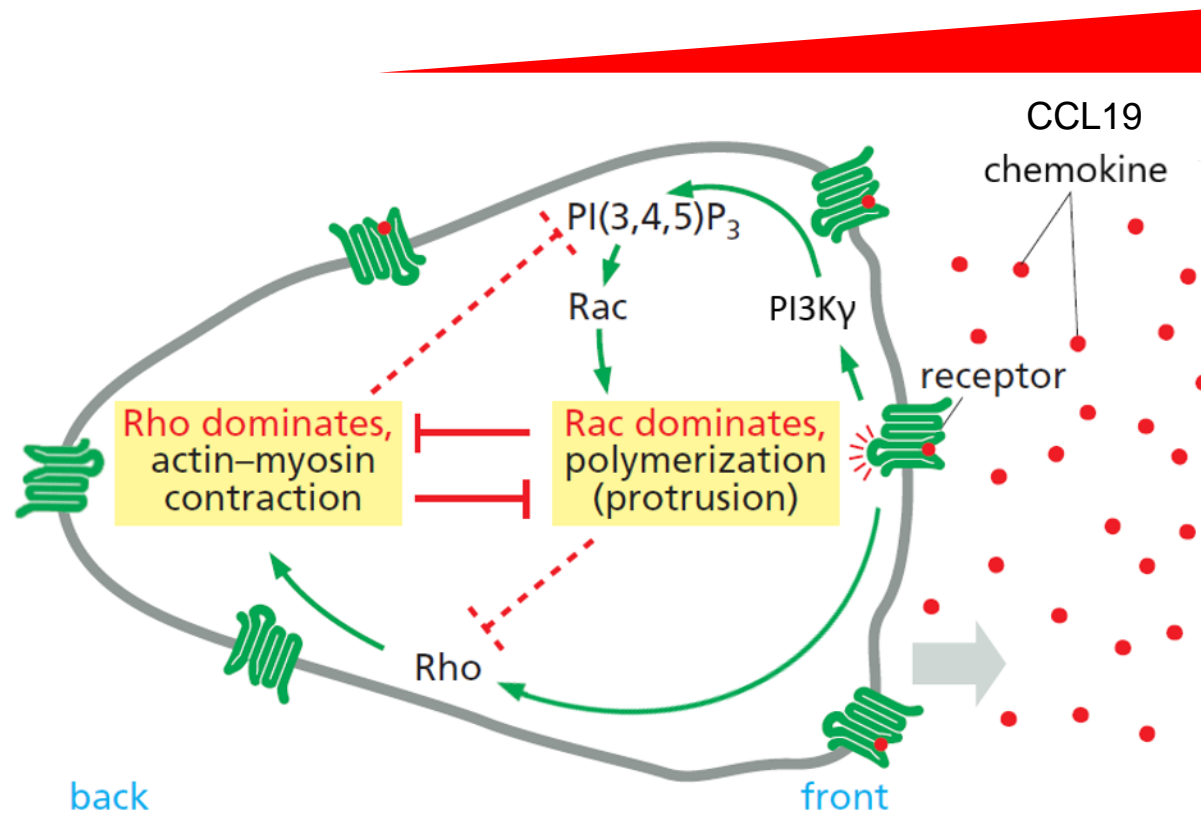
Polarizácia



Generovanie síl

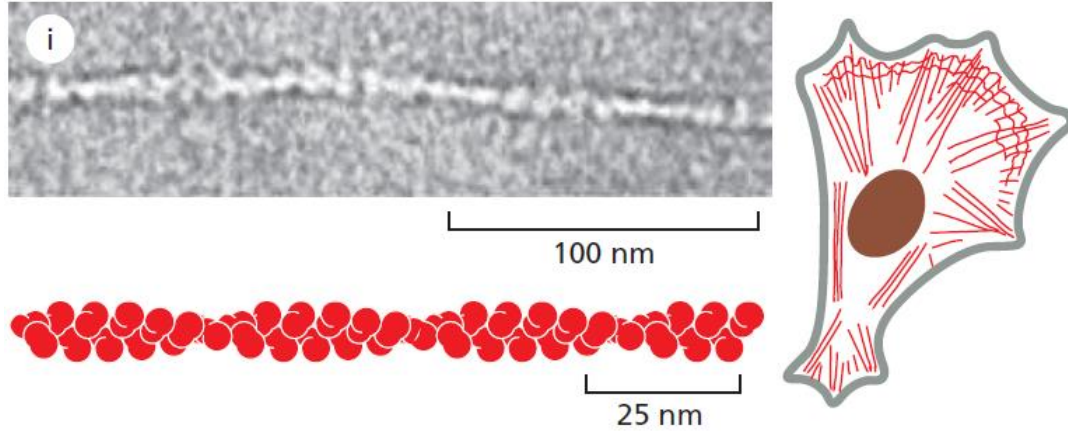


Vnímanie smeru a polarizácia

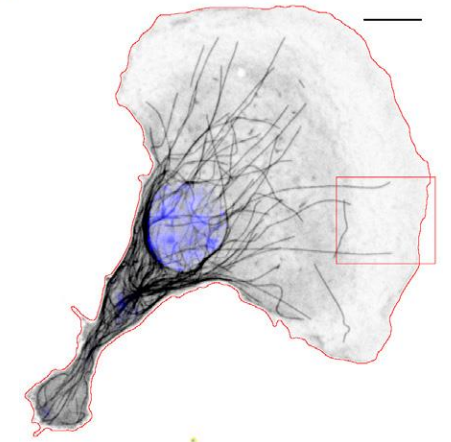
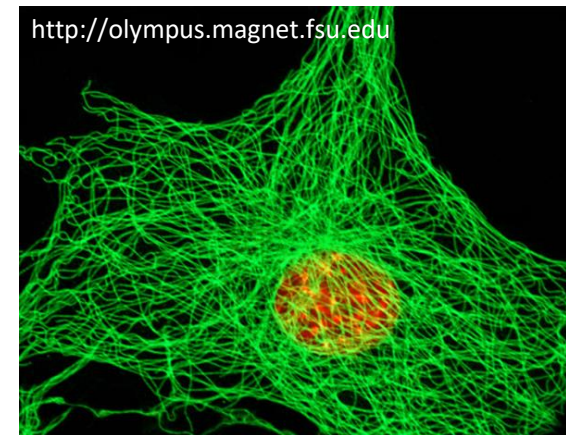
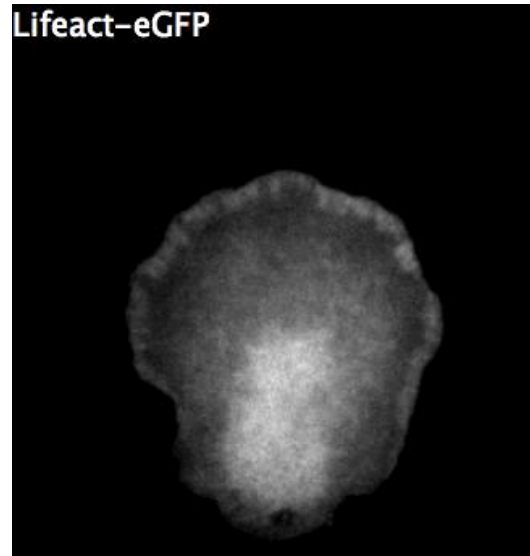
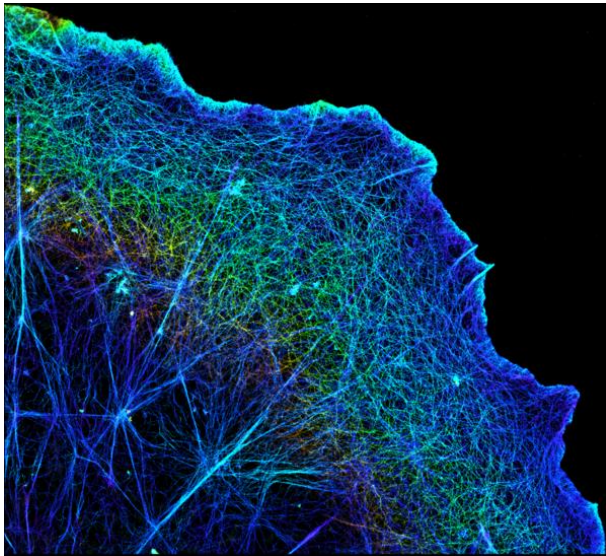
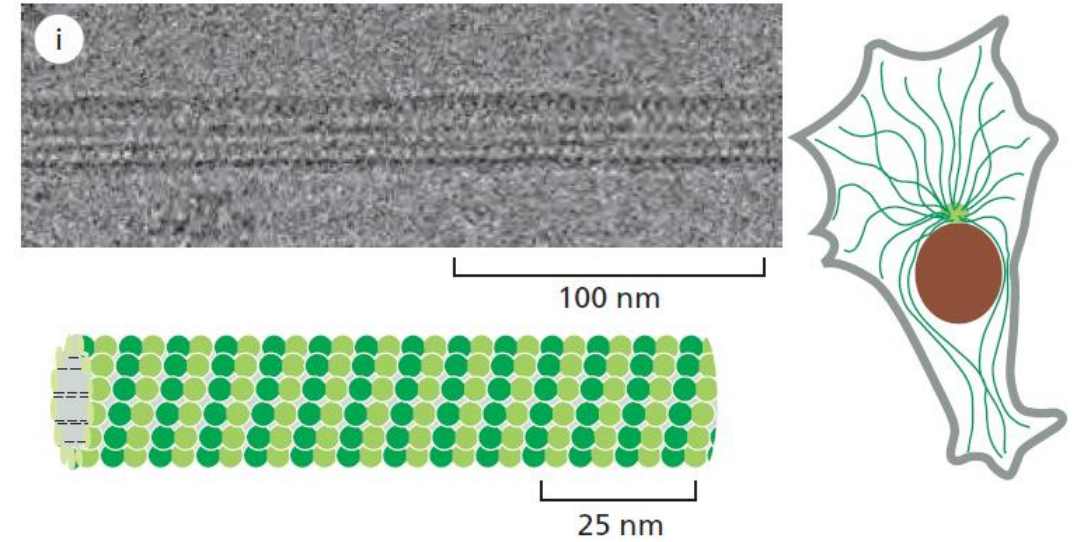


Generovanie síl - Cytoskelet

Aktín



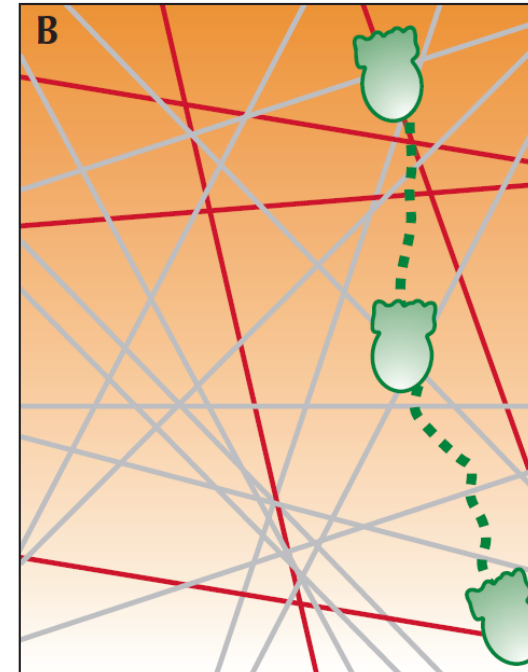
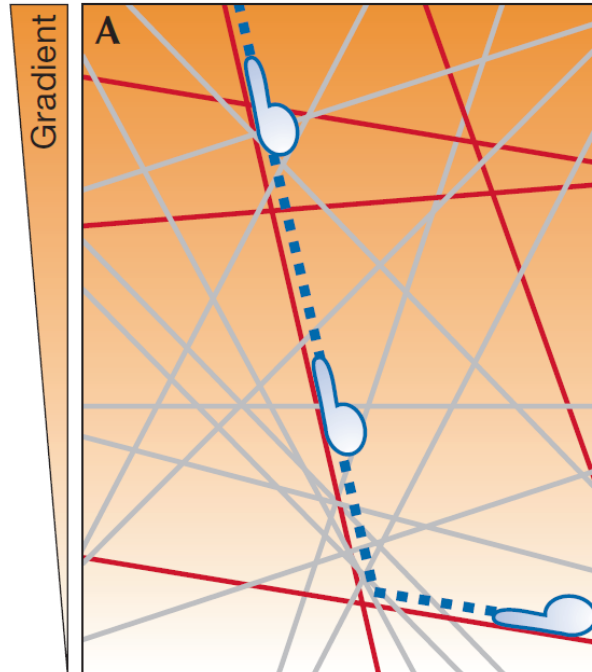
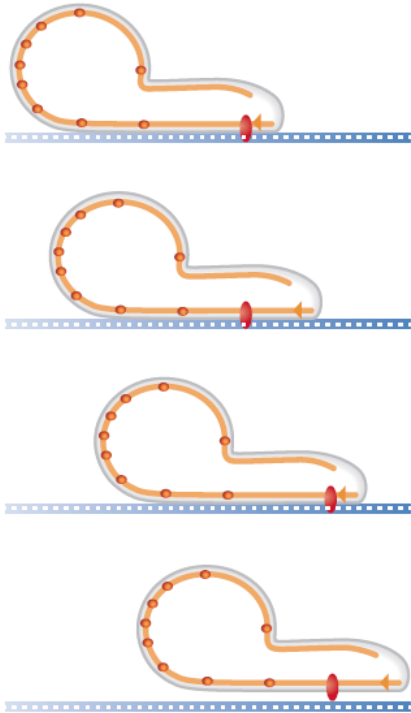
Mikrotubuly



Generovanie síl - Integríny

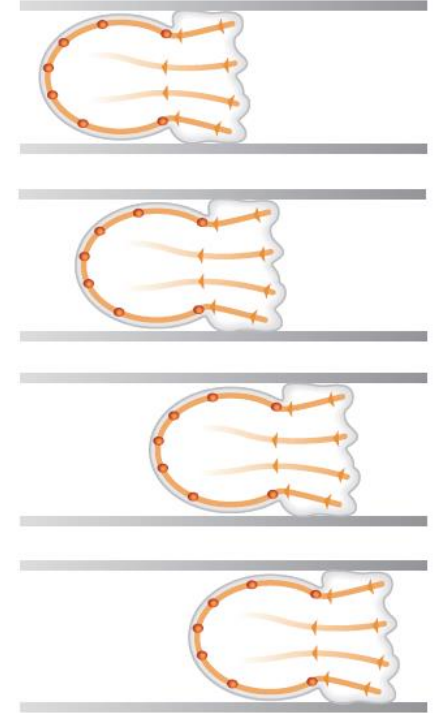
Pohyb závislý na integrínoch

- ▶ Adhesion based
- ▶ Polymerization driven



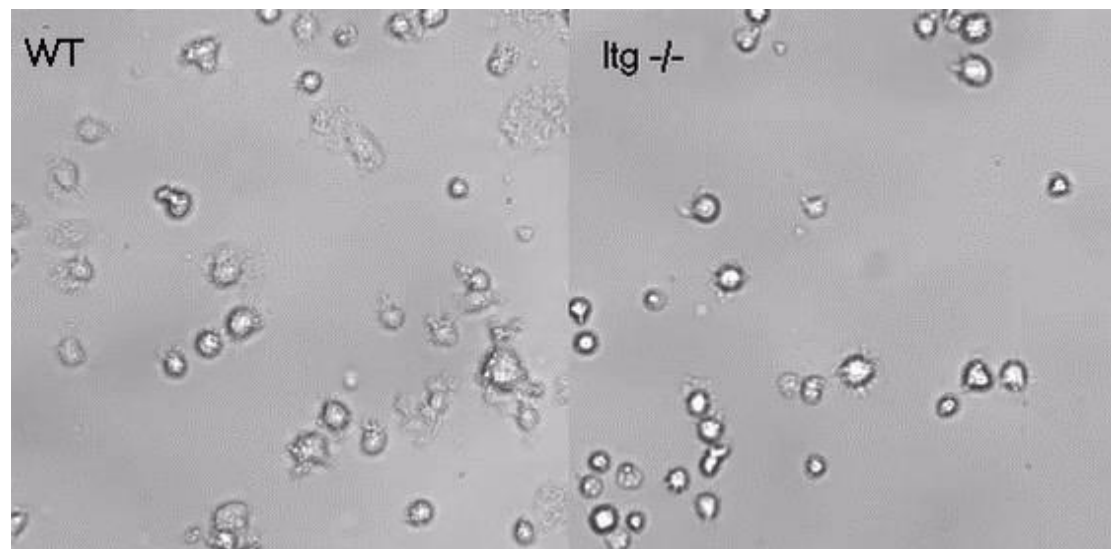
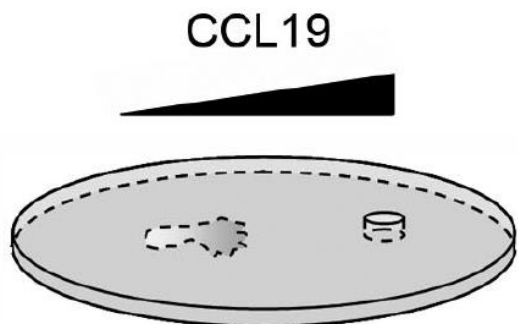
Pohyb nezávislý na integrínoch

- ▶ Deformation based
- ▶ Polymerization driven

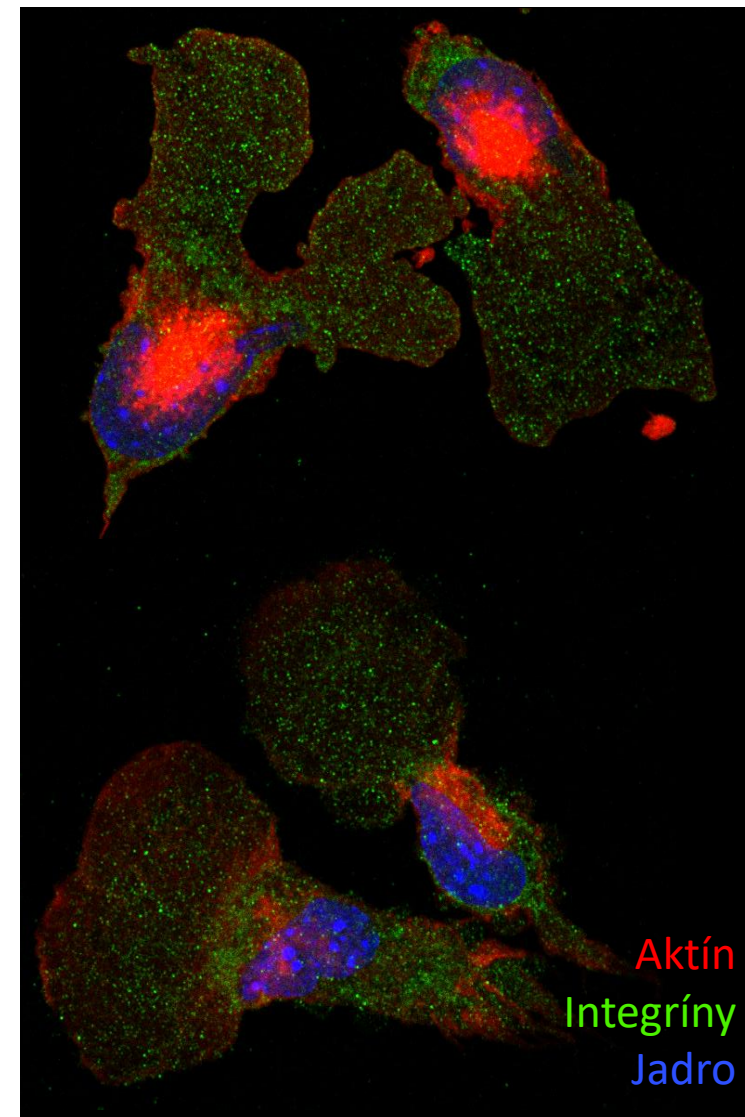


Dendritické bunky potrebujú adhéziu v 2D

- 2D experiment s gradientom chemokínu a bunkami migrujúcimi pod vrstvou agarózy

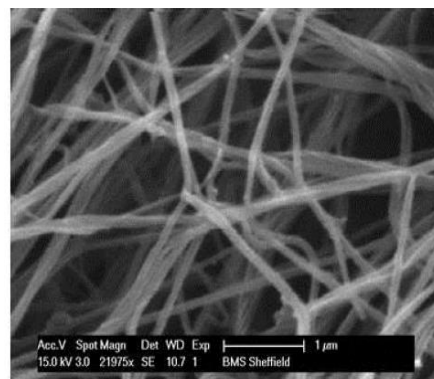
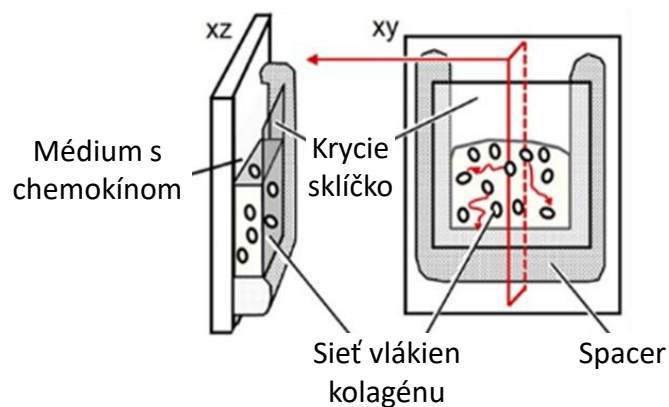


→ dendritické bunky sa bez integrínov nedokážu pohybovať v 2D priestoroch



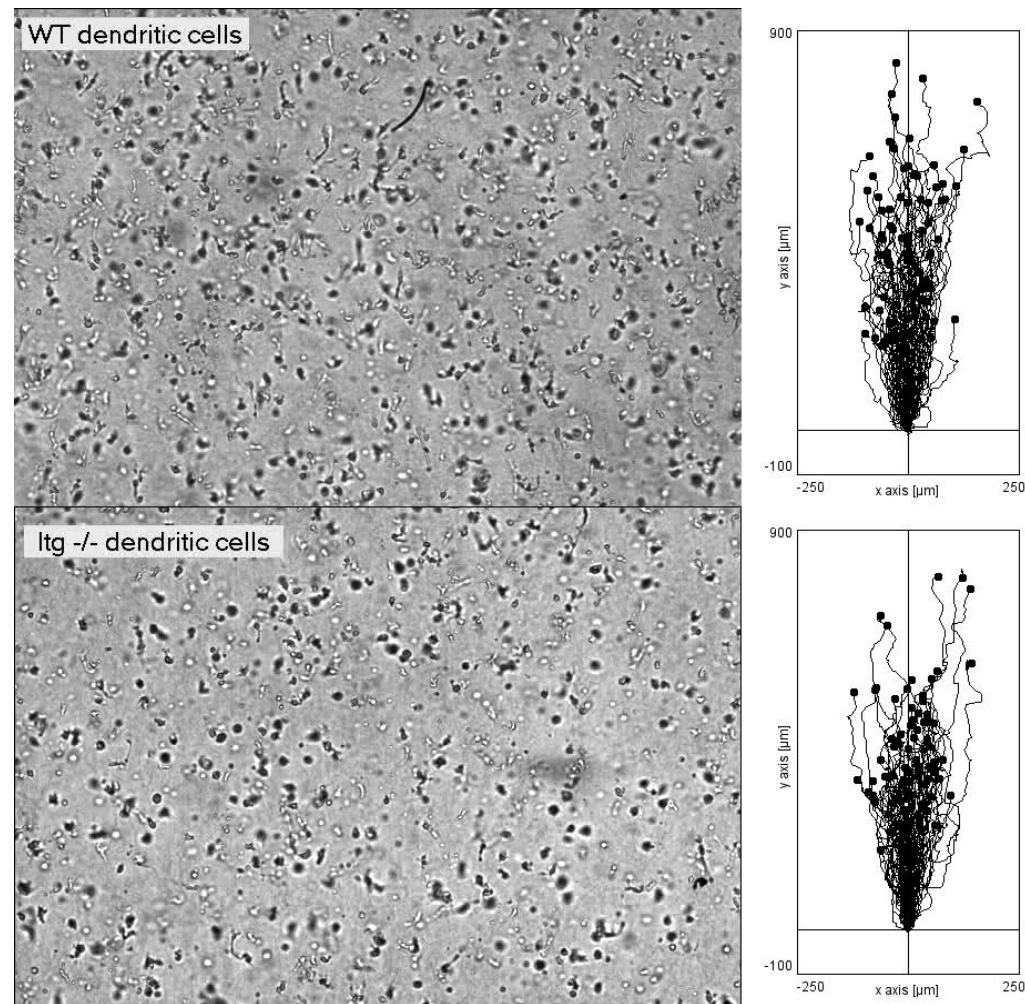
Dendritické bunky nepotrebujú adhéziu v 3D

- Experiment s gradientom chemokínu a 3D sieťou kolagénových vlákien



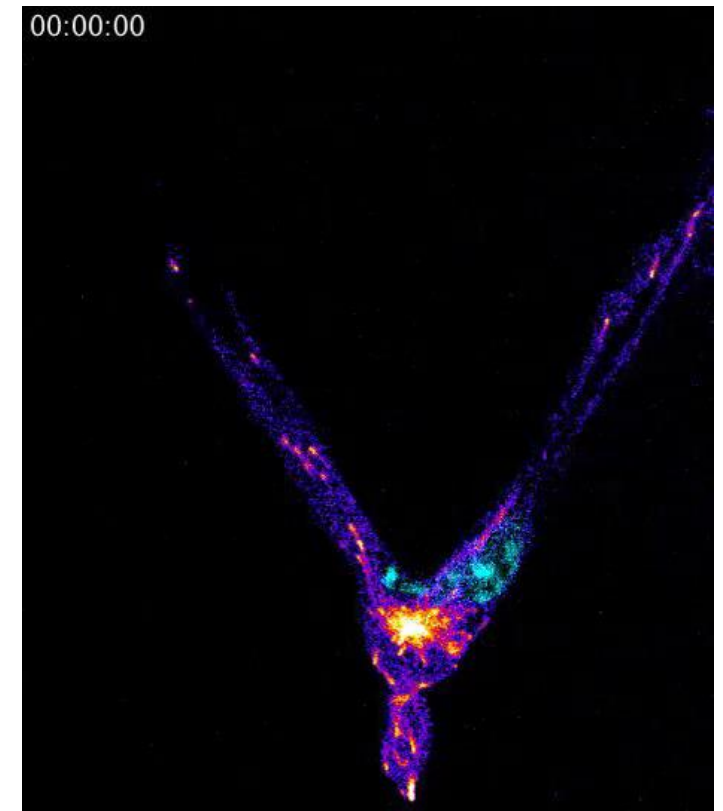
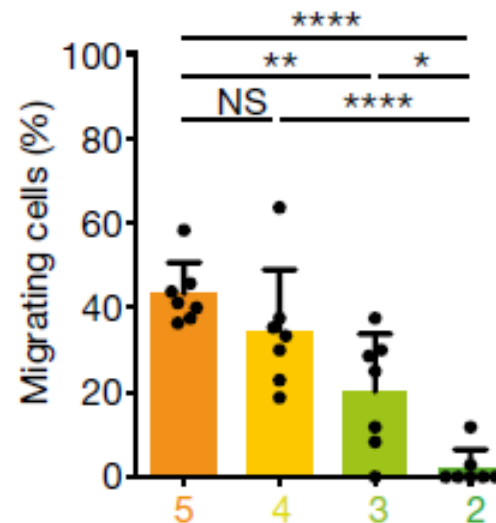
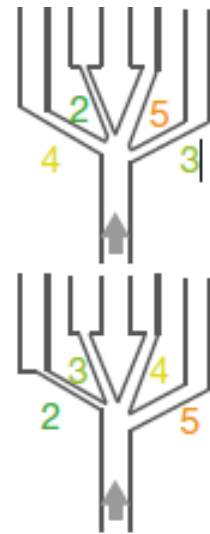
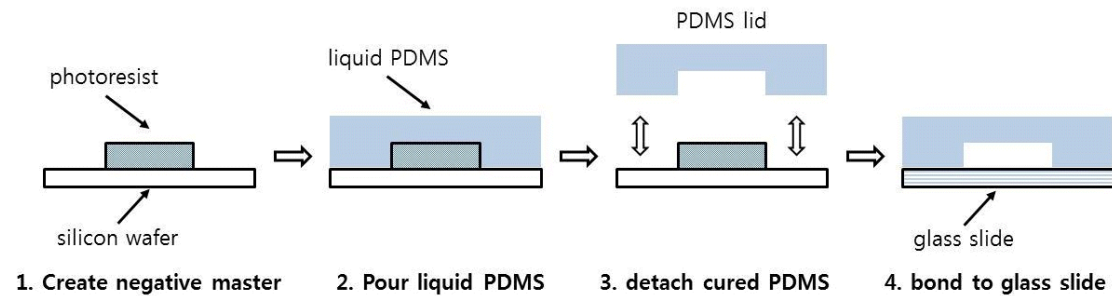
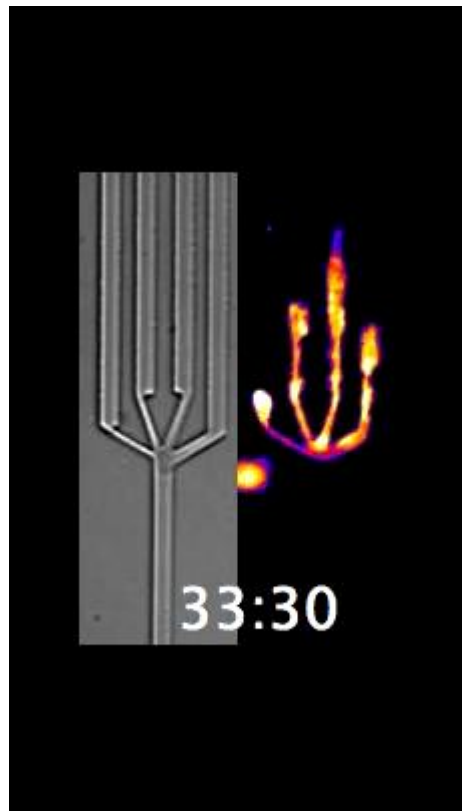
Sieť kolagénových vlákien

→ dendritické bunky používajú geometriu prostredia na ich poháňanie vpred



Ako sa dendritické bunky dokážu nezamotať?

- Mikrofluidické zariadenia na sledovanie buniek v špecifických podmienkach
 - Silikónové labyrinty



V čom sú dendritické bunky výnimočné?

- Vnímajú rôzne silné gradienty
- Vedia k zdroju chemokínu migrovať hodiny
- V geometricky zložitom prostredí nepotrebujú integríny
- Používajú svoje jadro ako pravítko, podľa ktorého si vyberajú cestu na križovatkách

Pod'akovanie



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BIOIMAGING FACILITY

The logo for FWF (Forschungsinstitut für Wissenschaften) consists of the letters 'FWF' in a bold, sans-serif font. The 'F' is grey, and the 'WF' is blue.



This program has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 665385.