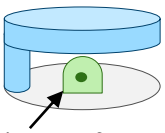
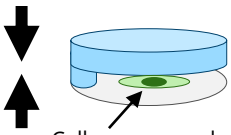
AgarSqueezer – a cell confiner

Confine your cells under agarose nanopillars to study cell behaviour

AgarSqueezer is a device designed to study cell response to short and long-term mechanical confinement within a physiological rigidity range.



Cell without confinement



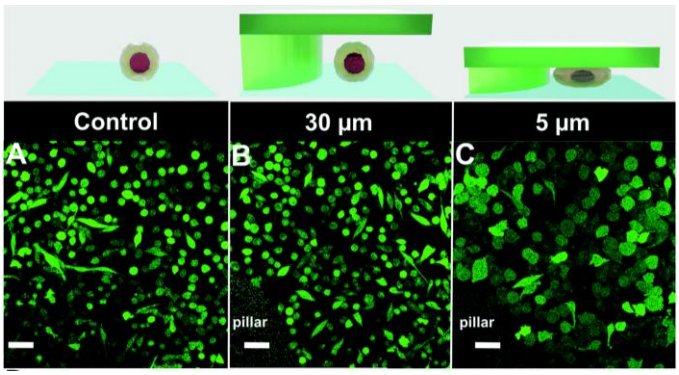
Cell compressed within a thin space

Compression height:
- *2.5 µm*
- *5 µm*
- *30 µm*
- *100 µm*

Key features

1. **Instant & homogeneous cell confinement.**
2. **Physiological rigidity**.
   The mechanical properties of agarose can reproduce stiffness of the in vivo microenvironment (1-150 kPa).
3. **Long-term confinement**.
   The porous nature of agarose facilitates nutrient and oxygen diffusion, allowing for long-term cell culture and monitoring in confined conditions (several days).
4. **Fully compatible with in situ and ex situ analyses.** The system is compatible with real-time dynamic imaging and all immunostaining steps can be performed in situ. Alternatively, cells can be easily collected for standard molecular biology or functional assays.
5. **Highly flexible.** Tunable pillar height, matrix stiffness & composition and possibility to coat with ECM proteins.

Results from users



Compression of immature TF1-GFP hematopoietic cells

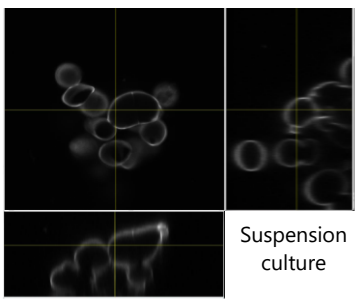
Quantification of cell morphology under confinement. (A–C): Morphology of immature TF1-GFP hematopoietic cells for control (A) and for 30 µm and 5 µm (B and C, respectively). Scale bar = 20 µm.

From A. Prunet et al. Lab on Chip, 2020.

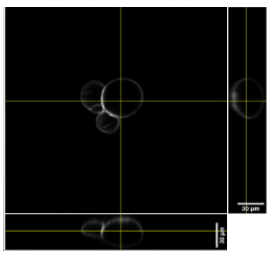
Arabidopsis root cells confined in Agarsqueezer

Arabidopsis thaliana Col-0 root cells stained with Calcofluor (cell wall) and imaged with a confocal microscope either in a traditional liquid culture (left), or after 24h of confinement under the 30µm (middle) or 5µm (right) pillars.

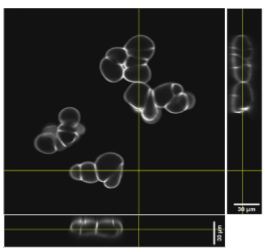
Image credits: Léa Bogdziewiez – UPSC – SLU Sveriges lantbruksuniversitet, Sweden



Suspension culture



30µm pillars



5µm pillars

Original publication:
A. Prunet et al., A new agarose-based microsystem to investigate cell response to prolonged confinement, ***Lab on a Chip. 20:4016–4030 (2020)***