

Inducing Maturation of iPSC-derived Hepatocyte-like Cells for Higher Functionality

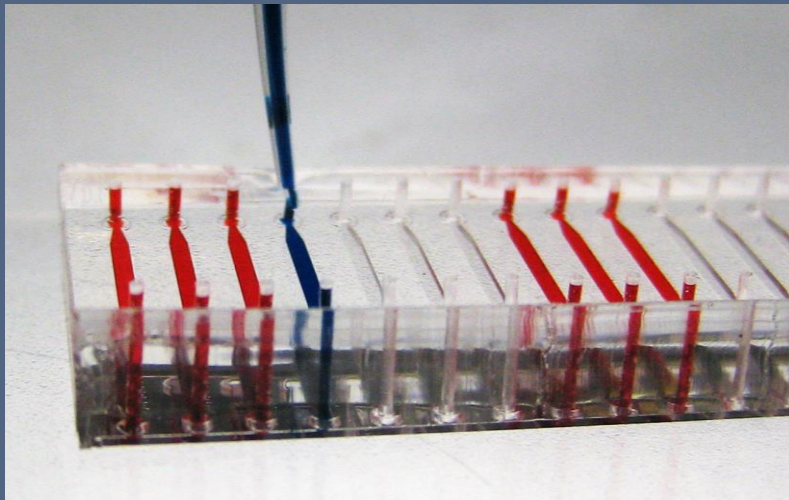
Kaylene Stocking (University of Pittsburgh)

Professor: Ken-ichiro Kamei

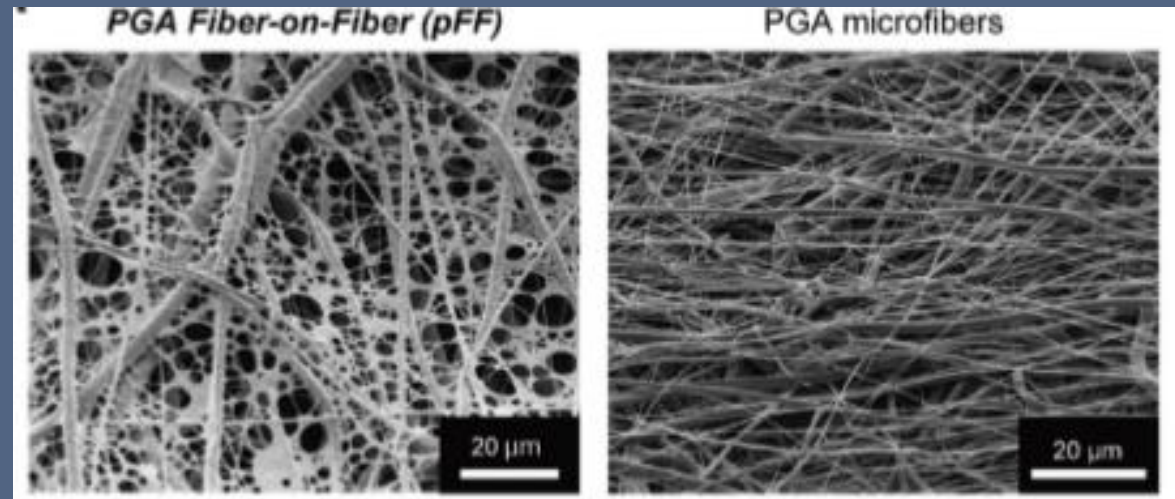
Mentor: Nicolas Minier
(Kyoto University)

iCeMS and Kamei Laboratory

- iCeMS: Institute for Integrated Cell-Material Sciences
- Many different labs within broad interdisciplinary field
- Kamei-sensei: body-on-a-chip, microfluidics
- How can we recreate conditions of human body *in vitro*?



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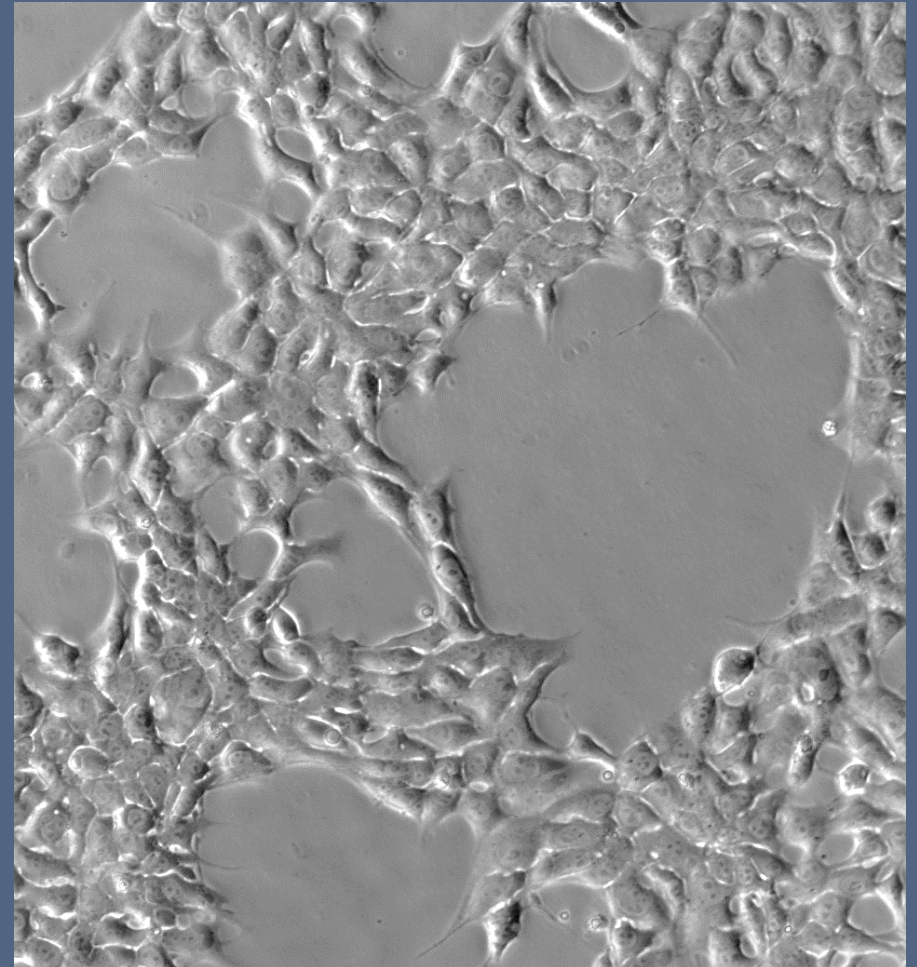
Liu et al. 2017, Biomaterials

Hepatocyte Differentiation and Maturation

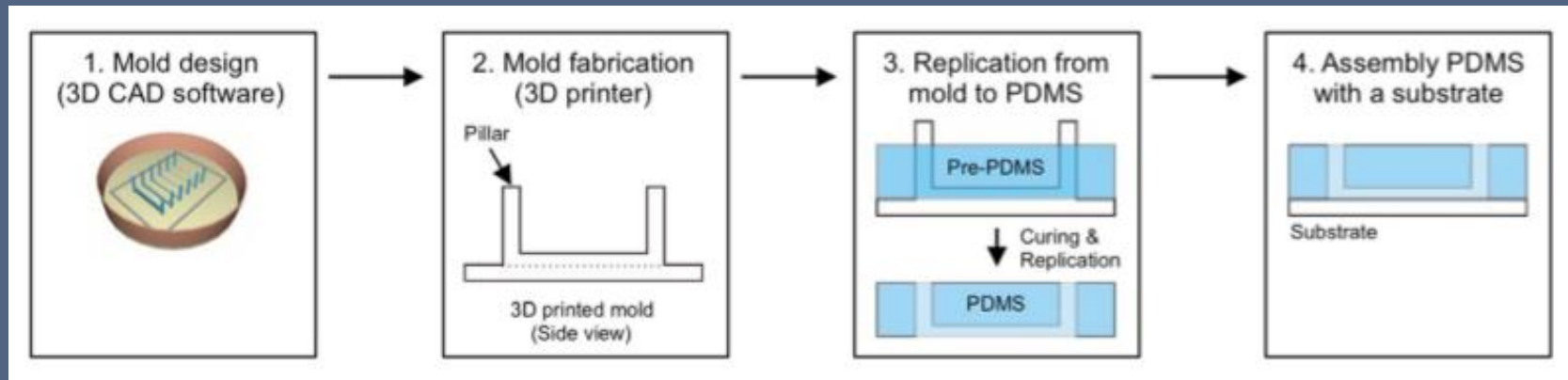
- Why hepatocytes?
 - Liver cells
 - Drug metabolism -> screening
 - Therapeutic use
- Current status
 - Problems with adult hepatocyte culture
 - Hepatocyte-like cells, but...

How can we give iPSCs similar function to adult hepatocytes?

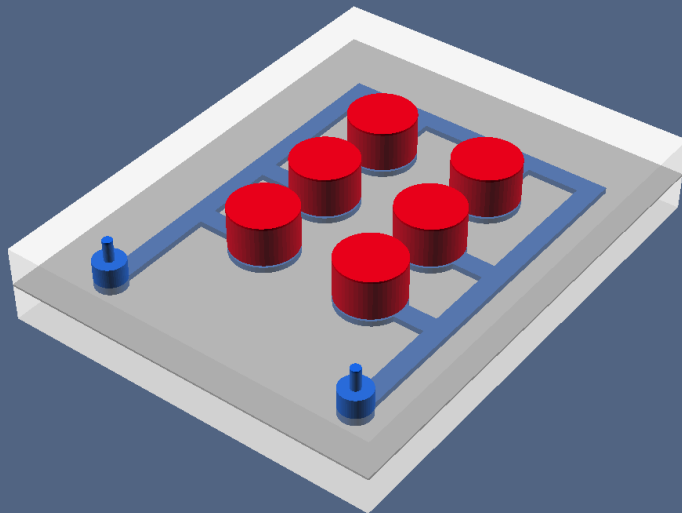
- My experiment: chemical compounds and 3D culture
- Nicolas: tensile stress



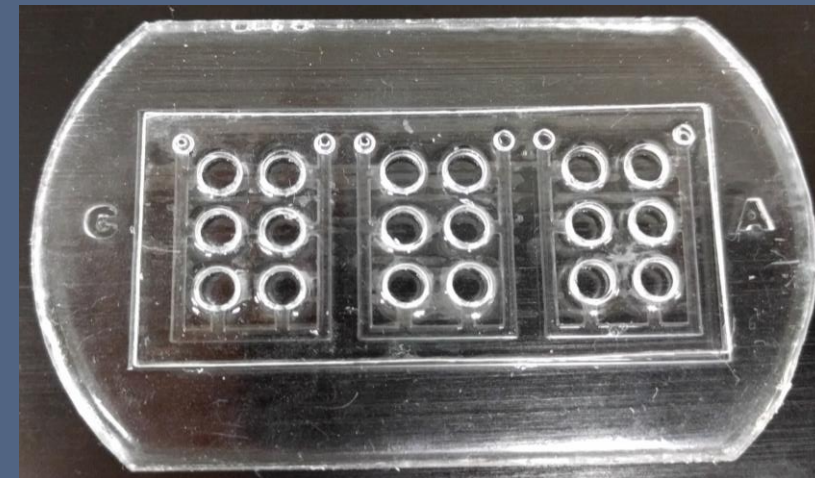
Designing the Cell Culture Environment



Kamei et al 2015, Biomed Microdevices

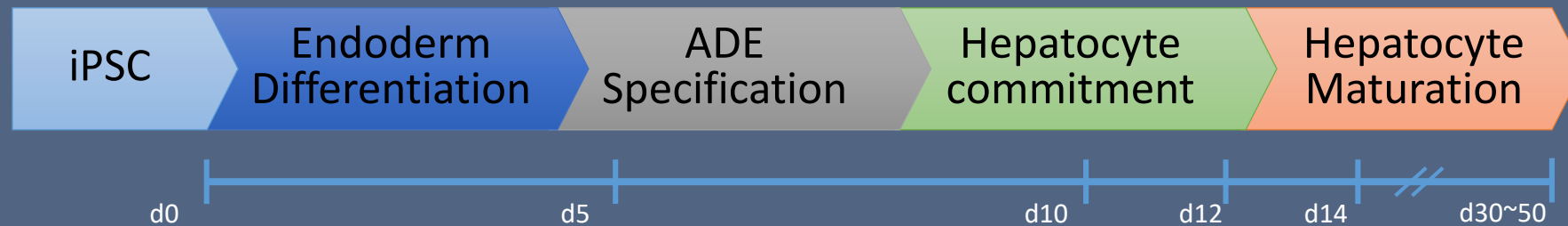


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Procedure and Methodology



6 Compounds

- Valproic acid
 - Dexamethasone
 - 8-bromo-cAMP
 - FH1
 - FPH1
- Reported
- Berberine
- New

Flow of Screening

- All 6 compounds
 - 5 compound mixture (x6)
- ↓
- “Critical” (promising) compounds
- ↓
- Optimization (Variation of concentrations)

Analysis of Results

- Immunocytochemistry
 - Determine expression of relevant proteins
- qRT-PCR
 - Quantitative real-time PCR
 - Compare gene expression to adult hepatocytes

Questions?

Thank you to the
Nakatani Foundation,
Kamei-sensei, Rice
University, and everyone
who has helped me get
this far!

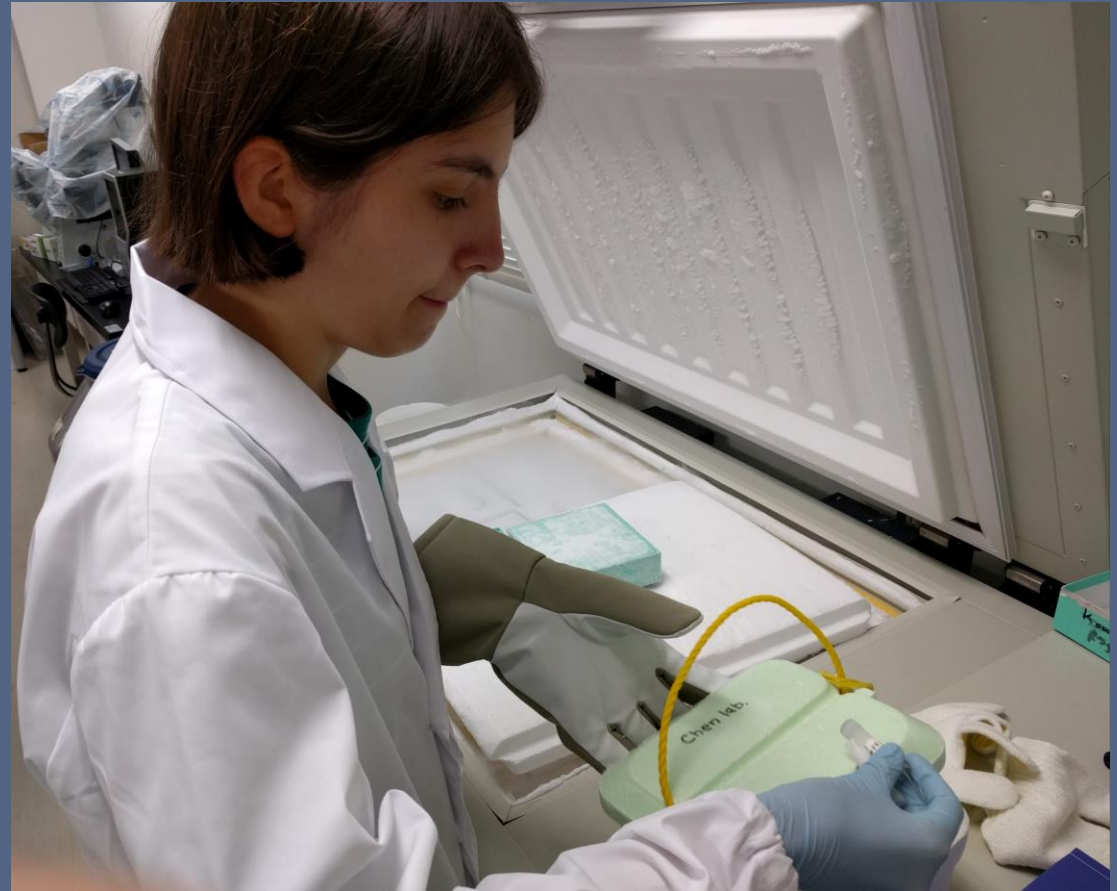


Photo by Nicolas Minier