

Organ on Chip Tech Network Public engagement

Paul Holloway

Paul.Holloway@rdm.ox.ac.uk

Aim: Inform the public what organ on a chip technology is why it is being researched.

Aim: Inform the public what organ on a chip technology is why it is being researched.

Audiences: key influencers in public opinion and future policy, actively engaged in social media

Aim: Inform the public what organ on a chip technology is why it is being researched.

Audiences: key influencers in public opinion and future policy, actively engaged in social media

Method:

- Free event for participants
- Event that can be re-used and adapted.
- Active participation
- Reach as many people as possible at minimal cost
- Single day event



Science Museum Lates

- Free
- One night every month themed around a science-related subject.
- Attracts ~4,000 visitors over the course of each night.
- The average age range of visitors is 18–35, usually young professionals.
- Fun and engaging atmosphere



29 January 2020: Medicine

Marks the launch the new Medicine Galleries, combining the collections of Henry Wellcome and the Science Museum.

Talks: 3 x30 min. ~100- 300 people

Drop in: stands ~ 400-600 people

Workshops: 'Make and take' ~500 people

Things to bear in mind

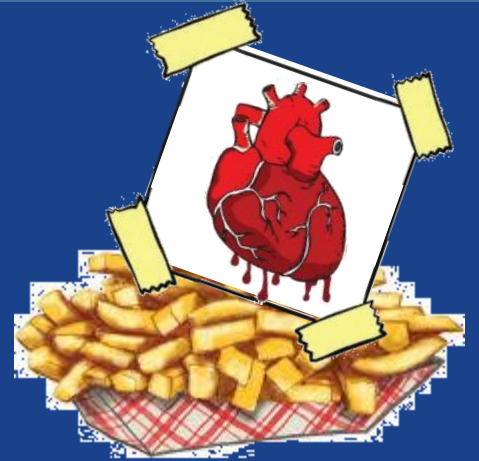
- Audience interaction
- Jargon free
- Humour
- Social media
- Costs
- Resources
- Health and safety



Organ-on-a-Chip
Technologies Network



CHIPS



Make and take session:

Make your own organ on chip keyring in the kitchen

HENLOW *fish n' Chips & Kebabs*

FISH

Cod	£4.80	£5.20
Haddock	£5.30	
Plaice	£4.60	
Scampi ^{12 Pcs}	£4.60	
Fishcakes	£1.30	
SAUCES		
Gravy	£1.00	
Curry	£1.00	
Mushy Peas	£1.00	
Chins	£1.70	£2.80

KEBABS

Chicken Kebabs	£6.00
Lamb Kebabs	£6.00

CHICKEN

2 pcs Southern fried Chicken	£2.80
5 pcs Southern fried Chicken	£4.95
Quarter of Chicken	£3.90
Chicken Nuggets 8 pcs	£3.50

Everything is freshly cooked in Vegetable oil. Fish may contain bones

PIES

Steak and Kidney Pie	£2.50
Chicken and Mushroom Pie	£2.50
Beef and onion Pie	£2.50

SAUSAGES & BURGERS

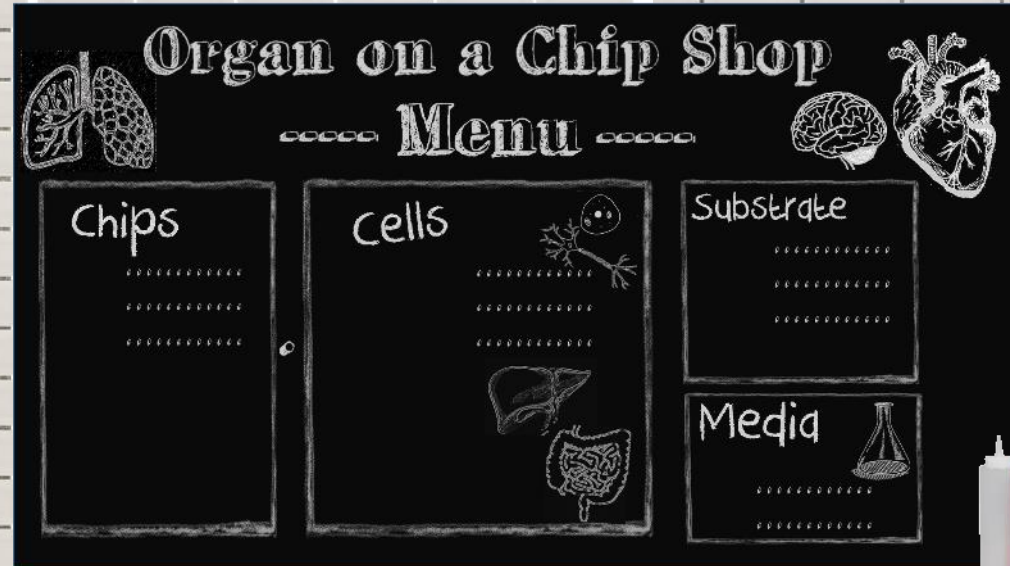
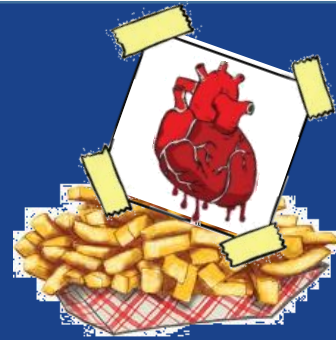
Saveloys	£1.70	
Sausages	£1.50	£1.70
Battered Sausages	£1.60	
Beefburger	£2.50	
Cheeseburger	£2.60	
Veggieburger	£2.50	

EXTRAS

Pancake roll	£1.50	Gherkins	45p
Onion	30p	Egg	40p
Pineapple fritter	£1.00		
Drinks	£1.00		

Salts
Blood

ORGANS on CHIPS



Shop front desk:

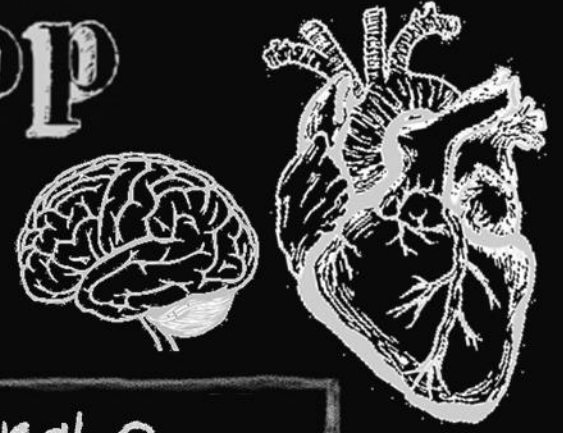
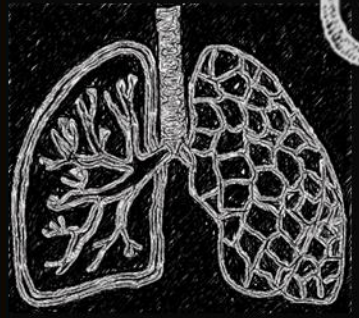
(display stand backdrop)

- Opportunity for brief interactions, questions etc.

The kitchen:

- Make and take area
- Make your own organ on chip keyring
- Allows interaction
- Gets participants thinking about the challenges involved
- Take home item = continued engagement

Organ on a Chip Shop



..... Menu

Chips

Brain

Lung

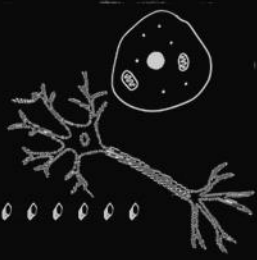
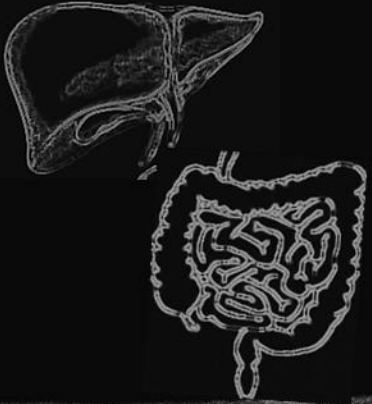
Liver

cells

Neurons

White blood cells

.....

Substrate

Silicone

Gels


Glass

Media

Nutrients

Salts

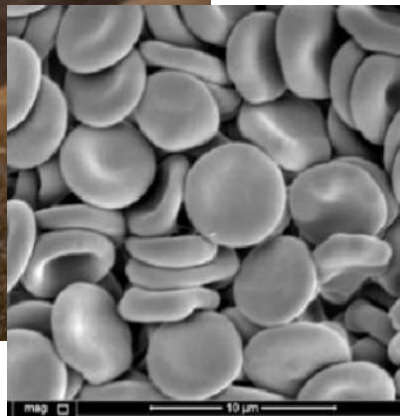
Blood



Props to stimulate discussion



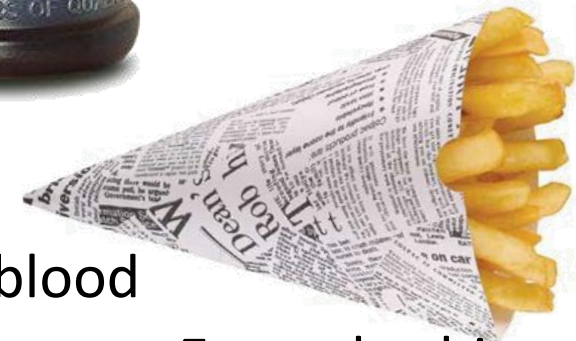
Cellular scale



Media/ artificial blood



pH regulation



Example chips

Uniform: Chef with an organ on a chip badge? Or an organ on chip t-shirt instead?



Welcome sign
Or sign pointing to 'kitchen' make area



Make area: Red check tablecloth could work with the chip shop theme. Or maybe a table cloth with chip designs printed on for inspiration



Keyring chip fabrication

- Quick
- Easy
- Cheap
- No mess
- Customisable
- attractive



TECHNICAL NOTE

www.rsc.org/loc | Lab on a Chip

Shrinky-Dink microfluidics: 3D polystyrene chips

Chi-Shuo Chen,^a David N. Breslauer,^b Jesus I. Luna,^a Anthony Grimes,^a Wei-chun Chin,^a Luke P. Lee^b and Michelle Khine^{*a}

Biomicrofluidics. 2011 Jun; 5(2): 022209.

PMCID: PMC3145234

Published online 2011 Jun 29. doi: [10.1063/1.3576930](https://doi.org/10.1063/1.3576930)

PMID: [21799715](https://pubmed.ncbi.nlm.nih.gov/21799715/)

Shrink-film microfluidic education modules: Complete devices within minutes

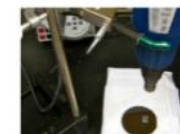
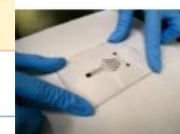
Diep Nguyen, Jolie McLane, Valerie Lew, Jonathan Pegan, and Michelle Khine

▶ Author information ▶ Article notes ▶ Copyright and License information

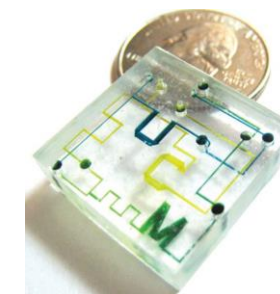
This article has been [cited by](#) other articles in PMC.

Abstract

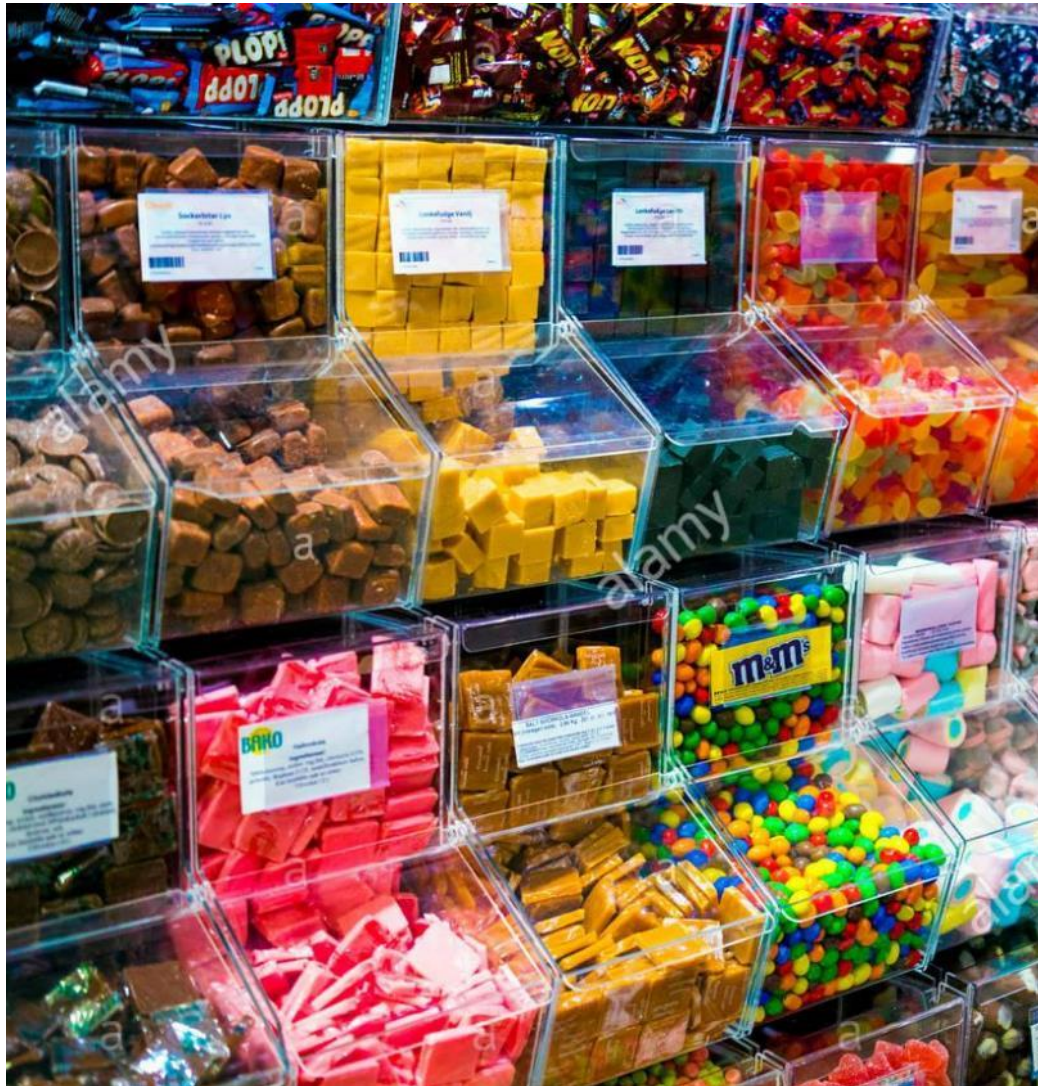
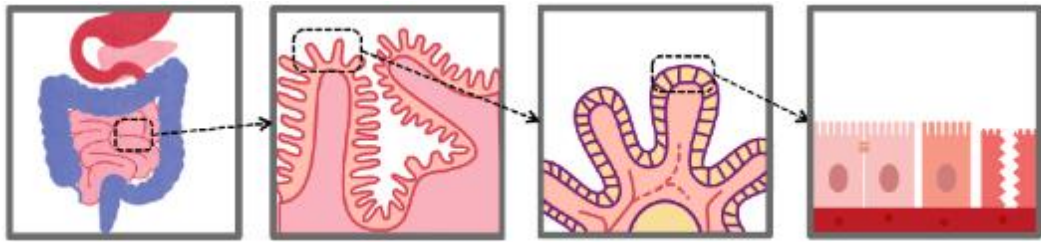
As advances in microfluidics continue to make contributions to diagnostic and therapeutic applications, the awareness of this expanding field becomes necessary. By leveraging simple, accessible fabrication techniques that require no capital equipment or infrastructure, simple, accessible microfluidic devices can be made available for a broad range of educational needs from high school to university laboratory classes. These modules demonstrate key microfluidic concepts



flex three-dimensional, linkage properties of thinner and deeper upon d within minutes.



resins stamps.⁷ Sudarsan *et al.* developed PS-based copolymeric elastomer gels to create viscoelastic 3D stacked devices using a molding approach.⁸ Huang *et al.* developed a DNA microfluidic device by molding perfluoropolyether (PFPE), resistant to organic solvents.⁹ Most recently, Fiorini *et al.* developed microfluidic devices in thermoset polyester for microfluidic devices.¹⁰ Fiorini *et al.* demonstrated high-aspect ratio microstructures using reactive ion etching of shrinkable PS films, but did not demonstrate complete chips with this approach.^{11,12}



Ingredients section (Collage approach)

- Different sections for different organs or components
- Images showing organ simplification to prompt design ideas
- Labels on each tub tells you about cells....

Neurons

Draw my axon

Neurons have long projections called axons that form the wires which connect your brain. In Organ on Chip devices microchannels, smaller than the cell body can be used to direct the way axons grow. Take a neuron cell body and draw on axons where you want them to grow



Endothelial Cells



How to design the chips?



Mini white board to arrange elements and draw
= Reusable, wipe clean, magnetic



Maybe add sticker for branding/to make square so elements fit easily/ to give space for keyring hole punch

Beads for cells?

Red Blood Cells



White Blood Cells



Patterned tape?

To represent flow and other elements.



Membranes



Flow



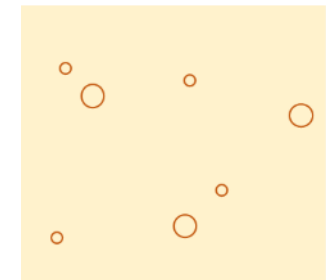
Pulsatile Flow
Turbulent flow

Coloured/patterned acetate for substrates?

Can be layered and positioned as needed



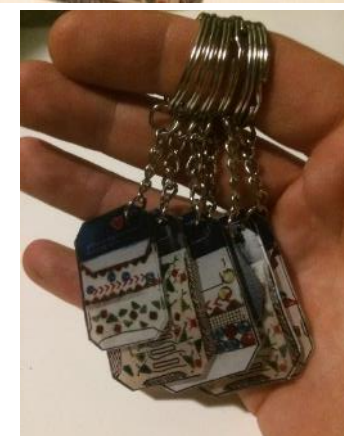
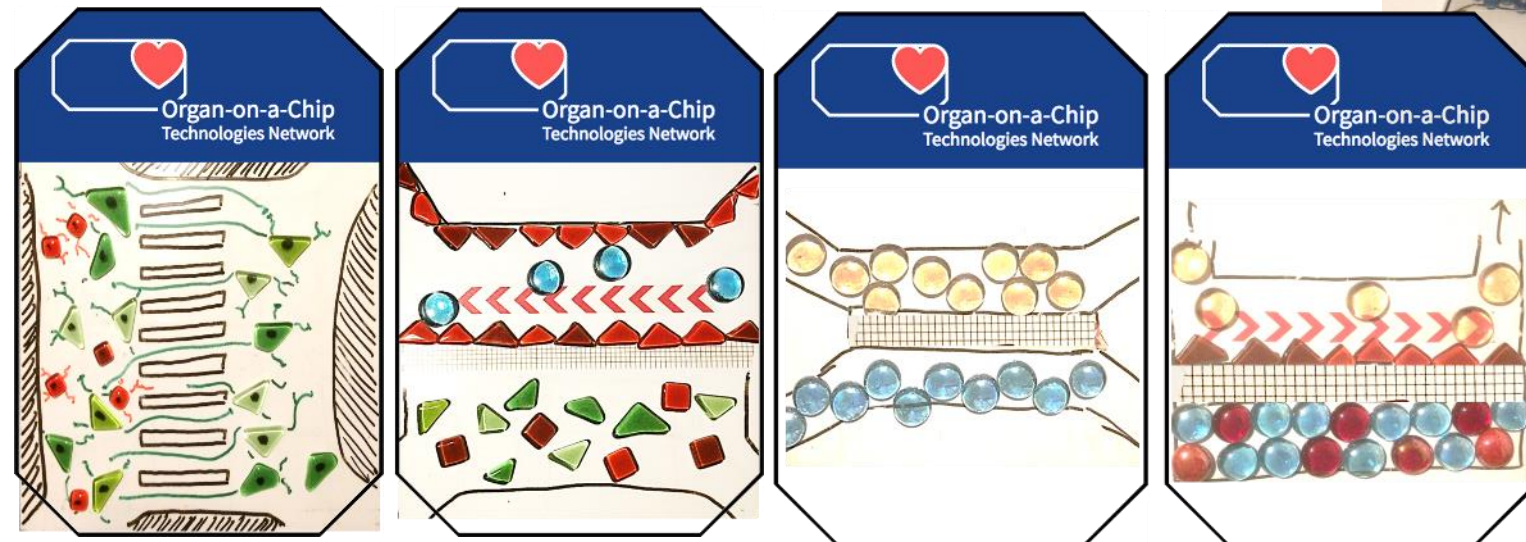
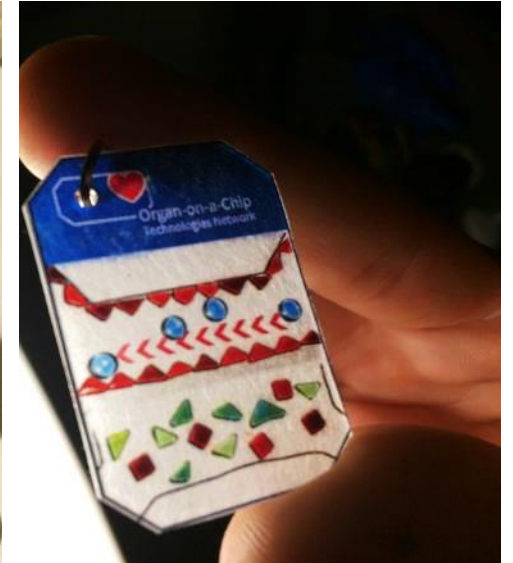
Porous scaffold



Hydrogel

Test run:

- Beads, patterned tape and pen on whiteboard.
- Photo pasted on to digital template.
- Printed, cut and heated to 150oC for 2 min



What next?

Volunteers needed:

- Behind the scenes: Costing, design, organising, sponsorship
- Event volunteers: front desk, 'chiefs', helpers

Ideas:

- How to improve the experience?
- Chip design: Is there a better way? What organs? What cells?

How do we incorporate:

- Social media, #myorganonachip
- Photo opportunities

Communication:

- Slack
- Emails

Legacy/ future events?