

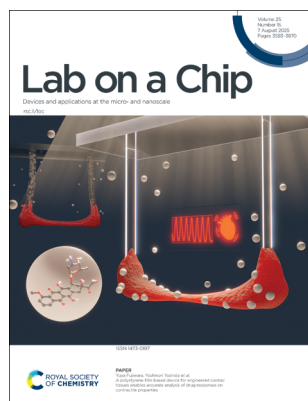
# Lab on a Chip

## Devices and applications at the micro- and nanoscale rsc.li/loc

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

### IN THIS ISSUE

ISSN 1473-0197 CODEN LCAHAM 25(15) 3583–3870 (2025)



**Cover**  
See Yuya Fujiwara,  
Yoshinori Yoshida *et al.*,  
pp. 3592–3603.  
Image reproduced by  
permission of Yuya Fujiwara  
and Yoshinori Yoshida  
from *Lab Chip*, 2025, 25,  
3592.



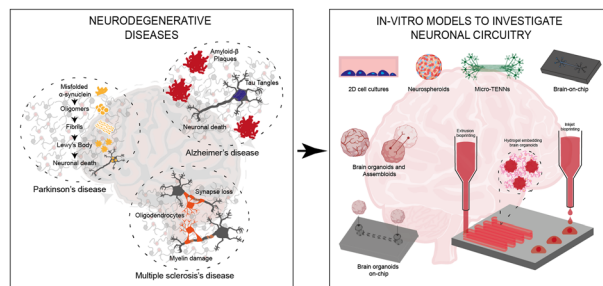
**Inside cover**  
See Shuqi Wang,  
Bangchuan Hu,  
Hongwei Jiang *et al.*,  
pp. 3604–3616.  
Image reproduced by  
permission of Shuqi Wang  
from *Lab Chip*, 2025, 25,  
3604.

### PERSPECTIVE

3592

#### Exploring neuronal circuitry in neurodegenerative diseases: from traditional models to cutting-edge techniques

Chiara Ausilio, Annachiara Scalzone  
and Paolo Antonio Netti\*

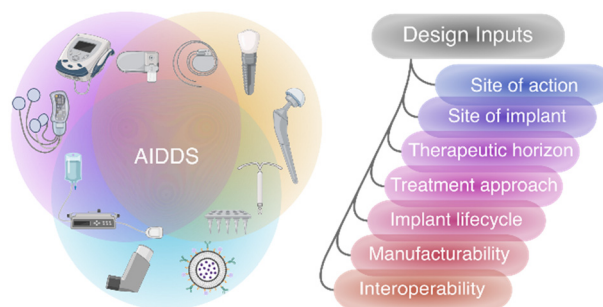


### TUTORIAL REVIEW

3608

#### Active implantable drug delivery systems: engineering factors, challenges, opportunities

Fabiana Del Bono,\* Nicola Di Trani, Danilo Demarchi,  
Alessandro Grattoni and Paolo Motto Ros





**GOLD  
OPEN  
ACCESS**

# EES Batteries

**Exceptional research on  
batteries and energy storage**

**Part of the EES family**

**Join  
in** | Publish with us  
**rsc.li/EESBatteries**

Registered charity number: 207890

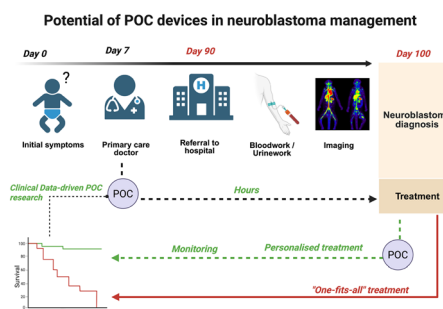


## CRITICAL REVIEW

3630

## Diagnostic technologies for neuroblastoma

Leena Khelifa, Yubing Hu,\* Jennifer Tall, Rasha Khelifa, Amina Ali, Evon Poon, Mohamed Zaki Khelifa, Guowei Yang, Catarina Jones, Rosalia Moreddu, Nan Jiang,\* Savas Tasoglu, Louis Chesler and Ali K. Yetisen

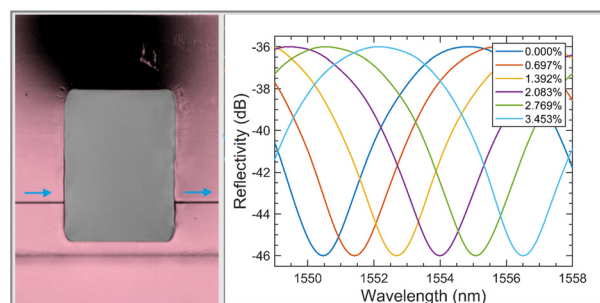


## COMMUNICATIONS

3665

## Refractive index sensing in a monolithic micro-optofluidic lithium niobate chip

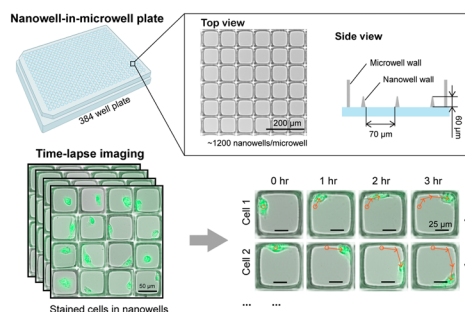
Daniel Nwatu,\* Sergiy Suntsov, Detlef Kip and Kore Hasse



3672

## High-throughput single cell motility analysis using nanowell-in-microwells

Pan Deng, Wenze Lyu, Deasung Jang, Kerry Matthews, Simon P. Duffy and Hongshen Ma\*

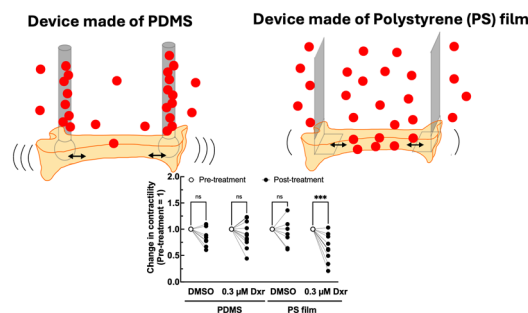


## PAPERS

3682

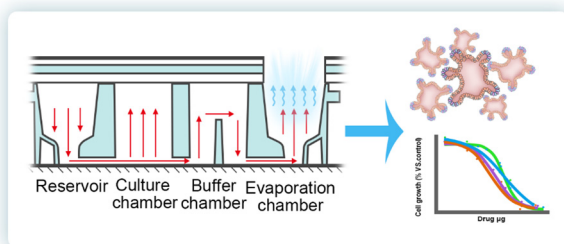
## A polystyrene-film-based device for engineered cardiac tissues enables accurate analysis of drug responses on contractile properties

Yuya Fujiwara,\* Masako Sasaki, Sohei Funaoka, Takuro Yoshikuni, Yuki Naka, Kazumi Ida, Taichi Aihara, Shunsuke Funakoshi, Kenichi Imahashi and Yoshinori Yoshida\*





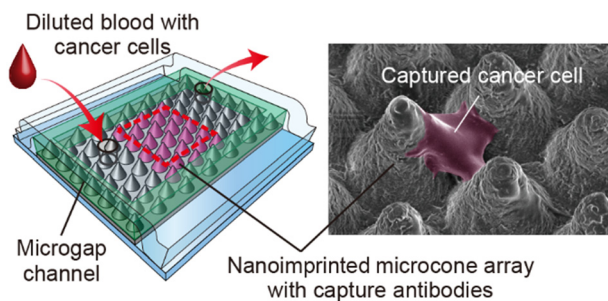
3694



### A novel microfluidic self-perfusion chip (MSPC) for pumpless 3D cell, microtissue and organoid culture

Guohua Wu, Di Wu, Wenqi Hu, Qinrui Lu, Yusen Zhou, Jie Liu, Qijun Du, Zhi Luo, Haijie Hu, Hongwei Jiang,\* Bangchuan Hu\* and Shuqi Wang\*

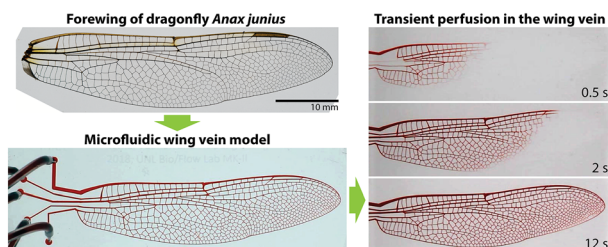
3707



### Enhancing cancer cell immunocapture on orientation-controlled nanoimprinted microcone arrays in microgap channels

Yuhei Saito, Natsumi Shimmyo, Shuhei Aoyama, Rie Utoh, Minoru Seki and Masumi Yamada\*

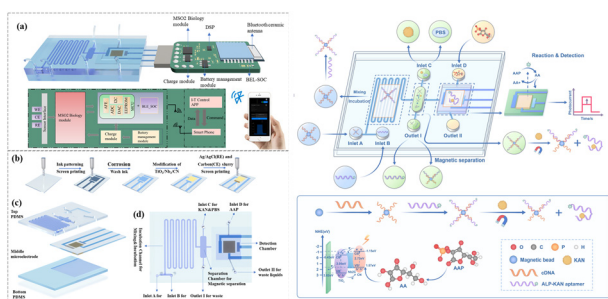
3718



### Insect wing circulation: transient perfusion through a microfluidic dragonfly forewing model

Sangjin Ryu,\* Haipeng Zhang, Tomer Palmon, Mary K. Salcedo, Günther Pass and John J. Socha

3730



### Magnetic-enzymatic synergy driven photoelectrochemical aptasensor on a microfluidic chip for sub-pM kanamycin detection

Yuchen Shen, YunYi Shi and Juan Wang\*



# Impact of multiphasic pore-scale interactions on gas hydrate formation and dissociation characteristics and kinetics: a microfluidic study

## In-Petri-dish acoustic vortex tweezers

Figure 1: Schematic diagram of the experimental setup and workflow. The setup includes an acoustic vortex tweezers system for manipulating objects in a Petri dish. The workflow consists of four steps: 1. Trapping flowing particles to construct an agglomerate. 2. Selectively capturing and transporting a particle. 3. Trapping and transporting a particle agglomerate. 4. Translating and rotating a zebrafish larva.

## A hand-operated microfluidic sample preparation-to-analysis workflow for simplifying the basophil activation test

**pU-prep workflow**

**Sample preparation**

Stim-stain cocktail

Whole blood input

1 cm

Blood & stim-stain mixed

Store at 4°C for 57 days

Custom incubator

Barcoded basophils

**Flow cytometry**

One tube

**Automated analysis**

RPMI 293.5

Allergen

Basophil classifier

CD63<sup>+</sup> gating

**Classified basophils**

Negative control

1,000 ng/mL peanut

500 1500 2500 CD63-FITC

**Dose response curves & metrics**

%CD63<sup>+</sup>

Max

Half-max

EC<sub>50</sub>

AUC

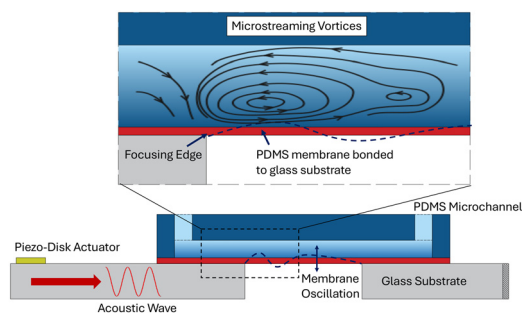
Peanut dose [ng/mL]

◆ pU-prep ◆ conv-prep

## MagSity platform: a hybrid magnetic levitation-based lensless holographic microscope platform for liquid density and viscosity measurements

The figure illustrates the experimental setup for viscosity and density measurements. The main setup consists of a MagSity Platform with an LED, a Pinhole, and a Capillary. A CMOS camera is positioned below the capillary. The diagram shows the measurement of viscosity (top) and density (bottom) using a magnetic field and a paramagnetic medium. The viscosity measurement involves a 90-degree rotation of the sample. The density measurement involves a 90-degree rotation of the sample and a measurement of the magnetic field components.

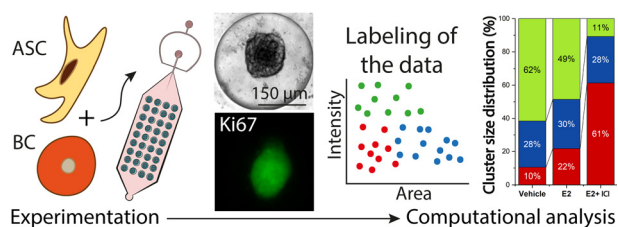
3803



### Acoustic microstreaming and augmentation of gas exchange using an oscillating membrane towards microfluidic artificial lungs

Anthony Mercader and Sung Kwon Cho\*

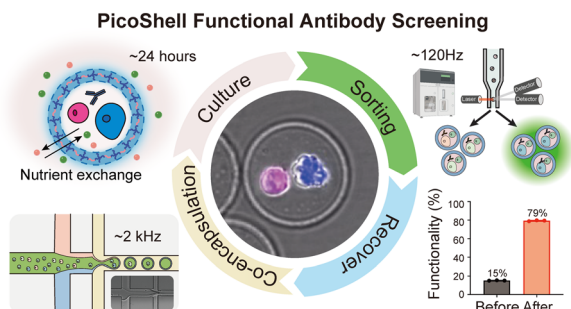
3817



### Droplet microfluidics integrated with machine learning reveals how adipose-derived stem cells modulate endocrine response and tumor heterogeneity in ER<sup>+</sup> breast cancer

Braulio Andrés Ortega Quesada, Calley Chauvin, Elizabeth Martin\* and Adam Melvin\*

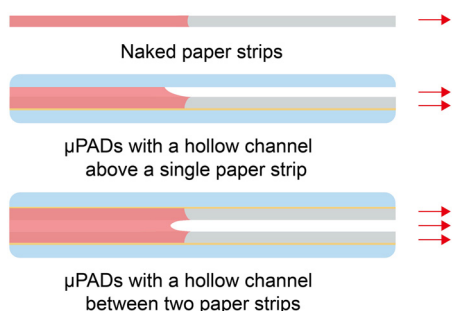
3831



### Functional screening of antibody-secreting cells by co-culture with reporter T cells using PicoShells

Kazuki Nishimoto,\* Rajesh Ghosh, Mark van Zee, Darren Fang, Zhiyuan Mao, Miyako Noguchi and Dino Di Carlo\*

3839



### Fast capillary flow on μPADs with hollow channels packaged by a thermal contraction tube

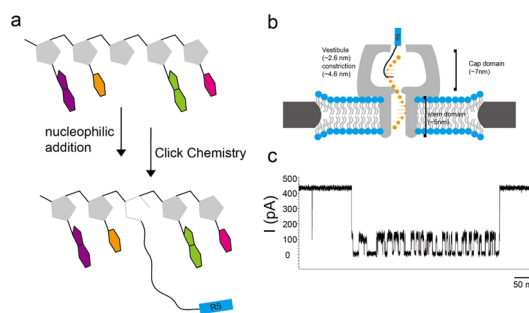
Xinyi Chen, Haonan Li, Xionghui Li, Muyang Zhang, Qinghao He, Jie Zhou, Jiahua Zhong, Hao Chen, Yixi Shi, Huilin Chen, Huiru Zhang, Lok Ting Chu and Weijin Guo\*



3849

## Polyarginine-functionalized AP site probes for mechanistic analysis of uracil–DNA glycosylase *via* nanopore-based single-molecule sensing

Ting Li,\* Shaojiao Song, Wei Lu, Xin Zheng, Hui Tian, Yu Cao, Qiuyue Zhao, Hongying Xie, Jiexin Zheng and Hailong Wang\*



3858

## Monitoring the mechanical responses of tumor metastasis based on a microfluidic chip integrated with an electrochemical detection system

Shuqi Chen, Hang Qi, Yuanheng Kuang, Quanning Li, Xuejiao Chen and Yanyan Wang\*

