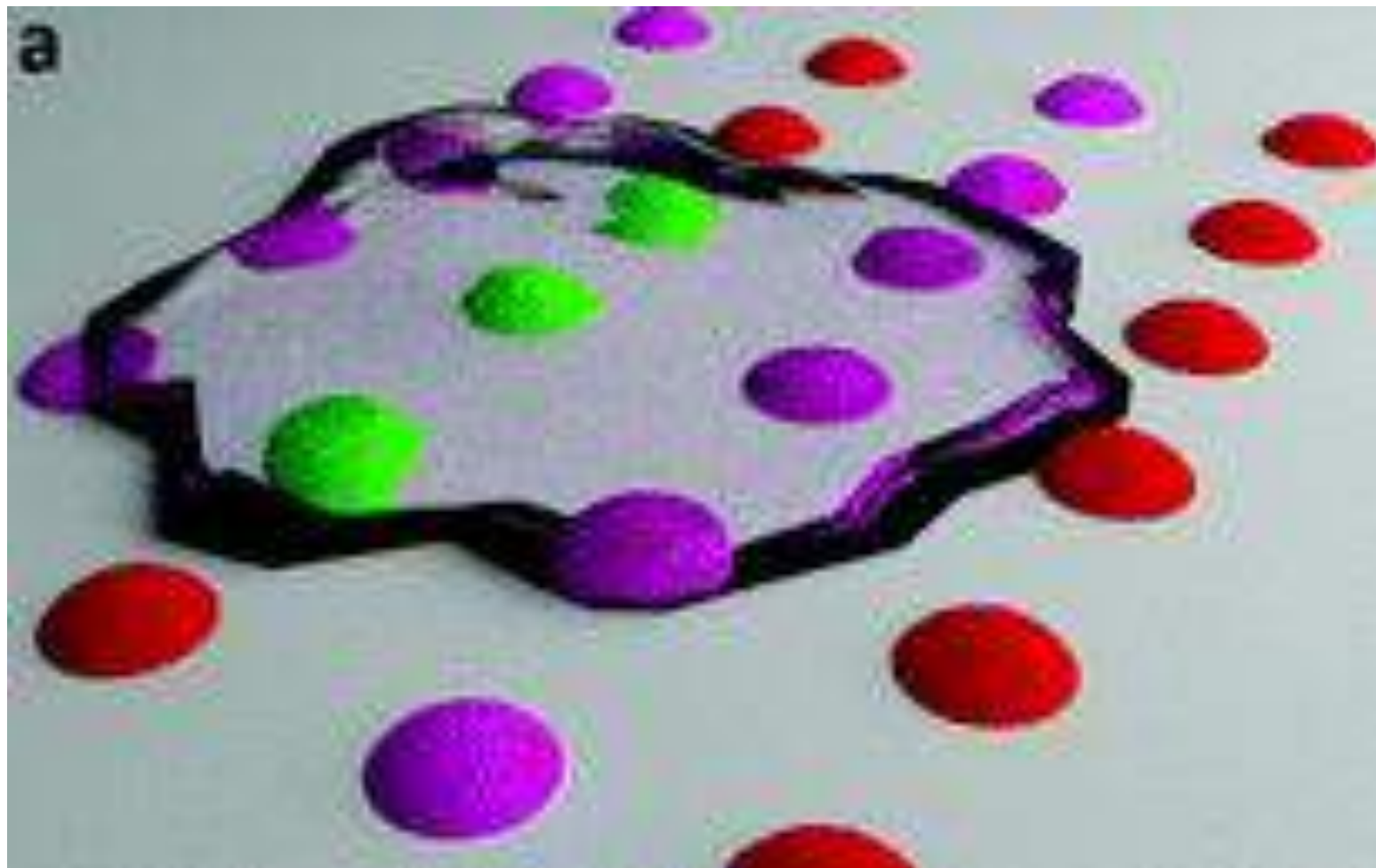


Micropatterned surfaces for advancement of diagnostics: Antigen Interface Generated by Dip-Pen Nanolithography and Polymer Pen Lithography

INSTITUTE OF NANOTECHNOLOGY

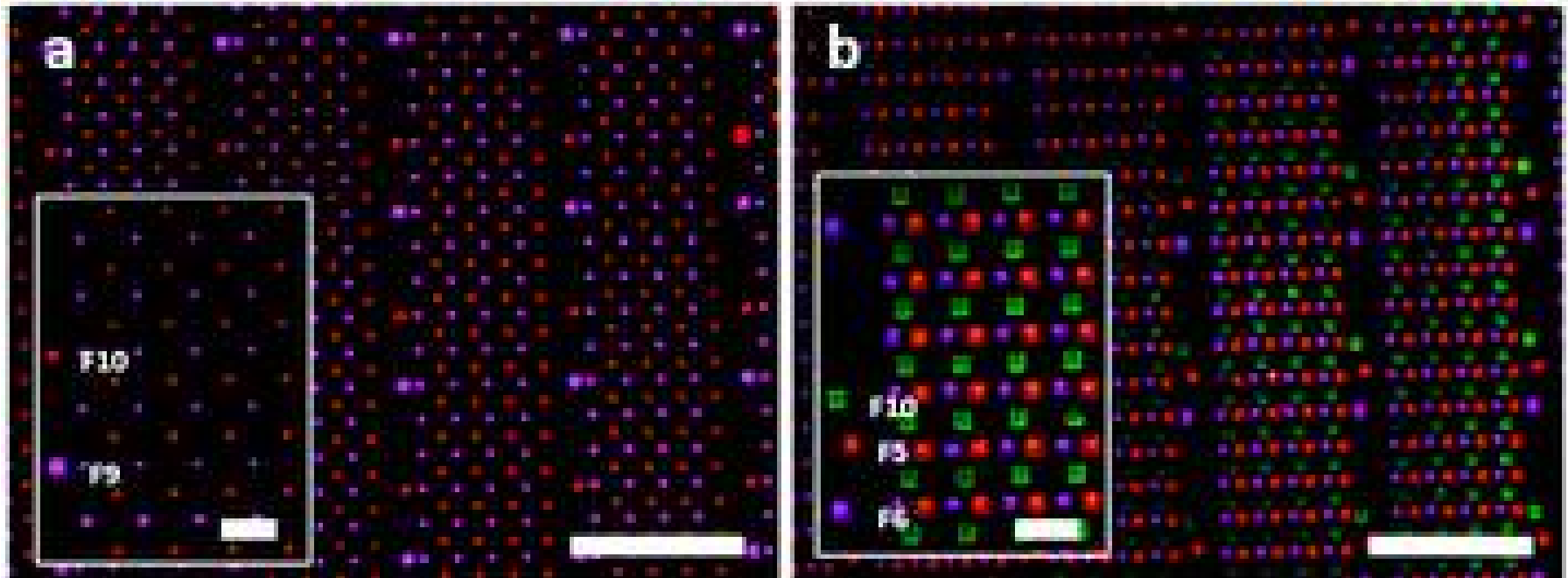


Studying events at the plasma membrane at the single cell level



1. Kumar *et al.*, **2016** Chem. Commun. 52, 12310-12313

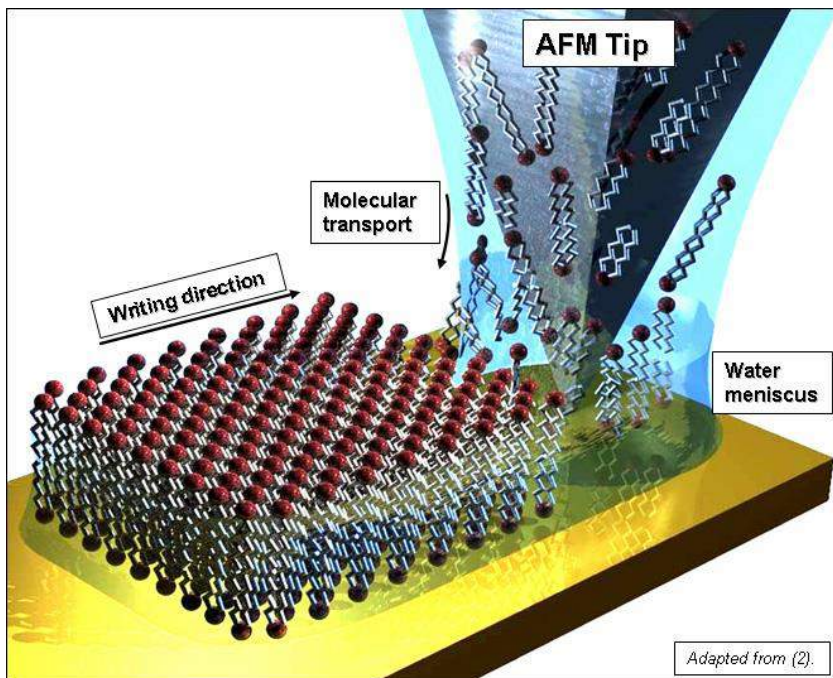
High resolution pattern and subcellular scales



1. Kumar *et al.*, 2016 Chem. Commun. 52, 12310-12313

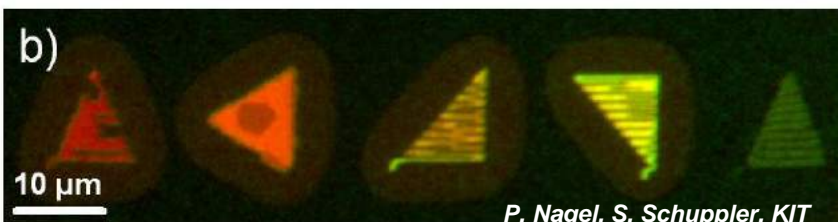
Parallel and multiplexed nano-arraying

Dip-Pen Nanolithography

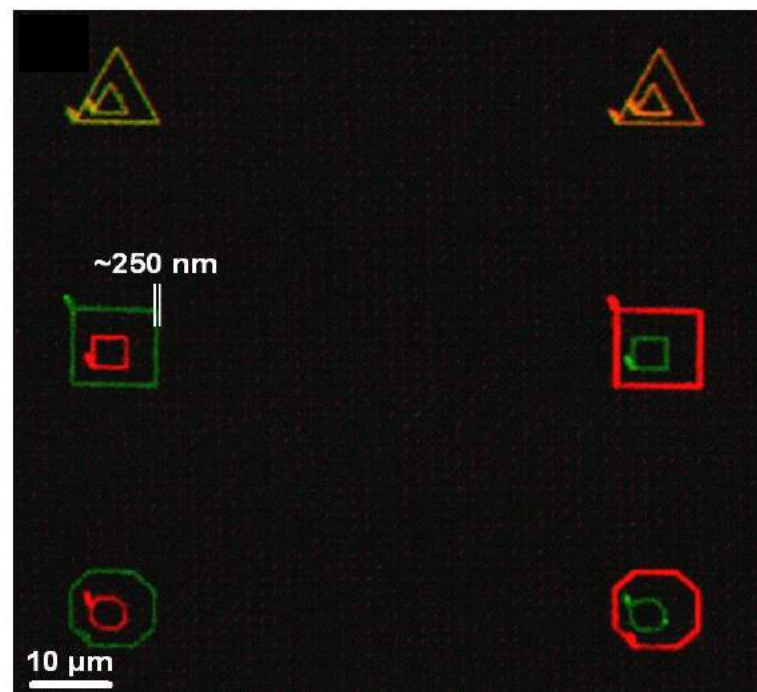


The Ink: 1,2-Dioleoyl-*sn*-Glycero-3-Phosphocholine (DOPC)

0 6,25 12,5 25 50 mol%

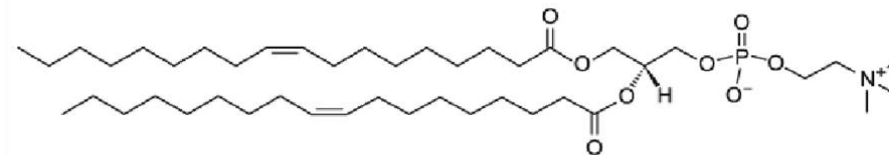
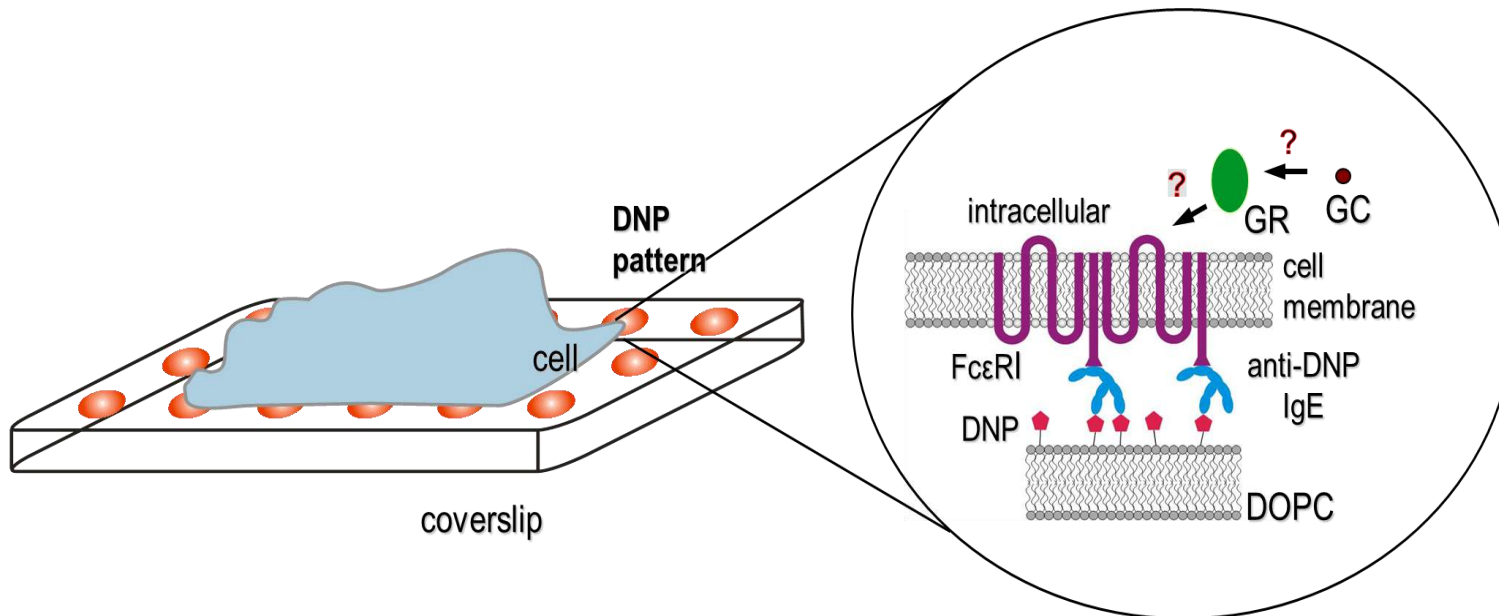


P. Nagel, S. Schuppler, KIT

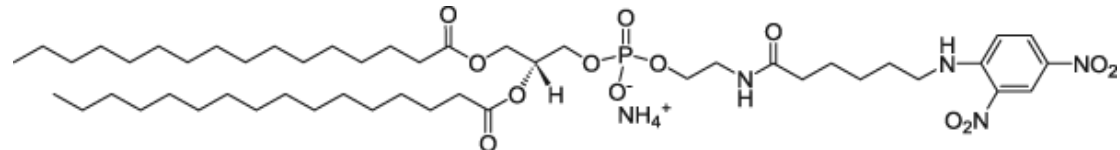


2. Lenhert *et al.*, 2007 *Small* , 3, 71
3. Sekula *et al.*, 2008 *Small* 4, 1785-1793

Non-Genomic Actions of Glucocorticoids in Mast Cells



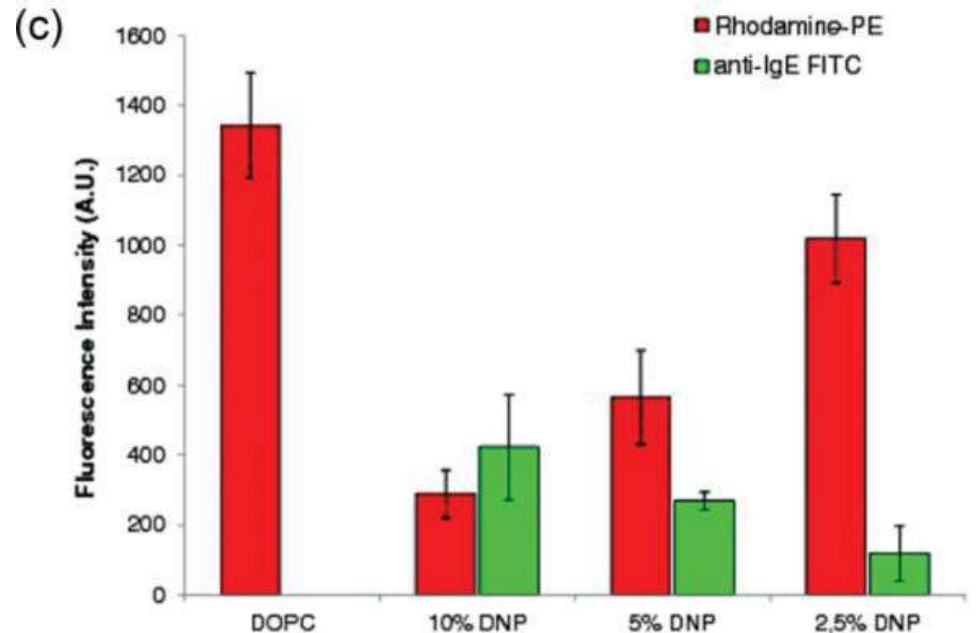
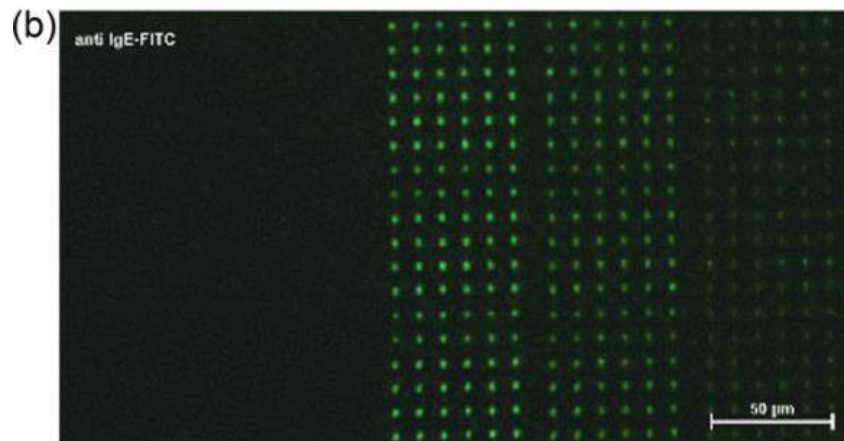
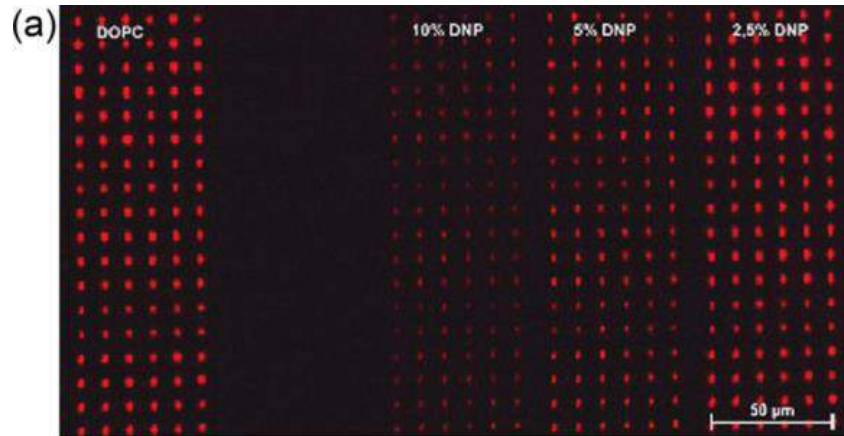
DOPC 1,2-dioleoyl-*sn*-glycero-3-phosphocholine



DNP-cap-PE

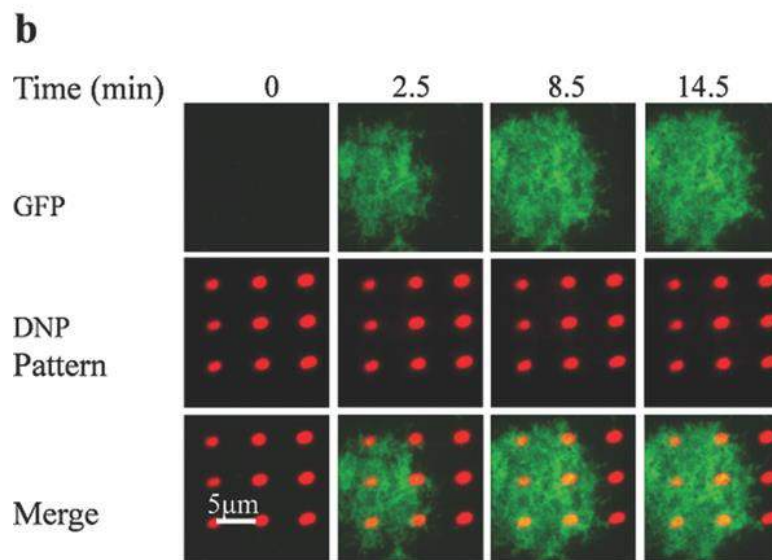
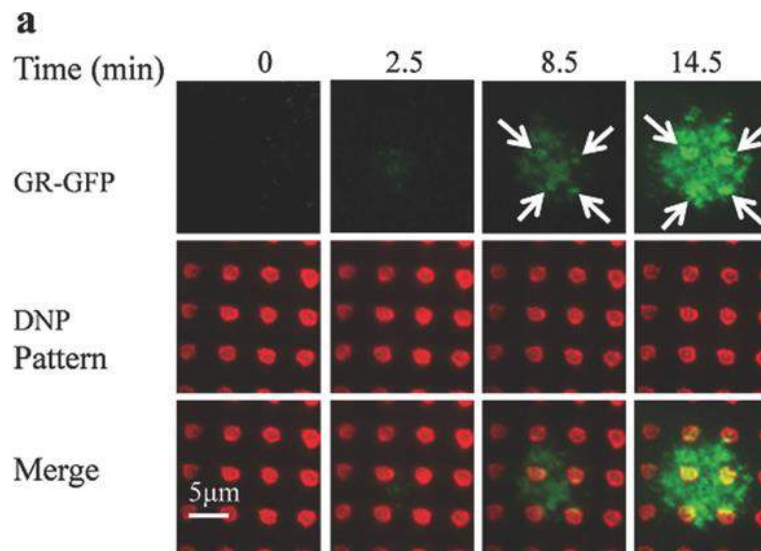
1,2-dihexadecanoyl-*sn*-glycero-3-phosphoethanolamine-N-[6-[(2,4-dinitrophenyl)amino]hexanoyl] (ammonium salt)

Antibody reactivity profile on gradient allergen arrays



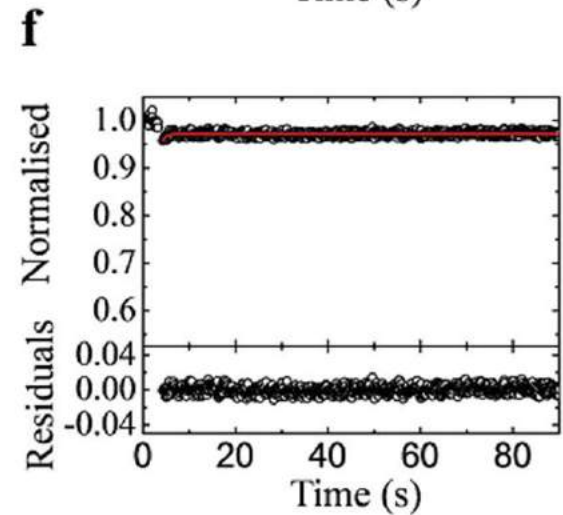
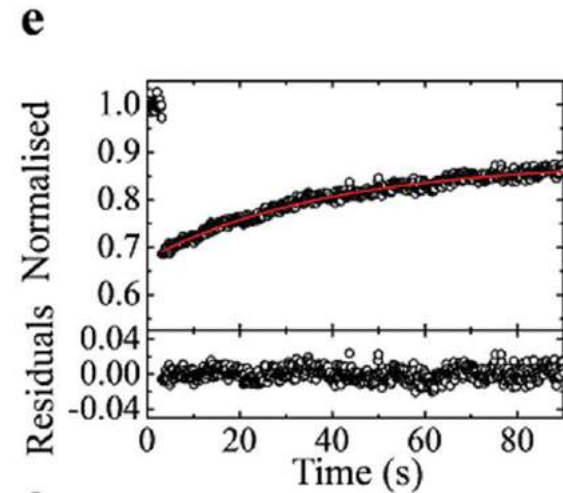
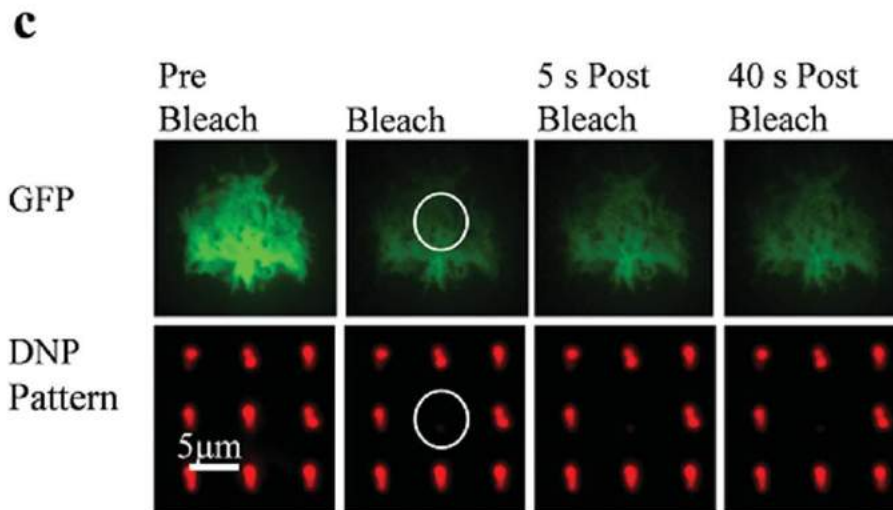
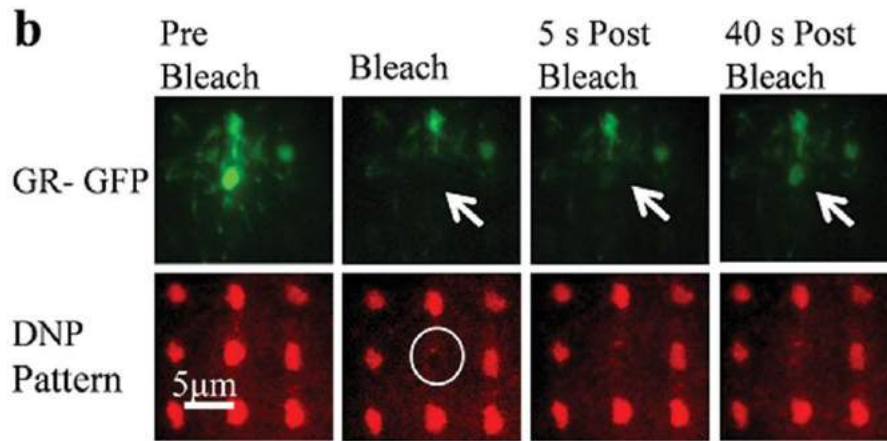
4. Sekula-Neuner *et al.*, 2012, *Small* 8, 585-591

Recruitment and Dynamics of GR at the plasma membrane



4. Oppong *et al.*, 2014, *Small* 10, 1991-1998

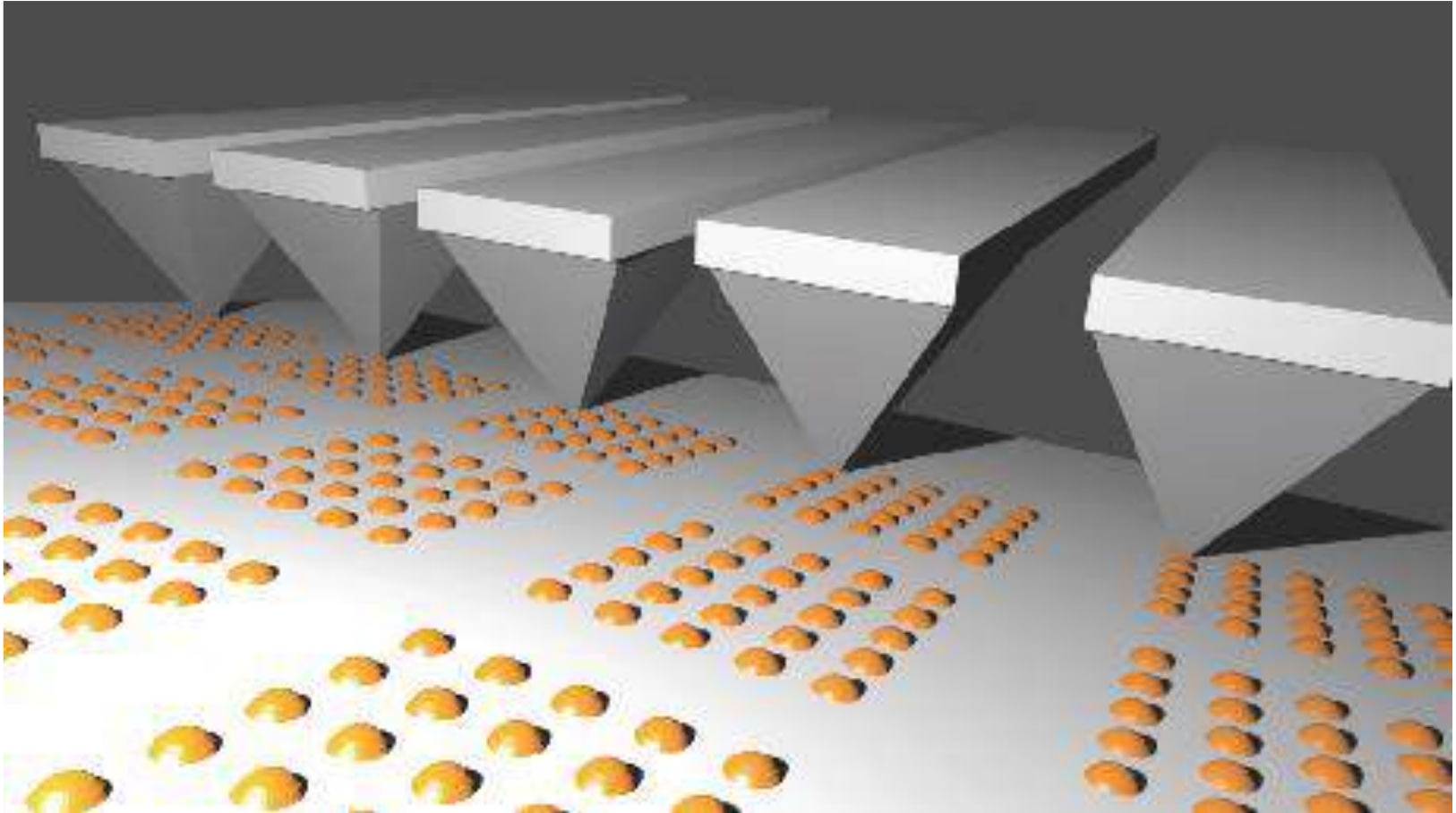
Recruitment and Dynamics of GR at the plasma membrane



4. Oppong *et al.*, 2014, *Small* 10, 1991-1998

Massively parallel deposition

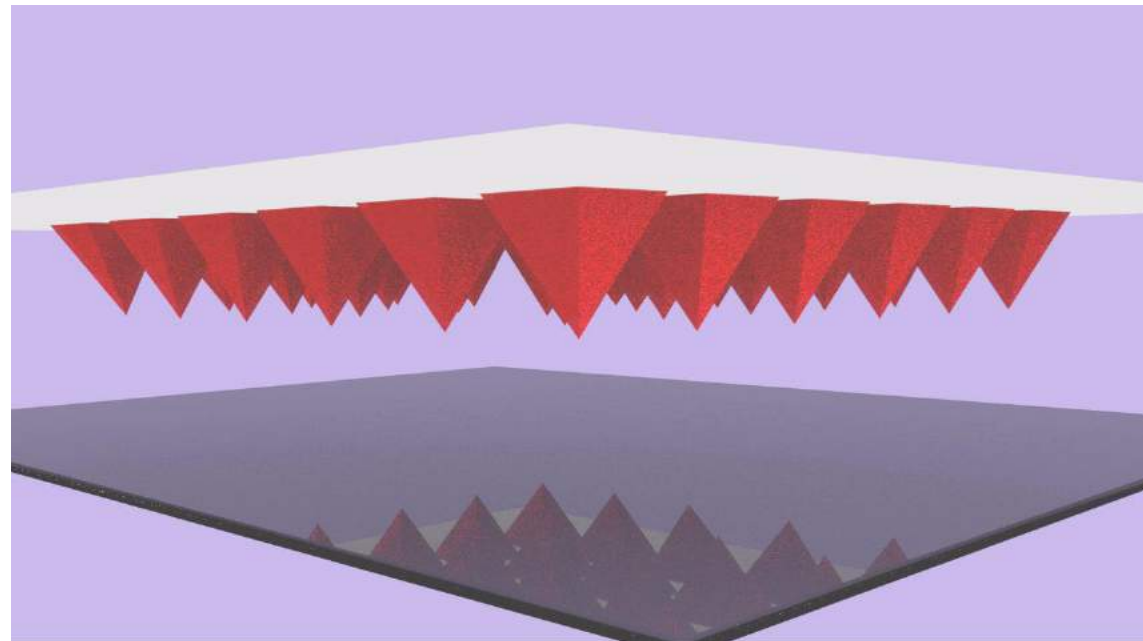
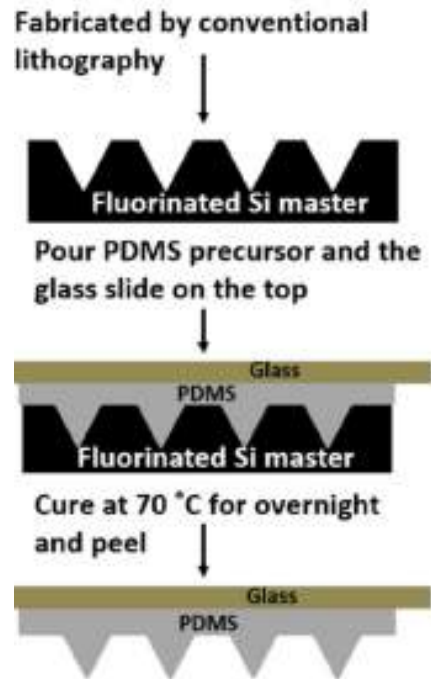
Polymer Pen Lithography



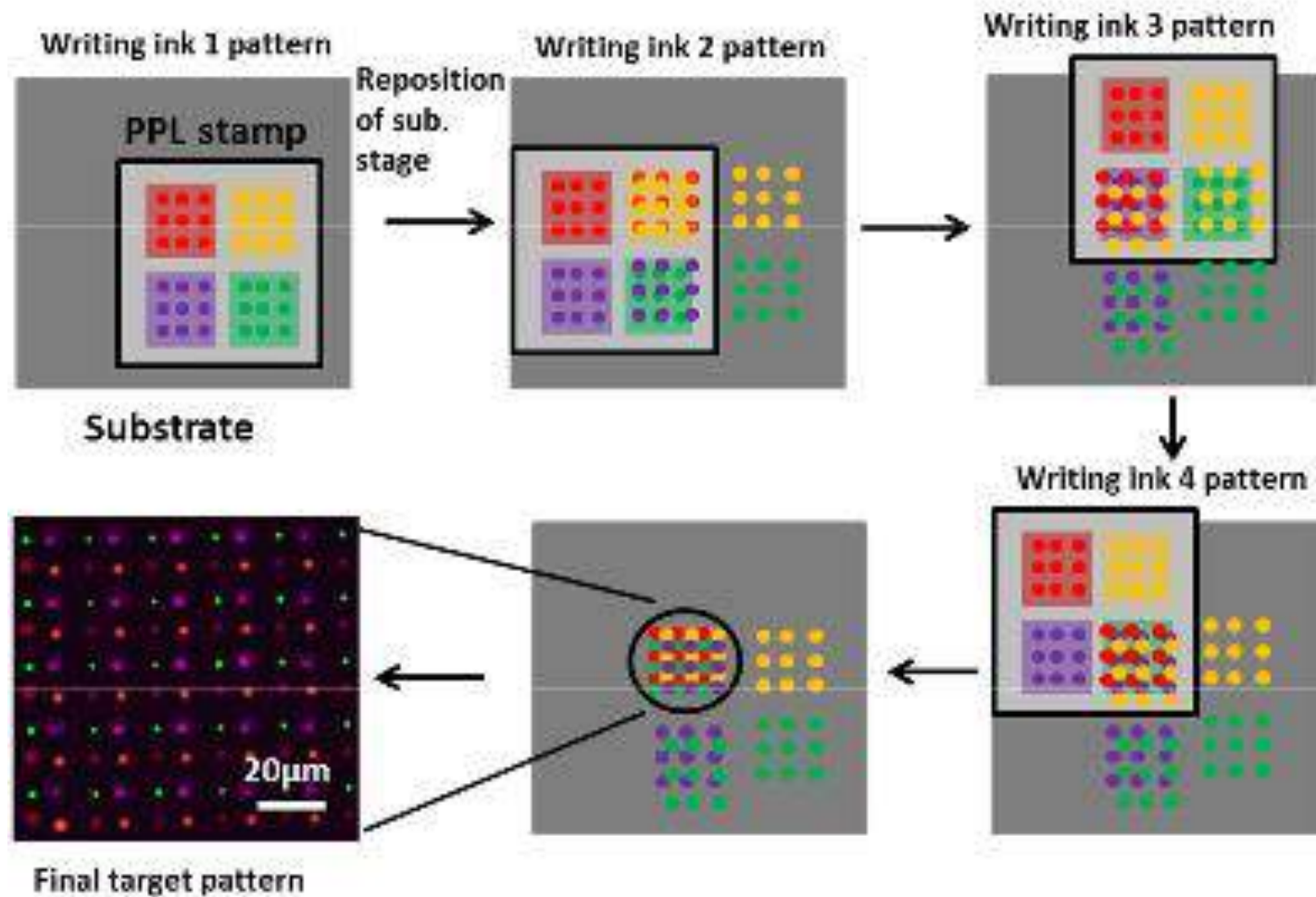
Polymer Pen Lithography

Hybrid technique of μ CP and DPN

Large area (cm^2) patterning + full pattern flexibility by precise spatial control

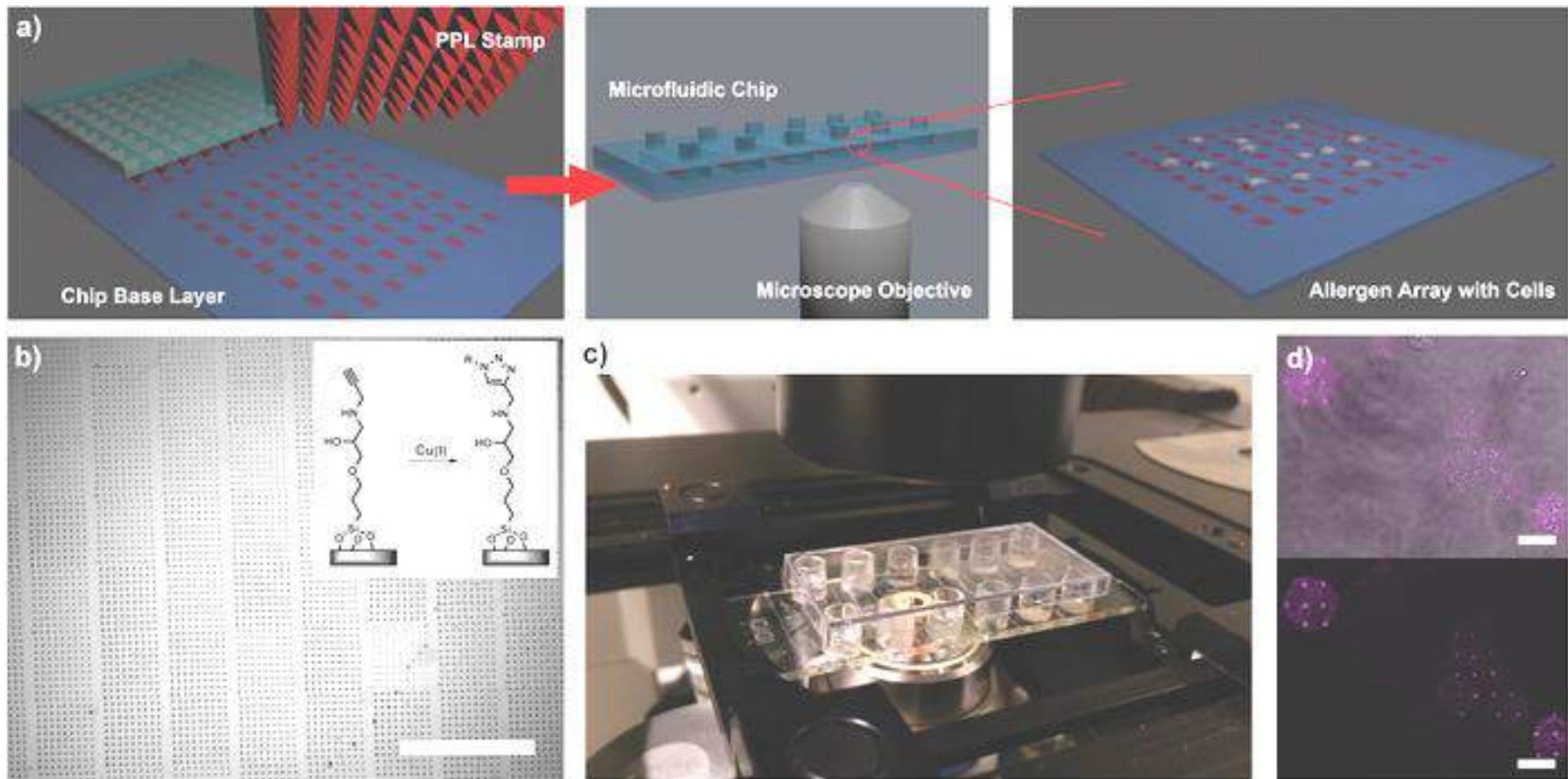


Polymer Pen Lithography



5. Kumar *et al.*, 2016 Chem. Commun. 52, 12310-12313

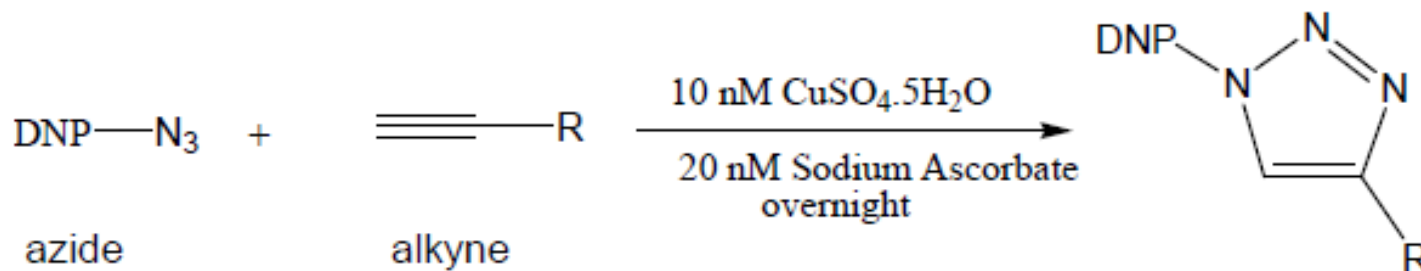
Click-chemistry Based Allergen Arrays for Mast Cell Studies



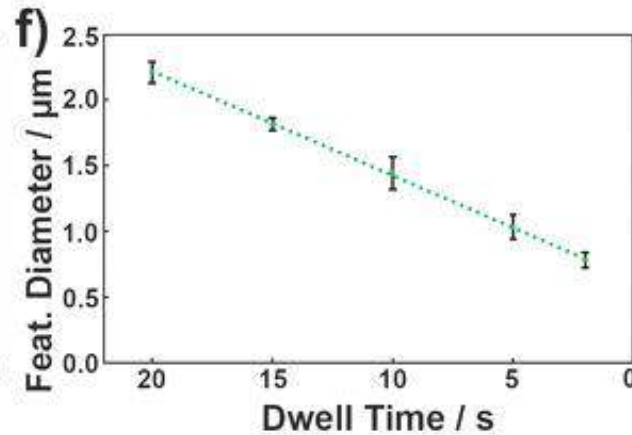
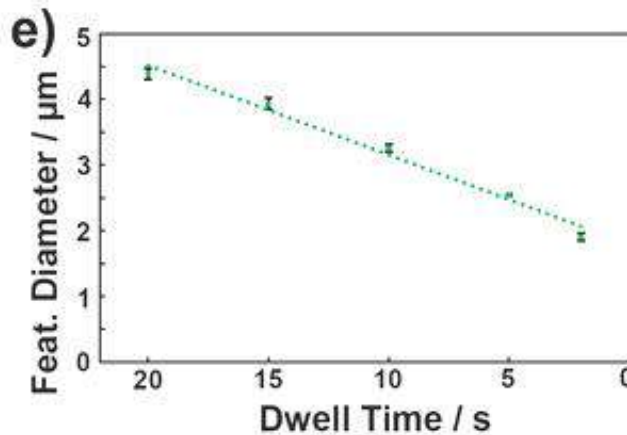
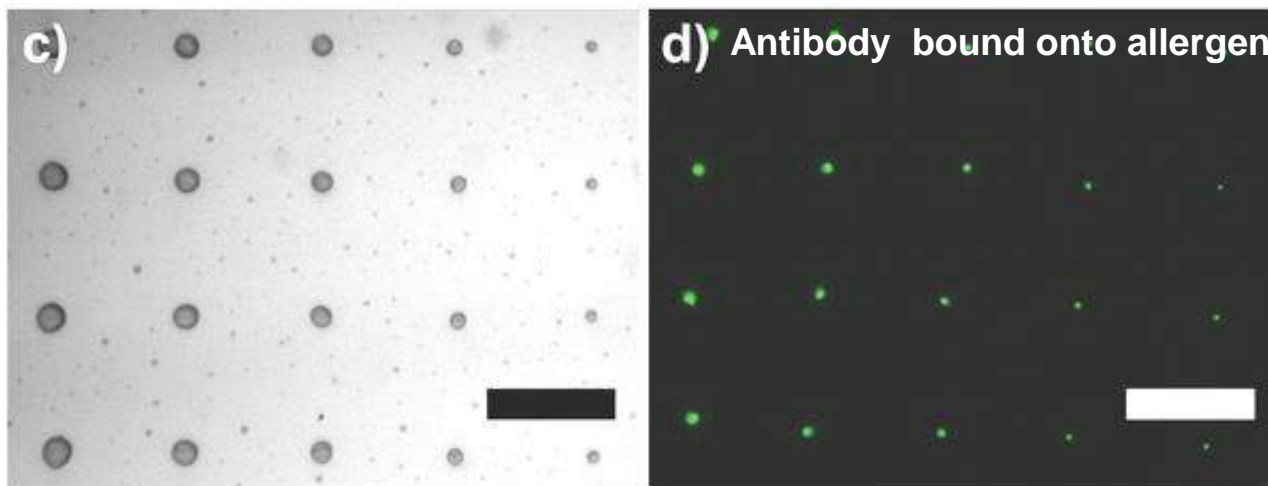
6. Kumar *et al.*, 2016 *Small* 12, 5330 - 5338

- Covalently bound allergen array by Click-chemistry
- Allergen dinitrophenol (DNP)

Copper(I)-catalyzed alkyne-azide cycloaddition (CuAAC)

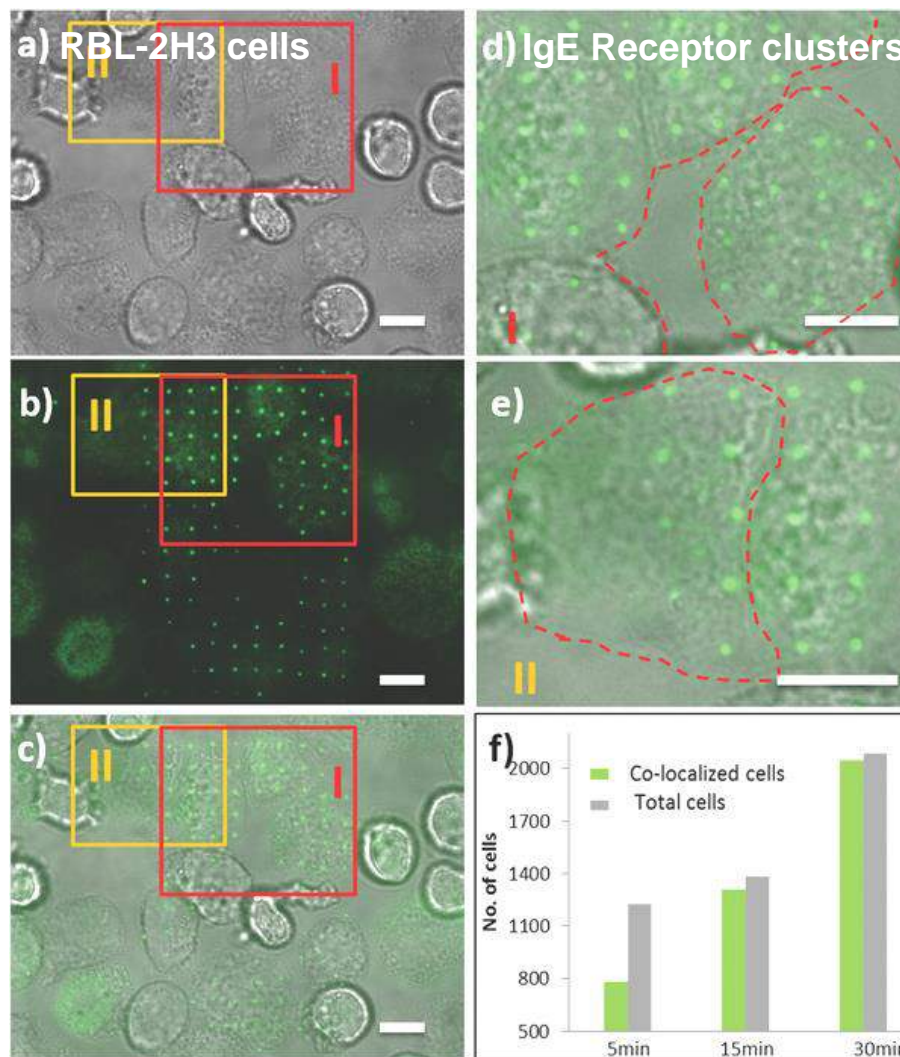


Covalently bound allergen arrays



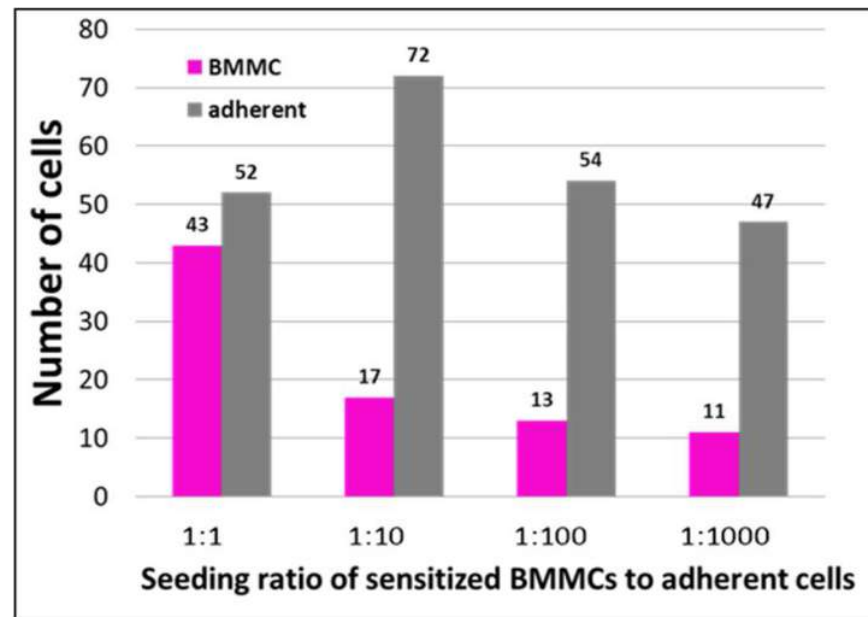
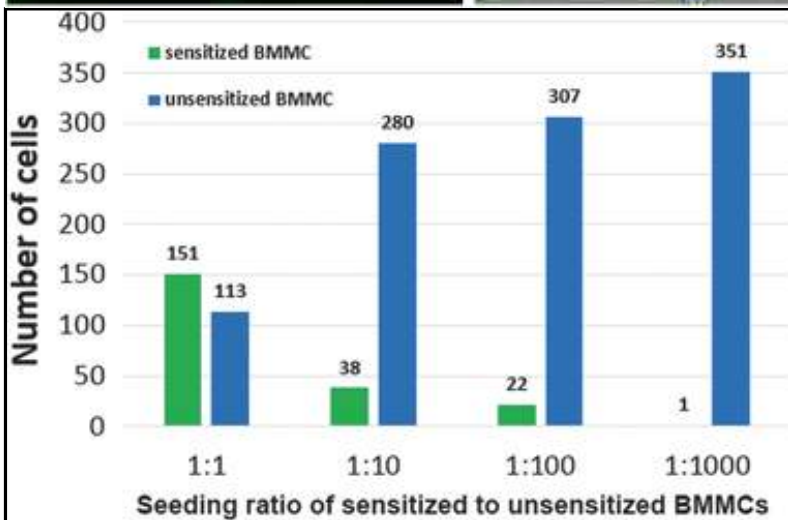
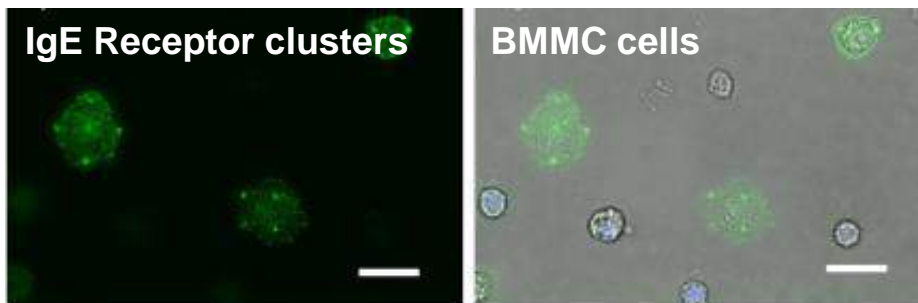
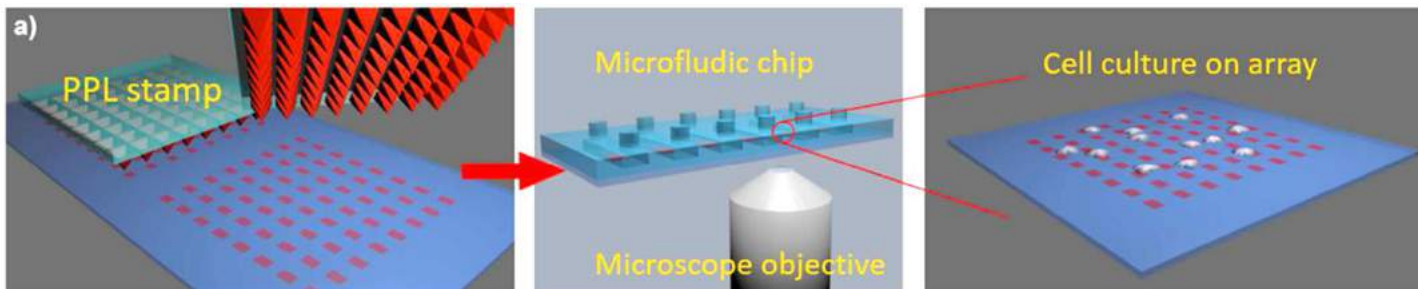
6. Kumar *et al.*, 2016 Small 12, 5330 - 5338

Mast cell activation on click-chemistry based allergen arrays



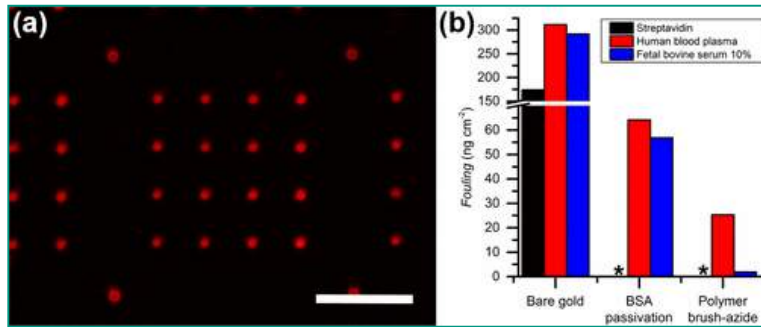
6. Kumar *et al.*, 2016 Small 12, 5330 - 5338

Mast cell enrichment on allergen arrays



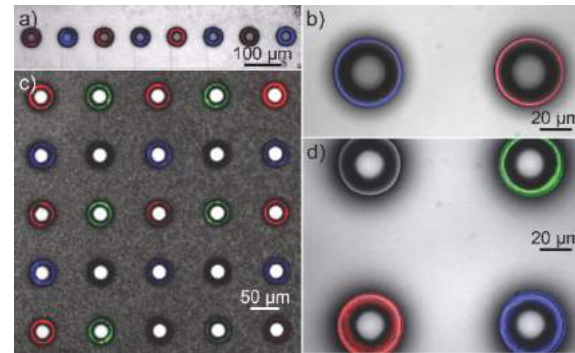
6. Kumar *et al.*, 2016 Small 12, 5330 - 5338

Bioactive surfaces

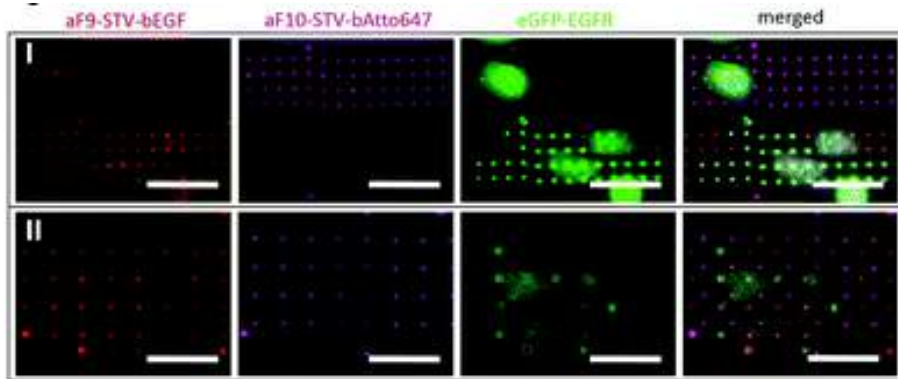


Protein binding on polymer brushes

Sensors

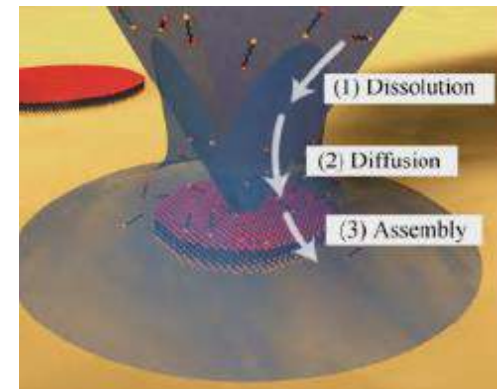


Functionalization of goblets



Oligonucleotide array for cell stimulation

Modelling



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FACILITATING INNOVATION IN
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Dip-Pen Nanolithography and Related Techniques

Institute of Nanotechnology



Prof. Dr. Harald Fuchs
Dr. Michael Hirtz, Group Leader

Institute of Toxicology and Genetics



Prof. Dr. Andrew C. B. Cato
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