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ONLINE WORKSHOP | FEBRUARY 26, 2021

SINGLE CELL METABOLOMICS WORKSHOP

ORGANIZED BY:
 Rima Kaddurah-Daouk, *Duke University*
 Jennifer Kirwan, *Berlin Institute of Health*
 Andrew N. Lane, *University of Kentucky*
 Mioara Larion, *National Cancer Institute*

PROGRAM

10:00 Welcome and Introduction Rima Kaddurah-Daouk, *Duke University*

Session I Chair: Mioara Larion, *National Cancer Institute*

10:05 "Single cell metabolomics for biomedical and drug research"
 Thomas Hankemeier & Ahmed Ali, *University of Leiden*

10:35 "High throughput metabolomics of individual cells in the brain"
 Jonathan Sweedler, *University of Illinois Urbana-Champaign*

11:05 "Optical methodologies to characterize the metabolic underpinnings of breast cancer"
 Nimmi Ramanujam, *Duke University*

11:35 Break


Session II Chair: Jennifer Kirwan, *Berlin Institute of Health*


11:55 "Towards super-resolution metabolic imaging using mass spectrometry imaging"
 Ian Gilmore, *National Physical Laboratory, London*



12:25 "Integrative approaches to study cancer and immune cell metabolism"
 Shawn Davidson, *Princeton University*

General Discussion Chair: Jonathan Sweedler, *University of Illinois Urbana-Champaign*

12:55 Discussants: S. Davidson, I. Gilmore, T. Hankemeier, I. Lanekoff, L-I. McCall, N. Ramanujam, J. Sweedler

Sponsored by:


Metabolomics Association of North America


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Thomas Hankemeier
 University of Leiden

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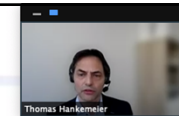
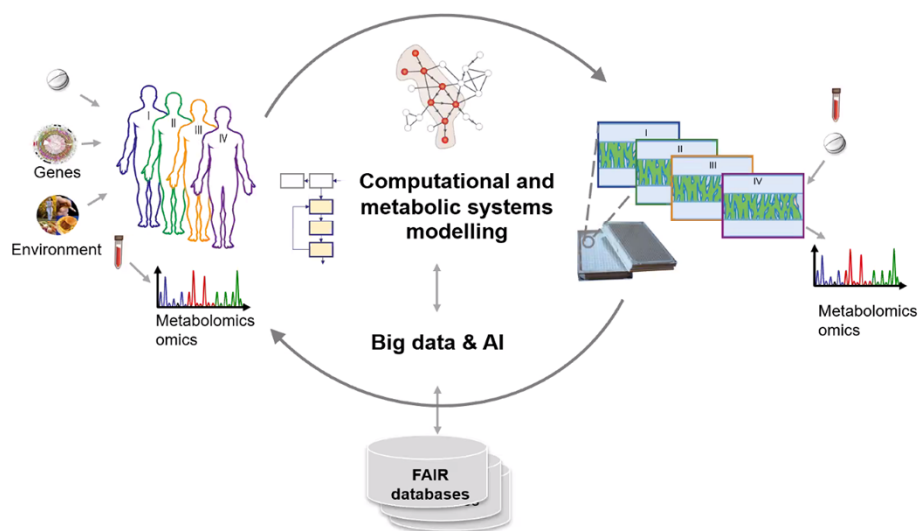
Outline

1. Introduction
2. Applications of SCM-MS
3. SCM shortcomings
4. Integration of MS with other techniques
5. Future work
6. Conclusion



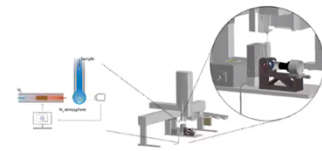
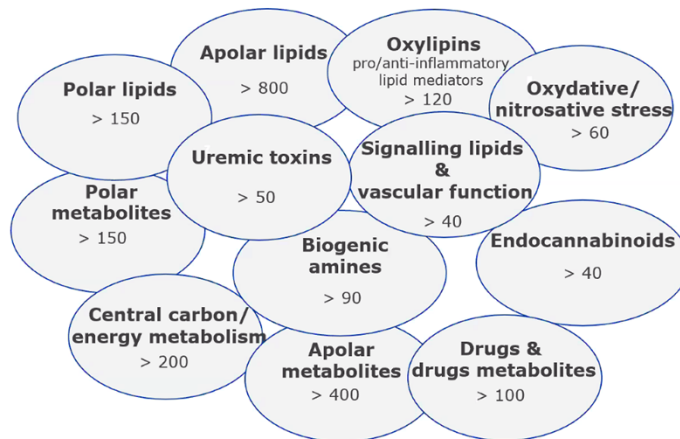
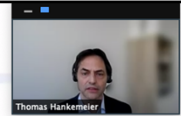
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Outline: Metabolomics for personalized medicine research



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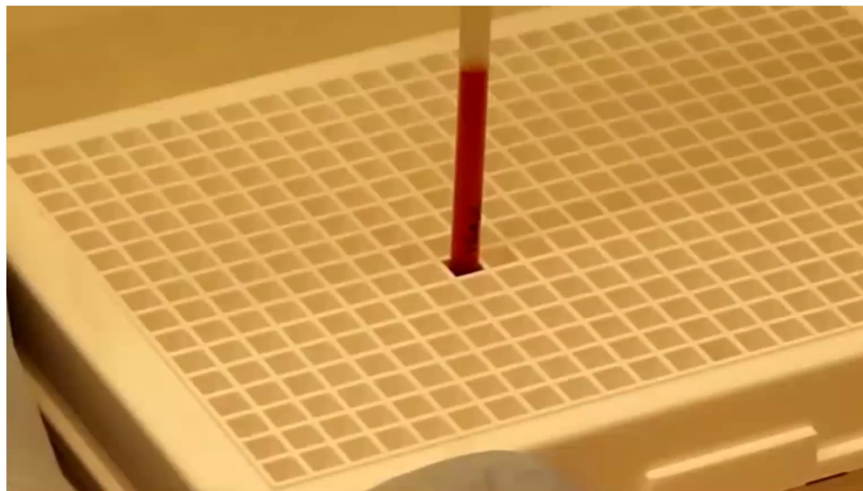
Metabolomics platform for blood and organ-on-chip samples



Innovative technologies for high throughput metabolomics

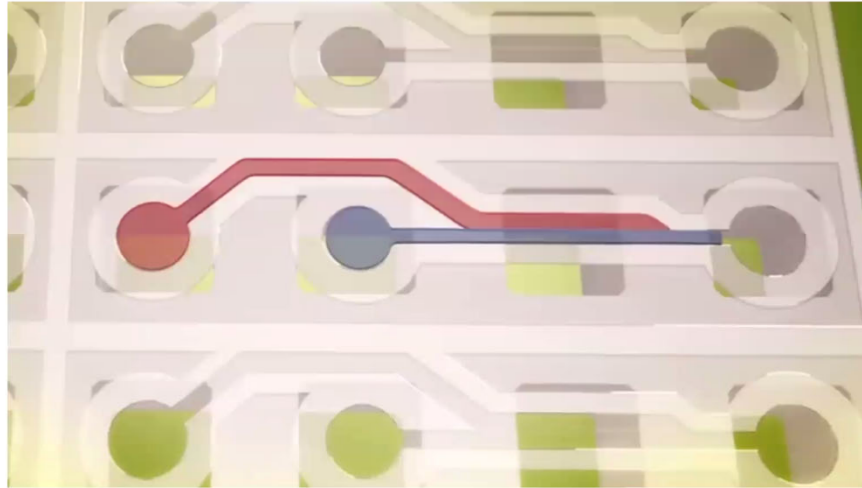
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Innovative patient-derived in-vitro platform for drug research



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Innovative patient-derived in-vitro platform for drug research



MIMETAS
the organ-on-a-chip company

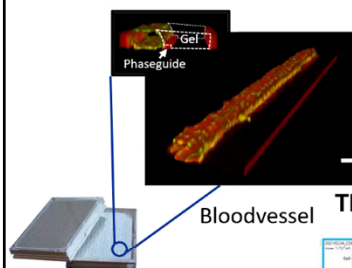
Universiteit
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Trietsch S et al. 2015. Lab on a Chip 13: 3548-54

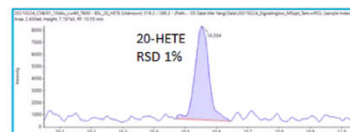
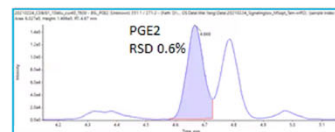
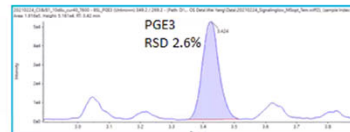
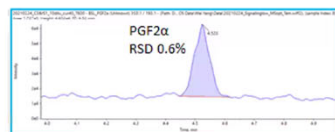
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Immune response in bloodvessels on chip



TNF- α response: proinflammatory & oxidative stress markers



Collaboration with prof. Van Zonneveld (LUMC)

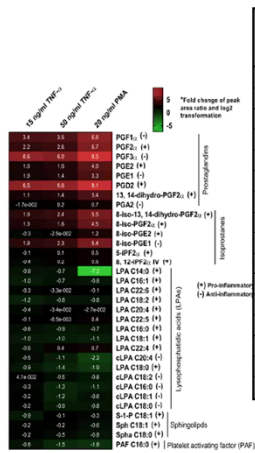
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A. Junaid et al., Elife (2020) e54754

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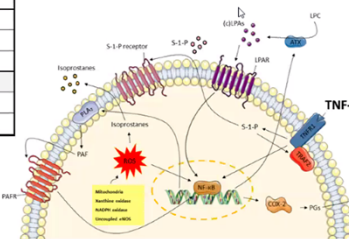
Immune response in bloodvessels on chip



Bioactive lipid	Plasma	Plasma 15 ng/ml TNF	Inflammatory action	Platelet activation	Vascular tone	Angiogenic action
PGF1α	0.0	3.3	anti	no	con	
PGF2α	0.8	3.8	pro	no	con	pro
PGE2*	-2.8	-0.1	pro	anti	dil	pro
PGD2	-4.3	-3.8	anti	anti	con	anti
8-iso-PGF2α*	-3.9	-1.6	pro	anti	con	anti
8-iso-PGE2	-5.4	-4.2	pro	anti	con	anti
LPA C14:0	-8.7	-8.8	pro	pro	con	pro
LPA C22:6*	-4.6	-4.0	pro	pro	con	pro
LPA C18:2	-3.7	-3.3	pro	pro	con	pro
LPA C20:4	-4.2	-3.9	pro	pro	con	pro
LPA C16:0	-4.1	-3.7	pro	pro	con	pro
LPA C18:1	-4.6	-4.0	pro	pro	con	pro
LPA C22:4	-6.6	-6.2	pro	pro	con	pro
cLPA C20:4	-10.3	-10.6	anti	anti	no	
LPA C18:0	-1.6	-0.9	pro	pro	con	pro
S-1-P C18:1	-2.9	-3.9	anti	anti		pro



Wei Yang

Abidemi
Junaid

Collaboration with prof. Van Zonneveld (LUMC)

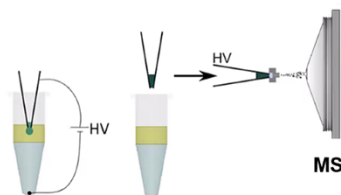


A. Junaid et al., Elife (2020) e54754



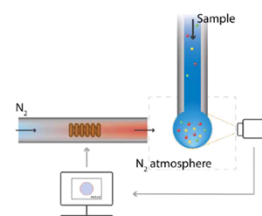
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Novel technologies for miniaturized and high throughput meta



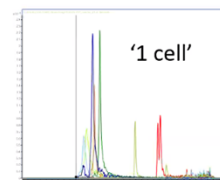
Electroextraction

Raterink et al, Anal Chem (2013) 7762ff

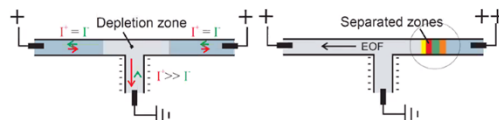


Hanging droplet evaporator

Schoonen et al., Anal. Chem. 2013, 85(12), 5734-39



Miniaturized separations



Depleted zone isotachopheresis

Quist et al., Anal. Chem. (2012) 84: 9065 ff



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