



Universiteit
Leiden
The Netherlands

Vasculature and flow in microfluidic systems

Kramer, B.

Citation

Kramer, B. (2025, October 23). *Vasculature and flow in microfluidic systems*. Retrieved from <https://hdl.handle.net/1887/4279472>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/4279472>

Note: To cite this publication please use the final published version (if applicable).

Vasculature and Flow in Microfluidic Systems

Bart Kramer

Cover: Vascularized liver spheroid in the OrganoPlate Graft

Printing: Ridderprint | www.ridderprint.nl

© Copyright, Bart Kramer, 2025

ISBN: 978-94-6522-726-9

All rights reserved. No part of this book may be reproduced in any form or by any means without permission of the author.

Vasculature and Flow in Microfluidic Systems

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op donderdag 23 oktober 2025
klokke 14.30 uur

door
Bart Kramer
geboren te Woerden
in 1991

Promotor:

Prof. dr. T. Hankemeier

Co-promotores:

Dr. H.L. Lanz

Dr. L.J. van den Broek

Promotiecommissie:

Prof. dr. M. van Eck

Prof. dr. E.C.M. de Lange

Prof. dr. B. van de Water

Prof. dr. A.J. van Zonneveld

Prof. dr. R. Masereeuw (Utrecht University)

Prof. dr. M. Buchholz (Marburg University)

Table of contents

Chapter 1	General introduction	7
Chapter 2	Interstitial Flow Recapitulates Gemcitabine Chemoresistance in A 3D Microfluidic Pancreatic Ductal Adenocarcinoma Model by Induction of Multidrug Resistance Proteins	27
Chapter 3	3D human microvessel-on-a-Chip model for studying monocyte-to-endothelium adhesion under flow – application in systems toxicology	55
Chapter 4	High-throughput 3D microvessel-on-a-Chip model to study defective angiogenesis in systemic sclerosis	99
Chapter 5	A robust and high-throughput approach for the quantification of three-dimensional vascular beds	125
Chapter 6	Conclusions and perspectives	145
Chapter 7	Addendum	155
	Nederlandse samenvatting	
	Curriculum Vitea	
	List of publications	
	Dankwoord	