

## Contents

<b>Main concept</b>	<b>1</b>
Motivation	1
Objectives	1
Thesis outline	2
<b>Chapter I: Inspired by nature: hydrogels as versatile tools for vascular engineering</b>	<b>4</b>
Abstract	4
Neovascularization	5
Hydrogels for vascular engineering	8
Novel (hydrogel-based) technologies for vascularized tissue models	13
Summary	17
<b>Chapter II: Notch-inducing PEG-hydrogels mimic the extracellular matrix switch of MSCs in the perivascular microenvironment</b>	<b>18</b>
Abstract	18
Introduction	19
Results	20
Discussion	30
Experimental section	32
Supporting figures	38
<b>Chapter III: Dual role of mesenchymal stem cells allows for micro-vascularized bone tissue-like environments in PEG hydrogels</b>	<b>41</b>
Abstract	41
Introduction	42
Results & Discussion	43
Experimental section	51
Supporting figures	55
<b>Chapter IV: Synthesis, Conclusions and Outlook</b>	<b>57</b>
Micro-capillary networks engineered in synthetic ECM-free hydrogels	57
Perivascular fate and ECM switch of MSCs in micro-capillary networks	59
Towards vascularized tissue models in synthetic ECM-free hydrogels	60
Vision: Towards complexity or simplicity?	63
<b>References</b>	<b>64</b>