

Screening Functionalised Polymersomes Targeting Transcytosis Across Blood-Brain Barrier

By Xiaohe Tian



The University of Sheffield

Faculty of Pure Science

Department of Biomedical Science

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Declaration

The work described in this thesis was undertaken at Department of Biomedical Science, The University of Sheffield between October 2010 and August 2013, under the supervision of Professor Giuseppe Battaglia. Unless otherwise stated, it is the work of the author and has not been submitted in whole or in any part for any other degree at this or any other institute.

Xiaohe Tian

Department of Biomedical Science

The University of Sheffield

Sheffield

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List of Abbreviations

AAV: Adeno-associated virus

AchR: Acetylcholine receptor

ACM: Astrocyte-conditioned media

AD: Alzheimer's disease

AMT: Adsorptive-mediated transcytosis

ANOVA: One-way analysis of variance

ATRP: Atom-transfer radical-polymerisation

BBB: Blood-brain barrier

BCE: Brain capillary endothelial

BEC: Brain endothelial cell

BCEC: Brain capillary endothelial cells

BCSFB: Blood-cerebrospinal fluid barrier

Bt: Biotin

CAC: Critical Aggregation Concentration

CB: Cerebellum

CD: Cluster of differentiation

CNS: Central nervous system

CP: Choroid plexus

CRP: Controlled radical polymerisation

CSF: Cerebrospinal fluid

DAMPs: Damage-Associated Molecular Pattern molecules

DIC: Differential interference contrast

DLS: Dynamic Light Scattering

DOXO: Doxorubicin

FACS: Fluorescence-activated cell sorting

HD: Huntington's disease

HDF: Human Dermal Fibroblast

HP: Hippocampus

HPLC: High-performance liquid chromatography

HRP: Horseradish peroxidase

IF: Immunofluorescence

IgG: Immunoglobulin G

ISF: Interstitial fluid
ISR: Insoluble:soluble ratio
IV: Intravenous
LDL: Low-density lipoprotein
LRP: Low-density lipoprotein receptor-related protein
MRP: Multi-drug resistance associated protein
MSC: Mesenchymal stem cells
NVU: Neurovascular Unit
PA: Plasminogen activator
PAMP: Pathogen-Associated Molecular Pattern
PBMC: Peripheral blood mononuclear cells
PD: Parkinson's disease
PEG/PEO: Poly(ethylene glycol)/Poly(ethylene oxide)
Pgp: P-glycoprotein
PMPC-PDPA:
poly (2-(methacryloyloxy)ethyl-phosphorylcholine)-co-poly(2-(diisopropylamino) ethyl methacrylate)
PNS: Peripheral nervous system
POEGMA: Poly Oligo (Ethylene Glycol) Methacrylate
RAFT: Reversible addition-fragmentation transfer polymerisation
RBC: Red blood cells
RES: Reticuloendothelial system
RMT: Receptor-mediated transcytosis
ROI: Region Of Interest
RVG: Rabies Virus Glycoprotein
SEM: Scanning electron microscopy
siRNA: small interfering RNA
SMA: Smooth Muscle Actin
SSCs: Small solute carrier(s)
SRB-1: Scavenger receptor class B1
StAv: Streptavidin
TEER: Trans-endothelial electrical resistance
TEM: Transmission Electron Microscope
TGF- β : Transforming growth factor- β
TJ: Tight Junction

TM: Thrombomodulin

ZO: Zonula occludens

ZP: Zeta Potential

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