Development of novel anti-cancer strategies utilizing the zebrafish xenograft model

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Abbreviations

BBB	blood brain barrier
BM	bone marrow
CAFs	cancer-associated fibroblasts
CHT	caudal haematopoietic tissue
CM	conjunctival melanoma
CSC	cancer stem cell
CSF-1	colony-stimulating factor
DHFR	dihydrofolate reductase
DLI	drug-to-light interval
DMC	disseminated melanoma cells
DMEM	dulbecco's minimal essential medium
DOC	duct of cuvier
DOPC	1,2-dioleoyl-sn-glycero-3-phosphocholine
DOPE	1,2-dioleoyl-sn-glycero-3-phosphoethanolamine
DOX	doxorubicin hydrochloride
Dpf	days post fertilization
ECCC	european collection of cell cultures
ECM	extracellular matrix
EE	entrapment efficiency
EMT	epithelial-to-mesenchymal transition
EPR	enhanced permeability and retention
FACS	fluorescence-activated cell sorting
FCS	fetal calf serum
FOV	field of view
GBM	glioblastoma multiforme
GM	glutamine-S
HIF-1α	hypoxia-inducible factor 1α
Hpi	hours post injection
IDH1	isocitrate dehydrogenase 1
IFNγ	interferon gamma
IV	intravenous administration
LSECs	liver sinusoidal endothelial cells
MMPs	matrix metalloproteinases
MTD	maximum tolerated dose
Mtmp	methylthiomethylpyridine
MTZ	metronidazole

NSCLC	non-small-cell lung cancer
NTR	nitroreductase
OXPHOS	oxidative phosphorylation
P/S	penicillin/streptomycin
PACT	photoactivated chemotherapy
PBS	phosphate-buffered saline
PCV	posterior caudal vein
PDT	photodynamic therapy
PDX	patient-derived xenografts
PET	positron emission tomography
PI	phototherapeutic index
PIGF	placental growth factor
PpIX	protoporphyrin IX
PSs	photosensitizers
Pt	platinum
RES	reticulo-endothelial system
RFP	red fluorescent protein
RGP	radial growth phase
RO	retro-orbital administration
ROS	reactive oxygen species
Ru	ruthenium
SECs	scavenger endothelial cells
SIV	sub-intestinal vein
SRB	sulforhodamine B
TAAs	tumor-associated-antigens
TAM	tumour-associated macrophages
TCA	trichloroacetic acid
2DG	2-deoxy-d-glucose
2HG	2-hydroglutarate
5-ALA	5-aminolevulinic acid
TEM	transmission electron microscopy
TLRs	toll-like receptors
TME	tumour microenvironmet
TNF-α	tumour necrosis factor alpha

TSAs	tumour-specific-antigens
UCNPs	upconverting nanoparticles
UVR	ultra-violet radiation
VEGF	vascular endothelial growth factor
VGP	vertical growth phase
WA	water administration
zPDX	patient-derived xenografts in zebrafish

Publication List

1. C. Tulotta, C. Stefanescu, **Q. Chen**, V. Torraca, A. H. Meijer & B. E. Snaar-Jagalska. CXCR4 signaling regulates metastatic onset by controlling neutrophil motility and response to malignant cells. Scientific Reports. 2019, 9, 2399

2. Li Kong#, **Quanchi Chen#**, Frederick Campbell, Ewa Snaar-Jagalska, Alexander Kros. Light triggered, cancer cell-specific targeting and liposomal drug delivery in a zebrafish xenograft model. Advanced healthcare materials. 2020, e1901489

3. **Quanchi Chen**, Vadde Ramu, Yasmin Aydar, Arwin Groenewoud, Xue-Quan Zhou, Martine J. Jager, Houston Cole, Colin G. Cameron, Sherri A. McFarland, Sylvestre Bonnet, and B. Ewa Snaar-Jagalska. TLD1433 photosensitizer inhibits conjunctival melanoma cells in zebrafish ectopic and orthotopic tumour models. Cancers. 2020, 12, 587; doi:10.3390

4. **Quanchi Chen**, Li Kong, Frederick Campbell, Ewa Snaar-Jagalska, Alexander Kros. Effects of PEGylation on the in vivo biodistribution of differently charged liposomes. Manuscript in preparation

5. **Quanchi Chen**, Vadde Ramu, Yasmin Aydar, Xue-Quan Zhou, B. Ewa Snaar-Jagalska, Sylvestre Bonnet. New ruthenium-based photoactivated chemotherapy compound is cytotoxic for various tumour cells in culture and conjunctival melanoma cells in zebrafish orthotopic xenograft model. Manuscript in preparation

Curriculum vitae

Quanchi Chen was born on the 2nd of October 1990 in Yancheng, Jiangsu, China. In 2008, he started his bachelor studies in clinical medicine at Nanjing Medical University. In 2013 he continued his master research in Shanghai Tenth People's Hospital. After obtaining his master degree in 2015, he was awarded a research scholarship from the Chinese Scholarship Council. With this scholarship, he moved to the Netherlands and joined the group headed by Prof. B. Ewa Snaar-Jagalska in the Institute of Biology Leiden at Leiden University and performed his PhD research project entitled "Development of novel anti-cancer strategies utilizing the zebrafish xenograft model". In this project, he utilized the zebrafish embryonic tumour models to investigate how macrophages modified by the tumour microenvironment promote tumour angiogenesis formation. In collaboration with Prof. Alexander Kros and Prof. Sylvestre Bonnet from the Leiden Institute of Chemistry at Leiden University he developed and utilized zebrafish cancer models to optimize the light-triggered liposome system to deliver doxorubicin specifically to cancer cells and tested anti-cancer efficacy of novel PDT and PACT compounds to attenuate ocular melanoma. He presented his research at international conferences and supervised four MSc students.