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Lipid bilayers decorated with photosensitive ruthenium complexes

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Lipid bilayers decorated with photosensitive ruthenium complexes

PROEFSCHRIFT

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volgens besluit van het College voor Promoties
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door

Azadeh Bahreman
geboren te Babol, Iran
in 1982

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“There may be one fault in a man that conceals a thousand qualities, or one excellence that conceals a thousand faults. The little indicates much.”

Shams Tabrizi

To my parents
and Saeed

Table of Contents

List of abbreviations.....5

Chapters

1 General Introduction.....9

2 Ruthenium polypyridyl complexes hopping at anionic lipid bilayers via a supramolecular bond sensitive to visible light……..…….45

3 Spontaneous formation in the dark, and visible light-induced cleavage, of a Ru-S bond in water: a thermodynamic and kinetic study……69

4 Binding of a ruthenium complex to a thioether ligand embedded in a negatively charged lipid bilayer: a two-step mechanism.....101

5 Liposomes functionalized with ruthenium complexes: towards a tumor targeted light-controlled anticancer prodrug.....123

6 Yellow-light sensitization of a ligand photosubstitution reaction in a ruthenium polypyridyl complex covalently bound to a rhodamine dye.....153

7 Summary, conclusions and outlook……..…….……..177

Appendices

AI General photochemistry methods.....187

AII Supporting information for Chapter 2.....195

AIII Supporting information for Chapter 3.....201

AIV Supporting information for Chapter 4.....215

AV Supporting information for Chapter 5.....219

AVI Supporting information for Chapter 6.....223

Samenvatting (Dutch summary).....227
List of Publications.....235
Curriculum Vitae.....237
Nawoord (Acknowledgements).....239

List of abbreviations

A2780	human ovarian carcinoma cell line
A2780 R	cisplatin-resistant human ovarian carcinoma cell line
A	absorbance
A_{inf}	Absorbance at t=infinity
ATP	Adenosine triphosphate
BCA	bicinchoninic acid
biq	2,2'-biquinoline
bpy	2,2'-bipyridine
cisplatin	*cis*-diamminedichloridoplatinum(II)
COSY	correlation spectroscopy
chol	cholesterol
d	doublet (in NMR)
dd	doublet of doublet (in NMR)
dcbpy	6,6'-dichloro-2,2'-bipyridine
DCC	dicyclohexylcarbodiimine
DCM	dichloromethane
DLS	dynamic light scattering
dmbpy	6,6'-dimethyl-2,2'-bipyridine
DMPA	4-dimethylaminopyridine
DMEM	Dulbecco's Modified Eagle Medium
DMPC	1,2-dimyristoyl-*sn*-glycero-3-phosphocholine
DNA	deoxyribonucleic acid
DMPG	1,2-dimyristoyl-*sn*-glycero-3-phosphoglycerol (sodium salt)
DOPC	1,2-dioleoyl-*sn*-glycero-3-phosphocholine
DOPG	1,2-dioleoyl-*sn*-glycero-3-phospho-(1'-rac-glycerol) (sodium salt)
DMSO	Dimethyl sulfoxide
DSPE	1,2-dioctadecanoyl-*sn*-glycero-3-phosphoethanolamine
em	emission
eq	equivalent
ESI-MS	electron spray ionization mass spectrometry
Et	ethyl
exc	excitation

FCS	fetal calf serum
FRET	Förster resonance energy transfer
GS	ground state
H_4EDTA	ethylenediaminetetraacetic acid
HepaRG	human hepatic progenitor
HepG2	liver hepatocellular carcinoma cell line
Hmte	2-(methylthio)ethanol
HRMS	high resolution mass spectroscopy
I	ionic strength
ICP-OES	Inductively Coupled Plasma Optical Emission Spectroscopy
irr	irradiation
ITC	isothermal titration calorimetry
[lipid]	Lipid bulk concentration in a liposome formulation
LUVs	Large unilamellar vesicles
MC	Metal-centered
Me	methyl
MLCT	Metal-to-ligand charge transfer
NBD-PC	1-acyl-2-{12-[(7-nitro-2-1,3-benzoxadiazol-4-yl)amino]dodecanoyl}-*sn*-glycero-3-phosphocholine
NMR	nuclear magnetic resonance
PBS	Phosphate-buffered saline
PACT	Photoactivated chemotherapy
PDT	photodynamic therapy
PEG	polyethylene glycol
phen	1,10-phenanthroline
Ph. red	phenolsulfonphthalein
ppb	parts per billion
ppm	parts per million
P/S	penicillin/streptomycin
pymi	phenylpiridin-2-ylmethylene-imine
rpm	revolutions per minute
r.t.	room temperature
$[Ru]_{tot}$	total bulk concentration of ruthenium complex
Ru-DMPG	ruthenium complex supported on DMPG liposome
RuHmte	ruthenium complex containing an Hmte ligand
$RuOH_2$	ruthenium complex containing an aqua ligand

RuSRR‘	ruthenium complex containing a sulfur-containing ligand
s	singlet (NMR)
T	temperature
t	triplet (NMR) or time
TEM	transmission electron microscopy
terpy	2,2';6',2"-terpyridine
TMS	tetramethylsilane
WST-1	2-(4-Iodophenyl)-3-(4-nitrophenyl)-5-(2,4-disulfophenyl)-2H-tetrazolium sodium salt