Evaluation of antitumor activity of zinc selenite nano particles compared with ionic liquid in tumor-bearing animal

A thesis
Submitted for the degree of Master of Science as a partial fulfillment
for requirements of the Master of Science

Submitted by

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B.Sc. in Chemistry/Biochemistry (2009) - Mansoura University

To
Faculty of Science
Ain Shams University
Department of Biochemistry

Under the Supervision of

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(2016)

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

﴿ رَبِّ أَوْزِعْنِيٓ أَنْ أَشْكُرَ نِعْمَتَكَ ٱلَّتِيٓ أَنْعَمْتَ عَلَيَّ وَعَلَىٰ وَٰلِدَيَّ وَأَنْ أَعْمَلَ صَٰلِحًا تَرْضَىٰهُ وَأَدْخِلْنِي بِرَحْمَتِكَ فِي عِبَادِكَ ٱلصَّٰلِحِينَ ﴿١٩﴾ ﴾

النمل: ١٩

صدق الله العظيم

Declaration

I declare that this thesis has been composed by myself and that the work which is recorded here in after has been done by myself. It has not been submitted for a degree at this or any other university.

Islam Younis

Dedication

I dedicate this work with all my love to my family and for all my friends and those from whom I have learned, whenever and wherever they are.

Isalm Younis

Acknowledgment

الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ

Praise is to Allah, the lord of all creatures who taught man the whole science and the names of all things.

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Islam Younis

Content

List of abbreviations

BHK-21	baby hamster kidney
$ZnSeO_3$-NPs	Zinc selenite Nano particles
BUN	Blood urea nitrogen
CAT	Catalase
CEA	Carcinoembryonic antigen
CTLs	Cytotoxic T-lymphocytes
DEN	Diethylinitrosamine
DISC	Death-inducing signaling complex
DNA	Deoxyribonucleic acid
DPTA	Diethylene triamine Penta acetic acid
DTNB	5,5`dithino-bis-(2-nitrobenzoic acid)
ECM	Extracellular matrix
EDTA	Ethylene di amine tetra acetic acid
FAD	Flavin adenine dinucleotide
FADD	FAS-associated death domain
FASL	FAS Ligand
Fe-NTA	Ferric-nitrilotriacetate
GPx	Glutathione peroxidise
GSH	Reduced glutathione
HE	Hematoxylin eosin stain
HSe^-	Selenide
IC_{50}	The half maximal inhibitory concentration
ICAD	Inhibitor of Caspase Activated DNase
Ils	Ionic liquids
LD_{50}	Median lethal dose
LDH	Lactate dehydrogenase
LPx	Lipid peroxidation
MDA	Malonadi-aldhyde
NAD^+	Nicotinamide adenine dinucleotide
NADH	Reduced form of NAD^+
$NADP^+$	Nicotinamide adenine dinucleotide phosphate

NBT	Nitro blue tetrazolium
NP	Nano particles
NTA	Nitrilotriacetate
p53	Tumor protein 53
RCC	Renal cell carcinoma
RNA	Ribonucleic acid
RNS	Reactive nitrogen species
ROS	Reactive oxygen species
Se	Selenium
SeCys	Seleno-cysteine
SeM	Seleno-methionine
SeMet	Seleno-methionine
SeO_2	Selenium di oxide
SeO_3^{-2}	Selenite
SOD	Superoxide dismutase
TBA	Thiobarbituric acid
TCA	Trichloroacetic acid
TEM	Transmission electron microscopy
TRADD	TNFR-associated death domain
TRAF-2	TNFR-associated factor-2
VACSERA	The holding company for biological products and vaccines
VEGF-A	Vascular endothelial growth factor-A

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