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Biological Studies on the Effect of Some Nano-Materials Used in Processing Military Protection Wears on the Skin

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بسم الله الرحمن الرحيم

يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

صدق الله العظيم

{المجادلة:11}

DEDICATION

I dedicate this work to all my family specially to the soul of my father, to my mother, my wife and my children for their support, quiet patience and unwavering love .

Thank for you all

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Sameh Abouzead

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List of Abbreviations

A549	Human alveolar epithelial cell line
ANOVA	Analysis of Variance
BAL	Broncho-Alveolar Lavage cell line
BEAS-2B	Human bronchial epithelium cell line
Caco-2	Human Colorectal adeno-carcinoma cell line
CB-NPs	Carbon Black Nanoparticles
CDNB	2,4-Dinitrochlorobenzene
DMEM	Dulbecco's Modified Eagle's medium
DTNB	1-Chloro-2,4-Dinitrobenzene
E. coli	*Escherichia coli*
EDTA	Ethane-1,2-Diyldinitrilo Tetra-Acetic acid
EDX	Energy Diffraction X-ray spectrum
ELISA	Enzyme Linked Immune Sorbent Assay
ESTs	Esterases
FTIR	Fourier Transform Infra-Red spectroscopy
GR	Glutathione Reductase
GSH	Reduced Glutathione
GSSG	Oxidized Glutathione
GST	Glutathione-S-Transferase
HaCaT	Human keratinocytes cell line
HDF	Human Dermal Fibroblasts cell line

HUVECs	Human umbilical Vein Endothelial cells
ICP-mass	Inductively Coupled Plasma mass spectroscopy
IR	Infrared
K. pneumonia	*Klebsiella pneumonia*
KDa	kilodalton
L-132	Human lung epithelial cells
LDH	Lactate Dehydrogenase
LM	Light Microscope
MDA	Malondialdehyde
MMPs	Matrix Metalloproteinase
MTS	Methylthiazol Tetrazolium Salt
MTT	Mitochondria cell viability assay
NADPH	Nicotinamide Adenine Dinucleotide Phosphate-oxidase
NMs	Nanomaterials
N-PAGE	Native Polyacrylamide Gel Electrophoresis
NPs	Nanoparticles
NTMPW	Nano-Treated Military Protection Wears
PBS	Phosphate Buffered Saline
PCR	Polymerase Chain Reaction
RAW264.7	Mouse monocyte macrophage cell line
REF-3	Rat Embryo Fibroblast cell line
Rm	Relative mobility
ROS	Reactive Oxygen Species

RT-PCR	Real-Time quantitative PCR
S. aureus	*Staphylococcus aureus*
S. epidermidi	*Staphylococcus epidermidis*
SC	Stratum Corneum
SD	Standard Deviation
SDS	Sodium Dodecyl Sulfate
SDS-PAGE	Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis
SEM	Scanning Electron Microscope
SG	Stratum Granulosum
SOD	Super Oxide Dismutase
SS	Stratum Spinosum
TEM	Transmission Electron Microscopy
TEMED	Tetramethylethylenediamine
TiO_2-NPs	Titanium dioxide Nanoparticles
TOF-SIMS	Time of Flight Secondary Ion Mass Spectrometry
UV	Ultraviolet
UV-VIS	Ultraviolet–Visible Spectroscopy
X	Mean
XRD	X-Ray Diffraction
XRF	X-ray Fluorescence
ZnO-NPs	Zinc Oxide Nanoparticles

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