Acknowledgement

First and foremost, praises and thanks to Allah, Al-Kareem, for his showers of blessings throughout my research work to complete this dissertation successfully.

I would like to express my deep gratitude to **Prof. Dr. Hamdy Hamed Swelim**, Professor of Cell Biology and Histology, Zoology Department, Faculty of Science, Ain Shams University, for his keen interest and devoted work to produce this thesis as clear as possible.

I would like to express my respectful thanks to **Prof. Dr. Ali Mohamed Ali Abd El-Aal**, Professor of Physiology, Zoology Department, Faculty of Science, Ain Shams University, for his fruitful notes and stimulating generous support during the whole time of thesis writing.

I am greatly indebted to **Dr. Salwa Mohamed Mahmoud El-Hallouty**, Associate Prof. of Biochemistry, Pharmacognosy Department, National Research Center, for her great effort with me during laboratory work and continuous help whenever needed. Also, many thanks to **Dr. Radwa Donia,** Research Assistant, National Institute of Nutrition, Ministry of Health**,** for her help in statistical analysis.

I would like to thank all of my family, especially my parents, whose love and help had motivated me to achievements beyond my own expectations as well as my friends who encouraged me during this work.

Contents

LIST OF ABBREVIATIONS

A549	Human lung adenocarcinoma cells.
ANOVA	One-way analysis of variance.
Av	Autophagic vacuoles.
BJcuL	Lectin from the venom of the snake *Bothrops jararacussu.*
BjV	*Bothrops jararaca* venom.
BmK	*Buthus martensi Karsch*.
BV	Bee venom.
CCV	*Cerastes cerastes* venom.
CN	Contortrostatin.
CrTX	Crotoxin.
CTX III	Cardiotoxin III.
DNA	Deoxyribonucleic acid.
DTNB	5, 5 dithiobis (2 –nitrobenzoic acid).
EAT	Ehrlich ascites tumor.
F	Filopodia.
FBS	Fetal bovine serum.
Fis1	Mitochondrial fission 1 protein.
g	Glycogen granules.
G	Golgi cisternae.
GSH	Glutathione reduced.

H. lepturus	*Hemiscorpious lepturus*.
H_2O_2	Hydrogen peroxide.
HBV	Hepatitis B virus.
HCC	Hepatocellular carcinoma.
HCV	Hepatitis C virus.
HeLa	Human cervical carcinoma cells.
HEp-2	Human laryngeal carcinoma cells.
HepG-2	Human hepatocellular carcinoma cell line.
IC_{50}	The half maximal inhibitory concentration.
K	Karyolysed nucleus.
K562	Human erythroleukemic cell line.
Kr	Karyorrhexis of the nucleus.
L	Lipid globules.
LAAO	L-amino acid Oxidase.
LD_{50}	Median lethal dose.
Lp	Lipofuscins.
Ly	Lysosomes.
M	Mitochondria.
MCF-7	Human breast cancer cells.
MDA	Malondialdehyde.
Mf	Myelin figures.
MTT	3-(4, 5-dimethylthiazol-2-yl)-2, 5-

	diphenyltetrazolium bromide.
N	Nucleus.
NCI-H292	Human lung mucoepidermoid carcinoma cells.
Ne	Nuclear envelope.
Nu	Nucleolus.
OHAP-1	Okinawa Habu apoxin protein-1.
OsO_4	Osmium tetroxide.
P	Peroxisomes.
PBS	Phosphate buffer saline.
Pk	Pyknotic nucleus.
PLA_2s	Phospholipase A_2s.
Pm	Plasma membrane.
RER	Rough endoplasmic reticulum.
ROS	Reactive oxygen species.
SCLC	Small cell lung cancer cell line.
SD	Standard deviation.
SDS	Sodium dodecyl sulfate.
SEM	Standard error of mean.
SER	Smooth endoplasmic reticulum.
SPSS	Statistical package for social science.
SVT	Snake venom toxin.
TAC	Total antioxidant capacity.
TBA	Thiobarbituric acid.

TEM	Transmission electron microscope.
U251-MG	Malignant glioma cells.
V	Vacuoles.

List of Tables

List of Figures

Abstract

Snake venoms are mixtures of bioactive proteins, peptides and enzymes that stimulate diverse biochemical activities and that made them attractive sources for research into potentially novel therapeutics. In the current study, *Cerastes vipera* crude venom was chosen to study its efficiency in inducing significant cytotoxicity to cancer cell line HepG-2. We performed a cytotoxicity test, morphological studies by using inverted microscope, transmission electron microscope (TEM) investigations and biochemical analyses by estimating the levels of glutathione reduced (GSH), lipid peroxide/malondialdehyde (MDA) and total antioxidant capacity (TAC) to examine cytotoxic effects of different concentrations of *Cerastes vipera* crude venom toward the cancer cell line HepG-2 at different time intervals.

MTT cell viability assay of cancer cells incubated with crude venom revealed that the venom showed significant cytotoxicity, besides we determined the IC_{50} of the venom. In general, the data proved that doses related to the IC_{50} of viper venom were potently cytotoxic to HepG-2 cells. Morphological studies and ultrastructural