



**The possible protective effect of vitamin C
on Cisplatin induced apoptosis in rats'
submandibular salivary glands
(Histological and immunohistochemical studies)**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ "

صدق الله العظيم

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DEDICATION

*To my great beloved parents
and my dear brother,*

*Thanks a lot for being there
for me.*

CONTENTS

Title	Page
List of figures.....	III
List of tables.....	VI
List of abbreviations.....	VII
Abstract.....	IX
Introduction and Review of literature....	1
• Classification of chemotherapy.....	2
• Cisplatin and its mode of action.....	3
• General adverse effects of Cisplatin.....	5
• Salivary glands and Cisplatin.....	8
• Apoptosis and regeneration of salivary glands	12
• Apoptotic pathways of Cisplatin cytotoxicity.....	14
• Prevention of Cisplatin toxicity.....	18
• Antioxidants and vitamin C.....	19
Aim of the study.....	23
Materials and methods.....	24

Results	
• Histological results.....	34
• Immunohistochemical results.....	50
• Statistical results.....	55
Discussion	60
Summary	71
Conclusions	75
References	76
Arabic summary	-

LIST OF FIGURES

Figure No.	Title	Page
1	An image of the section to be analyzed viewed by image analysis software	32
2	Areas of interest were shown, while other areas were covered by white pixels	32
3	The image after conversion into 8-bit monochrome type	33
4	Color thresholding to the image	33
5	A photomicrograph of GpIA (H&E X400)	38
6	A photomicrograph of GpIB (H&E X400)	38
7	A photomicrograph of GpIIA (H&E X400)	39
8	A photomicrograph of GpIIA (H&E X400)	39
9	A photomicrograph of GpIIA (H&E X400)	40

10	A photomicrograph of GpIIA (H&E X400)	40
11	A photomicrograph of GpIIA (H&E X400)	41
12	A photomicrograph of GpIIB (H&E X400)	41
13	A photomicrograph of GpIIB (H&E X400)	42
14	A photomicrograph of GpIIB (H&E X400)	42
15	A photomicrograph of GpIIB (H&E X400)	43
16	A photomicrograph of GpIIIA (H&E X400)	46
17	A photomicrograph of GpIIIA (H&E X400)	46
18	A photomicrograph of GpIIIA (H&E X400)	47
19	A photomicrograph of GpIIIA (H&E X400)	47
20	A photomicrograph of GpIIIB (H&E X400)	48

21	A photomicrograph of GpIIIB (H&E X400)	48
22	A photomicrograph of GpIIIB (H&E X400)	49
23	An immunostained photomicrograph of GpI (Anti-active Caspase 3 X 400)	52
24	An immunostained photomicrograph of GpIIA (Anti-active Caspase 3 X 400)	52
25	An immunostained photomicrograph of GpIIB (Anti-active Caspase 3 X 400)	53
26	An immunostained photomicrograph of GpIIIA (Anti-active Caspase 3 X 400)	53
27	An immunostained photomicrograph of GpIIIB (Anti-active Caspase 3 X 400)	54
28	A histogram showing the mean area percentage differences between groups in their immunopositivity to Anti-active Caspase 3	57

LIST OF TABLES

Table No.	Title	Page
1	Descriptive statistics to the groups	56
2	Mean, Std. deviation and P-value of one way ANOVA test	56
3	Multiple comparisons	58

LIST OF ABBREVIATIONS

Abbreviation	Stands for
AIF	Apoptosis inducing factor
BAK	Bcl-2 antagonist/killer
BAX	Bcl-2 Associated X protein
Bcl-2	B cell lymphoma 2
BH3	Bcl-2 homology domain 3
BW	Body weight
DNA	Deoxyribonucleic acid
Endo G	Endonuclease G
FAS	First apoptosis signal
FASL	FAS ligand
Fig.	Figure
GCT	Granular convoluted tubule

Gp	Group
H&E	Hematoxyline and Eosin
Min.	Minute
PCNA	Proliferating cell nuclear antigen
RBCs	Red blood cells
RNA	Ribonucleic acid
ROS	Reactive oxygen species
TNFR	Tumor necrosis factor receptor
TUNEL	Terminal Deoxynucleotidyl Transferase-mediated Deoxyuridine Triphosphate nick end labeling

ABSTRACT

Background: Cisplatin is widely used as an effective chemotherapeutic agent, but it affects normal tissues by generating reactive oxygen species and free radicals. Vitamin C is one of the most available potent antioxidant agents. It can counteract the damaging effect of free radicals and harmful oxygen-derived species in the tissues.

Aim: The aim of this study was to evaluate the apoptosis induced by Cisplatin in rats' submandibular salivary glands and the possible protective effect of Vitamin C.

Materials and methods: The study was carried out on 42 male albino rats weighing between 150-200 grams. The rats were divided into: **Control group:** rats were given distilled water orally and intra-peritoneal injection of saline. **Cisplatin group:** rats were given intra-peritoneal injection of single dose of Cisplatin (5 mg/kg). **Vitamin C and Cisplatin group:** rats were given single dose of vitamin C (100 mg/kg) orally and intra-peritoneal injection of Cisplatin. All groups were further subdivided into: **Subgroup A:** Seven animals were terminated 3 days after the injection. **Subgroup B:** The other seven animals were terminated 5 days after the injection. Sections of the processed submandibular salivary glands were stained by Hematoxyline & Eosin and Anti-active Caspase 3 stains to detect the histological changes induced by Cisplatin and the possible protective effect of vitamin C.

Results: The subgroups received Cisplatin revealed degenerative changes in the acini and ducts as numerous intracellular vacuoles and pyknotic nuclei. While those received Vitamin C and Cisplatin revealed more or less

normal glandular structure. Immunohistochemical examination revealed that the positive reaction to Anti-active Caspase 3 in Cisplatin subgroups was significantly higher than the control subgroups indicating severe apoptotic changes while Vitamin C and Cisplatin subgroups revealed significant reduction in the apoptotic activity in comparison with Cisplatin subgroups.

Conclusion: Vitamin C had a protective effect against cytotoxic and apoptotic changes induced by Cisplatin in rat submandibular salivary glands.