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THE EFFECT OF TWO ANTICANCER DRUGS, SINGLY AND COMBINED, ON THE HISTOLOGY, HISTOCHEMISTRY AND ULTRASTRUCTURE OF THE KIDNEY OF ALBINO RAT

A Thesis Submitted
For
(Ph.D.) Degree in Zoology

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ABSTRACT

Cisplatin and doxorubicin are two important antineoplastic agents which are widely used in the treatment of several human tumours. However, clinical application of these drugs has been limited by their undesirable systemic toxicity.

The present study was designed to investigate the effect of cisplatin and doxorubicin, singly and combined, on clinical picture and renal structure of adult male albino rats.

The therapeutic dose of both cisplatin and doxorubicin for rats was calculated to be equal to 10 mg/kg body weight. Eighty male rats were divided into eight groups, 10 rats each, and treated as follows: [1] Control rats being received a single intraperitoneal injection of distilled water. [2]Control rats being received intraperitoneal injections of distilled water weekly for 4 consecutive weeks. [3] Rats treated with a single therapeutic dose of cisplatin (10 mg/kg b.wt.). [4] Rats treated with 1/4 the therapeutic dose of cisplatin (2.5 mg/kg b.wt.) weekly for 4 consecutive weeks. [5] Rats treated with a single therapeutic dose of doxorubicin (10 mg/kg b.wt.). [6] Rats treated with 1/4 the therapeutic dose of doxorubicin (2.5 mg/kg b.wt.) weekly for 4 consecutive weeks. [7] Rats treated with a single dose of 1/2 the therapeutic dose of both cisplatin (5 mg/kg b.wt.) and doxorubicin (5 mg/kg b.wt.). [8] Rats treated with 1/8 the therapeutic dose of both drugs (1.25 mg/kg b.wt.) weekly for 4 consecutive weeks. Rats that received single doses (groups 1, 3, 5 & 7) were sacrificed one week later, while rats treated with divided doses weekly for 4 consecutive weeks (groups 2, 4, 6 & 8) were sacrificed one week after the last injection.

The results of the present study reveal that all rats treated with cisplatin or/and doxorubicin showed clinical abnormalities and histological, histochemical, and ultrastructural renal changes. In general, the alterations were less intense in rats receiving undivided doses of the two drugs together and also in rats receiving each drug alone in weekly divided doses. Whereas, the alterations were markedly less intense in rats receiving the two drugs together in weekly divided doses.

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LIST OF ABBREVIATIONS

BB	Brush border
BC	Bowman's capsule
BI	Basal infoldings
CL	Capillary lumen
CP	Cisplatin
CT	Collecting tubule
CX	Cortex
DCT	Distal convoluted tubule
DOX	Doxorubicin
DST	Distal straight tubule
E	Endothelium
En	Endothelial cell
F	Filaments
G	Glomerulus
GBM	Glomerular basement membrane
H & E	Haematoxylin and Eosin (stain)
HC	Heterochromatin
i.p.	Intraperitoneal
i.v.	Intravenous
IC	Inflammatory cells
L	Lumen
Ly	Lysosomes
M	Mitochondria
MC	Mesangial cell
MD	Medulla
MM	Mesangial matrix
Mv	Microvilli

N	Nucleus
Neg Mag	Negative magnification
PAS	Periodic acid Schiff (stain)
PCT	Proximal convoluted tubule
PEp	Parietal epithelial cell
PST	Proximal straight tubule
RBC	Red blood cell
RC	Renal capsule
SER	Smooth endoplasmic reticulum
SFP	Secondary foot processes
T	Thin limb of Henle's loop
TBM	Tubular basement membrane
Th	Thick ascending limb of Henle's loop
US	Urinary space
V	Vacuole
VEp	Visceral epithelial cell
Vs	Vesicles

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