Ain shams university
Women's college for Arts, Science & Education
Biochemistry and Nutrition Department

"The Role of Some Functional Foods in Regression of Hepatocellular Carcinoma in Experimental Animals"

Thesis

Submitted to Biochemistry and Nutrition Department
Women's College, Ain Shams University
In partial fulfillment of the Requirement for the
Degree of Master of Science (M. Sc)
(Biochemistry and Nutrition)

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2010

Abstract

The present study was performed to evaluate the role of some functional foods of animal and plant origins, such as fish oil and Artichoke (*Cynara scolymus l.)* against hepatocellular carcinoma in rats initiated by diethylnitrosamine (DEN). Animals were divided into 8 groups (8 rat/ group). The first group (Group 1) served as normal healthy (control rats). Group 2: was intraperitonealy injected with single dose 100 mg DEN/ kg body weight and fed on standard diet all over the experimental period. Group 3-8 were fed on standard diet supplemented with different concentrations of either fish oil or artichoke extract for 25 days; followed by intraperitonealy injection with the same dose of DEN then, again supplemented with the same concentrations of diet for 25 days.

The results of DEN treated group revealed a significant increase in the levels of tumor markers in serum including alpha fetoprotein (AFP), ferritin and vascular endothelial growth factor (VEGF). In addition, DEN group showed significant increase in serum aspartate amino transferase (AST), alanine amino transferase (ALT), gamma glutamyl transferase (GGT), alkaline phosphatase (ALP) activities and total bilirubin level. Concomitantly, the results revealed significant decrease in tissue reduced glutathione content, glutathione-S-transferase (GST), xanthine oxidase (XO) activities, total proteins and serum albumin. A marked increase in tissue malondialdehyde (MDA) and nitric oxide (NO) levels were also observed.

Also the administration of DEN affected the liver cells through occurrence of hepatic cellular degeneration and necrosis. Administration of either two doses of fish oil (5%, 10%) or artichoke heads or leaves extract (0.5g, 1g) for 25 days pre and post DEN administration were effective in ameliorating nearly all the studied parameters. Histopathological examination of liver sections showed also an improvement in the liver architecture as compared to DEN group. The obtained results pointed that 10% fish oil and 1g of artichoke leaves extract succeeded to protect from hepatocellular carcinoma to a certain degree. They may be considered as protective foods against angiogenesis.

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List of abbreviations

1-chloro-2,4-dinitrobenzene	CDNB
2,2-Azobis(2-amidinopropane) dihydrochloride	AAPH
3,3,5,5-tetramethylbenzidine	TMP
5,5 dithiobis-2-nitrobenzoic acid	DTNB
Acetylaminofluorene	AAF
Aflatoxin B1	AFB1
Alanine aminotransferase	ALT
Alkaline phosphatase	ALP
Alpha fetoprotein	AFP
American institute of nutrition (1993)	AIN-93
Antioxidant status	AS
Aspartate aminotransferase	AST
Basic fibroblast growth factor	bFGF
Carbon tetra chloride	CCl_4
Central vein	CV
Cholangio carcinoma	CAC
Cluster of differentiation	CD34
Cyclo-oxygenase	COX
Deoxyribonucleic acid	DNA
Diethylnitrosamine	DEN
Docosahexaenoic acid	DHA
Eicosapentaenoic acid	EPA
Endothelial cell	EC
Essential fatty acid	EFA
Fatty acids	FA_s
Food and agriculture organization	FAO
Gamma glutamyl transferase	GGT

General accounting office	GAO
Globe artichoke extract	GAE
Glutathione	GSH
Glutathione-s-transferase	GST
Hepatic sinusoids	HS
Hepatitis B virus	HBV
Hepatitis C virus	HCV
Hepatocellular carcinoma	HCC
Hepatocytes	HC
Horseradish peroxidase	HRP
Human immunity deficiency virus	HIV
Human proto-oncogene	Bcl-2
Hydrogen peroxide	H_2O_2
Interleukin	IL
Lactate dehydrogenase	LDH
Least significant difference	LSD
Lectin lens culinaris agglutin	LCA
Linoleic acid	LA
Lipid peroxidation	LPO
Lipoxygenase	LOX
Low density lipoprotein	LDL
Malate dehydrogenase	MDH
Malondialdehyde	MDA
Matrix metalloproteinases	MMP_s
N-1-naphthyl-ethylene diamine	NED
N-2-acetylaminofluorene	N-2 AAF
Neutrophil leukotriene	LT
Nitric oxide	NO
Nitroblue tetrazoluim	NBT

Non-alcoholic fatty liver disease	NAFLD
Nuclear factor	NFαB
Phenazine methosulphate	PMS
Phenobarbital	PB
Placental growth factor	PLGF
Platelet-derived growth factor	PDGF
Poly unsaturated fatty acids	$PUFA_s$
Primary liver cancer	PLC
Prostaglandin	PG
Reactive oxygen species	ROS
Ribonucleic acid	RNA
Round per minute	r.p.m
Standard deviation	SD
Superoxide dismutase	SOD
Tetra methylbenzidine	TMB
Thiobarbituric acid	TBA
Transforming growth factor	TGF
Triacylglycerol	TG
Trichloroacetic acid	TCA
United kingdom	UK
United States	US
Vascular Endothelial Growth Factor	VEGF
World Health Organization	WHO
Xanthine oxidase	XO
Xanthine oxidoreductase	XOR

Acknowledgement

All praise is due to Allah for granting me the power and will to perform this work.

My deepest gratitude and sincere appreciations to ***Prof. Dr. Tahani El sayed Kholeif,*** *professor of Biochemistry, Department of Biochemistry and Nutrition, Women's College, Ain Shams University for her valuable supervision, great help and guidance and for her continuous encouragement.*

I acknowledge deeply ***Dr. Nadia Mohamed Said Metwally,*** *Assistant professor of Biochemistry, Therapeutical Chemistry Department, National Research Center for helping me in the experimental part, her kind supervision, persistent support and encouragement during this work.*

I gratefully acknowledge the sincere advice and guidance of ***Prof. Dr. Abdel-Hamid Zaki Abdel-Hamid Amer****, Professor of Biochemistry, Therapeutical Chemistry Department, National Research Center for his kindness, cooperation during supervision and support in the practical work.*

I wish to express my deep thanks, grateful acknowledgement and gratitude to ***Dr. Kadry Zaki Ghanem****, Professor of Nutrition, Food Science and Nutrition Department, National Research Centre for his kind help during this work.*

I wish to express my deep thanks, grateful acknowledgement and gratitude to ***Dr. Abdel-Razik H. Farrag*** *Assistant Professor of Histochemistry,*

Pathology Department, National Research Centre for his effective help in the histopathological part of this thesis.

With great pleasure, I would like to express my sincere gratitude to the staff members of Therapeutical Chemistry Department, National Research Center for their sincere help and support. Finally my sincere thanks and profound gratitude to my family for their patience, continuous encouragement and support which make this work comes out to the light.