ULTRASTRUCTURAL STUDIES ON THE EFFECT OF SPIRULINA PLATENSI S ON EXPERIMENTALLY INDUCED BLADER CANCER IN RATS.

This work aimed to investigate the protective effect of Spirulina platensis on the ultrastructural changes of rat bladder cancer induced by dibutyl nitrosamine (DBN) precursors using scanning and transmission electron microscopes. Scanning electron micrographs (SEM) of the urinary bladder of Spirulina treated animals showed tightly adherent urothelial cells with polygonal profiles as that of the control rats. Also, the overall appearance of the urothelium in transmission electron micrographs (TEM) was much similar to like that of the control animals. The carcinogenicity of DBN precursors was clearly demonstrated in the form of long papillomas and nodular aggregates protruding into the lumen. Moreover, the results showed the occurrence of microvilli covered with glycocalyx. Deformed mitochondria, extensive rough endoplasmic reticulum, large number of ribosomes and polysomes were clearly visible throughout the cytoplasm of the urothelial cells. The nuclei contained masses of condensed chromatin especially peripheral to the nuclear envelope. The animals treated with DBN and spirulina showed long microvilli on the surface of the urothelial cells. In addition, large areas of the basal lamina lost some of their urothelial cells. The apoptotic cells were also identified by characteristic ultrastructural features suggesting that Spirulina platensis is a chemotherapeutic agent that cause apoptosis to tumor cells by reduction of the number of malignant cells to a single layer.

The protective effect of ginger against the nephrotoxicity of cisplatin in male rats.

Ginger, the rhizome of Zingiber officinale, is a common condiment for various foods and beverages. Ginger has a long history of medicinal use dating back to 2500 years. One ml of an aqueous extract of ginger 120 mg/ml was orally given to male rats, every other day, to evaluate its nephroprotective effect against cisplatin-induced nephrotoxicity. Treatment with three consecutive injections of 10 mg/kg of cisplatin caused significant body weight loss, elevation in serum blood urea nitrogen (BUN), and creatinine levels. These changes were markedly attenuated in the rats protected with ginger before treatment with cisplatin. The applied dose of cisplatin caused marked histopathological renal alterations such as damage in Malpighian corpuscles, necrosis in the epithelia of the renal tubules, leucocytic infiltration, and increased the immunohistochemical expression of Bax proapoptotic protein. In the combined treatment, an improvement occurred in both
histopathological observation and immunohistochemical investigation of Bax proapoptotic protein.

3-

ULTRASTRUCTURAL STUDY ON THE PROTECTIVE EFFECT OF GINGER AGAINST THE TOXICITY OF 7, 12 DIMETHYLBENZ [A] ANTHRACENE (DMBA) ON THE LIVER OF ALBINO RATS

The present work was planned to investigate the protective effect of ginger against the ultrastructural changes induced by DMBA in the liver of female albino rats. 7,12dimethylbenz[a]anthracene (DMBA) is one of the strongest pollutants in soil, water and air. It induces neoplasms in the liver, heart and lungs. Animals were intraperitoneally given a single dose of DMBA (40 mg/kg body weight). After five months of treatment, the nuclei of the hepatic cells showed chromatinolysis and pyknosis. HyDROPic degeneration of the hepatic cells and the breakdown of the mitochondria were also seen. The space of Disse and the bile canaliculi were very narrow and lost their microvilli. Oral administration of ginger (120 mg/ml) every other day stimultaneously with DMBA for five months reduced the lesions that induced by DMBA. The obtained results suggest that the protective effect of ginger is mediated through the decrease of oxidation of lipids and the enhancement of antioxidants defences, thus minimizing the carcinogenic risk of DMBA.

4-

Chemoprevention of rat liver toxicity and carcinogenesis by Spirulin

Spirulina platensis (SP) is a filamentous cyanobacterium microalgae with potent dietary phyto-antioxidant, anti-inflammatory and anti-cancerous properties. The present study aimed to investigate the chemopreventive effect of SP against rat liver toxicity and carcinogenesis induced by dibutyl nitrosamine (DBN) precursors, and further characterized its underlying mechanisms of action in HepG2 cell line. Investigation by light and electron microscopy showed that DBN treatment induced severe liver injury and histopathological abnormalities, which were prevented by SP supplementation. The incidence of liver tumors was significantly reduced from 80 to 20% by SP. Immunohistochemical results indicated
that both PCNA and p53 were highly expressed in the liver of DBN-treated rats, but were significantly reduced by SP supplementation. Molecular analysis indicated that SP treatment inhibited cell proliferation, which was accompanied by increased p21 and decreased Rb expression levels at 48hrs post-treatment. In addition, SP increased Bax and decreased Bcl-2 expression, indicating induction of apoptosis by 48hrs. This is the first report of the in vivo chemopreventive effect of SP against DBN-induced rat liver cytotoxicity and carcinogenesis, suggesting its potential use in chemoprevention of cancer.

5-

The protective effect of ginger extract against the hepatotoxicity of 7,12 Dimethylbenz(a)anthracene (DMBA) in albino rats

The present work was conducted to study the protective effect of ginger extract (GE) against the hepatotoxicity induced by 7,12-dimethylbenz(a)anthracene (DMBA) in female rats. DMBA group showed a highly significant decrease in body weight. However, DMBA/GE combined group displayed a highly significant increase in body weight compared with the DMBA group. Histologically, the liver of DMBA group showed nodule-like structures, hepatic cirrhosis, congestion of blood vessels, intercellular hemorrhage, hepatic pyknotic nuclei, lymphocytic infiltration, dilation of blood sinusoids and high proliferation of collagen fibres. DMBA/GE combined group displayed an improvement in the hepatic lesions induced by DMBA. Histochemically, the liver sections of DMBA group showed a marked depletion of polysaccharides and total protein content. However, DMBA/GE combined group showed a moderate increase in liver polysaccharides and total protein contents. Immunohistochemically, the hepatocytes of DMBA group showed a highly significant increase in the PCNA labelling index. However, DMBA/GE combined group displayed a highly significant decrease in the PCNA labelling index when compared with DMBA group.

6-

Biochemical and ultrastructural studies on the chemoprotective effects of ginger extract against the hepatotoxicity induced by cisplatin chemotherapy in male albino rats.

Ginger rhizomes (Zingiber officinale) belong to Zingeberacae family and it has been frequently used in traditional oriental medicine. The objective of this study was to investigate the chemoprotective effects of ginger on the liver biochemical and ultrastructural changes induced by cisplatin chemotherapy. Cisplatin chemotherapy induced severe liver lesions manifested by significant decrease in serum levels of AST and ALT and a significant increase in serum albumin level. Also, dilated and vesiculated rough endoplasmic reticulum, megamitochondria, swollen mitochondria, myelin figure, lipid droplets and wide broken blood sinusoids with degenerated and exfoliated kupffer and endothelial cells were noticed. Oral administration of ginger simultaneously with cisplatin improves the liver dysfunction and lesions that induced by cisplatin .In conclusions, the obtained results provide in vivo evidence, at biochemical and ultrastructural levels, of the chemoprotective effects of ginger against the hepatotoxicity
induced by cisplatin chemotherapy.