



A STUDY OF HISTOLOGICAL EFFECTS OF RADIATION AND COMBINED EFFECTS OF 2G MOBILE PHONE RADIATIONS WITH TURMERIC (CURCUMA LONGA) ON SEMINIFEROUS TUBULES OF TESTIS OF ALBINO RATS

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ABSTRACT

Introduction- The aim of present study is to observe the histological changes due to effect of electromagnetic radiations (EMR) on the seminiferous tubules of testis of Albino rats & find out the changes due to combined effect of curcuma longa and radiation on the seminiferous tubules of testis of albino rats in the department of anatomy, Dr. S.N. Medical college jodhpur (Raj.). This Study highlights some adverse effects of EMR and benefits of curcuma longa for primary prevention and treatment of cell damage due to regular use of cell phone.

Material and method- This study was conducted on thirty two male albino rats, were divided into four groups A, B, C, D. Group A was taken as control. Group B was exposed to radiations from cell phone (2G mobile 900-1900 Mhz). Group C was given curcuma longa orally & group D was exposed to both radiations and orally curcuma longa.

Result- After 2 months of exposure animals were sacrificed by cervical dislocation and their testis were used for observing histological changes. The regular cell phone radiation exposure on testis produced thinner irregular shape boundaries in seminiferous tubules.

Conclusion- Regular exposure of cell phone leads to structural variation in seminiferous tubules which could be decreased by using curcuma longa.

Key words:- Albino rats, 2G mobile phone, curcuma longa (turmeric).

INTRODUCTION

In present days of circumstances human beings are continuously exposed to internet wiring system, computer monitor, electromagnetic radiation like infrared, ultra violet, X-rays, gamma rays, radar waves, and mobile phone radiations as well as their supporting transmitters.

Out of these sources one of the most important electric gadget is cell phone which emit the electromagnetic radiations which has frequency ranging from 900MHz to 1900MHz. According to some studies electromagnetic waves emitted from cell phone even with the power density lower than the permitted limits (1mw/cm²) can lead to many disorders such as memory loss, fatigue, headache, heat sensations in the ears. Since the cell phone in the males usually placed near the scrotum and this can lead to damage their reproductive organs. In recent years histological and pathological studies have increased the evaluation of the electromagnetic radiations on human health.

ANTI OXIDANT ACTIVITY OF CURCUMIN

The curcumin (turmeric) or haldi is a bright yellow spice derived from rhizome of *Curcuma longa*. The biological classification of curcumin as both pro oxidant and anti oxidant is well supported by the studies showing curcumin as free radical scavenger (Barik A Mishra B et al 2007)⁵, reducing agent and DNA damage inhibitor especially in the presence of Cu or Fe ions. Curcumin is able to bind to Fe, Mn, and Cu that was reported to modulate the anti oxidant properties and radical scavenger effect of this agent. In vitro studies has shown that the curcumin inhibit nitric oxide and reactive oxygen species production in the macrophages. It also inhibit the lipo-oxygenase as well as cyclo-oxygenase in fibroblast cells of the rats.

Role of curcumin ameliorate the Leydig cell hyperplasia in the testis. This ameliorative effect of curcumin could be due to scavenger property of curcumin and acts as anti oxidant and might be enhancement of serum level of testosterone. (Alibadi E. et al 2011)². Curcumin may stop peroxidative alteration in the sperm cell and testicular membrane which leads to enhancement of sperm motility and decreased in spermatozoa defect (Abarikwu S.O. et al 2007)¹

AIMS AND OBJECTIVES

To observe the histological changes due to combined effect of *Curcuma longa* (turmeric) oral use and electromagnetic radiations on the seminiferous tubules of testis of albino rats.

To compare the results of proposed study with those of earlier workers.

This study highlights some adverse effects of electromagnetic radiations and benefits of *Curcuma longa* for primary prevention and treatment.

MATERIAL AND METHOD

This study was conducted on thirty two male albino rats in the department of Anatomy and department of pharmacology of Dr. S.N. Medical college Jodhpur Rajasthan (India). All the animals (albino rats) were housed in a standard animal facility with a controlled temperature of 25-27 degree Celsius, 5 to 10% humidity. Animals were divided into four groups a, b, c, d.

Each group having eight number of animals.

Group A-taken as control

Group B-exposure to radiations from cell phone (2G MOBILE 900-1900MHz)

GROUP C-given *Curcuma longa* orally

Group D-exposure to both radiations and orally *Curcuma longa*.

After 2 months of exposure subjects were sacrificed by cervical dislocation and their organs (testis) will be fixed in 10% formalin solution. These fixed organs will be used for observing histological changes in seminiferous tubules of testis.

Materials-

- 1) 32 male albino rats.
- 2) Rodent cage

3) Chemicals and stains

DISCUSSION

Lai and singh (1997) reported that exposure of electromagnetic radiation from the mobile phone can cause detrimental effects on cell function ,chromosomal aberrations and tissue injury .D.Verdugo-diaz (2010) observed the effects of acute electromagnetic field exposure and movement restraint on anti oxidant system in liver,heart,kidney and plasma of wister rats. Anti inflammatory and anti oxidant effects of curcuma longa were also analyzed by Sharaf A Hafiza(2012)¹⁰.curcumin inhibits formation of amyloid beta oligomer and fibrils , bind plaque and reduces amyloid in vivo Yang f,lim gp et el (2005).Mona Abdullah al Damegh (2012)⁷recorded that impairment of rate testis induced by the electromagnetic radiation from a conventional cellular telephone and the protective effect of anti oxidant vitamin c and vitaminE. Naziroglu Musta (2013) reported effects of wifi and mobile phone induced radiation on oxidative stress and reductive signaling pathways in female and males . They reported that male rats exposed to radiations show degeneration in seminiferous tubules reduction in the number of leydig cells and testosterone production as well as increased in lutinizing hormones levels and apoptotic cells.Gao XF,Wang SM et el 2009)⁵ show that microwave radiation may caused injury of primary cultured sertoli cells.Eesmekaya MA,Ozer et el (2011)³ reported that 900 mhz pulse – modulated radio frequency radiation induced oxidative stress on heart , liver,testis.

HISTOLOGICAL CHANGES IN SEMINIFEROUS TUBULES IN EXPERIMENTAL RATS:**Table1:** Distribution of histological changes in seminiferous tubules in control and EMR exposed group

Experimental group	Histological changes		Total
	Normal	Irregular shape ,break down boundaries and atrophy	
Control	8(100%)	0(0.00 %)	8(100.00%)
EMR	1(12.50%)	7(87.50%)	8(100.00%)
$\chi^2= 12.44$,df=1 , p value=0.000			

Figures in parenthesis indicate percentage

Majority (87.50%) of EMR exposed experimental group showed histological changes as irregular shape, breakdown boundaries and atrophy and on applying chi square test, there was significant difference in histological changes of control and EMR group p value (p<0.05).

Table 2: Distribution of histological changes in seminiferous tubules in control and curcuma exposed group

Experimental group	Histological changes		Total
	Normal	Irregular shape ,break down boundaries and atrophy	
Control	7(87.50%)	1(12.50%)	8(100.00%)
Curcuma	7(87.50%)	1(12.50%)	8(100.00%)
$\chi^2=0.00$ df=1 p value=1.00			

Figures in parenthesis indicate percentage

Majority (87.5%) of subjects did not show histological changes in both experimental groups and also there was no significant difference ($p>0.05$).

Table3 : Distribution of histological changes in seminiferous tubules in control and EMR+curcuma exposed group

Experimental group	Histological changes		Total
	Normal	Irregular shape ,break down boundaries and atrophy	
Control	7(87.50%)	1(12.50%)	8(100.00%)
EMR+Curcuma	5(62.50%)	3(37.50%)	8(100.00%)
$\chi^2=1.33$ $df=1$ $p\text{ value}=0.24$			

Figures in parenthesis indicate percentage

Majority of subjects in both groups did not show histological changes in both experimental groups and also there was no significant difference ($p>0.05$).

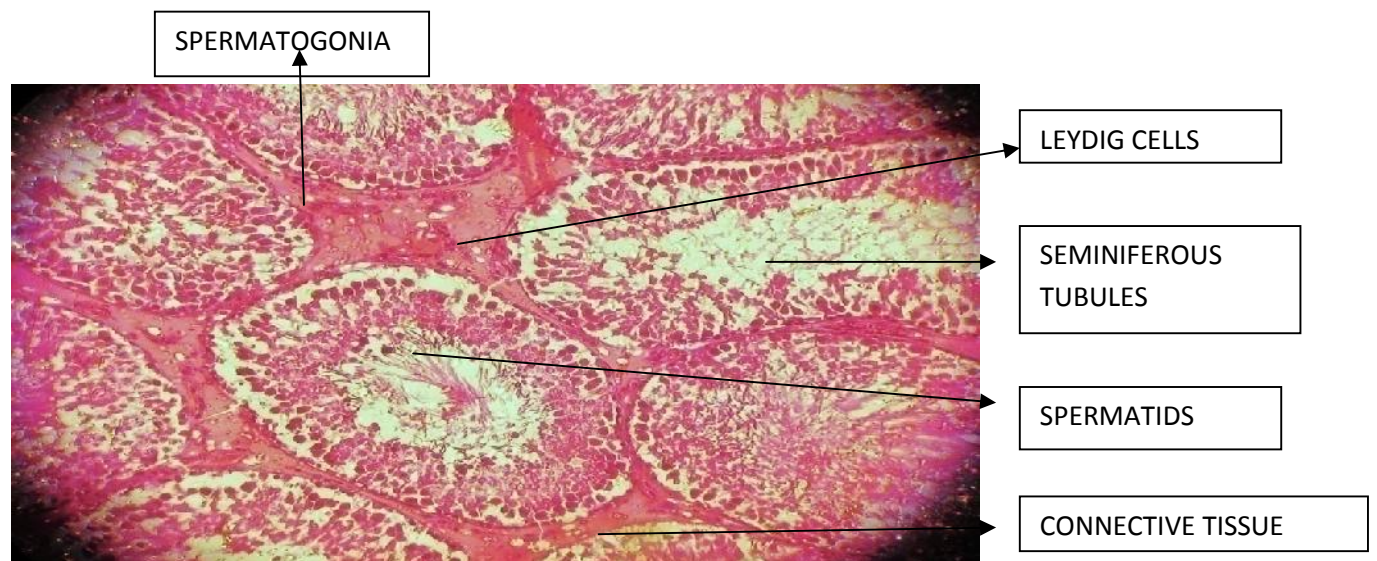


Figure 1.showing control group(A)- showing Normal histological structures of testis.

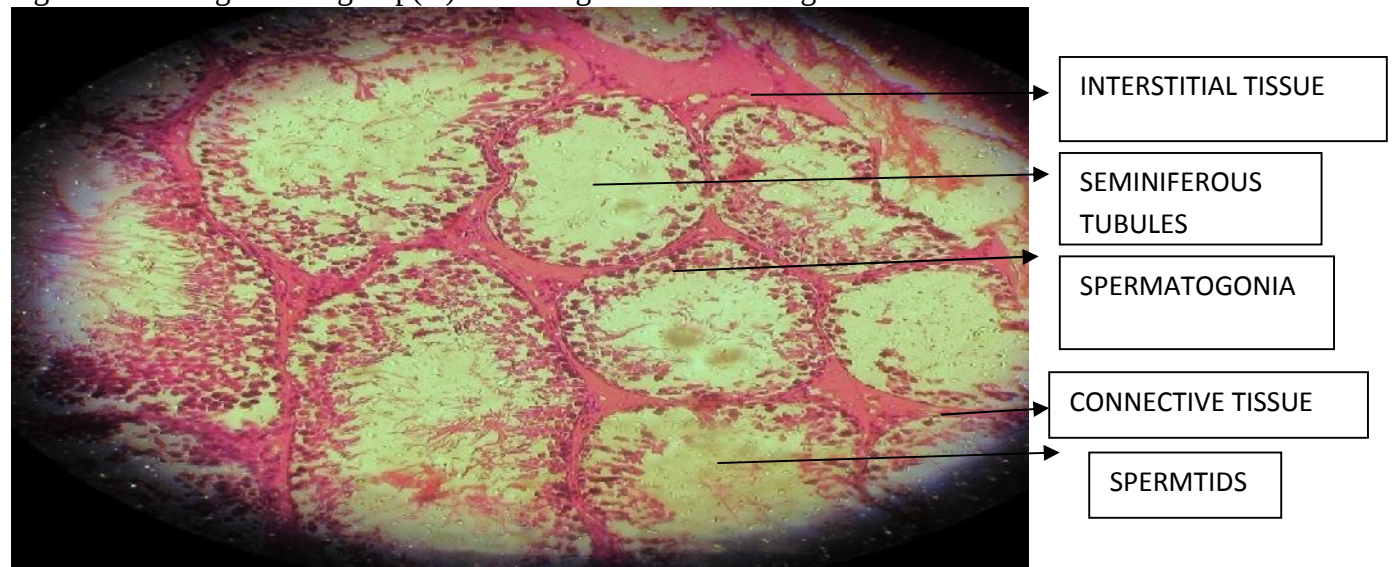


Figure 2. EMR exposed group(Group B)-showing irregular shape ,thin boundaries and atrophy of seminiferous tubules.



Figure 3. curcuma longa(group c) exposed group –Resembling normal histological structures due to anti oxidant effect of curcuma longa.

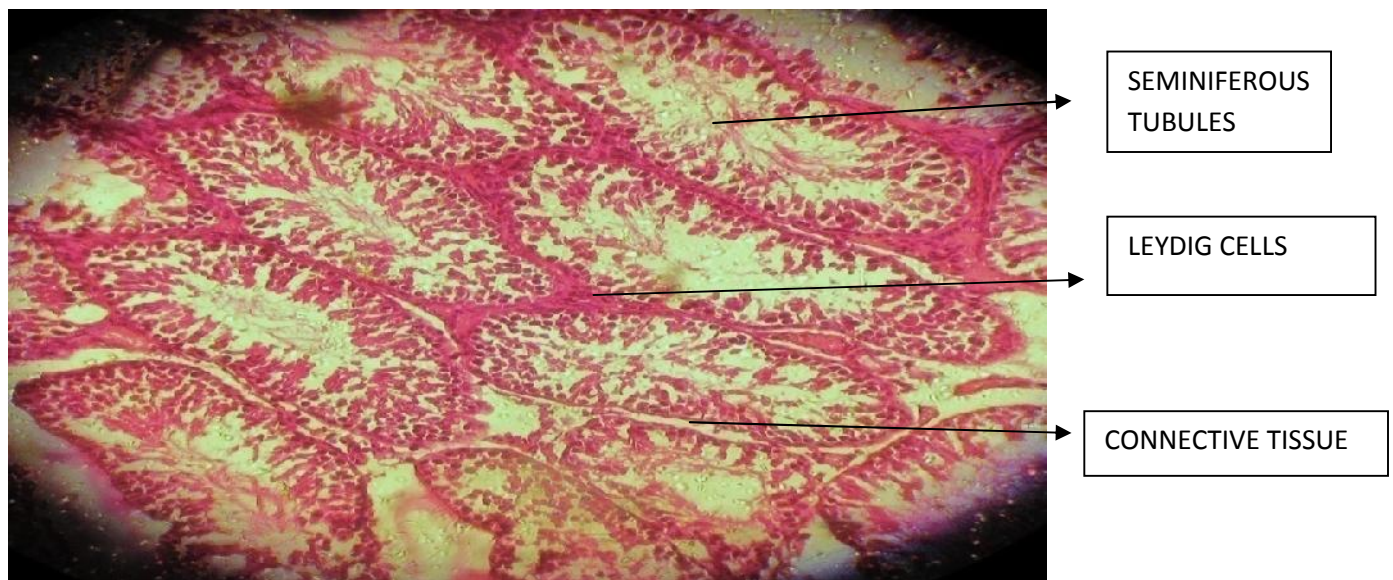


Figure 4. EMR & curcuma longa exposed(group d)-showing minimal changes than EMR exposed group due to preventive effects of curcuma.

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