



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2620924>Available online at: <http://www.iajps.com>

Research Article

**OVARIAN STRUCTURAL DAMAGE: EFFECTS OF MONO  
SODIUM GLUTAMATE IN EXPERIMENTAL ALBINO  
FEMALE RATS**Piriha abbasi<sup>1</sup>, Zaheer Ahmed<sup>2</sup>, Raima Kalhorho<sup>3</sup>, Sana Kashif<sup>4</sup>, Mozna Talpur<sup>5</sup>,  
Muhammad Ishaque<sup>6</sup><sup>1</sup>MBBS, M. Phil (Anatomy), Assistant Professor, Isra University, Hyderabad.<sup>2</sup>MBBS, M. Phil (Anatomy), Professor of Anatomy, Isra University, Hyderabad<sup>3</sup>MBBS, M. Phil (Hematology), Assistant Professor of Pathology, Isra University,  
Hyderabad<sup>4</sup>MBBS, M. Phil (Anatomy), Lecturer, Isra University, Hyderabad<sup>5</sup>MBBS, M. Phil (Pharmacology), Associate Professor, Isra University, Hyderabad<sup>6</sup>Lecturer department of Eastern Medicine, University of Balochistan, Pakistan**Article Received:** January 2019**Revised:** March 2019**Published:** April 2019**Abstract:**

*Mono sodium glutamate is a food preservative but it is prevailing concept that it has some harmful effects on human body. This current experiment was conducted in animal House at Agricultural University, Tandojam, Sindh, Pakistan on two groups of female rats. Each group consisted of 10 rats, group A was given normal diet but kept free from MSG to serve as control and group B was administered MSG at a dose of 0.08mg/gm for 4 weeks. Histology of ovaries was seen under microscope after making sections in anatomy department using hematoxylin and eosin stains. Group B showed significant disturbance in ovarian histology with thecal hypertrophy in 8 rats, hemorrhage in 7 follicular destruction and vacuolization each in 4 while 8 rats were found with loss of basement membrane as compared to normal histology of the normal group A.*

**Conclusion:** Mono sodium glutamate is responsible for structural damage to the ovaries of experimental rats

**Key Words:** MSG, Ovaries, hematoxylin, eosin, albino rats

**Corresponding author:****Dr. Piriha Abbasi,**

MBBS, M. Phil (Anatomy)

Lecturer, Isra University, Hyderabad

Email address: [precious-pearl87@hotmail.com](mailto:precious-pearl87@hotmail.com)

QR code



Please cite this article in press Piriha abbasi *et al.*, *Ovarian Structural Damage: Effects of Mono Sodium Glutamate in Experimental Albino Female Rats.*, *Indo Am. J. P. Sci.*, 2019; 06(04).

**INTRODUCTION:**

Addition of preservatives in food is a common practice in this modern age and MSG (Monosodium glutamate) is in common use for this purpose but it become a matter of great concern when its possible role in infertility of both genders was expected[1]. MSG is a salt of a natural non-essential amino acid (glutamic acid) having wide range of usage from home, restaurants to industry [2,3] Glutamic acid discovery was made by Karl Heinrich Ritthausen (German chemist) in 1866 later on Kikunae Ikeda in 1908 isolated it as a taste substance<sup>15</sup>. MSG is used in chips, snacks, sauces, frozen meals, marinated meats, chicken, flavored tuna, and burgers [4]. Three methods were used to prepare MSG 1. hydrochloric acid induced hydrolysis of vegetable proteins, 2. direct acrylonitrile based chemical synthesis and 3. the fermentation which is most common and in current use. Corynebacterium is cultured with carbohydrates and ammonia from sugar cane, beets, molasses that results into excretion of this amino acids and L-glutamate is then isolated from the culture broth[5] MSG is also called as Ajinomoto which contains glutamic acid (78%), water and sodium (22%)[5]. Many investigators worked on the fertility aspects of MSG and proposed possible effects on anovulatory infertility in females<sup>5</sup>. The current animal experiment was managed to elaborate the nature of the histological effects of MSG on the ovaries so that it may help the community.

**METHODOLOGY:**

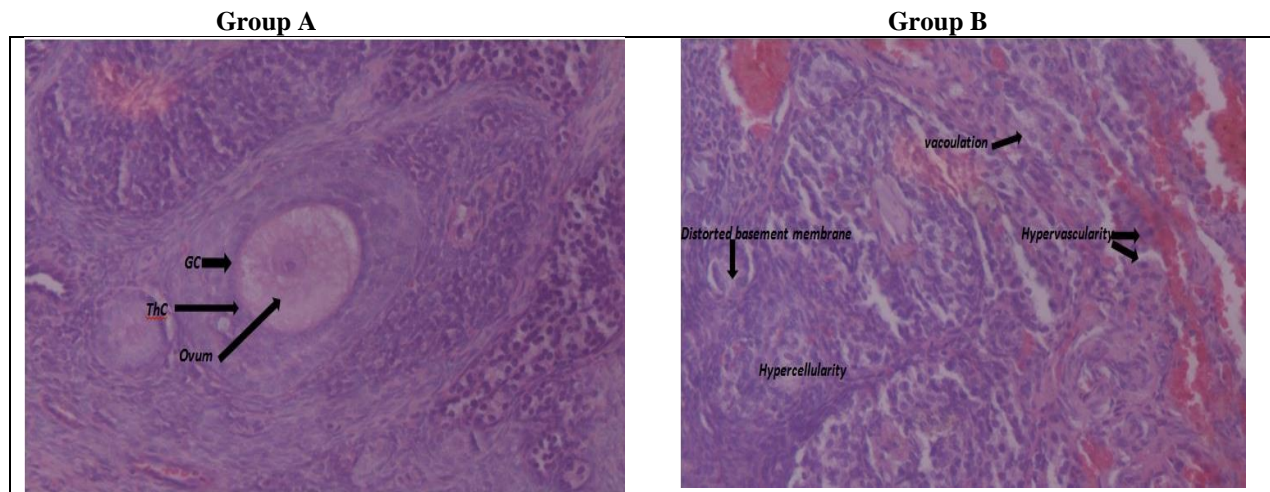
Animals were purchased under inclusion and exclusion criteria following ERC approval to conduct the research. After acclimatization MSG was administered to experimental group (Group B) while control group animals (group A) were left untreated. After one-month intervention rats were sacrificed by cervical dislocation and ovaries were removed to make slides to observe under microscope. Various parameters like number of nature follicle, Atretic follicle and Distortion of basement membrane were compared among the two groups through Chi-Square using SPSS 22 at 0.05 level of significance.

**RESULTS:**

Significant difference between the disturbance in histology of the ovaries was seen in group A (Control) and in group B (MSG treated) thecal hypertrophy was seen in 8 rats in group B while non in group A (p-0.0001), while 8 rats in group B had loss of basement membrane in comparison to normal intact of group A (p-0.0001) hemorrhage was seen in 7 rats in group B no hemorrhage was seen in group A (p-0.0008), atretic follicles and vacuolation were observed in 4 rats of group B and non from the group A (p-0.022) for both while mature follicles were found in 4 of the rats from group A and only 1 rat from the group B (p-0.08) Table 1.

**Table 01. Comparison between group A and group B for various parameters**

S.No	Parameters	Group A	Group B	Chi-Square	P-Value
1.	Mature Follicles	4	1	2.4	0.08
2.	Atretic follicle	0	4	5	0.022
3.	Vacuolization	0	4	5	0.022
4.	Haemorrhage	0	7	10.77	0.0008
5.	Cellular hypertrophy of theca cells	0	8	13.33	0.0001
6.	Distortion of basement membrane	0	8	13.33	0.0001



**Figure.01 Histological difference between Ovaries of group A and group B**

### DISCUSSION:

Findings observed by us in our current work are consistent with Ali AA *et al* (2014) who also found degenerative changes in ovaries along with atretic follicles and vacuolization in rats treated with MSG [6]. Similar results were reported by Mustafa SJ (2015) when he used MSG in wistar rats degeneration of follicles, vacuolation and congestion of blood vessels of ovary and may contribute in female infertility these findings are consistent with present study [7]. Ismail NH *et al* (2012) results were inconsistent to our results as he reported male infertility MSG affecting testes of the male wistar rats while we did not use male rats although infertility was common between the two studies [8]. El-Beltagy AE *et al* (2016) also reported that rats that were being treated with MSG their ovarian surface appeared invaginated with germinal epithelium as well as irregular. He concluded a relative decrease in developing follicles while there was an increase in follicular atresia associated with degenerating oocytes and granulosa cells with cytoplasmic vacuolations ovarian medullary congestion [9]. A research study showing upregulation of the estrogen receptors was conducted by Elly Dwi Wehyuni *et al* (2014) also fall in consistency to our study [10]. It is obvious from the current study as well as other researches that MSG should not be used any more owing to its adverse effects. Government of Pakistan has banned its sale and purchase due to its harmful effects.

### CONCLUSION:

Monosodium Glutamate is toxic for the ovaries that results in destruction of ovaries and a cause of infertility.

### REFERENCES:

1. Oladipo IC, Adebayo EA, Kuye OM (2015). Effects of Monosodium Glutamate in Ovaries of Female Sprague-Dawley Rats. *Int. J. Curr. Microbiol. App. Sci.* 4(5):737-45.
2. Yousef JM (2011). Study the impacts of monosodium glutamate (MSG) and extract of green tea (theaceae family) leaves induced on kidney biochemical functions in rats. *Int J Acad Res* 3:108-112.
3. Eweka AO, Om'iniabohs FAE (2011). Histological studies of the effects of monosodium glutamate on the ovaries of adult wistar rats. *Ann Med Health Sci Res* 1:37-44.
4. Wahyuni ED, Situmorang CC, Yueniwati Y, Barlianto W, Dwijayasa PM (2014). Combination of vitamin C and E modulated monosodium glutamate-induced endometrial toxicity in female Wistar rats. *Asian Pacific Journal of Reproduction.* 3(2):106-9.
5. Sano, Chiaki (2009) Technology and Engineering Center, Ajinomoto Co, Japan. "History of glutamate production". *The American Journal of Clinical Nutrition.* 90 (3): 728S-732S.
6. Ahmed Abozaid Ali, Ghada Hassan El-Seify, Hala Mohammed El Haroun, Mona Abd El Mawla Mohammed Soliman (2014). Effect of monosodium glutamate on the ovaries of adult female albino rats and the possible protective role of green tea. *Menoufia Med J* 27:793-800.
7. Mustafa SJ (2015). Effect of Monosodium Glutamate on Mice Ovaries and Possible

- Protective Role of Vitamin C. *Annals of Applied Bio-Sciences*. 2(4):A100-105.
8. Ismail NH (2012). Assessment of DNA damage in testes from young Wistar male rat treated with monosodium glutamate. *Life Sci J* .9 :930-939.
  9. El-Beltagy AE, Elghawet HA (2016). Adverse effects of monosodium glutamate on the reproductive organs of adult Female albino rats and the possible ameliorated role of carob (Ceratonia Siliqua). *Journal of Bioscience and Applied Research*. 2(3):170-84.
  10. Wahyuni ED, Situmorang CC, Yueniwati Y, Barlianto W, Dwijayasa PM (2014). Combination of vitamin C and E modulated monosodium glutamate-induced endometrial toxicity in female wistar rats. *Asian Pacific Journal of Reproduction*. 2014 Jun 1;3(2):106-9.