

Effect Of Stress On Male And Female Albino Rats An Experimental Study

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ABSTRACT: The aim of the study is to understand the affection due to stress in both male and female albino rats. 24 albino rats were used for the study .The animals were divided into two groups, control and study, study group was exposed to heat stress for 10 days and the levels of corticosterone was estimated before and after study. Osmotic fragility was estimated in both the groups. Both the genders were compared and the results tabulated statistically.

KEY WORDS: Stress, Gender Variation, Corticosterone, Osmotic fragility, albino rats

INTRODUCTION

Stress is a reaction that disturbs us both physically and mentally. (John.A.Bowersox) The most detrimental factor that affects the physiology of every living being in various aspects. The research compliments studies which have found that in times of stress, male rats are less likely to survive (McClintock) when people feel stressed their bodies undergo changes through HPA axis and sympathetic system activation.(Dr. Rajiv Iaroiya) Though it affects every individual ,there exists a gender variation for the same quantum of stress (sep 2005 web Med Medical news).Men and women react differently for the same stress. Such an understanding would have a significant impact, on analyzing the problems faced by each(yah hu et al, June 08,2007) Gender is an important determinant of health, and their exists clear pattern of sex-specific prevalence rates of various problems. This study actually focuses on gender specificity during stress. This was done on experimental animals, albino rats. (springer article, 2005)

MATERIALS AND METHODS:

The protocol for the study was approved by Animal Ethical committee, Madurai Kamaraj University, Madurai ,

ANIMALS AND EXPERIMENTAL DESIGN

Table 1 Levels of Hormone in Control Group (Jerne.et.al)

S.No	Level of hormone	Males	Females
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Type of stress: Heat stress

Induction by: 100 watts bulb, to a temperature of 38-40c, for 2 hours everyday for 10 days .

Period of study: 10 days .

Animals Required: 24 albinorats (12 Males & 12 Females) weighing 200gms-225 gms.

Physiological parameters: blood corticosterone level
Osmotic fragility.

At the end of the study, these parameters were estimated and statistically analysed .

We studied 24 albino rats of either sex, the animals of same age and weight was taken. 12 males rats were divided into two groups. (control & study group). Likewise 12 female rats were divided into two groups (control & study group). The animals were acclimated to a temperature of 22c with normal feeds and water ad libitum. The study group was exposed to a temperature of 38-41c for 2 hours .Everyday for 10 days. At the end of 10 days, serum corticosterone level and osmotic fragility were estimated. The blood was drawn from the animal using cardiac puncture .

The corticosterone levels were estimated using ELISA method in lab. The osmotic fragility was estimated using saline method. The results were statistically analyzed and tabulated.

	Corticosterone	2.50 microgram/dl	2.82 microgram /dl
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Table 2 Levels of Hormone in Study Group

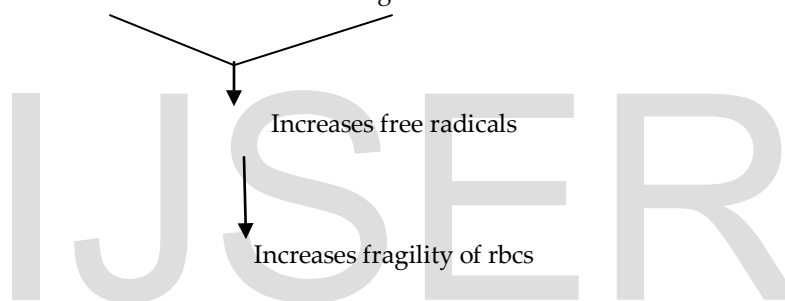
S.No	Levels of the hormone	Males	Females
	Corticosterone	25.07microgram/dl	22.8microgram/dl

NOTE : The hormone levels after exposure to stress is more in males compared to females.

Table 3 Osmotic fragility

S.NO		Lysis starts	Lysis ends
Control group	male	0.60%	0.30 %
	female	0.60%	0.35%
Study group	male	0.85%	0.40%
	female	0.75%	0.40 %

Stressful conditions - endogenous corticosterone elevation



DISCUSSION :

Many researchers have established the response of both genders to a stressor. The activation of sympathetic nervous system, causes release of various hormones.

The hormones like oxytocin, vasopressin, and CRF (corticotrophin releasing factor) are released during stress. Among these hormones, oxytocin, counteracts the effects of the stress response.

However oxytocin is present in both males and females, but in greater quantities in females.

Oxytocin works to reduce the blood pressure as well as cortisol, the hormone responsible for facing stress. (International journal of Neurosciences)

Actually in our study, female albino rats showed less response to stress, compared to their male counterparts,

indicating a possible interference of oxytocin in normal stress response (Mendel.et.al)

- Oxytocin – Decreases cortisol, Decreases BP
- Produces less typical fear response in females
- Oxytocin mediated stress response cascade.

CONCLUSION :

New researches suggest that stressful events have a major impact on men's health, both (mental & physical) than women. As a result of their decreased ability to cope up with stress, they either get affected by diseases like DM, HT or they go in for addiction, aggressiveness and antisocial behavior.

To conclude for the, for the same quantum of stress, men are more affected than women, and need an early

identification and rectification, which would otherwise result in a major threat to mankind.

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REFERENCES :

1. Eisdorfer C, et al. *Stress, Disease, and behavior*. In: Birren JE, Schaie KW ed. *Handbook of the psychology*.
2. Frankenhauser M. *Coping with stress at work*. *Int J Health Ser* 1981 ;11 :481-510 .
3. Himsworth HP, Scott D. *BMJ Physiol* 1938 ;93 :159
4. Jameson JL *Principles of Hormonal Action*. In: Weatherall DJ, Ledingham JGG, Warrell D A, editors, *Oxford text Book of Medicine* :3rd ed. 1996, pp.1563.
5. *Biological effects of single and repeated stress in rats*, yan Hu et al.
6. *Stress adjustments*, *Text book of Physiology*, Saradha Subramaniam, 4th ed .1998.
7. *Stress affects mens health more*, article -web MD medical news ,sep 2 ,2002 .
8. *Journal of Psychosomatic Medicine* ,October issue .
9. *Effects of various stresses on Lab animals* ,*Text book of lab animal study*.
10. K.D. Beck, V.N. Luine
Sex differences in behavioral and neurochemical profiles after chronic stress: role of housing conditions
Physiol Behav, 75 (2002), pp. 661–673

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