

**UNIVERSITI TEKNOLOGI MARA**

**EFFECT OF SUPPLEMENTATION OF  
TOCOTRIENOL ON ALTERATION OF ESTROUS  
CYCLE IN FEMALE RATS SUBJECTED TO  
STRESS.**

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## ABSTRACT

Menstrual cycle can be altered by many factors including stress. Physiological stress such as exercise has been proved to cause menstrual irregularities. This may be due to the disruption at the hormone level or due to the production of free radical during intense exercise. Antioxidants such as tocotrienol could reduce the activity of free radical thus prevent the damaging effect on the biological structure in the body. Therefore, this study was carried out to observe the effect of supplementation of tocotrienol in female rat estrous cycle that had been put under forced swimming stress. Twenty Sprague Dawley rats were divided into four groups that consist of 5 rats. The first group was the control group where no treatment was given. The second group was given 0.2ml corn oil only while the third group was put under force swimming stress. The fourth group also was put under force swimming stress but supplemented with 60mg/kg tocotrienol dissolved in 0.2 ml pure corn oil. The mean cycle length between control and treated groups were compared using independence T-test with 95% confidence interval. The result showed that mean cycle length of the group that was given 0.2ml corn oil was  $4.55 \pm 0.17$  days. For the group that was put under force swimming stress but supplemented with 60mg/kg tocotrienol had mean cycle length of  $5.27 \pm 0.26$  days. These result were statistically no significant different with the control group where the mean cycle length was  $4.61 \pm 0.14$  days. Group that have been put under force swimming stress had significantly longer estrous cycle length ( $6.85 \pm 0.40$  days) compare with control group,  $p < 0.05$ . This proved that force swimming stress can alter the estrous cycle by prolonging its length and this alteration can be reversed by supplementation of tocotrienol.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

Stress is a psychological and physiological response to events that upset our personal balance in some way. Women's menstrual cycle disturbance can occur due to physiological stress such as strenuous exercise (Warren & Perlroth, 2001) and emotional stress (Dmitry et. al, 2005). Extended or repeated activation of the stress response takes a heavy toll on the body. Jenifer et. al (2007) reported that stressful life events in incarcerated women cause ammenorhea (9%) and menstrual irregularities (33%). Fenster et al. (1999) found that women who experienced high stress at work had higher risk of short cycle. Study by Susannah et. al (2004) also found that increase stress levels in perimonopousal women shorten the menstrual cycle and duration of bleeding. However, the result has no relationship with the age of the women. Menstrual irregularity that are due to strenuous exercise originates from dysfunction at hypothalamic level (Warren & Perlroth, 2001). Low energy availability during strenuous exercise also could lead to menstrual disturbances (Nancy et. al, 2001). Reactive oxygen species (ROS), a type of free radicals play a role in female reproductive function (Oyawoye et. al, 2003). Though ROS is essential in some process of reproduction,