

## ABSTRACT

### Effect of Music Therapy on Synaptogenesis of Frontal Cortex Neurons in Stressed Mice

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Stress is a disorder of the body and mind that caused by stressor and gives a respon to physiological, psychological, and behavioral. Stress caused by activation of the *Hypothalamic Pituitary Adrenal Axis* in *hypothalamus*. Music has ability to direct behavior toward calm, divert response limbic. Music also known that can increases of synapse formation. The present study was designed to investigate the effect of music for affecting the *synaptogenesis* on mice. Forty mice were divided into five groups randomly, which are normal, stress, stress with Javanese, Classical, and Rock music group. Music therapy was given one hour after induction of stress. Mice were induced in stress condition by foot shock with 0,6 mA on 60 volt. Foot shock was given daily for 10 minutes with 30 seconds interval for 14 days. Parameter of stress was measured on day 0 (baseline) and 14<sup>th</sup> day with Elevated Plus Maze (EPM) and Conditioned Place Preference (CPP). Mice brain were evaluated by *haematoxyllin - eosin* staining and immunostaining with anti-*Synaptophysin*.

Javanese and classical music significantly decreased stress behavior in stress parameter of EPM ( Javanese ( $F_{(3,28)} = 6,260$ ,  $p < 0.05$ ) and classical music ( $F_{(3,28)} = 6,260$  ;  $p < 0.05$ ) ). But different result was occurred on rock music administration, didn't significantly decrease stress behavior in stress parameter of EPM ( $F_{(3,28)} = 6,260$ ;  $p > 0.05$ ). It was also on CPP parameter of stress, Javanese and classical music significantly decreased stress behavior (Javanese ( $F_{(3,28)} = 7,249$ ;  $p < 0.05$ ); classical ( $F_{(3,28)} = 7,249$ ;  $p < 0.05$ )), but rock music didn't significantly decrease stress behavior ( $F_{(3,28)} = 7,249$ ;  $p < 0.05$ ) ). Javanese and classical also significantly increased the number of neurons that expressed of anti-*synaptophysin* existing in *frontal cortex* (Javanese ( $F_{(3, 116)} = 14,111$ ;  $p < 0.0001$ ); classical ( $F_{(3, 116)} = 14,111$ ;  $p < 0.05$ )). It wasn't happened in rock music therapy ( $F_{(3, 116)} = 14,111$ ;  $p > 0.05$ ). These finding of the present study indicated that Javanese and classical music were significantly decreased stress condition on mice.

Keyword : stress, *synaptogenesis*, *foot shock*, Javanese music, classical music, rock music, EPM, CPP, anti-*Synaptophysin*, *frontal cortex*.