

# Qari (Male Voice) Increases Higher Expression of *Synapsin 1* than Qariah (Female Voice) in the *Cerebrum* Newborn *Rattus Norvegicus*

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## Abstract

**Introduction:** Pregnancy is the golden period to prepare children for the future. Stimulation is needed during pregnancy, one of which is brain stimulation. This can be done with Al Qur'an Murratal Surah Ar-Rahman stimulation. This study aims to analyze expression of *synapsin 1* in the *cerebrum* of newborn *Rattus norvegicus* when given murratal Surah Ar-Rahman stimulation by qari, qariah, and not given any stimulation during pregnancy.

**Methods:** Experimental with post-test only control group design. Sampling in this study was considered homogeneous because it met the inclusion criteria. The samples obtained were distributed randomly to each experimental group and randomized into 3 groups, including control group, group stimulated by qari, and group stimulated by qariah. The treatment was given on the 6<sup>th</sup> day of pregnancy for 1 hour in a soundproof room with an intensity of 65 dB.

**Results:** The highest mean expression of *synapsin 1* in the *cerebrum* is qari group ( $6.96 \pm 2.59$ ), then qariah group ( $5.84 \pm 2.90$ ), and the lowest is control group ( $5.74 \pm 2.32$ ). There is no significant difference in expression of *synapsin 1* in the *cerebrum* between control and qari groups ( $p = 0.306$ ), control and qariah groups ( $p = 0.932$ ), qari and qariah groups ( $p = 0.347$ ).

**Conclusion:** The highest expression of *Synapsin 1* in the *cerebrum* of newborn *Rattus norvegicus* is the group stimulated by qari.

**Keywords:** qari, qariah, *synapsin 1*, *cerebrum*, *Rattus norvegicus*

## Introduction

Pregnancy is the golden period to prepare children

for the future. In that pregnancy, most women focus on filling their pregnancy with activities that make the fetus healthy and smart, to prepare quality human resources.

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Report from the World Economic Forum Indonesia's competitiveness position in 2019 was at level 50, down compared to 2018 which was in 45th position. The lowering of this competitiveness ranking is due to the low quality of human resources<sup>(1)</sup>. Intelligence is related to the quality of the brain which states that stimulation will increase the potential for intelligence if it is done during pregnancy and early in life. Lack of brain stimulation during pregnancy can lead to the child's

inability to learn and adapt to the demands of society<sup>(2)</sup>.

Efforts to improve the quality of human resources through the First 1000 Days of Life program continue to be voiced in Indonesia. At 1000 HPK, there is a rapid rate of proliferation, migration, differentiation, synaptogenesis, myelination, and apoptosis<sup>(3)</sup>. Good brain development will affect cognitive and motor skills to prepare for the development of future generations. The brain consists of the *cerebrum* which plays a role in cognitive function. This process is supported by *synapsin I* as a marker for *synaptogenesis*. *Synapsin-I (Syn-I)* is the main isoform in neurons which is a phosphoprotein that binds to synaptic vesicles<sup>(4)</sup>.

Dr. Al Qadhi, the main director of the Islamic Medicine Institute for Education and research in Florida, United States, said that 97% of Al-Qur'an murattal therapy reduces reflective nerve tension and these results are recorded and measured quantitatively and qualitatively by computer-based tools. The most frequently used Murattal of the Koran is the Surah Al-Rahman<sup>(5)</sup>. Research on the spectrum analysis of the human voice based on gender has been carried out. The results showed that the frequency ranged from 120 - 150 Hz for men and 200 - 280 Hz for women<sup>(6)</sup>. Murattal sounds certainly have their respective sound characteristics based on the frequency and intensity values of the sound source. From the description above, a study was carried out on qari (male voice) increase higher expression of *synapsin I* than qariah (female voice) in the *cerebrum* newborn *Rattus norvegicus*.

## Materials and Methods

This researched was a laboratory experimental study with a post-test-only control group design. The samples of this studied were white adult female rats (*Rattus norvegicus*) aged 2-3 months of 6 days of gestation with an initial body weight of 120-160 grams with three groups were randomized, including control group (K1),

qari (K2) and qariah (K3). On the 18th day of pregnancy, *Rattus norvegicus* was sacrificed, then expression of *synapsin I* was calculated using immunohistochemical methods and analyzed with the appropriate statistics. In the expression of *synapsin I* variable, each subject was assessed according to the Remmele method. The data normality test was performed using the Shapiro Wilk test. Normally distributed data will be analyzed using one-way ANOVA followed by the Least Significant Differences test between groups.

## Results

Expression of *synapsin I* in the *cerebrum Rattus norvegicus* which is the variable of this study. The table 1 shows the mean and standard deviation o expression of *synapsin I* in the *cerebrum* of *Rattus norvegicus* which was highest in the Ar-Rahman voice treatment group by Qari (K2).

**Table 1. Mean And Standard Deviation Expression Of Synapsin I In Cerebrum Rattus norvegicus With Various Treatments**

| Treatment Group | Mean ± standard deviation |
|-----------------|---------------------------|
| K1              | 5.74 ± 2.32               |
| K2              | 6.96 ± 2.59               |
| K3              | 5.84 ± 2.90               |

Note: K1: Control group

K2: Qari group

K3: Qariah group

The figure 1 shows the expression of *synapsin I* in the *cerebrum* uses immunohistochemical methods. Red arrows indicate the expression of *Synapsin I* in the brain which indicates the presence of a chromogen brown color. The tissue was observed under a light microscope at 5x the field of view at 400X magnification.

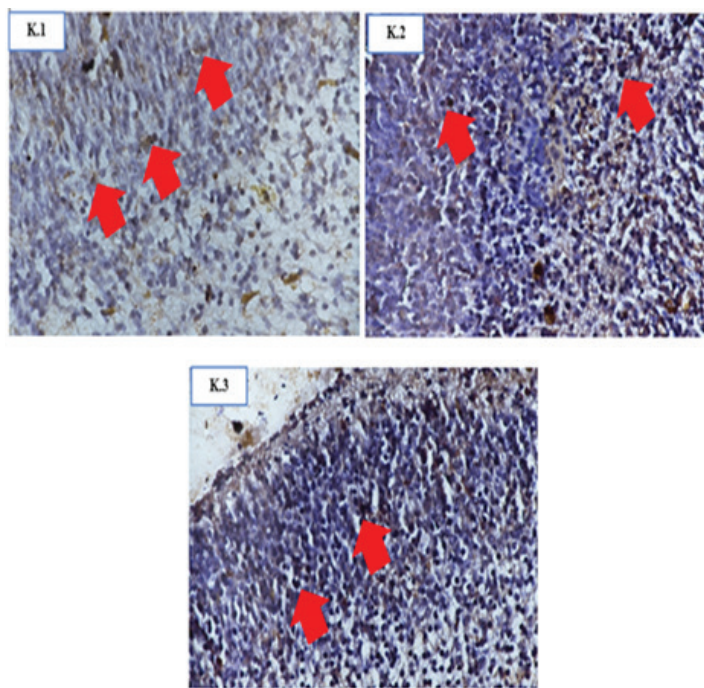


Figure 1. Expressions in the SYNAPSIN 1 Cerebrum group.

The results of the normality test using the Shapiro-Wilk test showed that the distribution expression of *synapsin 1* data in the *cerebrum* in each group was normally distributed. The ANOVA test results with a significance value of 0.519. Then the Analysis Least Significant Difference further test.

Table 2. Test Results LSD Against Expression Of *Synapsin 1* In *Cerebrum Rattus norvegicus*

| Treatment Group | LSD Test Significance Value |       |       |
|-----------------|-----------------------------|-------|-------|
|                 | K1                          | K2    | K3    |
| K1              | -                           | 0.306 | 0.932 |
| K2              | 0.306                       | -     | 0.347 |
| K3              | 0.932                       | 0.347 | -     |

The results of the Table 2 LSD advanced test showed no significant difference between the control group (K1) compared to the Ar-Rahman voice treatment group by Qari (K2), there was no significant difference between the control group (K1) compared to the Ar-Rahman voice treatment group by Qariah (K3), and there is no significant difference between the Ar-Rahman voice treatment group by Qari (K2) compared to the Ar-Rahman voice treatment group by Qariah (K3) with a significance value of more than 0.05.

### Discussion

The *cerebrum* of the newborn *Rattus norvegicus* showed that the mean expression of *Synapsin 1* which was given murottal surah Ar-Rahman stimulation by the qari during pregnancy was higher than that qariah and control group, but there were no significant differences in expression of *synapsin 1* in the *cerebrum*. During this period the fetus can deliver information in the form of sound waves to the brain. The sound waves activate a specific area of the bacillary membrane according to the frequency of the vibrations<sup>(7)</sup>. The qari used in this

research is the voice of Muzammil Hasbalah. A qari who reads every word of the surah in a good and easy way can make a person concentrate on listening and can provide a more pleasant stimulus. Listening to soothing sounds can increase, reduce pain perception, and provide sound stimulation that will affect physiological functions<sup>(8)</sup>. The advantages of learning Al Quran with audio visual media by Hj wafiq azizah. Audio visual media that are more varied can increase the activeness and learning outcomes of students. Murottal surah Ar-Rahman stimulation by qariah which is given during the prenatal period from an early age is expected to improve the intellectual function and emotional function of children as they grow and develop in the future<sup>(9)</sup>.

Surah Ar-Rahman has a duration of 13 minutes 55 seconds with a tempo of 79.8 beats per minute, a tempo of 79.8 bpm is a slow tempo. The slow tempo has a range between 60-120 bpm. The slow tempo itself is a tempo that is in line with the human heartbeat, so the heart will synchronize the beat according to the tempo of the sound<sup>(10)</sup>. Music that is rich in high frequency and has a high rhythm (similar to the rhythm of the fetal heartbeat), which can be associated with simulation and energizing functions. Mozart's music has the best combination with mellow sound colors dominated by violin instruments which help mothers to relax, there are no minor tones, the number of beats in the rhythm is around 60-80 times/minute which corresponds to the mother's heart rate<sup>(11)</sup>. Likewise with the murottal Surah Ar-Rahman by the qari has a frequency that can be associated with fetal stimulation.

At 26-28 weeks' gestation, the fetal hearing function begins to respond and process to auditory stimulation through stimulation of the auditory cortex located in the cerebral cortex and brainstem. 30-35 weeks of gestation, the fetus can hear and respond to the mother's voice and begins to distinguish between sounds around it. At 42 weeks, the lines of the auditory system with the central nervous system undergo a process of maturity and will then develop after the baby is born<sup>(12)</sup>. In this study, the murottal element that can be adjusted is the intensity where all types of murottal that are presented have been

adjusted to an intensity of 65 dB using a sound level meter and analyzed using Cubase 5, it was found that it was murottal qari around 15,400 Hz and the murottal qariah around 13,000 Hz. This difference in frequency will be captured differently by the tonopy of the cochlea, so the response to the brain will be different<sup>(13)</sup>.

From the recorded sound spectrum, the basic frequency is determined. The results showed that there were fewer males than females. The mean formant value of boys was slightly higher than that of girls, including 525 Hz for girls and 512 Hz for boys, respectively<sup>(6)</sup>. This is to support that the mother's voice, which is higher in frequency, is received by the fetus. Auditory stimulation of the mother's voice has been applied in several studies. This is in line which states that the ability to receive auditory stimulation and memorization has begun since the fetus in the womb has a permanent impact on brain development<sup>(14)</sup>.

The initial male frequency was smaller than the female initial frequency, the male final frequency was smaller than the female final frequency, the highest male frequency was smaller than the female high frequency, the lowest male frequency was smaller than the lowest frequency girls. Broadly speaking, it can be said that the male voice frequency is smaller than the female voice frequency<sup>(15)</sup>. From this study, it is related to the current research that the results of the analysis show that the voice frequency of male voice is higher than that of female voice. Therefore, it is obtained a higher expression in the voice of the qari than the voice of the qariah.

## Conclusion

The highest expression of *Synapsin I* in the *cerebrum* of newborn *Rattus norvegicus* is the group stimulated by qari, but there is no significant difference among control, qari, and qariah groups

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