

ABSTRAK

IDENTIFIKASI MORFOLOGI DAN DISTRIBUSI SEROTONIN (5-HYDROXYTRYPTAMINE, 5-HT) PADA HIPOKAMPUS KELELAWAR BUAH (*Rousettus amplexicaudatus*)

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Kelelawar buah atau biasa dikenal dengan codot (*Rousettus amplexicaudatus*) merupakan salah satu mamalia dari ordo Chiroptera, subordo Megachiroptera. *Rousettus amplexicaudatus* memiliki kemampuan visualisasi yang baik, hal ini sangat membantu proses pencarian makanan. Aktivitas tersebut akan diproses dan disimpan di otak dengan melibatkan aktivitas *learning and memory*. Aktivitas *learning and memory* ini berpusat di hipokampus dengan peran neuron serotonergik. Penelitian ini bertujuan untuk mengidentifikasi morfologi dan distribusi neuron serotonergik pada hipokampus *Rousettus amplexicaudatus* yang berkaitan dengan fungsi serotonin dalam aktivitas *learning and memory*.

Penelitian ini menggunakan tiga ekor *Rousettus amplexicaudatus* yang dianestesi menggunakan ketamin xylazine. *Rousettus amplexicaudatus* selanjutnya diperfusi menggunakan larutan NaCl 0,9% dan paraformaldehid 4% secara intrakardia. Otak *Rousettus amplexicaudatus* kemudian dipotong sagital dan diproses menjadi blok parafin, lalu dipotong dengan ketebalan 8 μm secara serial. Slide jaringan kemudian dilakukan pewarnaan hematoksin eosin, *cresyl echt violet*, dan imunohistokimia dengan serum kelinci anti-serotonin (1:200). Hasil pewarnaan selanjutnya diamati dan dianalisis secara kualitatif dengan mendeskripsikan stratum dan bentuk neuron pada hipokampus. Analisis kuantitatif dilakukan dengan menggunakan *software image J* dan GraphPad Prism 7.

Hipokampus *Rousettus amplexicaudatus* tersusun atas girus dentatus, hipokampus proper, dan subikulum. Pada girus dentatus ditemukan rata-rata sel imunoreaktif serotonin di stratum granular $132,00 \pm 35,03$ sel/ mm^2 , stratum polimorfik $86,33 \pm 11,23$ sel/ mm^2 , stratum molekular $93,00 \pm 1,00$ sel/ mm^2 . Area CA3 sel yang imunoreaktif terhadap serotonin ditemukan pada tiap stratum. Stratum paling imunoreaktif yaitu stratum piramidal, molekuler, lusidum, radiatum, oriens, dan alveus berturut-turut $91,00 \pm 27,40$ sel/ mm^2 , $63,00 \pm 13,11$ sel/ mm^2 , $62,67 \pm 8,08$ sel/ mm^2 , $55,33 \pm 10,21$ sel/ mm^2 , $48,00 \pm 3,46$ sel/ mm^2 , dan $28,67 \pm 2,52$ sel/ mm^2 . Area CA1 rata-rata pada stratum piramidal, molekuler, lusidum, oriens, radiatum, dan alveus berturut-turut $91,00 \pm 27,40$ sel/ mm^2 , $60,33 \pm 20,65$ sel/ mm^2 , $53,67 \pm 4,51$ sel/ mm^2 , $44,33 \pm 10,40$ sel/ mm^2 , $41,33 \pm 5,51$ sel/ mm^2 , dan $27,00 \pm 4,00$ sel/ mm^2 .

Kata kunci: Hipokampus, Imunohistokimia, *Learning and memory*, *Rousettus amplexicaudatus*, Serotonin.

ABSTRACT

IDENTIFY THE MORPHOLOGY AND DISTRIBUTION OF SEROTONIN (5-HYDROXYTRYPTAMINE, 5-HT) IN THE HIPPOCAMPUS'S OF FRUIT BAT (*Rousettus amplexicaudatus*)

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Old World fruit bats or commonly known as *codot* (*Rousettus amplexicaudatus*) are one of the mammals from Chiroptera order, Megachiroptera suborder. *Rousettus amplexicaudatus* possessed an outstanding visual ability, which helps in the process of searching for food. Those activities will be processed and saved within the brain involving the learning and memory activity. Learning and memory activity is centered in the hippocampus with the help of neuron and serotonergic. This study was conducted to identify the morphology and distribution of serotonergic neuron in the hippocampus's of *Rousettus amplexicaudatus* which related to the function of serotonin within the learning and memory process.

This study used 3 *Rousettus amplexicaudatus* which were anesthetized using ketamin xylazine. *Rousettus amplexicaudatus* then perfused using NaCl 0,9% and paraformaldehyde 4% intracardially. *Rousettus amplexicaudatus* brain's later sagittally cut and processed into paraffin block, and further cut with 8-micrometer thickness serially. Tissue slides then colored using hematoxylin eosin, cresyl echt violet, and immunohistochemistry with rabbit's anti-serotonin (1:200). The result then observed and analyzed qualitatively by describing the stratum and the form of neurons in the hippocampus. Quantitatively using an image J and GraphPad Prism 7 software.

Rousettus amplexicaudatus hippocampus's composed of gyrus dentatus, hippocampus proper and subiculum. Inside the gyrus dentatus were found an average amount of serotonin immunoreactive cells within the granular stratum $132,00 \pm 35,03$ cells/mm², polymorphic stratum $86,33 \pm 11,23$ cells/mm², molecular stratum $93,00 \pm 1,00$ cells/mm². CA3 area cells that immunoreactive toward serotonin were found in each stratum. Stratum which most immunoreactive was the pyramidal stratum, molecular, lucidum, radiatum, oriens, and alveus respectively $91,00 \pm 27,40$ cell/mm², $63,00 \pm 13,11$ cell/mm², $62,67 \pm 8,08$ cell/mm², $55,33 \pm 10,21$ cell/mm², $48,00 \pm 3,46$ cell/mm², dan $28,67 \pm 2,52$ cell/mm². CA1 area average on the pyramidal stratum, molecular, lucidum, oriens, radiatum, and alveus were respectively $91,00 \pm 27,40$ cell/mm², $60,33 \pm 20,65$ cell/mm², $53,67 \pm 4,51$ cell/mm², $44,33 \pm 10,40$ cell/mm², $41,33 \pm 5,51$ cell/mm², and $27,00 \pm 4,00$ cell/mm².

Keyword : Hippocampus, Immunohistochemistry, Learning and memory, *Rousettus amplexicaudatus*, Serotonin.