

# Efek Ekstrak Etanol *Centella Asiatica* pada Recognition Memory: Kajian Ekspresi $\alpha$ -7 Nicotinic Acetylcholine Receptor dan Choline Acetyltransferase Korteks Prefrontal Model Tikus Obes = Effect of *Centella asiatica* Ethanolic Extract on Recognition memory: Expression of Alpha-7-nicotinic acetylcholine receptor and Choline acetyltransferase in the Prefrontal Cortex of Obese Mouse Models

Harahap, Iqlima Khairiyah Putri, author

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## Abstrak

Obesitas menyebabkan inflamasi sistemik dan neuroinflamasi sehingga dapat mempengaruhi otak, salah satunya area korteks prefrontal. Area ini merupakan area asosiasi multimodal, berperan dalam fungsi memori episodik berkaitan dengan informasi objek, lokasi, dan waktu (recognition memory). Neuroinflamasi berkaitan dengan disfungsi kolinergik otak dan berimplikasi menyebabkan gangguan memori. Tanaman herbal *Centella asiatica* (CA) memiliki sifat antiinflamasi dan anti-asetilkolinesterase. Tujuan penelitian ini untuk membuktikan manfaat CA terhadap fungsi recognition memory ditinjau dari sistem kolinergik pada obesitas. Sebanyak 24 tikus Wistar dibagi dalam 4 kelompok yaitu kelompok kontrol, obes, dan obes yang diberikan ekstrak etanol CA 200mg/kgBB atau 300mg/kgBB. Intervensi dilakukan selama 35 hari. Fungsi recognition memory diukur dengan serangkaian uji object recognition terdiri dari novel object preference (NOP), object place preference (OPP), dan object in place preference (OiP). Fungsi sistem kolinergik dinilai dari ekspresi Choline Acetyltransferase (ChAT) dan reseptor  $\alpha$ 7 nicotinic acetylcholine receptor ( $\alpha$ 7nAChR) dianalisis dengan Real-Time Polymerase Chain Reaction (RT-PCR). Hasil penelitian didapatkan terjadi penurunan fungsi recognition memory pada kelompok obes, dan pemberian CA 200 dan 300mg/kgBB dapat memperbaiki recognition memory pada kondisi obes. Ekspresi  $\alpha$ 7nAChR dan ChAT tidak berbeda bermakna antar kelompok. CA berpotensi mempertahankan fungsi recognition memory pada kondisi obes dan dibutuhkan penelitian lebih lanjut terkait mekanismenya

.....Obesity causes systemic and neuroinflammation which affect the brain, such as prefrontal cortex (PFC) area. PFC is a multimodal association area, playing a role in episodic memory functions related to object, location and time information (recognition memory). Neuroinflammation affected brain cholinergic dysfunction resulting in memory impairment. *Centella asiatica* L. (CA) herb used as anti-inflammatory and anti-acetylcholinesterase. This study analyzed the benefits of CA on cholinergic system induced by high-fat diet and resulting changes in recognition memory. Twenty-four male Wistar rats were divided into four groups; control, obese, obese groups + 200mg/kgBB and 300mg/kgBB CA ethanol extract for 35 days. Recognition memory function assessed using the Novel Object Preference (NOP), Object Place Preference (OPP), and Object in Place Preference (OiP). The cholinergic system's function; expression levels of Choline Acetyltransferase (ChAT) and  $\alpha$ 7-nicotinic-acetylcholine receptor ( $\alpha$ 7nAChR) were analyzed using Real-Time Polymerase Chain Reaction (RT-PCR). Decreased recognition memory function seen in the obese group, and obese groups + CA (200 and 300mg/kgBB) could improve recognition memory in obese conditions. The expression of  $\alpha$ 7nAChR and ChAT was not significantly different in between groups. CA has the potential effect to maintain recognition memory function in obese conditions and future research may elucidate the mechanism.