EFEKTIVITAS PEMBERIAN *BETA CAROTENE* TERHADAP *HIPPOCAMPUS* TIKUS WISTAR BETINA *(Rattus Norvegicus)* *MENOPAUSE* UNTUK MENCEGAH *NEUROFIBRILLARY TANGLES* (NFTS)

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ABSTRAK

Latar Belakang: *Alzheimer's Disease* (AD) adalah gangguan neurodegeneratif kronis umum pada orang tua berusia >65 tahun dan sering terjadi pada wanita *menopause*. AD ditandai dengan penurunan fungsi kognitif akibat hiperfosforilasi protein tau yang membentuk *Neurofibrillary Tangles* (NFTs). B-carotene dikenal sebagai antioksidan kuat yang mampu melindungi sel otak dari kerusakan oksidatif dan mencegah pembentukan NFTs. Namun, penelitian yang melaporkan efek pemberian β-carotene pada tikus model *menopause* untuk mencegah NFTs masih terbatas.

Tujuan: Penelitian ini bertujuan untuk membuktikan pemberian β-carotene memiliki efek positif terhadap *hippocampus* tikus wistar betina (*Rattus Norvegicus*) *menopause* untuk mencegah *Neurofibrillary Tangles* (NFTs).

Metode: Penelitian eksperimental ini menggunakan metode *Randomized Controlled Trial* (RCT) dengan desain *Post Test Only Control Group Design* menggunakan 21 ekor tikus wistar betina yang dibagi menjadi 3 kelompok, yaitu kontrol normal (kelompok I), *ovariectomy* (kelompok II), dan *ovariectomy* dengan β-carotene dosis 3 mg/kgBB/hari selama 21 hari (kelompok III). Sampel otak tikus diambil dan dihitung jumlah NFTs di area CA1, CA3, dan DG *hippocampus*. Data dianalisis dengan uji *One Way* ANOVA dan uji LSD.

Hasil Penelitian: Hasil penelitian menunjukkan bahwa didapatkan perbedaan signifikan ($p<0,05$) dalam jumlah NFTs di area CA1, CA3, dan DG *hippocampus* antara kelompok I dengan II, kelompok II dengan III, dan tidak ada perbedaan signifikan antara kelompok I dengan III.

Kesimpulan: Kesimpulan penelitian ini adalah pemberian β-carotene dengan dosis 3 mg/kgBB/hari selama 21 hari terbukti memiliki efek positif untuk mencegah NFTs pada *hippocampus* tikus yang diinduksi model *menopause*.

Kata Kunci: *Alzheimer's disease* (AD), *Neurofibrillary Tangles* (NFTs), *Menopause*, *Ovariectomy*, β-carotene.

EFFECTIVENESS OF GIVING *BETA CAROTENE* TO THE *HIPPOCAMPUS* OF MENOPAUSAL FEMALE WISTAR RATS *(Rattus Norvegicus)* TO PREVENT *NEUROFIBRILLARY TANGLES* (NFTS)

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ABSTRACT

Background: Alzheimer's Disease (AD) is a chronic neurodegenerative disorder common in older people aged >65 years and often occurs in postmenopausal women. AD is characterized by decreased cognitive function due to hyperphosphorylation of the tau protein which forms *Neurofibrillary Tangles* (NFTs). B-carotene is known as a powerful antioxidant that can protect brain cells from oxidative damage and prevent the formation of NFTs. However, studies reporting the effect of administering β-carotene in menopausal mouse models to prevent NFTs are still limited.

Objective: This study aims to prove that administration of β-carotene has a positive effect on the *hippocampus* of postmenopausal female Wistar rats (*Rattus Norvegicus*) to prevent *Neurofibrillary Tangles* (NFTs).

Methods: This experimental research used the *Randomized Controlled Trial* (RCT) method with a *Post Test Only Control Group Design* using 21 female Wistar rats divided into 3 groups, namely normal control (group I), *ovariectomy* (group II), and *ovariectomy* with β-carotene dose 3 mg/kgBW/day for 21 days (group III). Rat brain samples were taken and the number of NFTs in the CA1, CA3 and DG areas of the *hippocampus* was counted. Data were analyzed using the *One-Way* ANOVA test and LSD test.

Results: The results showed that there was a significant difference ($p<0.05$) in the number of NFTs in the CA1, CA3, and DG areas of the *hippocampus* between groups I and II, group II and III, and there was no significant difference between groups I and III.

Conclusion: The conclusion of this study was that administration of β-carotene at a dose of 3 mg/kgBW/day for 21 days was proven to have a positive effect on preventing NFTs in the *hippocampus* of rats induced by the *menopause* model.

Keywords: Alzheimer's disease (AD), *Neurofibrillary Tangles* (NFTs), *Menopause*, *Ovariectomy*, β-carotene.