DISERTASI

PENGARUH PEMBERIAN DADIH TERHADAP EKSPRESI BETA AMYLOID, PROTEIN TAU, GEN CASPASE-3 DAN GEN BETA SECRETASE-1 PADA OTAK TIKUS MODEL ALZHEIMER

Penelitian Eksperimental Secara *In Vivo* pada Tikus Putih *(Rattus norvegicus)*

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ABSTRAK

PENGARUH PEMBERIAN DADIH TERHADAP EKSPRESI BETA AMYLOID, PROTEIN TAU, GEN CASPASE-3 DAN GEN BETA SECRETASE-1 PADA OTAK TIKUS MODEL ALZHEIMER

Penyakit alzheimer mengalami peningkatan insiden dengan cepat dari tahun ke tahun. Hipotesis kaskade amiloid dan hipotesis tau merupakan mekanisme patogenik yang paling banyak dianut sebagai penyebab terjadinya alzheimer. Perbaikan defisit kognitif telah dilaporkan pada model hewan dengan kecemasan, parkinson dan diabetes yang diberi probiotik. Dadih dikenal sebagai nutrisi fungsional yang mengandung probiotik. Tujuan penelitian ini yaitu untuk menganalisis pengaruh dadih terhadap ekspresi beta-amyloid, *protein tau,* gen caspase 3, gen BACE-1 pada otak tikus model alzheimer (*Rattus norvegicus)* dan pemberian $AlCl_3$ terhadap otak tikus pada Y-Maze test serta pengaruh dadih terhadap otak tikus pada Y-Maze Test. Penelitian ini menggunakan rancangan eksperimental murni laboratorium *post test only control group design* dengan tikus putih galur wistar sebagai hewan coba. Pengukuran ekspresi beta amyloid dan protein tau dengan pemeriksaan immunohistokimia, serta ekspresi gen caspase-3 dan gen BACE-1 dengan pemeriksaan q-PCR. Penelitian ini terbagi atas 4 kelompok dimana terdapat kelompok kontrol negatif, kontrol positif dan 2 kelompok perlakuan. Hasil Penelitian menunjukkan bahwa pemberian $AlCl_3$ selama 5 hari pada tikus dapat menurunkan nilai Y-Maze Test, pemberian dadih peroral 1,87 gram/200 gram BB tikus selama 42 hari dapat menurunkan ekspresi beta amyloid secara bermakna ($p < 0,001$), menurunkan ekspresi protein tau secara bermakna ($p < 0,001$), menurunkan ekspresi gen caspace-3 dan tidak bermakna secara statistik ($p = 0,134$), menurunkan ekspresi gen BACE- dan tidak bermakna secara statistik ($p = 0,151$), serta meningkatkan nilai Y-Maze Test. Hasil dari penelitian ini membuktikan bahwa pemberian dadih dapat memperbaiki alzheimer dengan menurunkan ekspresi beta amyloid, protein tau, gen caspase-3 dan gen BACE-1.

Kata Kunci: Beta Amyloid, Beta Secretase-1, Caspase-3, Dadih, Protein Tau

ABSTRACT

The incidence of Alzheimer's disease is increasing rapidly year by year. The amyloid cascade hypothesis and the tau hypothesis are the most widely accepted pathogenic mechanisms for the development of Alzheimer's disease. Cognitive deficits have been reported to improve in animal models of anxiety, Parkinson's disease, and diabetes when given probiotics. Dadih is known as a functional food containing probiotics. The aim of this study was to analyse the effect of dadih on the expression of beta-amyloid, tau protein, caspase 3 gene, and BACE-1 gene in the brains of Alzheimer's disease model rats (Rattus norvegicus) and the effect of $AlCl_3$ administration on rat brains in the Y-Maze test, as well as the effect of dadih on rat brains in the Y-Maze test. This study used a pure laboratory experimental design with a post-test only control group, using Wistar strain white rats as experimental animals. Measurement of beta-amyloid and tau protein expression was performed using immunohistochemistry, while expression of caspase-3 and BACE-1 genes was measured using q-PCR. The study was divided into four groups: a negative control group, a positive control group, and two treatment groups. The results showed that administering $AlCl_3$ for 5 days to rats reduced Y-Maze Test scores, while administering 1.87 grams of dadih per 200 grams of rat body weight orally for 42 days significantly reduced beta-amyloid expression ($p < 0.001$), significantly reduced tau protein expression ($p < 0.001$), reduce caspase-3 gene expression, though not statistically significant ($p = 0.134$), reduce BACE- gene expression, though not statistically significant ($p = 0.151$), and improve Y-Maze Test scores. The results of this study demonstrate that dadih can improve Alzheimer's disease by reducing beta amyloid expression, tau protein expression, caspase-3 gene expression, and BACE-1 gene expression.

Keywords: Beta Amyloid, Beta Secretase-1, Caspase-3, Dadih, Tau Protein