

Fungsi memori spasial tikus pada kombinasi latihan aerobik dan environmental enrichment kontinyu: kajian IGF-1 dan FGF-2 hipokampus = Spatial memory function of rats treated with combination of aerobic exercise and continuous environmental enrichment: study of hippocampal igf-1 and fgf-2

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Abstrak

Latar Belakang: Memori sangat berperan penting dalam proses kehidupan. Seiring dengan bertambahnya usia, fungsi memori akan mengalami penurunan karena proses neurodegenerasi. Stimulus eksternal baik latihan fisik aerobik maupun environmental enrichment EE mampu memperlambat terjadinya neurodegenerasi dengan meningkatkan neuroplastisitas melalui ekspresi berbagai protein baik protein sinaptik maupun growth factor seperti insulin like growth factor 1 IGF-1 dan fibroblast growth factor 2 FGF-2 . Pemberian kombinasi latihan aerobik dan environmental enrichment kontinyu dan pengaruhnya pada ekspresi IGF-1 dan FGF-2 yang diharapkan mampu meningkatkan fungsi memori belum dilakukan pada penelitian sebelumnya. Bahan dan Metode: Penelitian ini merupakan penelitian eksperimental pada 24 tikus Wistar jantan *Rattus norvegicus*, 300-400 gram, usia 7-8 bulan , dibagi secara acak ke dalam 4 kelompok: kontrol K , latihan aerobik A , Environmental Enrichment kontinyu EE , dan kombinasi latihan aerobik dan Environmental Enrichment kontinyu A-EE . Hasil: Kelompok kombinasi latihan aerobik dan environmental enrichment A-EE menunjukkan fungsi memori spasial tikus terbaik. Namun ekspresi IGF-1 dan FGF-2 hipokampus pada kelompok A-EE tidak lebih tinggi dari kelompok lain. Selain itu, ekspresi FGF-2 hipokampus berkorelasi positif dengan kekuatan sedang dengan fungsi memori, sedangkan IGF-1 hipokampus berkorelasi negatif dengan kekuatan lemah dengan fungsi memori. Kesimpulan: Peningkatan fungsi memori pada kelompok kombinasi merupakan hasil induksi ekspresi berbagai protein di hipokampus, namun jalur utama yang meningkatkan fungsi memori bukanlah melalui peningkatan ekspresi IGF-1 dan FGF-2 di hipokampus.

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Background Memory plays an important role in life. Memory declines with age through the process of neurodegeneration. External stimuli such as aerobic exercise and environmental enrichment EE can delay neurodegeneration by improving neuroplasticity via expression of various synaptic proteins and growth factors such as insulin like growth factor 1 IGF 1 and fibroblast growth factor 2 FGF 2 . Combination treatment of aerobic exercise and continuous environmental enrichment and their effect on the expression of IGF 1 and FGF 2 which were expected to improve memory function has not been studied previously. Materials and Methods This is an experimental research using 24 male Wistar rats *Rattus norvegicus*, 300 400 g, age 7 8 months divided randomly into 4 groups control C , aerobic exercise A , continuous environmental enrichment EE , and combination of aerobic exercise and continuous environmental enrichment A EE . Results Combination of aerobic exercise and environmental enrichment group A EE showed the best improvement in rats rsquo spatial memory. But their hippocampal IGF 1 and FGF 2 expression were not higher than other groups. There was positive correlation between hippocampal FGF 2 and memory function, but there was negative correlation between hippocampal IGF 1 and memory

function. Conclusions Improvement in memory function in combination group is a result of induction of various protein expression in the hippocampus, but the primary pathway of memory function improvement is not through the hippocampal IGF 1 and FGF 2 expression.