

Erythropoietin protects against cognitive impairment and hippocampal neurodegeneration in diabetic mice

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Abstract

The aim of this study was to determine whether EPO administration protects against the impairment of cognitive function and motor performance, as well as degenerative changes in the hippocampus, associated with long-term diabetes. Twelve male BALB/c mice aged 5-7 weeks (20-25g) were administered streptozotocin i.p. (STZ) 55mg/kg/day for 5 days. Diabetic mice were then randomly assigned to either control (i.e. sodium citrate buffer i.p.) (n=6), or EPO treatment 5U/g/day (dissolved in sodium citrate buffer; i.p.) (n=6), three times per week for a period of 10 weeks starting the day after the first administration of STZ. An additional group of six mice served as normal controls. At the end of the treatment period, cognitive performance was assessed in Morris water maze. Mice were killed by overdosing with ether and decapitated. The brains were processed for light microscopic evaluation of CA1, CA3 and dentate gyrus (DG) regions of the hippocampus, staining was with haematoxylin-Eosin and cresyl violet (for Nissl granules). In the water maze, control animals showed improvement in escape latency and distance swam over the five days. There was a similar trend for the EPO-treated diabetics although this was not significant. By contrast, diabetics showed a deterioration in escape latency. There were evidence of neurodegeneration in all regions of the hippocampus of diabetic animals as well as a reduction in numbers of granule cells in the DG; these effects were reduced in EPO-treated diabetics. In conclusion, chronic EPO-treatment is protective against cognitive deficits and hippocampal neurodegeneration in diabetic mice.



Biography:

Amer Kamal Al Ansari was graduated from Basrah University/ College of Medicine in 1978; he received his PhD in neurophysiology in 1986 from Lauvain University/ College of medicine. He worked in University of Utrecht in the Netherlands as senior researcher and University docent for about 20 years, and then joined the Arabian Gulf University/



College of Medicine and Medical Sciences staff in Bahrain. In addition to his teaching responsibilities, he worked as a consultant doctor in the Bahrain Defense Force hospital for the last 6 years. His research field belongs to electrophysiology of hippocampus, learning and memory, behavioral studies ageing and Diabetes mellitus.

Speaker Publications:

1. The Effect of Silver Nanoparticles on Learning, Memory and Social Interaction in BALB/C Mice. Publication date January 8, 2019 publication description International Journal of Environmental Research and Public Health.

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