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**Dietary deficiency of n-3 fatty acids affects BDNF gene expression and spatial learning behaviour in young rats**

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**Background** – Brain tissue contains large quantity of n-3 fatty acids, particularly decosahexaenoic acid (DHA). DHA is derived from its precursor alpha-linolenic acid, a dietary essential n-3 fatty acid, or it can be obtained directly from dietary sources. Dietary deficiency of n-3 fatty acids leads to impairment of spatial learning and memory in experimental animals, and dietary supplementation with DHA appears to improve mental development in human infants. How DHA influences brain memory function is not fully understood although a number of potential mechanisms have been proposed. One of the possible mechanisms is to affect the synthesis of neurotrophic factors in the brain.

**Objectives** – The present study aimed to investigate the effect of dietary n-3 fatty acid deficiency on brain-derived neurotrophic factor (BDNF) gene expression and spatial learning performance in young rats.

**Design** – Sprague Dawley rats were fed on an n-3 fatty acid deficient diet for three generations. The rat pups of the third generation were tested for their spatial learning performance using Morris Water Maze at four and ten weeks of age. At the end of the behaviour test, the rat pups were killed and the brain tissue was dissected for measurement of BDNF and its mRNA levels using ELISA and real-time PCR techniques respectively.

**Results** – Dietary n-3 fatty acid deficiency led to a marked depletion of DHA in the brain tissue. The concentration of BDNF mRNA in the cerebral cortex and the hippocampus was significantly lower in n-3 deficient rat pups than in the control counterparts (P<0.05), although BDNF level in the brain tissue did significantly differ between the control and n-3 deficient animals. In comparison with the control animals, n-3 deficient rats performed significantly poorer in Morris Water Maze task (P<0.05), and the effect was particularly evident at four weeks of age.

**Conclusion** – Dietary n-3 fatty acid deficiency leads to the impairment of spatial learning and memory performance and to a reduction of BDNF gene expression in the brain, the latter is a neurotrophic factor known to be involved in the memory function of the brain.

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**Labelled magnitude scale for perceived satiety – a tool for diverse populations**

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**Background** – The labelled magnitude scale (LMS) has been found to provide better discrimination of satiety sensations compared to other scales for a homogenous population¹. Verbal anchors were placed on the scale to represent numerical ratios of perceived satiety. The satiety perception in a diverse population such as Australia may produce differences in the numerical ratios due to language acquisition and diversity.

**Objective** – To investigate whether LMS is an appropriate methodology to assess satiety in a diverse population.

**Design** – Forty three subjects (28 female, 15 male) took part in the study. Of this group, 44% had English as their first language (EFL) while 56% had other language as first language (EOL). Subjects quantified the semantic meaning of 47 English words denoting hunger/fullness at various intensities. Ambiguous words were removed and geometric means (GM) were calculated. Eleven final words were chosen for anchors for scale construction.

**Outcomes** – Words removed due to ambiguity differed between EFL and EOL groups as these words have no equivalent in non-English first languages e.g. *ravenous* and *voracious*. An asymmetrical scale was constructed. The scale developed for this diverse population had some differences in magnitude of numerical ratios of words such as *extremely full/hungry* and *very full/hungry* compared to previous study¹.

**Conclusions** – Provided ambiguous words are avoided, labelled magnitude scale can be used in English to assess satiety in populations differing in their first language.

**Reference**