Memory-related gene expression profile of the male rat hippocampus induced by teeth extraction and occlusal support recovery.


Abstract

OBJECTIVES: The present study aimed to identify the effect of memory-related genes on male rats tested for spatial memory with either molar teeth extraction or its restoration by occlusal support using experimental dentures.

DESIGN: Memory-related genes were detected from hippocampi of male Wistar rats (exposed to teeth extraction with or without dentures, or no extraction (control)) (7-week old) after behavioural testing (via the radial maze task) using a DNA microarray. The time course of the expression of these genes was evaluated by quantitative real-time polymerase chain reaction (PCR) (on 49-week-old rats).

RESULTS: In preliminary experiments, to determine which memory genes are affected by spatial memory training, DNA microarray analysis revealed that thyrotropin-releasing hormone (Trh) and tenascin XA (Tnxa) were up-regulated and neuronatin (Nnat) and S100a9 were down-regulated after the maze training. The expression of Tnxa, Nnat and S100a9 of 49-week-old rats (during the time course) via quantitative real-time PCR was consistent with the results of microarrays of the preliminary experiment. Expression of Trh that was evaluated by quantitative real-time PCR did not agree with the results for this gene from the microarray for all groups. Therefore, expression of Trh may have increased in only young, trained rats. The expression of S100a9 prior to the maze task was down-regulated in only the extraction group.

CONCLUSION: These results demonstrated that Trh, Tnxa and Nnat genes were affected according to the degree of memory in male rats. This study also indicated that S100a9 is a memory-related gene, which is affected by the presence of occlusal support.

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KEYWORDS: Gene expression; Hippocampus; Memory and learning; Nnat; S100a9; Tnxa; Trh

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