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Dietary trans-fat combined with monosodium glutamate induces dyslipidemia and impairs spatial memory.

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Source

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Abstract

AIMS: Recent evidence suggests that intake of excessive dietary fat, particularly saturated fat and trans-hydrogenated oils (trans-fatty acids: TFA) can impair learning and memory. Central obesity, which can be induced by neonatal injections of monosodium Glutamate (MSG), also impairs learning and memory. To further clarify the effects of dietary fat and MSG, we treated C57BL/6J mice with either a TFA-enriched diet, dietary MSG, or a combination of both and examined serum lipid profile and spatial memory compared to mice fed standard chow. Spatial learning was assessed at 6, 16 and 32 weeks of age in a Morris Water Maze (MWM). The subjects were given four days of training to find a hidden platform and a fifth day of reversal learning, in which the platform was moved to a new location.

RESULTS: The TFA+MSG combination caused a central adiposity that was accompanied by impairment in locating the hidden platform in the MWM. Females in the TFA+MSG group showed a greater impairment compared to the other diet groups, and also showed elevated levels of fasting serum LDL-C and T-CHOL:HDL-C ratio, together with the lowest levels of HDL-C. Similarly, males in the TFA+MSG diet group were less successful than control mice at locating the hidden platform and had the highest level of abdominal adiposity and elevated levels of fasting serum LDL-C.

CONCLUSION: Dietary trans-fat combined with MSG increased central adiposity, promoted dyslipidemia and impaired spatial learning.

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