

***N*-Acetyl aspartic, aspartic and glutamic acid brain levels in aggressive mice\***

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IN PREVIOUS studies it was reported that male mice becoming aggressive after prolonged isolation show a decreased brain level of free *N*-acetyl-L-aspartic acid (NAA). This change was found neither in isolated female mice<sup>1</sup> nor isolated male rats (unpublished observation) which do not develop aggressiveness by isolation.

The purpose of this note is to report the time course of the decrease of brain NAA in male mice and to observe if other brain aminoacids were changed after isolation. Aggressive animals were produced according to Yen<sup>2</sup> by keeping albino Swiss male mice isolated for 21-28 days in controlled environmental conditions previously described.<sup>3</sup>

Brain extraction procedures and gas-chromatographic determination of NAA have been described elsewhere.<sup>4</sup> For the estimation of aspartic and glutamic acids, the brain was deproteinized with an homogenization in 75 per cent cold ethanol 1:10 (w/v). After centrifugation a portion of the supernatant was evaporated to dryness under vacuum and the residue was redissolved in water and passed through a Dowex 1 × 4 (OH-form) ion exchange column (2 × 5 cm). The resin was washed with 50 ml of water. The acidic compounds were eluted with 30 ml of HCl 1 N. The eluate was evaporated to dryness and then esterified with diazopropane.<sup>5</sup> After evaporation, the sample was trifluoroacetylated and submitted to gas-chromatography.

Figure 1 indicates that the decrease of brain NAA parallels the onset of aggressiveness. It is interesting that no changes occurred after the first day of isolation, at a time when there was already a decreased turnover of brain serotonin.<sup>6</sup>

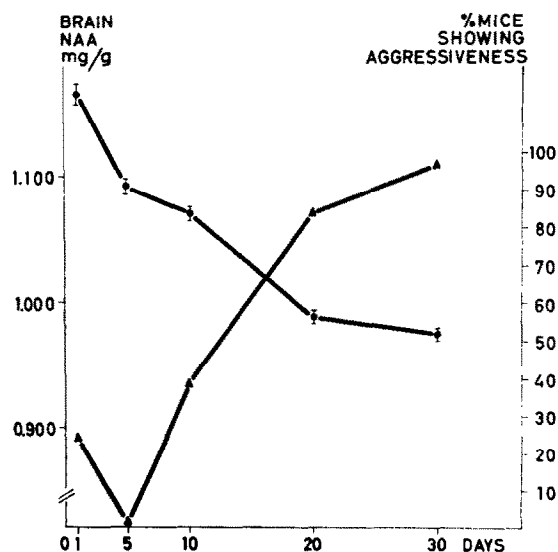


FIG.1. Relation between NAA brain levels (●—●) and development of aggressiveness (▲—▲) in isolated male mice. The level of brain NAA in grouped animals was  $1.149 \pm 0.004$  mg/g and did not change during the period of 30 days. Grouped animals did not show aggressive behaviour at any time.

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TABLE 1. *N*-ACETYL-L-ASPARTIC, ASPARTIC AND GLUTAMIC ACIDS IN BRAIN OF NORMAL AND ISOLATED AGGRESSIVE MALE MICE

Behaviour	NAA content mg/g $\pm$ S.E.	Brain Aspartic acid mg/g $\pm$ S.E.	Brain Glutamic acid mg/g $\pm$ S.E.
Normal	1.149 $\pm$ 0.004	0.356 $\pm$ 0.010	1.096 $\pm$ 0.034
Aggressive	0.975 $\pm$ 0.006*	0.356 $\pm$ 0.014	1.166 $\pm$ 0.046

Each figure is the mean of four different determinations.

\*  $P < 0.01$ .

Table 1 shows that after 30 days of isolation when the level of brain NAA was lowered, there was no change in the concentration of brain aspartic and glutamic acids. These findings are a further contribution to the understanding of the biochemical changes taking place in the brain of isolated aggressive mice.

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