NEWS

Cognition and behavior: Supplement keeps Rett mice healthy

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Treating mice that model Rett syndrome with acetyl-L-carnitine (ALC) delays the onset of symptoms until adulthood, according to a study published 5 December in *PLoS One*[1]. If taken continuously and early in life, the supplement may help treat the disorder, the researchers say.

ALC is present at high concentrations in meat and is known to enter the brain, where it helps cells produce energy and protects them from oxidative damage.

A study last year found that some children with autism have a **rare mutation that prevents carnitine synthesis**, suggesting that the supplement may treat at least some children with the disorder.

Two small clinical trials have shown that ALC improves sleep quality, communication skills and heart problems in girls with Rett syndrome[2,3].

In the new study, researchers used mice lacking **MeCP2**, the gene mutated in Rett syndrome, to assess ALC's effects during key periods of brain development.

Boosted branches: Treatment with carnitine (right) normalizes the signal-receiving tips of neurons, which are less dense in mice that model Rett syndrome (middle) than in controls (left).

They injected these mice with the supplement from birth until their deaths at about 47 days old. Newborn mice are developmentally equivalent to human fetuses entering the third trimester.

By day 21, male mice lacking the MeCP2 gene have breathing difficulties. They are also smaller

and have a weaker grip than controls, indicating poor general health. ALC delays these symptoms until about day 35.

The treated mice are also more active at days 21 and 29 than are those given saline injections. However, later in life — around 40 days of age — they are just as inactive and clumsy as untreated mutant mice.

ALC also normalizes **dendritic spines** — the signal-receiving branches of neurons — which tend to be shorter and less complex in the mutant mice than in controls.

The supplement may only be effective early in life because MeCP2's loss becomes increasingly important with age, or because the mice become resistant to the treatment, the researchers suggest.

References:

1: Schaevitz L.R. *et al. PLoS One* **7**, e51586 (2012) **PubMed**

2: Ellaway C.J. *et al. Brain Dev.* **23**, S85-S89 (2001) **PubMed**

3: Giuderi F. *et al. Pediatr. Cardiol.* **26**, 574-577 (2005) **PubMed**