

# Ketone bodies

The three “ketone bodies” ([acetoacetate](#), [beta-Hydroxybutyric acid](#), [acetone](#)) are secreted to the venous circulation, followed by uptake in extrahepatic tissues, excretion in the kidney, or exhaling (acetone) via the lungs. Acetoacetate may also be used in the cytosol for cholesterol synthesis and possibly lipogenesis

The [ketone bodies](#), especially the [beta-Hydroxybutyric acid](#), had been shown to modulate the function of the central nervous system and prevent the pathological progression of [Alzheimer's disease](#) (AD). However, little is known about the role of [acetoacetate](#) in the AD brain. Thus, Wu et al. intraventricularly injected acetoacetate into familial AD mice (APP<sup>SWE</sup>) for 14 days and monitored their [memory](#) and biochemical changes. During the behavior test, acetoacetate at 100 mg/kg led to significant improvement in both Y-maze and novel object recognition tests (NORTs) (both  $P < .05$ ), indicating ameliorating spatial and recognition memory, respectively. Biomedical tests revealed two mechanisms were involved. Firstly, acetoacetate inhibited the GPR43-pERK pathway, which led to apparent inhibition in [tumor necrosis factor- \$\alpha\$](#)  and Interleukin-6 expression in the [hippocampus](#) in a concentration-dependent manner. Secondly, [acetoacetate](#) stimulated the expression of hippocampal brain-derived [neurotrophic factor](#) (BDNF). They concluded that acetoacetate could ameliorate AD symptoms and exhibited promising features as a therapeutic for AD <sup>1)</sup>.

<sup>1)</sup>

Wu XJ, Shu QQ, Wang B, Dong L, Hao B. Acetoacetate Improves Memory in Alzheimer's Mice via Promoting Brain-Derived Neurotrophic Factor and Inhibiting Inflammation. Am J Alzheimers Dis Other Demen. 2022 Jan-Dec;37:15333175221124949. doi: 10.1177/15333175221124949. PMID: 36113018.

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Last update: **2024/06/07 02:58**

