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Review [Crit Rev Food Sci Nutr](#). 2024;64(12):3961-3970. doi: 10.1080/10408398.2022.2137776.

Epub 2022 Oct 26.

## Beneficial effects of butyrate on brain functions: A view of epigenetic

Gabriela de Cássia Ávila Alpino <sup>1</sup>, Gabriela Amorim Pereira-Sol <sup>2</sup>, Mariana de Moura E Dias <sup>1</sup>, Aline Silva de Aguiar <sup>3</sup>, Maria do Carmo Gouveia Peluzio <sup>1</sup>

Affiliations

PMID: 36287024 DOI: [10.1080/10408398.2022.2137776](https://doi.org/10.1080/10408398.2022.2137776)

### Abstract

Brain functions are influenced by the presence, activity, and metabolism of the gut microbiota through the gut-microbiota-brain (GMB) axis. The consumption of a fiber-rich diet increases the content of short-chain fatty acids (SCFAs) from bacterial fermentation in the colon. Among SCFAs, butyrate stands out because of its wide array of biological functions, such as ability to influence brain functions. Pharmacologically, sodium butyrate (NaB) regulates gene expression in the brain, where it has several beneficial effects ranging from neurodegenerative diseases to behavioral disorders through inhibitors of histone deacetylases (HDACs). In this context, we review the mechanisms of action of the two types of butyrate on brain functions, with an emphasis on the epigenetic approach. Both types of butyrate are potentially interesting for the prevention and adjuvant therapy of neurological and psychological disorders due to their neuroprotective functions. However, further studies are needed to investigate the possible neuroepigenetic effects of butyrate derived from bacterial fermentation.

**Keywords:** Butyrate; brain disorders; epigenetics; gut-microbiota-brain axis; high-fiber diet.

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