# The microbiota-gut-brain axis impacts chronic cerebral hypoperfusion via short chain fatty acids

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**Video Byte**

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# Abstract

Chronic cerebral hypoperfusion (CCH) drives the secondary brain injury found in some central nervous system (CNS) diseases. Certain CNS diseases can be exacerbated by a dysregulated microbiota-gut-brain axis through metabolites like short chain fatty acids (SCFAs). But is there a relationship between gut dysbiosis and CCH, and does maintaining SCFA metabolism by restoring the gut microbiota protect against CCH? To answer these questions, a recent study examined the effects of fecal microbiota transfer (FMT) on a rat model of CCH. CCH was induced with bilateral common carotid artery occlusion (BCCAO). BCCAO caused cognitive impairment, impaired gut function, altered gut microbiota, and reduced SCFA levels. However, the transfer of a balanced microbiota to BCCAO rats reduced these symptoms. Specifically, a rebalanced microbiota improved gut motility and barrier functions. It also led to higher levels of hippocampal SCFAs and reduced neuroinflammation in response to lipopolysaccharide. Additionally, FMT inhibited hippocampal neuronal apoptosis, which lead to reduced cognitive decline and less depressive-like behaviors. SCFA supplementation also reduced inflammatory effects and hippocampal neuronal apoptosis in BCCAO rats. These results suggest that CCH symptoms can be ameliorated by FMT, potentially by increasing microbe-derived SCFA abundance.