Methionine

Methionine is an essential amino acid in humans. Methionine is important in angiogenesis, the growth of new blood vessels, and supplementation may benefit those suffering from Parkinson's, drug withdrawal, schizophrenia, radiation, copper poisoning, asthma, allergies, alcoholism, or depression.

Overconsumption of methionine, as is typical in the standard American diet, but not vegan diet (although nuts, soy, and beans also have high levels of methionine), is related to cancer growth in a number of studies.

Mechanisms of action by which methionine metabolism affects gliomas remain largely unclear. The present study found that methionine starvation of glioma cells significantly increased the expression of CXCL8. Mechanistically, E3 ubiquitin ligase was found to mediate the ubiquitinated degradation of the histone demethylase LSD1 via CBL, reducing LSD1 protein stability and, enhancing H3K4me1 modification of the CXCL8 gene. CXCL8 was found to be involved in regulating the reprogramming of glycerophospholipid metabolism, enabling it to respond to a methionine-deprived environment. CXCL8 expression was significantly higher in glioma than in normal brain tissue samples, with elevated CXCL8 being associated with a poor prognosis. In summary, CBL-mediated degradation of LSD1 acts as an anti-braking system and serves as a quick adaptive mechanism for re-remodeling epigenetic modifications. This, in turn, promotes cell proliferation, even in a methionine-restricted environment. Taken together, these findings indicate that the CBL/LSD1/CXCL8 axis is a novel mechanistic connection linking methionine metabolism, histone methylation, and glycerophospholipid reprogramming in the tumor microenvironment [1)].

11C methionine positron emission tomography

see 11C methionine positron emission tomography.

1)
Chang J, Wang L, Zhou X, Yuan J, Xu W. The CBL-LSD1-CXCL8 axis regulates methionine metabolism in glioma. Cytokine. 2022 Jan 5;151:155789. doi: 10.1016/j.cyto.2021.155789. Epub ahead of print. PMID: 34998158.