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Immunostaining of carbamoylphosphate synthase II and fatty acid synthase in glial cells in rat, mouse, and hamster brains suggests roles for carbonic anhydrase in biosynthetic processes

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Abstract

Double immunofluorescence staining showed carbonic anhydrase and glutamine synthetase in the same astrocytes. Carbamoylphosphate synthase II, which catalyzes the first committed step in pyrimidine biosynthesis, was also immunostained in astrocytes. The results suggested that in the astrocytes carbonic anhydrase and glutamine synthetase could provide the substrates, bicarbonate and glutamine, for pyrimidine biosynthesis. In the oligodendrocytes acetyl-CoA carboxylase was colocalized with carbonic anhydrase, and fatty acid synthase was immunostained in the same cell-type. As well as providing bicarbonate to initiate fatty acid synthesis in oligodendrocytes, the

carbonic anhydrase in oligodendrocytes could recycle the carbon dioxide generated during this process.



Keywords

Carbamoylphosphate synthase II; Fatty acid synthase; Carbonic anhydrase; Acetyl-CoA carboxylase; Glutamine synthetase; Astrocyte; Oligodendrocyte; Glial cell

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