

CA10

Carbonic anhydrase-related protein 10 is an **enzyme** that in humans is encoded by the CA10 gene.

This gene encodes a protein that belongs to the carbonic anhydrase family of **zinc metalloenzymes**, which catalyze the reversible hydration of carbon dioxide in various biological processes. The protein encoded by this gene is an acatalytic member of the alpha-carbonic anhydrase subgroup, and it is thought to play a role in the central nervous system, especially in brain development. Multiple transcript variants encoding the same protein have been found for this gene.

Studies have revealed that **neurons** can promote **glioma** growth through activity-dependent secretion of **neurotrophins**, especially **neurologin-3**. It has therefore been suggested that blocking neuron-derived neurotrophins may serve as a therapeutic intervention for gliomas. **CA11** and **CA10** are secreted synaptic **proteins** which function as **neurexin ligands**, and the **gene** encoding **CA11** is part of a **gene signature** associated with **radiotherapy** and **prognosis** in **gliomas**. Thus, Tao et al., hypothesized that CA11/CA10 might participate in the neuronal activity-dependent regulation of glioma growth. In this study, they report that CA11 secreted by depolarized cultured neurons within conditioned medium (CM) inhibited the growth of glioma cell lines. CM from depolarized neurons inhibited CA11 expression in glioma cell lines via the Akt signaling pathway. Consistently, CA11 expression was also reduced in clinical glioma samples and negatively associated with high histological grade. Low CA11 expression of gliomas was associated with short survival in four independent datasets (REMBRANDT, TCGA LGG, GSE4271, and GSE42669). CA11 knock-down promoted cell growth, clone formation, and migration, inhibited apoptosis, and increased tumor size in xenografted nude mice. Similarly, CA10 and CA10 secreted by depolarized cultured neurons also inhibited the growth of glioma cell lines. Low CA10 expression was associated with short survival in REMBRANDT, TCGA LGG and GSE4271 datasets. Our results suggest that CA11 and CA10 negatively regulate neuronal activity-dependent glioma growth and inhibit glioma aggression. Thus, CA11/CA10 may represent a potential therapeutic target for the treatment of gliomas ¹⁾.

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Tao B, Ling Y, Zhang Y, Li S, Zhou P, Wang X, Li B, Zhong J, Zhang W, Xu C, Shi J, Wang L, Zhang W, Li S. CA10 and CA11 negatively regulate neuronal activity-dependent growth of gliomas. *Mol Oncol*. 2019 Jan 12. doi: 10.1002/1878-0261.12445. [Epub ahead of print] PubMed PMID: 30636076.

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