BCYRN1

Brain cytoplasmic RNA 1 is a protein that in humans is encoded by the BCYRN1 gene.

This gene, which encodes a neural small non-messenger RNA, is a member of the family of interspersed repetitive DNA, and its product represents an example of a primate tissue-specific RNA polymerase III transcript. The RNA sequence is divided into three domains: a 5' portion homologous to the Alu Lm, a central adenosine-rich region, and the terminal 43-nt nonrepetitive domain. It is believed that this gene was retropositionally generated and recruited into a function regulating dendritic protein biosynthesis. At least two pseudogenes of this gene have been identified.

Mu et al. uncovered and elucidated its function and molecular mechanism in the progression and development of glioma. Three fresh tumor tissues from glioma patients and three normal brain tissues from craniocerebral trauma patients were prepared for high-throughput RNA sequencing. Differential RNA transcripts and BCYRN1 were identified by RT-qPCR in glioma samples and controls. CCK-8, colony formation assays, flow cytometry, TUNEL assays, cell migration assays, wound-healing assays, and xenograft model were established to investigate the biological function of BCYRN1 both in vitro and in vivo. Various bioinformatics analysis, dual-luciferase reporter assays, biotinylated RNA pulldown assays, and rescue experiments were conducted to reveal the underlying mechanisms of competitive endogenous RNAs (ceRNAs). 183 lncRNAs were identified with significant dysregulation in glioma and randomly selected differential RNAs were further confirmed by RT-qPCR. Among them, BCYRN1 was the most downregulated lncRNA, and its low expression positively correlated with glioma progression. Functionally, BCYRN1 overexpression inhibited cell proliferation, migration in glioma cell lines, whereas BCYRN1 depletion resulted in the opposite way. MiR-619-5p was further confirmed as the direct target of BCYRN1. Mechanistically, miR-619-5p specifically targeted the CUE domain containing protein 2 (CUEDC2), and BCYRN1/miR-619-5p suppressed glioma tumorigenesis by inactivating PTEN/AKT/p21 pathway in a CUEDC2-dependent manner. Overall, our data presented that the reduced expression of BCYRN1 was associated with poor patient outcome in glioma. BCYRN1 functioned as a ceRNA to inhibit glioma progression by sponging miR-619-5p to regulate CUEDC2 expression and PTEN/AKT/p21 pathway. Our results indicated that BCYRN1 exerted tumor suppressor potential and might be a candidate in the diagnosis and treatment of glioma [1)].

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Mu M, Niu W, Zhang X, Hu S, Niu C. LncRNA BCYRN1 inhibits glioma tumorigenesis by competitively binding with miR-619-5p to regulate CUEDC2 expression and the PTEN/AKT/p21 pathway. Oncogene. 2020 Sep 25. doi: 10.1038/s41388-020-01466-x. Epub ahead of print. PMID: 32978519.