

# Calcium Signaling as a Target for Medulloblastoma

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## ABSTRACT

Researchers at the University of California, Davis have developed methods to treat medulloblastoma by restoring calcium signaling that promotes neuronal differentiation and inhibits tumor growth.

## FULL DESCRIPTION

Medulloblastoma (MB) is a malignant pediatric brain tumor linked to abnormal cerebellar development driven by dysregulated Sonic hedgehog (SHH) signaling. This invention targets calcium signaling pathways, specifically activating the TRPC3 ion channel with agonists like GSK1702934A, to induce differentiation of cancerous progenitor cells. By switching SHH signaling from proliferative to neurogenic through calcium-dependent mechanisms, the technology aims to reduce tumor proliferation and progression. Treatment approaches include administration of TRPC3 agonists, optionally combined with EZH2 inhibitors such as tazemetostat, or the use of transcranial magnetic stimulation to restore normal neuronal differentiation and inhibit medulloblastoma growth.

## APPLICATIONS

- ▶ Treatment of Sonic hedgehog-activated medulloblastoma in pediatric and adult patients.
- ▶ Therapies for other brain tumors where calcium signaling restoration can induce tumor cell differentiation.
- ▶ Development of oral pharmaceutical formulations containing TRPC3 agonists.
- ▶ Adjunct therapies combining calcium signaling modulators with epigenetic drugs such as EZH2 inhibitors.
- ▶ Non-invasive brain tumor treatments using transcranial magnetic stimulation technology.

## FEATURES/BENEFITS

- ▶ Induces differentiation of medulloblastoma tumor cells, reducing proliferation and tumorigenic potential.
- ▶ Targets calcium-signaling pathways, shifting treatment beyond reliance on surgery, radiation, and chemotherapy.
- ▶ Reduces treatment-related toxicity, lowering risks such as neurological damage and secondary cancers.
- ▶ Enables oral administration of TRPC3 agonists at therapeutic doses.
- ▶ Improves efficacy by supporting combination therapy with EZH2 inhibitors.
- ▶ Provides non-invasive options by applying transcranial magnetic stimulation to the tumor region.

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

calcium signaling,  
cerebellar progenitors,  
differentiation therapy,  
GSK1702934A,  
medulloblastoma,  
neuronal differentiation,  
Sonic hedgehog pathway,  
TRPC3 agonist,  
tazemetostat, tumor  
treatment

### CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ **Health**

- ▶ Suppresses SHH-driven overproliferation of cerebellar granule neuron progenitors in medulloblastoma.
- ▶ Expands access to effective, less toxic medulloblastoma treatments.
- ▶ Mitigates neurological side effects and reduces secondary-cancer risk linked to current therapies.
- ▶ Offers an alternative therapy for SHH-medulloblastoma resistant to current SHH-targeting therapeutics.
- ▶ Decreases recurrence by promoting durable (ideally permanent) tumor-cell differentiation.

- ▶ **Medical**
  - ▶ [Disease: Cancer](#)
  - ▶ [Disease: Central Nervous System](#)
  - ▶ [Therapeutics](#)

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Patent Pending

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