A focal hypothermia device to slow down tumor growth

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Unmet Need

Malignant brain tumors such as glioblastoma multiforme (GBM) and diffuse intrinsic pontine glioma (DIPG) progress rapidly and can be fatal. Median survival for these cancers is on the order of 15-18 months with only 5% of patients surviving at the 5-year mark. Traditional clinical treatments such as surgery, chemotherapy, and radiotherapy all have specific drawbacks such as a lack of diffusivity, non-adaptability, and specificity, respectively, that make them less effective in the context of these cancers. The proposed technology presents a novel mechanism of addressing the treatment and/or management of tumors in the brain through focal hypothermia.

Technology

The proposed invention is an implantable device that can induce focal hypothermia at the tumor site and thereby stunt the growth of cancerous cells. It operates on the Peltier effect to generate thermoelectric cooling and can be used to maintain the local temperature of tumors around 20-30 C. Additionally, the cooling element is mounted on an MRI-compatible base.

Other Applications

The benefits of this treatment could also be extended to focal tumors in other parts of the body.

Advantages

This treatment has several potential benefits over the traditional treatment model which includes a combination of surgery, chemotherapy, and radiotherapy:

- Slowing down tumor metabolism can lower the chance of mutations.
- By decreasing the rate of growth of the tumor, it could afford doctors and patients more time to try various therapies.
- The treatment can be made to be much more specific than radiotherapy and does not have the neurotoxic effects of chemotherapy.