Thyroid hormone treat medulloblastoma (Ref. No. 567-ZY)

Background

A medulloblastoma is a malignant pediatric brain tumor that arises in the cerebellum, a part of the brain located at the base of the skull. This tumor is the most common malignant brain tumor in children between 5 and 9 years of age and is rare in people over 30. Treatment for medulloblastoma focuses on removing as much of the tumor as safely possible and relieving pressure in the child's skull (e.g., intracranial pressure) due to swelling or hydrocephalus. In addition to surgical removal of the tumor, a physician may sometimes recommend a shunt to help drain cerebrospinal fluid buildup and steroid treatments to reduce tumor swelling. Surgery is often followed by radiation and chemotherapy. These therapies address cancer cells that might have been unreachable by surgery and those that have spread from the tumor to other parts of the brain or spinal cord. Despite the aggressive tumor treatment including surgical resection, chemotherapy, and radiation, a significant proportion of patients with medulloblastoma still succumbs to this disease. Moreover, patients who survive medulloblastoma, often suffer severe side effects of aggressive treatment, such as endocrine disorder and cognitive deficit. Thereby more effective and less toxic approaches to treat medulloblastoma are urgently needed.

Summary of the Invention

Thyroid hormones triiodothyronine (T3) and thyroxine (T4) are two hormones produced and released by follicular cells of the thyroid gland. Both T3 and T4 are tyrosine-based hormones largely responsible for the regulation of metabolism. Thyroid hormones are essential for the proper development and differentiation of all cells influencing a variety of physiological and pathological processes such as increasing basal metabolic rate, affecting protein synthesis, regulating lone bone growth, increasing catecholamine sensitivity, regulating protein, fat, and carbohydrate metabolism, stimulating vitamin metabolism, and inhibiting neuronal activity.

The researchers at Fox Chase Cancer Center have been focused on the investigation of cellular and molecular basis of medulloblastoma growth, aiming to explore normal strategies for medulloblastoma treatment. They found that many medulloblastoma patients have hypothyroidism, a condition in which the thyroid gland doesn't produce enough thyroid hormone. Moreover, patients with medulloblastoma also frequently develop hypothyroidism, as a side effect of tumor treatment, particularly after radiotherapy. These observations led them to examine the possible functions of thyroid hormone in medulloblastoma growth. In the current studies, the proliferation of medulloblastoma cells was significantly inhibited by treatment with thyroid hormone, suggesting that thyroid hormone could be used to treat medulloblastoma. These findings will pave the way to use thyroid hormone to treat medulloblastoma in clinic.

Patent Status: A patent application has been filed.

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