

## 03-C-0278: A Comparative Study of Pediatric CNS Tumor Activity as Assessed by [<sup>18</sup>F]- FDG PET Imaging and Proton Magnetic Resonance Spectroscopic Imaging (<sup>1</sup>H-MRSI)

Proton Nuclear Magnetic Resonance Spectroscopic Imaging (<sup>1</sup>H-MRSI) is a non-invasive method of detecting and measuring cellular metabolites in vivo, providing biochemical information in conjunction with the spatial information obtained by MRI. Positron Emission Tomography (PET) is a technique that also provides data on metabolic activity of brain lesions. However, a comparison of these two methods in determining a lesion's metabolic activity has not been reported in children with brain tumors. This study will be conducted to compare biologic or metabolic activity of brain tumors in pediatric patients as determined by <sup>1</sup>H-MRSI and [<sup>18</sup>F]-FDG PET scanning and to correlate results of <sup>1</sup>H-MRSI and <sup>18</sup>F-FDG PET imaging with outcome.

### ELIGIBILITY CRITERIA

#### INCLUSION CRITERIA:

Age: ≥ 4 years and ≤ 21 years

**Diagnosis:** Patients must have a brain tumor or residual abnormality (e.g. post-operatively or post-radiation) that is measurable or evaluable on standard MRI or CT.

**Informed Consent:** All patients or their legal guardians (if the patient is < 18 years of age) must sign a document of informed consent indicating their awareness of the investigational nature and the risks of this study. When appropriate, the minor patient will be asked for oral assent.

**Durable Power of Attorney (DPA):** A DPA will be offered to all patients 18 - 21 years of age.

#### EXCLUSION CRITERIA:

- Patients <18 years who weigh >70 kg are excluded because they would exceed the standard allowable dosimetry for pediatric patients. Patients >136 kg are excluded, as this is the maximum weight allowable on PET scanner tables.
- Pregnant women are excluded because the effects from the magnet on the fetus are unknown. In addition, gadolinium is not approved for use in pregnant women, because its teratogenic effects have not been studied.
- Any patient who is unable (either because of physical or psychological factors) to undergo imaging studies without sedation but is not considered an anesthesia candidate.
- Any patient with a metallic MRI incompatible implant, including cardiac pacemakers, neural pacemakers, aneurysmal clips, shrapnel, cochlear implants or ferrous surgical clips.
- Any patient with a history of a severe reaction to Gadolinium or other contrast agents.
- Any patient with Diabetes mellitus or steroid-induced hyperglycemia (fasting glucose >150) because this may interfere with the interpretation of the [<sup>18</sup>F]-FDG PET scan.
- Any patient with permanent braces, permanent retainers or nonferrous implant that, in the judgement of the Principal Investigator, would interfere with obtaining spectroscopy in the area of the tumor.

#### PRE-IMAGING EVALUATION (performed within 48 hours prior to first imaging study)

History and physical examination (including a neurological examination).

Urine or serum pregnancy test in females of childbearing potential.

Anesthesia consultation and evaluation for patients who will require IV sedation or general anesthesia

Fasting glucose

#### Study Design:

Patients referred for this study will have both <sup>1</sup>H-MRSI and <sup>18</sup>F-FDG PET imaging performed within 2 weeks of each other at the NCI.

#### ACCRUAL:

Open to accrual.

Patients meeting eligibility criteria can be referred to the Neuro-Oncology Branch, NCI (Dr. Kathy Warren at (301) 402-6298) for evaluation.