



DOCUMENT SOURCE	
Lawrence Berkeley Laboratory Archives and Records Office	
Records Series Title	BIONMED TUMOR LAB SCIENTISTS'
Accession No.	434-92-0066
File Code No.	19-14-6
Carton No.	3/18
Folder No.	LUNG META BRAIN TUMORS
Notes	
Found By	ANDY MUGNIER
Date	

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can place the radiation throughout the entire tumor area, we cannot expect to obtain improved results.

Heavy particles were used to treat one other patient with a brain tumor (pinealoma); in this case, because of the central location and small size of the tumor, a technique was employed similar to that for pituitary irradiation, using the plateau of the alpha-particle beam with rotation. The patient, a fifty-five year-old man, had been in good health until August, 1965, when he first experienced diplopia. Medical work-up revealed a 2-cm. mass in the posterior part of the third ventricle causing partial obstruction to the cerebrospinal fluid pathways. Following two shunting procedures in September and in October, 1965, his visual symptoms disappeared, apparently because of temporary relief of the hydrocephalus and the direct pressure from the mass. It was then decided, hoping to achieve a more permanent result, to irradiate this tumor with heavy particles; in December, 1965, a total tumor dose of five thousand three hundred and fifty rads was given in two increments separated by a three-day interval. The patient was essentially asymptomatic until late October, 1966, when he again noted diplopia. During the next few months he also experienced progressive loss of visual acuity and hearing sense; in January 1967 he was hospitalized and ventriculography revealed a third ventricular mass which was interpreted as tumor recurrence (in retrospect, however, this actually represented a hematoma). The patient became stuporous and

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Accession No.	434-92-0066
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developed left hemiparesis. Following a right occipital craniotomy, he remained permanently comatose and five days later, January 14, 1967, the patient expired. At autopsy, the essential cranial findings were post-surgical hemorrhagic necrosis of the right occipital lobe, right and left thalamus, and pulvinar; there were post-irradiation changes in the target area, but notably, none outside the target area. There was no evidence of residual tumor cells.

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DOCUMENT SOURCE	
Lawrence Berkeley Laboratory Archives and Records Office	
Records Series Title	BIONED TUNNERS LAB SCIENTISTS
Accession No.	454-93-0066
File Code No.	19-14-6
Carton No.	3/18
Folder No.	LUNG META BRAIN TUMORS
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4 Slides  
(five in this unit - up)

204 CORNELIUS A. TOBIAS, JOHN T. LYMAN, AND JOHN H. LAWRENCE

the other one did well for a period of 5 years. However, in each of these patients there was subsequently evidence of tumor recurrence outside of the radiation field, and the patients died at intervals ranging from 6 months to 6 years after treatment. In the 4 cases where post-mortem results are available, the tumor extension outside the radiation field was shown. Thus, while cessation of tumor growth in the treated area may be achieved, there is often recurrence later outside of the radiation field, and this points out a major difficulty to overcome in treating these cases—the exact delineation of the tumor area must be known. Even though one can take advantage of the heavy particle's favorable radiobiological characteristics and thereby deliver greater tumor doses while sparing the skin and intervening tissues, unless one can place the radiation throughout the entire tumor area improved results cannot be expected.

In the case of the sixth patient with a brain tumor (pinealoma), because of the central location and small size of the tumor it was decided to employ a technique similar to that for pituitary irradiation using the plateau of the alpha-particle beam with rotation. This patient was essentially asymptomatic for 10 months following therapy, but then again noted diplopia. Ventriculography revealed a third ventricular mass which was interpreted as tumor recurrence, but which in retrospect actually represented a hematoma. He died 5 days after a right occipital craniotomy, and at autopsy the essential cranial findings were postsurgical hemorrhagic necrosis of the right occipital lobe, right and left thalamus, and pulvinar; there were postirradiation changes in the target area, but notably none outside the target area. There was no evidence of residual cells.

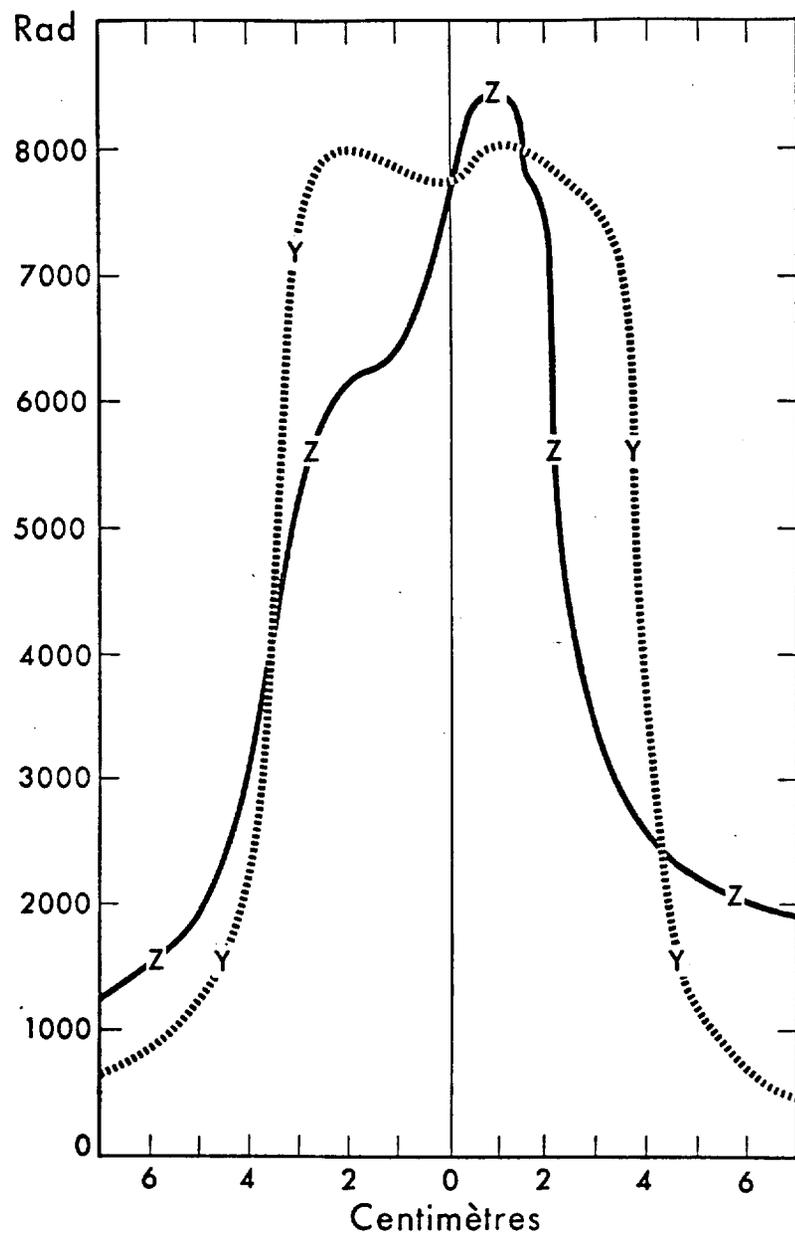
We have also used the Bragg peak of the 910-MeV alpha-particle beam to perform thalamotomies in 2 patients with Parkinson's disease [132] but there are not sufficient data to discuss the results. More recently we have used the Bragg peak to treat pulmonary metastases in 3 patients; following is a case history of the first patient.

*Case history.* A 44-year-old woman with a 6-year history of cylindroma of the palate was referred in September, 1969, for treatment of pulmonary metastases. Resection of the hard and soft palate without radical neck dissection (no cervical nodes were palpable) had been done in March, 1963, the pathological section showing adenoid cystic carcinoma in all margins except one. Postoperative radiation therapy with 2-MeV x ray was administered, the total dose being 5000 rads in 25 days. Multiple follow-up examinations revealed no evidence of local recurrence nor distant metastases until February, 1969, when both were detected. The primary site was treated with implantation of two radon

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 Dose profiles along lateral ZZ and anterior-posterior axis YY

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Records Series Title: **BIOMED TUMOR LAB SCIENTISTS**  
 PAPERS OF J. LAWRENCE - 1940-1981

Accession No. **474-92-0000**  
 File Code No. **19-71-0**  
 Carton No. **3718**  
 Folder No. **LINCS MEDIA BRAIN TUMORS**

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 Date: \_\_\_\_\_

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3005651

Case Summary: [REDACTED] 71  
First Brain-Tumor Patient  
Bragg-Peak Therapy

This four-year old boy with a recurrent parasagittal oligodendroglioma had undergone surgery three times within nine months for excision of a lemon-sized brain tumor. He had also received one course of x-ray therapy (estimated tumor dose, 3,130 rads delivered to the tumor site from February 13 through March 9, 1961). When referred to us in December 1961, there was evidence that the tumor had spread across the midline, bilateral involvement of the motor cortex being present.

Bragg peak alpha particles were used to treat the tumor, using 13 fields in eight treatments over a 24 day period. The maximum dose delivered to the tumor was 8,500 rads with a majority of the treatment field receiving more 6,000 rads (less than 2,000 rads went to any of the skin areas).

There was good palliation for eight months; however, the tumor then recurred outside the radiation field and the patient died nine months following completion of therapy.

Autopsy revealed recurrent oligodendroglioma extending widely into both cerebral hemispheres and into the thalamus.

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DOCUMENT SOURCE	
Lawrence Berkeley Laboratory	
Archives and Records Office	
Records Series Title	
BIRMINGHAM TUMOR LAB SCHEMATIC	
PATIENT, DR. J. LAWRENCE - BRAGG-PEAK	
Accession No. 272-92-0066	
File Code No. 9-14-8	
Cotton No. 3/18	
Folder No. LINT MEDIA BRAIN TUMORS	
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HEAVY PARTICLES (BRAGG PEAK) IN TREATMENT OF BRAIN TUMORS

Patient	Type of tumor	Previous treatment	Heavy-particle therapy Rads/days Date finished	No. Rxs. portals	Palli- ation survival	Postmortem findings
1. [redacted] ♂	Oligoden- droglioma	12/60 Surgery 3/61 3,100 r 5/61 Surgery 10/61 Surgery	6,000/24 1-12-62	8 13	8 mon. 9 mon.	Extension of tumor beyond radiation field. PH
2. [redacted] ♀	Astrocy- toma III	6/62 Surgery 7/62 Surgery	4,000/15 7-13-62	5 9	3 mon. 6 mon.	Extension of tumor beyond radiation field. PH
3. [redacted] ♀	Astrocy- toma II	6/62 Surgery	2,500/8 7-13-62	4 5	60 mon. 73 mon.	Extension of tumor beyond radiation field. PH
4. [redacted] ♀	Oligoden- droglioma	1961 Co-60 1963 Nitrogen mustard	4,000/7 6-14-65	2 14	12 mon. 14 mon.	No postmortem examination.
5. [redacted] ♂	Astrocy- toma III	7/65 Surgery	6,000/10 10-15-65	5 8	10 mon. 23 mon.	Extension of tumor beyond radiation field. PH
6. [redacted] ♀	Pinealoma	9/65 Shunting 10/65 procedures	5,350/3* 12-23-65	2 ---	13 mon. 13 mon.	Hemorrhagic necro- sis (post-surgery) PH

\* Rotation only -- no Bragg peak.

**DOCUMENT SOURCE**  
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Records Series Title: BIOMED TUMOR LAB SCRIPTS  
Accession No. 42-92-0000  
File Code No. 19-14-B  
Folder No. 2/18  
Euler No. LINX META BRAIN TUMORS  
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Brain Tumor Case #2: [REDACTED]

Previous history: 50 year old white male, initially suspected of having a brain tumor in April 1962, after a 2 1/2 year history of progressive weakness in the right hand and a short history of difficulty with speech and right hemiparesis. A left carotid arteriogram demonstrated a left temporal-parietal tumor. On May 21, 1962, a subtotal resection was performed. the pathological diagnosis being a grade 3 astrocytoma.

Postoperative Bragg peak heavy particle irradiation was started on June 29, 1962. This therapy was interrupted after the first two treatments, and a second craniotomy performed with removal of a massive amount of recurrent glioblastoma. Bragg peak heavy particle therapy was then resumed on July 9 and completed on July 13, 1962. There were five treatments during the 15 day period, using 9 portals. Maximum tumor dose delivered was 5,250 rads; the majority of the treatment field received greater than 4,000 rads.

The patient subsequently improved; he was subjectively better and skull x-rays taken three months after therapy revealed no particular change in the multiple silver clips and the bone flap appeared to be in satisfactory condition. However, after these three months he gradually began a progressively downhill course and expired in January of 1963 (six months after the end of treatment).

Postmortem findings showed a grade 4 astrocytoma extensively involving the left cerebral hemisphere. There was again similar recurrence beyond the area of radiation.

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<b>COPY</b>	Records Series Title	BLIND TUMOR LAB SECURITY
	Accession No.	24-92-0066
	File Code No.	24-92-0
	Carton No.	318
	Folder No.	UNIT MEDIA BRAIN TUMORS
	Notes	
Found By	ANDY MULLER	
Date		

DOCUMENT SOURCE  
Lawrence Berkeley Laboratory  
Archives and Records Office

3005954

Brain Tumor Case #3: [REDACTED]

History: a 38 year old man, first noted symptoms in January 1962 which progressed in severity and were associated with vague personality changes, and at least one episode of loss of contact with his surroundings. Papilledema was evident in June of 1962 and a ventriculogram demonstrated a left frontal mass. A left frontal craniotomy was performed on June 9, 1962 with subtotal removal of a grade 2 astrocytoma from a lesion of the left silvian fisher.

Bragg peak heavy particle irradiation was carried out between July 6 and July 13, 1962. There were four treatments during the 8 day period, the irradiation being delivered through five different portals (three of the portals were used more than once, but the beam was allowed to penetrate to a different depth each time). The maximum dose was 4,450 rads; most of the field received more than 2,500 rads. The hemiparesis disappeared one year later, aphasia was improved but still present. and the patient was working regularly at that time and was able to drive his car. He continued to do well, and 4 1/2 years after treatment examination revealed no headaches or neurological signs of tumor recurrence. However, within the next year there was tumor recurrence, and in July of 1968 he underwent a left frontal craniotomy with lobectomy. The tissue was glioblastoma multiforma, grade 4. The patient did well for 10 days but then had a grand mal seizure. and declined until death on August 23, 1968.

The autopsy showed right frontal and corpus collosum involvement with intracranial hemorrhage. . We are still waiting the details of the microscopic findings.

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Records Series Title  
RICHARD TRAUER LAB SCIENTISTS  
LABOR, DR. J. LAWRENCE - 1946-1985

Accession No. 19-92-0000  
File Code No. 19-92-0  
Carton No. 318  
Folder No. LUNA MEDIA BRAIN TUMORS  
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Date

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3005655

Brain Tumor Case #4: [REDACTED]

A 55 year old female with a clinical diagnosis of slowly growing oligodendoglioma. History: Onset of symptoms in 1951. In 1961 she received cobalt 60 therapy (5,400 rads in 8 weeks) and responded very well for two years. Symptoms then recurred and she was given a brief course of nitrogen mustard, with no resulting improvement.

Bragg peak heavy particle irradiation was administered in June 1965. A tumor dose of 4,000 rads was given in two treatments over a one-week interval (using 7 portals on each side).

One year later there was no evidence of tumor recurrence but the patient died 14 months after treatment. Unfortunately no autopsy was performed, and the results of the radiation therapy could not be fully assessed.

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<b>DOCUMENT SOURCE</b> Lawrence Berkeley Laboratory Archives and Records Office	Records Series Title	BIOMED TUMOR LAB SCHEMATIC
	Accession No.	194-92-0000
	File Code No.	194-92-0
	Case No.	3718
	Folder No.	UNCLASIFIED BRAIN TUMORS
	Notes	Found By ANDY KAUFMAN
Date:		

3005656

Brain Tumor Case #5: [REDACTED]

58 year old man who had grade 3 astrocytoma. History: Symptoms first noted in May 1965. On July 27, 1965 craniotomy performed and a five centimeter tumor was removed just posterior to the left postcentral gyrus. The improvement was dramatic and his only residual abnormality was minimal right hemiparesis. However, in view of pathological evidence of presence of tumor cells at the margins at the excised specimen, it was felt that post-operative heavy particle therapy was indicated.

Bragg peak heavy particle therapy was administered in five treatments over a 10 day period, using 8 portals. The treatment ended on October 15, 1965. The total tumor dose was 6,000 rads.

Following treatment the patient had a fair remission for about a year. However, about December 1967 he started to show signs of deterioration, and the patient expired in August of 1967. Cause of death was acute and organizing bronchopneumonia, cachexia, astrocytoma of left parietal lobe (recurrence with extension to left frontal and temporal lobes).

Microscopic findings at postmortem revealed in the brain, (1) glioblastoma multiforme; (2) radiation necrosis of tumor and some adjacent white matter and (3) mineralization of blood vessels.

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Records Series Title: BIRMINGHAM TUMOR LAB SCIENTISTS  
Accession No. 2-1-92-0016  
File Code No. B-12-0  
Carton No. 3/18  
Folder No. UNIV. MEDIA - BRAIN TUMORS  
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3005657

Brain Tumor Case No. 6: [REDACTED] (Pinealoma)

Fifty-five year old male who had been in good health until August 1965 when he first experienced diplopia. The medical workup revealed a 2 centimeter mass in the posterior part of the third ventricle, causing partial obstruction to the cerebral spinal fluid pathways. Following two shunting procedures in September and October 1965, his visual symptoms disappeared, apparently because of temporary relief of the hydrocephalus and the direct pressure from the mass. It was then decided, hoping to achieve a more permanent result, to irradiate this tumor with heavy particles.

In this case, Bragg peak heavy particles were not used because of the central location and small size of the tumor -- a technique was employed similar to that for pituitary irradiation using the plateau of the alpha particle beam with rotation. A total tumor dose of 5,350 rads was given in two treatments over a three-day period (initial plan had been to deliver 8,000 rads in three increments over eight days; however, increased diplopia developed and it was decided to stop after two treatments with 5,350 rads probably being an adequate dose). Therapy was completed on December 27, 1965.

The patient did well and was essentially asymptomatic until late October 1966 when he again developed diplopia. There was no evidence of increased intracranial pressure, and the shunt valve was working well. In early January 1967 he was hospitalized with an episode of progressive somnolence, associated with deafness and third nerve paralysis. The patient underwent ventriculography on 1/3/67 and 1/5/67 after the ventriculo-atrial shunt had been ligated. This revealed what at first was interpreted to be a

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<b>DOCUMENT SOURCE</b>	
Lawrence Berkeley Laboratory Records and Records Office	
Records Series Title: <b>BIOMED TUMOR LAB SCIENTISTS</b>	
Accession No. <b>24-92-0066</b>	
File Code No. <b>B-14-8</b>	
Canton No. <b>318</b>	
Folder No. <b>UNIVERSITY OF CALIFORNIA</b>	
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Date:	

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