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DOSIMETRY MEETING 1/4/77

IN VIVO DOSIMETRY EXPERIMENTS

1.	Activation techniques TLD's Si diodes	Hogstrum
2.	Si detectors	Richman
3.	Space charge dosimeters	Hutson
4.	Neutron measurements	Amols

EXPERIMENTAL DOSIMETRY

5.	Idealized tissue/bone interface study	C. Richman (Si detectors) Amols, Dicello (extrapolation chamber)

6.	Conventional dosimetry a) Complete characterization of small volume for comparison with calc. b) New beams c) Collimator effects d) Complex geometries	Smith, Hogstrum
7.	Microdosimetry measurements on either original or new 8 cm range-shifted beam with both LET chamber and Si detector	Richman, Dicello
8.	Stopping distribution meas. on range-shifted beam for comparison with calc.	Richman

CALCULATIONS

9.	Tissue/bone interface (cf. #5) with ~ 1 mm resolution - both π^+ and π^- to indicate scattering effects	ORNL, Berardo

CALCULATIONS (contd.)

10. Range-shifted beams — Amols
    a) Stopping distributions
    b) Effects of small variations in parameters
    c) New functions for 5 cm and 8 cm beams

11. PIPLAN — Berardo
    a) Resolve discrepancies between calc. and exp.
    b) Calculations with realistic geometry

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OFFICE MEMORANDUM

TO : DISTRIBUTION

DATE. January 13, 1977

FROM : Stephany Wilson

SUBJECT : Dosimetry Task Force Meeting, January 10, 1977

SYMBOL : ADRT

MAIL STOP 282

The Dosimetry Task Force met on January 10, 1977, at the Biomedical Facility. Dr. Bradbury distributed a listing of experiments suggested at the group's meeting on January 4, 1977 (copy attached).

Dr. Kligerman described his most recent observations of the last group of patients. He said the method used for calculating skin tolerances for the patients appeared to have worked well. He noted that an area on the shoulder of one of the last group of patients displayed the greatest skin reaction and was in an area that was raised with reference to other tissues in the field. Dr. Amols noted the area could have been in the proximal area of the peak where the stopping distribution of pions was increased. He noted that a "saddle" effect occurred in the stopping distribution of pions in the beam used for the last series of tests, with a depression in the central portion of the peak.

Dr. Kligerman requested that the UNM physicists take topographical measurements of the treatment field so various points on the skin surface could be correlated with their position in depth in the stopping region.

Dr. Kligerman also told the group that the patient with the breast primary displayed marked erythema and dry desquamation, but that little tumor regression has occurred. He will be retreating the patient with electrons. He also noted that a patient with multiple skin nodules treated last June shows no recurrence in any of the areas treated with pions or x-rays and shows no untoward long-term effects in any treated areas.

Dr. Berardo said calculations indicate that tissue-bone interfaces should not contribute to large enhancement of effects, but that longitudinal effects might be greater and should be examined. Dr. Kligerman suggested that longitudinal tissue-bone interface studies should be done with several thicknesses of bone, starting with a thickness not greater than that of the front of the manible, and taking into account the differing densities of bone, teeth, and dentin.

Dr. Amols suggested revising the range shifter function for the 8 cm beam to distribute stopping pions more uniformly through the peak. Dr. Kligerman concurred, but said he would not require the development of

continued --

any new beams for the coming run. He said he will not use a beam on which he does not have biological or clinical information for patient treatment. Thus he will not be changing beams for the coming run. He said he wanted to treat patients with a beam that has a maximum amount of high LET, but it will probably be necessary to use multiple ports with large volume tumors from now on to obtain uniform effects.

He discussed Dr. Yuhas' cellular recovery data and requested that topographic curves be worked out for all the patients on whom treatment was just completed. He said he would like a correlation between those curves, microdosimetry from Drs. Richman and Dicello, calculations from Dr. Berardo, and stopping distributions from Dr. Amols, perhaps as a series of clear overlays for comparison. He noted that he was having difficulty correlating Dr. Richman's curves with the biological and clinical observations, and suggested that item 7 on the list distributed by Dr. Bradbury is a high-priority experiment for the coming run. He also suggested delaying the start of patient treatment for six days after the start of the coming cycle, so that some biology and physics could be done first.

Dr. Kligerman brought up the question of the degree to which dose rate may be affecting recovery in the distal portion of the peak. He noted that low LET in that area is about 70 percent of the dose; thus at an average dose rate of 2.5 rads/minute, the low LET dose rate is approximately 1.75 rads/minute. At such a low dose rate, recovery from low LET injury may be essentially complete; thus any impact in that area is entirely from high LET radiation with no recovery. He said he and Dr. Yuhas will be recommending biological studies of the dose rate impact.

He suggested that the responsible persons write up mini-proposals of the experiments listed from the January 4 meeting, for discussion at a meeting on Friday, January 14, at 2 p.m.

SW:ft

attachment