Orig. sent to Grace 6 LR's comments

Logged

TOR Louis Rosen from [illegible]

Informal Summary

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LAMPF Radiation Therapy Subcommittee

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First Day, November 8, 1971 - 1:30 pm

REPOSITORY LANL/ARC
COLLECTION MP-DO
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Introductory Remarks - Louis Rosen

A proposal to AEC/NCI for pre-LAMPF work was written but withdrawn because it did not go far enough of [illegible] a program [illegible] from [illegible]. Where do we go from here? There are funds from NCI for the channel, funds for A & E on building (OMB has), and funds for planning (H-9). Earliest biomed building could be available is end of CY 73. Control room, animal facilities and lab space ~~to~~ can be placed in trailers. With funds in hand and committed, there is the capacity to proceed with radiobiology and animal experiments early in CY 73.

Biomedical Users are the largest group with the fewest proposals. Because of AEC/NCI interagency agreemtnt, first priorities on beam channel must focus on clinical trials. Two things are needed:

1) Overall program - basic research
2) Structure for program - how to utilize talents to get clinical trials going?

We need an overall proposal that goes up to "clinical trials" that separates DBM and NCI responsibility. But individual project proposals to be accepted from anyone. Low energy pion channel will be available before biomed channel.

overall proposal which [illegible] up to clinical trials should be structured so as to accomodate independent [illegible] [illegible] [illegible]

Powers: CRTS recommendations on mesons:

1) clinical aspects only
2) trials national in scope
3) neutron studies can help pion program
4) need interactions between groups of people towards a programmatic approach

Rosen: No one in the biomedical users group comes to LAMPF to work for weeks at a time as on other beam lines.

Kligerman: Last meeting was good but we all went home. We need to spend saobatical leaves here and get started now.

Powers: Chronic and acute animal experiments for neutrons are needed now. Utilization of neutron sources at LASL in these areas would:

1) get people at LASL
2) get program going
3) would provide useful data and experience later for mesons

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Facility and Beam Line - R. Hutson

Neutron dose in patient may be a problem. It comes from three sources:

1) pion stars
2) transmission through the shield
3) scattering along the pion beam channel

Fluxes are unknown. Transmission through shield has 1/E spectrum. Scattered beam through the ducts has spectrum. Need to know how much neutron dose is tolerable. Electron contamination 5-15% of pion flux. Tradeoffs can reduce the amounts of contamination.

Oliver: M. D. Anderson and Rice have proposal in to measure these contaminants

Boone: Real problem with neutrons, since there is fractionated RBE. Also RBE's are very high for low dose levels.

Informal survey of those present on maximum allowable whole-body neutron dose:

Powers - < 1% of π dose

Chadrazian - 5 rad/wk

Boyd - 10% of star neutrons

Wiley - 10 rads total overall fractions

Johnson - ≤ 5%

George - 0.5% bad; 5% impossible

Nickson - problems of uniformity of whole-body dose

Kligerman - < 0.25%

Groce: "Whole body" dose - very nonuniform

1) stars - $1/r^2$ dependence
2) pipe - gaussian centered at treatment volume
3) shielding - uniform whole body

Boyd: dose from stars goes as treatment volume

Recommendation passed: Total neutron dose to "whole body" should be kept below 0.5% of pion tumor dose. Above 5% would be impossible to do therapy

Program at Stanford - Douglas Boyd

today 1.4 MeV/ft

Superconducting linac and spectrometer; linac is a physics machine; 4 MeV/ft la

2 BeV or 8 BeV electrons; 35' long, future medical machine, 500 MeV, 1 mA electrons

Spectrometer: target - 1/4 rod length H-Z followed by 2½ cm graphite

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Boyd (continued)

Spectrometer: $\Delta \Omega \sim 1.5$ steradians
60 sectors
10^{15} n/cm^2/year neutron flux for damage purposes
cost: \$200 - 300 K
Time to build: $1\frac{1}{2}$ yrs

Purpose of project is to test feasibility; may be some radiobiology. Four would go into Stanford University Hospital.

Pion beams (60) overlap 12 cm diam x $1\frac{1}{2}$ cm thick volume. Turn on and off to shape volume. Monitored by multiwire proportional counter ($\pi^- \to \pi^0 \to 2\gamma$) in coincidence. Make patient into a cylinder. Electron contamination 5 - 15 %. Eight ft of steel to stop neutrons.

NAL Protons & Pion Program - J. Nickson

Advantages for these programs at Chicago:

1) large population base
2) many radiotherapists
3) injector at NAL only used 3% for physics

Lester Skaggs, Warren Sinclair and others put together planning grant. Injector for protons; injector plus new accelerator sections for mesons.

Other Programs

TRIUMPF - Proceeding 1 yr behind LAMPF. Money may be a problem.
BNL - Hal Atkins - proposal out
SIN - ?
Mercado - lots of things could be started before Jan. 1973. Proposals are needed as soon as possible.

Specific Clinical Problems:

Powers: Phase I - accessible lesions; multiple incurable lesions at different doses; patients not expected to live long but see degree of local control. Long term radiation response on animals needed: skin, kidney, gut, lung, brain, soft tissue, bone marrow, bone.

Phase II - lesions in known volume that can be encompassed by beam; primary inoperable breast cancer.

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Chabazian: agree with Powers. In addition:

1) tumors not dependent on oxygen factors
2) combined treatment - boost
3) low dose levels for whole body irradiation

Nickson: Phase I - visable lesions; skin primary or secondary; head and neck; neck nodes.

Phase II - treatment volume well known; at least 1 yr life expectancy; common tumors: advanced cervix, advanced bladder, breast (?)

Phase III - common tumors: cervix 3b or maybe 3a

T-3 N2 tumors of head and neck.

Also uncommon tumors for Phases II & III on mid-line that are not handled well: pancreas, inoperable renal, esophagus, brain)?)

Kligerman: (has list at home) Phase I - accessible & multiple lesions, lung (normal structure also), any incurable single lesions, soft tissue sarcoma

Phase II & III - bladder, prostate, cervix 3 and 4 with lumbar irradiation, brain, stomach (not have to randomize everyone)

Phase III - stage II tumors; lots yet to be done even for those which can be controlled when stage I. Why do they fail?

Lower equivalent doses to treat regional metastesies

Johnson: Additional thoughts:

1) normal tissue response on hopeless individuals
2) better methods of tumor localization
3) better techniques - treatment table, embolization and support techniques, patient data system.

Simmons: What to exclude from list: End point patients for Phase I. Not define Phase II & III programs yet.

George: Inovative patient handling systems for repositioning, embolization, and support. Automation techniques.

Phase I - neglected far-advanced lesions, i.e. head and neck, skin

Phase II - pions even used on lesions where good control now

Others - lymph node extensions; massive tumors

Boone: Earlier list in LA-4490-P (green book); osterscarcomas and soft tissue tumors

George: dogs with advanced sarcomas; work at TAMVEC - 55 dogs already on neutrons.

Compiled by D. E. Groce
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