



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
 PUBLIC HEALTH SERVICE  
 NATIONAL INSTITUTES OF HEALTH  
 BETHESDA, MARYLAND 20814

712689

NATIONAL CANCER INSTITUTE

May 1, 1975

Our References: 1 RO1 CA 17637-01 RAD  
 1 RO1 CA 17708-01 RAD

To: JOHN DICELLO  
 MP-3 DIV

Dr. Tony W. Armstrong  
 Staff Scientist  
 Applied Research Institute  
 Post Office Box 1454  
 La Jolla, California 92037

Dear Dr. Armstrong:

In response to your letter of April 15 requesting the scientific evaluation of your above referenced grant proposals, I am pleased to provide the following comments from our reviewers.

1 RO1 CA 17637-01 RAD

The proposal presented here is a good one and should provide calculations which are meaningful for the determination of absolute absorbed dose for negative pions with significance both to the radiotherapy planned for such particles at various centers and for the necessary radiobiology. Using calculational methods, some of which have been developed by the principal investigator, the project should yield information from calculations which will provide insight into the relative importance of the spectrum of charged particles and uncharged particles produced when pions interact with biological tissue. This proposal has good scientific research content and should have good chances of providing data significant to cancer radiotherapy and radiobiology involving negative pions.

However, our reviewers have tentatively concluded that Dr. Armstrong could do most of what he proposes to do by less expensive methods. He proposes to use the Monte Carlo method, which is expensive because it uses a lot of computer time and memory. R. S. Caswell did some of the same things for neutrons that Dr. Armstrong is proposing for pions without using Monte Carlo Radiation Research 27 92-107 (1966). One cannot be completely sure of this conclusion, because the application does not contain a detailed description of the computer program. Also, some of the features Dr. Armstrong says he will add, energy straggling and delta-ray effects, may require Monte Carlo techniques, depending on how he goes about it. Dr. Armstrong was previously employed at the Atomic Energy Commission's Oak Ridge National Laboratory where he was one of the staff that developed the computer program

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to be used and several others concerned with pions; all were Monte Carlo programs. It would appear that he just went ahead using the same method on the present problem without thinking whether there was a better alternative.

Our reviewers do not mean by the preceding remarks that Dr. Armstrong's methods are incorrect; they are perfectly all right as far as can be seen. What it does suggest, is that the \$12,000 Dr. Armstrong budgeted for computer time could be \$2,000 if he went about the work differently.

1 RO1 CA 17708-01 RAD

This very brief application proposes a continuation of work which Dr. Armstrong carried out at Oak Ridge on the calculation of energy deposited in silicon detectors under pion irradiation. This type of calculation is interesting and indeed might be useful for tissue dosimetry and pion therapy. However, lack of sufficiently detailed information, as to how this group intends to proceed, led our reviewers to recommend disapproval.

I hope these comments are of value to you.

Sincerely,



Francis J. Mahoney, Ph. D.  
Program Director for Radiation  
Biology and Physics  
Division of Cancer Research  
Resources and Centers  
National Cancer Institute

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