JHL ✓

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DEPARTMENT OF PHYSICS

CAMBRIDGE, MASS. April 10, 1940

Professor Ernest O. Lawrence
Radiation Laboratory
University of California
Berkeley, California

Dear Ernest:

Dr. Compton is still radiant over all the many wonderful things he saw in Berkeley. I was delighted to hear that you have received the grant for the super "Big Bertha". Heartiest congratulations!

As you probably know, Arthur Kip, Dr. Francis Hunter, and others are investigating the distribution of arsenic in leukemia patients and in rats. This problem is of special interest because of the fact that arsenic, in the form of Fowler's Solution, produces about the same effects as x-rays in some leukemia cases. While we continue our battle with our cyclotron, we have been carrying on these researches with the long-lived arsenic (13 to 17 days) obtained from Rochester and Harvard. The maximum available quantities from these two sources, while adequate for the rats, have failed to be sufficiently active to carry out the investigations on humans. In rats, using injections of a total of 0.66 mg of arsenic, some 33 percent of the labelled arsenic is found in the blood. In leukemia patients, with injections of 5 mg, the blood arsenic has been found to be less than 1 percent.

We have prepared the targets using about 0.5 gm of powdered Germanium metal fused on to a copper plate with the aid of a fluoride Handy-flux. We have received a maximum of 50 microcuries activity of 18 day arsenic from 10 hours of proton bombardment at about 6.5 MEV from the Rochester cyclotron. On the Harvard cyclotron, using 11 MEV deuterons, we can recover about 30 microcuries of 13 day arsenic from 20 microampere hours of bombardment. The 50 microcuries arsenic has been separated with 3 millicuries of carrier.

It seems very important to obtain measurements on both normal and leukemic humans. For this purpose, patients are available in Dr. Hunter's clinic and he has made arrangements with one of the students at the medical school to act as a control, provided the experiments can be begun about May 1, so that they will be completed by the end of the school year. Would it be possible for you to send me a Germanium deuteron target for this purpose?

Since 50 microcuries was insufficient to show up the arsenic in the blood of our leukemia patient, (although it was measurable in the urine), we estimate that we should need 0.2 to 0.5 millicuries of the 13-day arsenic for each of two subjects: one control and one normal. The chemical separations can be carried out here. Does it seem possible to send us a target from which we can recover about 1 millicurie of 13-day arsenic and to have it arrive about May 1?

With every good wish,

Cordially yours,

Robley D. Evans

RDE:BHS