FITZSIMONS GENERAL HOSPITAL
U. S. ARMY
DENVER 30. COLORADO

IN REPLY REFER TO
MEDEO-X

16 July 1965

ARM2.950127.014b

The Surgeon General
Department of the Army
ATTN: MEDPS-PO
Washington D. C. 20315

SUBJECT; Quarterly Report of the Fitzsimons General Hospital Radioisotope Committee

The following material comprises the Radioisotope Committee Quarterly Report in accordance with AR-40-37.

HERBERT F. JOHNSON
Major, MC
Recorder, Radioisotope Committee

ADDRESS ALL COMMUNICATIONS TO THE COMMANDING GENERAL
FITZSIMONS GENERAL HOSPITAL

MINUTES OF RADIOISOTOPE COMMITTEE MEETING

The seventh meeting of the Radioisotope Committee, Fitzsimons General Hospital, was called to order at 1315 hours 6 July 1965 in the Bruns Room, Fitzsimons General Hospital. Major Paul E. Siebert, Chief, Radiology Service, presided as Chairman.

All members were notified of the meeting. Members present were:

Colonel David E. Thomas, MC, Chief, Department of Surgery
Colonel Edwin L. Overholt, MC, Chief, Department of Medicine
Colonel Arthur Steer, MC, Chief, Pathology Service
Major Paul E. Siebert, MC, Chief, Radiology Service
Major Gerald DeNardo, MC, Chief, Radioisotope Section, Radiology Service
Major Herbert F. Johnson, MC, Post Radiation Safety Officer
Capt. Kenneth E. Kinnamon, VC, Chief, Radioisotope Section, USAMRNL

Also present were:

Zigman Z. Ziporin, Ph.D., Chemistry Division, USAMRNL
Capt. Leonard C. Griff, MC, Radiology Service

Members absent were:

Commanding Officer, USAMRNL
Chief, Supply and Service Division

Minutes of the previous meeting were read and approved by the Radioisotope Committee.

There was no old business to discuss.

NEW BUSINESS:

1. According to AR 40-37, paragraph 4b, Summary Report of Studies on the Ascorbic Acid Requirements of Men Exposed to High Altitude Studies is attached hereto as Appendix I.

2. Application was submitted requesting 1st Lt. John C. Saari, MSC, be certified as user for nonhuman use of Carbon-14, Sulfur-35, Phosphorus-32, and Hydrogen-3 in amounts specified on application. Requested certification was approved by the Committee, and application is attached hereto as Appendix II.

3. Application was submitted requesting Nicholas Raica, Jr., Ph.D., be certified as user for nonhuman use of Carbon-14 in amount specified on

application. Requested certification was approved by the Committee, and application is attached hereto as Appendix III.

4. Application is submitted requesting Capt. Leonard C. Griff, MC, be certified as user for human use of radioisotopes listed in application. Requested certification was approved by the Radioisotope Committee and is attached hereto as Appendix IV.

5. Capt. Griff is to temporarily fill the hiatus which will occur in the Radioisotope Section of the Radiology Service from the time of Major DeNardo's departure on 20 July 1965 until a replacement arrives in September. It is proposed that, in this capacity, he be authorized to use only those radioisotopes for which he is certified, and all other radioisotopes be used under the control of the Radioisotope Committee and of Dr. Donald W. Brown of the University of Colorado.

6. It is announced that Zigman Z. Ziporin, Ph.D., will temporarily replace Capt. Kenneth E. Kinnamon, VC, Chief, Radioisotope Section, USAMRNL, upon his departure, until such time as Capt. Kinnamon's replacement arrives. Dr. Ziporin is already approved for use of the radioisotopes with which he will be required to work.

7. Reports of radioisotopes procured, on hand, and disposed of during the quarter 1 April through 30 June 1965 were submitted by the Radiological Safety Officer. At no time were these amounts in violation of AEC requirements The reports were approved by the Committee and are attached as Appendix V.

8. The Radiological Safety Officer reminded the Committee of the fact that the present AEC license will expire 31 January 1966, and it is hoped that a new application might be drafted for approval by the next quarterly meeting of the Radioisotope Committee.

9. The next meeting of the Radioisotope Committee will be held at 1315 hours, Tuesday 12 October 1965, in the Research and Development Conference Room, USAMRNL, Building 603.

The meeting adjourned at 1356 hours.

Herbert F. Johnson

HERBERT F. JOHNSON
Major, MC
Recorder, Radioisotope Committee

Appendix II, III + IV on file in the office of Asst Md Dir Surgeon General

APPROVED: Radioisotope Committee
Fitzsimons General Hospital

Paul E. Siebert

PAUL E. SIEBERT
Major, MC
Chairman, Radioisotope Committee

Clinton S. Lyter

CLINTON S. LYTER
Major General, MC
Commanding

3 June 65

SUMMARY REPORT OF STUDIES ON THE ASCORBIC ACID REQUIREMENTS OF MEN EXPOSED TO HIGH ALTITUDE STRESS

Since a method to approximate the actual utilization of ascorbic acid, by the use of ^{14}C-labeled ascorbic acid in man has been developed by this laboratory, it was requested and permission was granted to label human volunteers with L-ascorbic-1-^{14}C acid at Natick, Massachusetts and at the research site on the summit of Pikes Peak, Colorado (see attached protocol, Appendix #1). The subjects that were used are the same ones who were used in the high altitude study conducted by this laboratory. The object of the experiment was to determine whether or not there was any actual change in the vitamin C pool size and the rate of utilization of the vitamin in subjects subjected to high altitude stress.

Four groups of subjects, consisting of 2-3 subjects per group were labeled with 20 μc of L-ascorbic-1-^{14}C acid at the start and again at the end of the high altitude study. The subjects were broken down into 4 groups as follows:

A. With Exercise:

Group I (sea level)

Natick #1. 20 μc dose at start of study

Natick #2 20 μc dose at end of study

Group II (Pikes Peak, 14,000 feet)

Pikes Peak #1. 20 μc dose on arrival at 14,000 feet.

Pikes Peak #2. 20 μc dose at the end of study (3 weeks)

B. Non-Exercise:

Group III (sea level)

Natick #1. 20 μc dose at start of study

Natick #2. 20 μc dose at the end of study

Group IV (14,000 feet)

Pikes Peak #1. 20 μc dose on arrival at 14,000 feet

Pikes Peak #2. 20 μc dose at the end of study

Appendix I

It should be pointed out that Natick #1 and 2 represent initial and final re-labeling of the same 6 subjects of which 3 are in the Exercise group and the remaining 3 are in the Non-Exercise group. The same is true of "Pikes Peak" initial and final label, with the exception that there were 3 subjects in the Exercise group, and only 2 subjects in the Non-Exercise group.

The results of the experiment are shown in Table I. As seen in Table I, there were no great differences shown in the pool size and the utilization of vitamin C with the exception of the Pikes Peak #1 Non-Exercise group, and since there were only 2 subjects in this group the value for the pool size and utilization may not be significant.

Values of 15 to 30.0 mg/day utilization of vitamin C are slightly higher than those we initially reported since we had stated that 20.0 mg/day would be the highest value expected. However, the higher values reported here certainly would have been more than adequately covered by the NRC recommended intake of 75 mg/day.

The results of this study would indicate that the vitamin C requirement of young adult men is not increased markedly by the stress of altitude.

TABLE I

Mean Values Showing Vitamin C Pool Size in gm and Utilization in mg/day of the Subjects Studied at Natick, Massachusetts and Pikes Peak, Colorado

	Exercise		Non-Exercise	
	Pool (gm)	Utilization (mg/day)	Pool (gm)	Utilization (mg/day)
Natick #1	2.902	30.2	2.754	30.0
Natick #2	2.232	22.2	2.079	17.4
Pikes Peak #1	2.545	28.1	2.229	11.7
Pikes Peak #2	2.329	15.1	2.394	20.2

PROTOCOL: APPENDIX #1 (As Approved by A.E.C.)

Ascorbic Acid Requirements of Men Exposed to High Altitude Stress

Arutyunov (1) has previously reported that vitamin C requirement is increased in pilots subjected to high altitude stress. Since a method to approximate the actual utilization of ascorbic acid by the use of ^{14}C-labeled ascorbic acid in man has been developed by this laboratory (2), it is requested that permission be granted to label human volunteers with L-ascorbic-1-^{14}C acid at Ft. Devens, Massachusetts and at the research site on the summit of Pikes Peak, Colorado. The subjects to be used are the same ones who will be used for the high altitude study described in Appendix #2. The object of this experiment is to determine whether or not there is any actual change in vitamin C pool size and rate of utilization in subjects subjected to high altitude stress.

Experimental Design

Four groups of subjects, consisting of 2-3 subjects per group will be labeled with 20 μc of L-ascorbic-1-^{14}C acid at the start and at the end of the high altitude study. The subjects will receive the labeled ascorbic acid orally under the direction of Lt. Col. J. E. Hanson, MC. The subjects will be broken down into 4 groups as follows:

Conditioned

Group Ia (sea level)

Ft. Devens (1) 20 μc dose at start of 14,000-foot study

(2) 20 μc dose at end of study (after 3 weeks)

Group IIIa (14,000 ft.)

Pikes Peak (1) 20 μc dose at time of arrival at 14,000 ft.

(2) 20 μc dose at end of study (after 3 weeks)

Non-Conditioned

Group Ib (sea level)

Ft. Devens (1) 20 μc dose at start of study

(2) 20 μc dose at end of study

Group IIIb (14,000 ft.)

Pikes Peak (1) 20 μc dose at time of arrival at 14,000 ft.

(2) 20 μc dose at end of study (after 3 weeks)

The subjects will receive the 20 μc of L-ascorbic acid at 0800 in the morning. After this, they will be required to collect a complete 24-hour urine sample. A 300 ml aliquot will be taken for the isolation of the labeled ascorbic acid and total oxalic acid ^{14}C activity. Whole blood and urinary ascorbic acid determinations will be made on the day that the subjects are labeled, then only urinary excretion of ascorbic acid will be determined for a 4 to 5-day period following the ingestion of the labeled ascorbate.

As noted previously, each subject will be labeled twice, once at the start of the study and then again at the end of the study. The total dose of L-ascorbic-1-^{14}C acid will not exceed 40 μc in any subject.

Facilities

There are excellent facilities available at both Ft. Devens, Massachusetts and at the summit of Pikes Peak, Colorado. These facilities are described in detail in Appendix #2. The ^{14}C labeled ascorbic acid will be kept in sealed glass containers until it is to be administered and then only a sufficient amount needed to label the subjects will be opened.

Transportation, Waste Products and Monitoring

All materials will be transported together with the investigators by automobile or airplane. The isotope will be contained in a sealed glass container (each vial will contain a total of 50 μc). These, in turn, will be placed in a sealed plastic container when transported. Unused portions of the isotope will be returned to the laboratory in the same fashion at the conclusion of the study. All radioactive urine samples collected from the subjects will be transported back to the main Denver laboratory in proper containers. Further, all transportation of the isotope or specimens will be properly monitored. Other materials such as glassware, pipettes, etc. will be returned to the main laboratory in Denver for disposal or decontamination as specified in Application for License No. 5-46-13(A66). There will be no disposal of radioactivity or decontamination of any equipment at either Ft. Devens or at the summit of Pikes Peak. Further, the experimental areas at both Ft. Devens and at Pikes Peak will be continuously monitored for radioactivity.

Further, it should be pointed out that there is no other route of excretion of ^{14}C activity other than the urine excreted by the subjects since no $^{14}CO_2$ is formed from the labeled ascorbate.

REFERENCES

1. Arutyunov, G. A. et al. Intern. Z. Vitaminforsch. 33: 129-130, 1963.
2. Baker, E. M. et al. Proc. Soc. Exp. Biol. Med. 109: 737, 1962.