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INSTITUTE FOR MEDICAL RESEARCH
CEDARS OF LEBANON HOSPITAL
4751 FOUNTAIN AVENUE
LOS ANGELES 29, CALIFORNIA
NORMANDY 2-9111

November 17, 1953

H. E. Ratcliffe, Lt. Colonel, M.C.
Research and Development Division
Office of the Surgeon General
Washington 25, D. C.

Dear Colonel Ratcliffe:

Attached you will find three copies of our progress report covering the period 1 August to 31 October 1953. I am sorry that we failed to include them with our letter and report of November 2nd.

Very truly yours,

PSalisbury

jr
enc.

Peter F. Salisbury, M. D.,Ph.D
Principal Investigator

Washington National Record Center
Office of the Army Surgeon General
Record Group 112
Accession #: 58A 1094
Box #: 56
File: Dr. Peter F. Salisbury MD-263 Cedars of Lebanon Hospital

MEDDH-MR 10 November 1953

Peter F. Salisbury, M.D.
Institute for Medical Research
Cedars of Lebanon Hospital
4751 Fountain Avenue
Los Angeles 29, California

Dear Dr. Salisbury:

Thank you for your letter of 2 November 1953 and the inclosed progress report.

As indicated in the instructions regarding reports and manuscripts sent to you at the time your contract was initiated, it is necessary that you submit four copies of all progress reports on your investigation.

We would, therefore, greatly appreciate receiving three additional copies of your progress report, covering the period 1 August to 31 October 1953.

Sincerely,

H. E. RATCLIFFE
Lt. Colonel, M.C.
Research and
Development Division

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November 2, 1953

Chairman, Medical Research and Development Board
Office of the Surgeon General
Department of the Army
Room 2151, Main Navy Building
Washington 25, D. C.

Dear Colonel Wood:

Enclosed please find our quarterly progress report which is due November 10, 1953.

Very truly yours,

Peter F. Salisbury, M.D., Ph.D.
Principal Investigator

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November 2, 1953

TO: Chairman, Medical Research and Development Board
Office of the Surgeon General
Department of the Army
Room 2151 Main Navy Building
Washington 25, D. C.

SUBJECT: PROGRESS REPORT

Reporting Period: 1 August 1953 to 31 October 1953

Principal Investigator: Peter F. Salisbury, M.D., Ph.D.
Institute for Medical Research
Cedars of Lebanon Hospital
Los Angeles 29, California

Title of Study: Analysis of the Indirect Effect of Radiation

Contract No.: DA-49-007-MD-263

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1. ABSTRACT: During the period covered by this report thirty dogs were irradiated using the procedure described before. Efforts were made to receive the donor blood in a bottle preliminary to its infusion into the irradiated animals. In sixteen significant experiments the donor blood was traumatized by constricting the cross section of a plastic tube between the pump and the administration catheter, thereby creating high pressure in a segment of the blood administration circuit and exposing the donor blood to a certain amount of mechanical trauma while flowing from the bottle into the irradiated animal. In the remaining experiments the blood circuit was constricted between the donor bottle and the pump, thereby exposing the blood to mechanical trauma plus a substantial vacuum as it flowed from the donor bottle into the irradiated animal. Those animals which were treated with donor blood exposed to vacuum plus mechanical trauma uniformly died within two weeks after irradiation but usually sooner; severe patchy pneumonia is thought to be the cause of death in these animals and it is believed that this pneumonia is caused by embolization of small pulmonary vessels with the cell clumps caused to appear in the blood when it is administered with both vacuum and mechanical trauma. On the other hand it appears that protection is being conferred by administering the bottled donor blood which has been traumatized under high pressure; the last nine animals of this series have not yet passed through the observation period of thirty days and therefore definite conclusions are not yet in order.

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2. PROGRESS: (1) Control Studies: None performed during the reported period.

(2) Experimental Studies: Dogs were selected, prepared and irradiated as described before. Donor blood was obtained by cannulating the carotid artery of healthy intact dogs. The donor blood was received in siliconed bottles where heparin was added amounting to 100 mgs per liter. The tubing and cannula consisted of polyvinyl chloride and polyethylene. An amount of blood corresponding to five percent of the donor dog's body weight can be obtained with this method. The donor dogs were anesthetized with pentobarbital sodium. The blood was drawn within three hours of its infusion into the irradiated animals and was kept at 37^0 C. pending administration. Within two hours after the end of irradiation with 450r the experimental dogs were transferred to the cross-transfusion laboratory, the right jugular vein was isolated under local anesthesia, and the double lumen catheter inserted into the superior vena cava. In order to avoid excessive dilution of such protective factors as might be present in the donor blood, between three and four hundred cc of the irradiated animal's blood was withdrawn before infusion of the donor blood was started. However, the volume of blood which had been withdrawn from the irradiated animal was later restored by the administration of equivalent amounts of donor blood. Amounts of blood corresponding to eight percent of the body weight were exchanged; resulting in an estimated blood replacement of eighty percent. Although it is possible with our technique to transfer volumes of blood corresponding to the total blood volume of the animal within a few minutes, the experiments described here took

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between ten and thirty minutes each because the administration of blood was slowed down considerably by the constrictions applied to the donor circuit. When the donor blood was administered under vacuum it is estimated that the vacuum reached about five hundred mm Hg on the average. When the donor blood was administered under pressure a pressure of about five hundred mm Hg was applied on the average. After administration of the traumatized donor blood the blood of the experimental animals contained about 50-100 mgm free hemoglobin in the serum, which indicates the degree of damage deliberately inflected on the donor blood. The experimental animals were studied with serum hemograms and pathological techniques as before. It is our impression that the protective effect of cross-transfusion is exerted by means of a decrease of hemorrhagic phenomena because even those irradiated and transfused animals which came to autopsy showed a marked reduction of the hemorrhagic phenomena which are so conspicuous in the untreated irradiated control animals.

3. FUTURE: In addition to the pathological and hematological studies performed now serial platelet counts will be undertaken in dogs. Another series of irradiated but untreated controls should be run at this time. Further experiments will be performed which should elucidate the effect of non-traumatized bottled donor blood and the effect of blood fractions. In the unlikely event that all nine animals currently under observation should succumb, it would have to be concluded that bottled donor blood cannot exert a protective

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effect and that therefore the original cross transfusions of irradiated dogs will have to be repeated. If desired by the Surgeon General's Office we will submit supplementary information about this point at the end of the current month. It should be mentioned here that during the first week of September the undersigned had contacts with hematologists and physiologists in the eastern part of this country where possible explanations and possible further courses of action were discussed.

4. REFERENCES AND MANUSCRIPTS: None.

Respectfully submitted,

Peter F. Salisbury, M.D., Ph.D.
Principal Investigator

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