OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
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212

MEMORANDUM FOR (See Distribution)

SUBJECT: Minutes of the Fifty-first Joint Medical Research Conference

The following were present at the fifty-first conference in Room 3-D-1021 of the Pentagon, 0900 - 1120, 14 October 1965:

Dr. Charles G. Anderson, Office of Civil Defense, D/A
Cmdr C. E. Brodine, BuM&S, D/N, Guest
Maj Frank Camp, MSC, USA, USAMRL, Fort Knox, Guest
Dr. F. J. Frese, Jr., OAD/R, ODDR&E
Col Gerrit L. Hekhuis, USAF, MC, DASA
L/Col H. C. Hendrickson, USAF, AFRST, D/AF
Col Donald L. Howie, MC, USA, AMR&DC, D/A
L/Col John J. Kovaric, MC, USA, AMR&DC, D/A
Dr. Gerald M. McDonnel, The Center for Health Sciences, U.C.L.A., Chairman
R/Adm William N. New, MC, USN, ODASD/H&M, OASD/M
R/Adm Langdon C. Newman, MC, USN, BuM&S, D/N
Dr. Herbert Pollack, Institute for Defense Analysis, Guest
Capt Joseph P. Pollard, MC, USN, BuM&S, D/N
Col Robert K. Quinnell, USAF, MC, AFMSPA, D/AF
Maj Charles E. Shields, MC, USA, USAMRL, Fort Knox, Guest
B/Gen John M. Talbot, USAF, MC, AFMSPA, D/AF
Col Colin F. Vorder Bruegge, MC, USA, AMR&DC, D/A
Capt Steven Wagensteen, MC, USA, AMR&DC, D/A
Col Harold Whitcher, RAMC, British Liaison Officer

The Chairman, Dr. McDonnel, called the meeting to order. The minutes of the fiftieth conference were corrected as follows: page 2, third paragraph, last line: so much of this line as reads, "USN School of Aviation Medicine", is amended to read, "U.S. Naval Aerospace Medical Institute."

The executive secretary reported that the print-out dates for ILSE, the joint NASA-DOD information storage and retrieval system, are running slightly behind schedule because of several administrative delays, but the new anticipated dates will still be well ahead of those for last year.

Dr. McDonnel announced that there would be a change in the proposed meetings of the DDR&E Advisory Panel on Medical and Biological Sciences; the first meeting for this fiscal year will be in January, 1966, at Pensacola, and the second meeting will be at Walter Reed Army Institute of Research, in the Spring.

Dr. Frese reported that the proposed systems-analysis-type study on the design, construction, operation and maintenance of future fixed facilities for medical care (F^3MC) was momentarily delayed by certain uncompleted fiscal actions, but that it was anticipated that these would be resolved and contracts let with the selected bidders prior to the next joint conference.

General Talbot asked for a discussion of the continued support by Department of Defense for the various medical committees of the National Academy of Science-National Research Council. His principal concern was whether these several committees were of sufficient continuing value to DOD to justify the level of fiscal support presently being maintained. Admiral Newman felt that the committees had been helpful with guidance, especially on clinical subjects. Col Hendrickson said that the Air Force tends to use its Scientific Advisory Board and its panels, when in need of guidance from civilian sources. Dr. Pollack noted that since these NAS-NRC committees seem to have a built-in lead time of six to nine months, they are difficult to use for acute problems. However, he felt that some of the committees are good, although most are too large to react quickly. Col Vorder Bruegge said that one committee which had been quite useful, the Committee on Sanitary Engineering and Environment, appears to have been dissolved. As a capsule history, he pointed out that in the early days the National Research Council was the final consultant to the military departments on all matters of medical research. As the Office of the Army Surgeon General developed an adequate staff, they began to assume in-house responsibility for such decisions and used the NRC committees less and less. At present, the principal one supported by the Army alone is the Committee on Tropical Health, which the Army finds still valuable. In his opinion, these Committees of NRC-NAS are but one part of the problem of the military departments getting too much civilian advice, large segments of which are frequently contradictory. Finally, he said that if it is decided to reduce the funding of these committees by the Department of Defense, it should be done in a gradual and orderly fashion so as to minimize disruption of their efforts. General Talbot inquired if there were other sources of funds for these committees and was informed that they are also funded by National Institutes of Health, the Veterans Administration, the National Aeronautics and Space Administration and several foundations. As a collateral inquiry, Dr. McDonnel asked if DOD funded any of the activities of the American Institute for Biological Sciences, and the answer was negative. As a summation, Dr. McDonnel said that despite some problems it appeared that the services of the NAS-NRC committees were valuable and worthwhile. However, some thought should be given to a possible reduction in the level of funding by DOD. Dr. Lamanna added that the committees were most useful when their advice is sought on broad policy questions and not on specific, quick-reaction problems.

Pursuing a matter discussed at previous conferences, Cmdr Brodine was asked to report on the status of the Navy Frozen-blood project for South Viet Nam. Cmdr Brodine emphasized that the project was not research, but was a feasibility test of hardware for the use of a frozen-blood bank in a combat situation and a study of the logistic support required for such a bank. The present status of the project is that two vans are being equipped for the test and are being

given a "shake-down" trial at the USN Oakland Hospital. The personnel involved consist of a team of one surgeon, one laboratory officer, one CPO laboratory technician, and three hospital corpsmen. The principal equipment consist of a Huggins cytoagglomerator, refrigerated centrifuges and freezing equipment. Dr. McDonnel asked what was the anticipated output for a given period of time, and was told that at maximum capacity the team should be able to produce 15 units of blood per hour. Cdr Brodine said that during the "shake-down" run, quality control of their operations would be monitored by the USN Laboratory at Chelsea, Mass.. It is also planned at a later date to install a cytoagglomerator on the hospital ship, USS REPOSE. Simultaneously with the feasibility study of the hardware in this program, there will be research to evaluate the effectiveness of frozen blood in the treatment of shock. Dr. McDonnel inquired if any progress had been made in the research for extending the shelf-life of stored blood. General Talbot said that the project for testing adenine-fortified blood for this purpose had been approved and would be carried out at the USAF Wilford Hall Hospital at Lackland AFB, Texas.

Major Charles E. Shields, MC, USA, of the U.S.Army Medical Research Laboratory at Fort Knox, Kentucky, gave a paper on his organizations activities regarding blood preservation research. (Coppy attached).

Maj Frank Camp, MSC, USA, of the same organization, gave a brief report on its other activities, including quality control service for all Army blood-transfusion and blood bank activities and the training of specialist-technicians. Admiral New inquired of Major Shields whether in the work reported so far there had been a significant number of transfusion reactions. Major Shields said that he did not consider their series of 32 cases adequate to give a validated answer, but it was their impression that the number of reactions would be relatively low.

There being no further business before the conference, it was adjourned by the Chairman at 1120.

The next meeting of the Joint Conference will be in Room 3-D-1021, The Pentagon, at 0900 on 18 November 1965.

Frederick J. Frese, Jr.

FREDERICK J. FRESE, JR.
Colonel, USAF MC
Chief, Biological & Medical Sciences Div.
Ofc Asst Director (Research)

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Dr. Charles G. Anderson, Office of Civil Defense, D/A
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Lt Col John J. Kovaric, MC, USA, AMR&DC, D/A
Dr. Carl Lamanna, ARO, D/A
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R/Adm W. N. New, MC, USN, ODASD/H&M (OASD/M)
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Col Colin F. Vorder Bruegge, MC, USA, AMR&DC, D/A

IMPROVING PRESERVATION BY ADDING ADENINE TO ACID-CITRATE-DEXTROSE SOLUTIONS

Charles E. Shields, Major, MC
BTRD USAMRL
Fort Knox, Kentucky

Several additives have been considered for improving blood preservation but as a group, the purine ribosides have held the most promise. Adenosine increased shelf-life but also produced hypotension in the recipient. Storage time was extended seven additional days with inosine without adverse effect. However, adenine has been shown to maintain the blood adequately for five to six weeks of storage as measured by post-transfusion erythrocyte survival percentages of 70%. This test has been used to compare preservation between various solutions where an accepted standard has been a survival percentage of 70% for the erythrocytes, as has been established for blood stored in ACD solution for three weeks.

Our program was designed to obtain two units of blood from donors, store these for six weeks in ACD with and without adenine in random sequence. The blood unit was then returned to the donor as an auto-transfusion. The survival of the stored red blood cells was measured by chromium isotope tagging, using fresh cells labelled with phosphorus tagging for the initial volume correction. In this study, the first unit was drawn into one of the solutions, and six weeks later returned, then the second unit was placed in the alternate solution and returned in six weeks.

Several series of studies were done in the interim, such as baseline chemistries clotting and hematological studies on samples from the subject and then done on the unit during storage and prior to transfusion. The

stored blood was sampled by culture for bacteria during the fifth week of storage, and a smear was studied on the day of transfusion; if any microorganisms were found, that unit was not transfused.

The results of the storage studies were obtained from 19 subjects in duplicate, for a total of 37 units of blood. However, only 13 subjects were transfused with both units. The basic chemical changes were essentially as predicted for each type of solution, with the only suggestive findings being a lower level of free hemoglobin in the adenine group; this apparently indicated less hemolysis. In addition, a higher glucose level was found in the adenine group, suggesting a lower rate of glycolysis.

The important result has been the demonstration of the post-transfusion survival values. The average survival for ACD blood was 41% and when adenine was added the average went to 70%. Other authors, specifically Simon had the following after 39-46 days: ACD 41%, adenine 70%, and de Verdier found after 35 days that adenine fortified samples had an erythrocyte survival of 80%. Further evaluation of the group of thirteen subjects that were transfused with units stored in both solutions demonstrated that twelve of the thirteen improved, that is, the post-transfusion survival percentage rose after adenine was included.

It should be mentioned that three cultures were found positive for bacteria; two of these were related to failure of the sterile collection system. In addition, two units were found to have organisms upon pre-transfusion smear. Most studies have shown 2-3% contamination after three weeks of storage, indicating that sterility will be an ever present, and perhaps increased, problem when storage time is lengthened.

After the transfusions, the subjects were carefully interviewed and

six untoward reactions were noted. Three subjects had generalized stiffness and aching, which may have been related to unusual exercise done before the transfusion. One had similar findings and a chill, while two had fever and chills without aches. These latter two occurred 8-10 hours after transfusion, clearing the next day. Of the six reactors, four received ACD and two, adenine solutions. No evidence of hemolysis could be found in any of the six, and the reactions remain unexplained.

These findings along with the two other studies on adenine illustrate a definite potential in this substance for maintaining erythrocytes over a five to six week period of storage as measured by post-transfusion survival values. Blood stored in this solution of ACD with adenine could be given without marked hazard as single units even after six weeks of storage.