

SGRD-UE-EMT (70)

10 Aug 92

MEMORANDUM THRU

Chief, Thermal <sup>MUS</sup> Physiology and Medicine DivisionDirector, <sup>VPP</sup> Environmental Physiology and Medicine DirectorateChairperson, <sup>BN</sup> Human Use Review Committee

For Commander, USARIEM

SUBJECT: Amendment to approved research protocol entitled "Hyperhydration with a Glycerol Solution: Effects on Fluid and Electrolyte Balance During rest and Cold/Exercise Exposure" HURC #450, Beau J. Freund Ph.D. Principle Investigator.

1. It is requested that Phase 2 of HURC 450 be amended to include a control trial in addition to the two hyperhydration trials previously approved. During the control trial subjects will undergo identical testing as the two hyperhydration trials with the exception that they will not hyperhydrate prior to cold exposure (10 oC). The addition of a control trial had been suggested by the SRC and should help in determining the mechanism/s of cold induced diuresis.

2. The consent form for Phase 2 has been modified to reflect the requested changes (see Enclosure). Changes to the Consent Form are underlined for your ease in review. The additional blood (6 ounces) and time required to complete the additional trial (approx 6 hr) are indicated. As with the two hyperhydration trials, the control trial will be separated from the other trials by a minimum of 72 hrs.

Encl



Beau J Freund  
CPT, MS  
Research Physiologist

**VOLUNTEER AGREEMENT AFFIDAVIT**

For use of this form, see AR 70-25; the proponent agency is OTSG

**PRIVACY ACT OF 1974**

**Authority:** 10 USC 3013, 44 USC 3101, and 10 USC 1071-1067

**Principle Purpose:** To document voluntary participation in the Clinical Investigation and Research Program. SSN and home address will be used for identification and locating purposes.

**Routine Uses:** The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study, implementation of medical programs, education of claims, and for the mandatory reporting of medical conditions as required by law. Information may be furnished to Federal, State and local agencies.

**Disclosure:** The furnishing of your SSN and home address is mandatory and necessary to provide identification and to contact you if future information indicates that your health may be adversely affected. Failure to provide the information may preclude your voluntary participation in the investigational study.

**PART A(1) - VOLUNTEER AFFIDAVIT**

**Volunteer Subjects in Approved Department of the Army Research Studies**

Volunteers under the provisions of AR 40-38 and AR 70-25 are authorized all necessary medical care for injury or disease which is the proximate result of their participation in such studies.

I, \_\_\_\_\_, SSN \_\_\_\_\_

having full capacity to consent and having attained my \_\_\_\_\_ birthday, do hereby volunteer/give consent as legal representative for \_\_\_\_\_ to participate in \_\_\_\_\_

The Effects of Hyperhydration with a Glycerol Solution on the Physiological Responses to Cold Exposure  
*(Research Study)*

under the direction of Captain Beau J. Freund, Ph.D.

conducted at US Army Research Institute of Environmental Medicine, Natick, MA 01760-5007  
*(Name of Institution)*

The implications of my voluntary participation/consent as legal representative, duration and purpose of the research study, the methods and means by which it is to be conducted, and the inconveniences and hazards that may reasonably be expected have been explained to me by Captain Beau J. Freund

Contact telephone(s): 508-651-4873

I have been given an opportunity to ask questions concerning the investigational study. Any such questions were answered to my full and complete satisfaction. Should any further questions arise concerning my rights/the rights of the person I represent on study-related injury, I may contact:

Office of Chief Counsel

at US Army Natick Research, Development and Engineering Center (508)651-4322  
*(Name, Address and Phone Number of Hospital (Include Area Code))*

I understand that I may at any time during the course of this study revoke my consent and withdraw/leave the person I represent from the study without further penalty or loss of benefits, however, if the person I represent may be required (military volunteer) or requested (civilian volunteer) to undergo certain examination if, in the opinion of the attending physician, such examinations are necessary for my/the person I represent's health and well-being. My/the person I represent's refusal to participate will involve no penalty or loss of benefits to which I am/the person I represent is otherwise entitled.

**PART A (2) - ABSENT VOLUNTEER AFFIDAVIT (MINOR CHILD)**

I, \_\_\_\_\_, SSN \_\_\_\_\_, having full

capacity to consent and having attained my \_\_\_\_\_ birthday, do hereby volunteer for \_\_\_\_\_ to participate in \_\_\_\_\_

*(Research Study)*

under the direction of \_\_\_\_\_

conducted at \_\_\_\_\_  
*(Name of Institution)*

**(Continue on Reverse)**

**PART A(2) - ASSENT VOLUNTEER AFFIDAVIT (MINOR CHILD) (Cont'd.)**

the implications of my voluntary participation, the nature, duration and purpose of the research study, the methods and means by which it is to be conducted, and the inconveniences and hazards that may reasonably be expected have been explained to me by

I have been given an opportunity to ask questions concerning the investigational study. Any such questions were answered to my full and complete satisfaction. Should any further questions arise concerning my rights I may contact

(Name, Address, and Phone Number of Hospital (Should Area Code))

I understand that I may at any time during the course of this study revoke my assent and withdraw from the study without further penalty or loss of benefits. However, I may be requested to undergo certain examination if, in the opinion of the attending physician, such examinations are necessary for my health and well-being. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled.

**PART B - TO BE COMPLETED BY INVESTIGATOR**

**INSTRUCTIONS FOR ELEMENTS OF INFORMED CONSENT** (Provide a detailed explanation in accordance with Appendix E, AR 40-26 or AR 70-25.)

During exposure to heat, cold or exercise stress, body fluids are lost. This can cause dehydration, reduces one's ability to work as well as increases susceptibility to injury. Drinking fluids reduces dehydration. However, this is not always possible during certain military operations and therefore, it would be beneficial if soldiers could increase their body fluids before beginning these types of operations. However, when humans drink large volumes of water the kidney rapidly rids the body of this additional fluid by increasing urine formation. Recent studies however, have suggested that by adding glycerol (a natural product found in many foods and in human blood) to water, more of the water drunk can be retained. Importantly, drinking glycerol enriched water might improve exercise performance.

This study will investigate possible advantages for ingesting glycerol solutions during various military operations. These studies will be conducted at the U.S. Army Research Institute of Environmental Medicine (USARIEM), the U.S. Army Natick Research, Development and Engineering Center (NATICK) facilities, Natick, MA, and at the Naval Blood Research Laboratory, Boston, MA.

I  do  do not  (check one & initial) consent to the inclusion of this form in my outpatient medical treatment record.

SIGNATURE OF VOLUNTEER	DATE	SIGNATURE OF LEGAL GUARDIAN (if volunteer is a minor)
PERMANENT ADDRESS OF VOLUNTEER	TYPED NAME OF WITNESS	
	SIGNATURE OF WITNESS	DATE

### Testing/Procedures to be Conducted Prior to Experimental Test Days

Prior to experimental testing, your physical fitness and percent body fat will be determined. In addition, your total body water will be measured on one day and your blood and plasma volume on another.

#### % Body Fat.

To estimate your body fat, you will be weighed on a scale underwater. During this procedure you will be required to hold your breath for approximately 10 seconds after you have expelled all your air. You will need to repeat this approximately 5-10 times. In addition, the remaining gas in your lungs will be measured by having you breathe oxygen through a snorkel-like apparatus. This total procedure takes approximately 1 hour.

#### Maximal Effort Exercise.

For the maximal effort exercise test, you will be running on a treadmill with the intensity of the exercise increasing every 1.5 min. At each increasing work load we will measure your oxygen uptake by having you breathe through a rubber mouthpiece and a plastic valve. You will continue to exercise to the point of your maximal ability or until you feel you cannot continue. This total test, including a 10 minute warm-up, takes about 30 minutes to complete.

#### Blood Volume Measurement.

This test will be performed at the Naval Blood Research Laboratory in Boston. A small sample of blood will be taken from your arm vein. Radioactive material will be added, and the blood will then be reinjected. Blood samples will be collected twice following the injection. The total volume of blood removed for this test is approximately 1 1/2 fluid ounce. In addition, you will receive a very small amount of radioactive material. The total amount of radiation that you receive is less than one chest x-ray. One half of the radioactivity will be gone from your body in 30 to 60 days. This test will take about three hours.

#### Total Body Water.

You will be asked to drink approximately 1 ounce of labeled water. This labeled water is a special type of water that occurs normally in nature in small amounts and appears and tastes completely normal and possess no health risk to you. Blood samples will be obtained from your arm once immediately before drinking the water and once 3 hours later. The total amount of blood removed for this procedure will be less than 1/2 ounce.

Volunteer's Initials \_\_\_\_\_

Witness's Initials \_\_\_\_\_

## Testing/Procedures to be Conducted on Experimental Days

### Fluid Ingestion:

On two separate occasions you will be asked to drink one of two test solutions and a large volume of water. During one of these trials the test solution will be normal water that is flavored with an artificial sweetener and color. The other test solution will be identical except that included in the solution will be 2-3 ounces of glycerol. Glycerol is a naturally occurring substance found in many foods and it is also produced in the body by metabolism. Following the ingestion of the test solution, you will be asked to drink a large volume of water over a 15 minute time period. The total volume you are being asked to consume is based on your body weight but for comparison a 150 lb individual of an average body fat content would be asked to consume a little over 3 1/2 pints of fluid. A 200 lb individual of a similar body composition would be required to consume 4 3/4 pints of fluid. In addition to the fluid ingestion trials, a control trial will also be completed. This control trial is identical to the other two trials with the exception that no fluid will be ingested during the control trial.

### Cold Exposure:

Immediately after you have ingested the test solution and water (or no fluid during the control trial) you will be carried into a cold room (50°F) and will remain there for four hours. During this time you will remain seated and will be dressed in only shorts, a Tee-shirt, and tennis shoes.

### Physiological Measurements During Test Days:

During the 30 minute control period and the 4 hours of cold exposure, heart rate, blood pressure and rectal and skin temperatures will be measured at 15-min intervals. On several occasions (approximately 10) you will be asked to breathe into a mouthpiece while wearing a nose clip so that your expired air can be analyzed for oxygen and carbon dioxide. In addition, you will be periodically asked to rebreathe a carbon dioxide-oxygen mixture for 15-20 seconds.

Blood and urine samples (a total of 5 each) will be collected throughout the testing period. The volume of blood that will be removed during each experimental trial is approximately 6 ounces. The total amount of blood that will be removed for the entire study including the blood volume determination is approximately 20 ounces or 1 1/4 pint. Subjects who have difficulty voiding their bladder at the required time intervals may be excluded or dismissed from the study.

### Potential Risks and Hazards.

The primary risks of participating in this study are those associated with (a); physical exercise; (b); obtaining venous blood samples; (c); drinking large volumes of fluid; (d); breathing carbon dioxide; (e); exposure to cold; (f); exposure to radioactively labelled material; (g); underwater weighing; (h); glycerol ingestion.

Volunteer's Initials \_\_\_\_\_

Witness's Initials \_\_\_\_\_

The stress of exercise, and especially maximal effort, increases the potential for uncovering and/or aggravating pre-existing heart problems. Therefore, your electrocardiogram will be displayed and periodically monitored. Muscle soreness, cramps, and general fatigue may also result from exercise; this pain and discomfort is temporary and not deemed harmful. There is also the possibility that you could fall while exercising on the treadmill. The risk of this is probably less during the supervised activities used in a study than in unsupervised exercise, free play or competitive sports. You will be closely supervised and a "spotter" will be available to assist you if needed.

Needle punctures and the insertion of a small plastic tube (catheter) into an arm vein will be performed by skilled technicians with sterile techniques. These procedures involve little risk of any injury beyond possible bruising and temporary discomfort. With the use of sterile techniques the development of infection is unlikely.

Drinking large volumes of fluid may cause nausea and vomiting.

The risk associated with rebreathing 8 to 15% carbon dioxide (in oxygen) for 15 to 20 seconds is temporary light headedness, and therefore, a technician will closely monitor you.

Some subjects find the exposure to 50°F relatively uncomfortable and there is a small chance of have your internal temperature drop to levels that would require your removal from the chamber. However, your internal or rectal temperature will be continuously monitored.

Blood volume measurements with the labelled radioactive chromium and albumin methods are performed routinely in the United States, and the low level of radiation is associated with no known risks.

Breathing in water is a risk associated with the underwater-weighing procedure.

Glycerol ingestion may cause nausea, vomiting, diarrhea, and metabolic disturbances in individuals with diabetic tendencies.

You will have several electrodes taped to your chest so that we can monitor your heart rate. During the cold exposure we will measure your skin, and rectal temperatures. The rectal thermometers are flexible probes which may be somewhat unpleasant to insert the first time, but are not harmful.

#### Restrictions.

On test days, including the 3 experimental days as well as the days that blood volume and the total body water measurements are made, you will be restricted from physical exercise, alcohol, and tobacco for the 15 hours prior to testing. In addition, you will be placed on a restricted diet (no food or fluid following dinner meal until after the next mornings testing) and required to spend the 12 hour before each test in the Chambers Building.

Volunteer's Initials \_\_\_\_\_

Witness's Initials \_\_\_\_\_

Benefits.

The benefits of this study to you are only indirect. You will be able to find out your percent body fat and physical fitness level. Both of these measurements are of value to individuals interested in assessing the state of their physical conditioning program. All data and medical information obtained about you as an individual will be considered privileged and held in confidence; you will not be identified in presentation of the results. Complete confidentiality cannot be promised, particularly to subjects who are military personnel, because information bearing on your health may be required to be reported to appropriate medical or command authorities, and applicable regulations note "the possibility that the U.S. Army Medical Research and Development Command officials may inspect the records."

This study requires approximately 26 hours of testing which includes approximately 5 1/2 hours for each of the 3 experimental trials, 3 1/2 hours for the blood volume measurements, 3 1/2 hours for the total body water measurements, 1 hour for the under water weighing procedures, and 1/2 hour for the treadmill exercise test. The total time commitment, including the 12 hours spent in the Chambers Building prior each of the 5 testing occasions and the travel time to and from Boston, is approximately 86 hours. Please take your commitment seriously and plan to complete all testing if you volunteer. However, you are free at any time to withdraw from the study without prejudice.

You will receive a copy of this consent form for your personal records.

Volunteer's Initials \_\_\_\_\_

Witness's Initials \_\_\_\_\_