MANRISE TECHNICAL REVIEW

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INFORMATION FOR AUTHORS

Manrise Technical Review. At this time, the most widely recognized means of increasing the probabilities of surviving clinical death involve the induction of solid state hypothermia, a low temperature state in which chemical and biological processes are essentially arrested. Most information published in MTR will be directly relevant to this subject.

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Abbreviations. In all cases except the most common abbreviations, definitions should be shown in parentheses after first use of the abbreviation in the text.

References. All references should be cited in the text, indicated by arabic numbers, in parentheses, on the line. The reference list must appear on a separate sheet in order of citation, not alphabetical order. The following minimum data will be given: names of authors, complete title of article cited, name of journal (standard abbreviations acceptable), volume number, first and last page numbers, year of publication.

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C O N T E N T S

Volume 2 · Number 6
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MANRISE
TECHNICAL
REVIEW

EDITORIAL

Phase II and the other remaining sections of the manual (Instructions for the Induction of Solid State Hypothermia in Humans) have recently been released. This took a long while, and we appreciate your patience. What exists now is a beginning, not the last word, and many improvements will be added with time. Yet, we think a reasonable foundation exists on which to build. For a moment, consider our path to this point.

Dr. Dante Bruno devised, in 1967, a proposed cryobiological method for preserving dying human beings (1). It exhibited ingenuity and comprehensive attention to many details of importance. Dr. Bruno's method lay unused and unimproved for many years. Then in 1970, Dr. Peter Gouras offered an advanced protocol for low temperature storage of human subjects (2). Through continued correspondence with Mr. Art Quaife, Dr. Armand Karow and others, refinements were added. Dr. Gouras presented these results at the Fourth Cryonics Conference in 1971. Still, implementation of the final protocol entailed many practical difficulties. Mr. Quaife conducted extensive mathematical studies during 1972, which culminated in his recent paper in MTR (3). Now, with Mr. Quaife's collaboration and approval, a procedural method for implementation is available in the manual.

Over a year ago, when Manrise Corporation announced its intention to publish an instruction manual, we were greeted with cautious enthusiasm. "Keep it uncomplicated", we were advised. "If it is too sophisticated, or if too large an expenditure for equipment and chemicals is required, few will be able to make use of it".

We sympathize with this point of view. We know, from first hand experience, how much effort and money are needed to implement frequently improved recommendations. Nevertheless, we cannot base the manual's contents on the assumption that "it must be easy and cheap or no one will do it". We know a number of organizations which are prepared to do whatever is necessary to develop reasonable capabilities, and our efforts are directed towards satisfying *their* needs. The older methods are always available for those who find our recommendations are beyond their means.

We are willing to go to great lengths to help those who are interested in implementing the instructions in the manual. Inquiries are answered by detailed letters in which we explain, to any extent necessary, the rationale underlying these procedures and our recommendations for practical implementation of them. If specific stumbling blocks exist, we will do our

(continued on page 140)

SPECIFIC GRAVITY OF DMSO-QUAIFE SOLUTION AS A FUNCTION OF TEMPERATURE AND CONCENTRATION

by F. R. Chamberlain

President,
Manrise Corporation

Measurements were made of specific gravity vs DMSO concentration and temperature in Quaife solution (Q-3) with dextran and heparin omitted. Raw data and curves are both included, along with a description of measurement techniques and problems. A critical parameter, change of specific gravity with change of DMSO concentration, seems to be relatively independent of the base perfusate.

At this time, specific gravity is the parameter of choice for estimating the concentration of DMSO in Phase II perfusates. Since specific gravity of any fluid is a function of temperature, this too must be accounted for. Recent measurements are presented in this paper, comparable to earlier data reported for DMSO and Collins' solution (1).

The base perfusate used in these measurements was a "Quaife' solution, modified (2) since last reported in the open literature (3). The constituents for the solution (Q-3) are shown in Table I. For comparison, the constituents of the Collins' solution (C-4) used previously (1) in specific gravity measurements are shown also. One can readily see that there are significant differences in these perfusates, and differences in specific gravity would be expected. This was the case.

NAMES - FORMULAS OF CONSTITUENTS	GRAMS PER LITER	
	Q-3	C-4
KH_2PO_4	0.92	2.05
$K_2HPO_4 \cdot 3H_2O$	4.37	9.70
$NaH_2PO_4 \cdot H_2O$	1.15	----
$Na_2HPO_4 \cdot 7H_2O$	6.12	----
NaCl	1.52	----
Glucose	25.00	25.00 **
Dextran 40	50.00 *	----
Phenoxybenzamine	0.025	0.025
$MgSO_4 \cdot 7H_2O$	0.37	7.40 *
KCl	----	1.12
$NaCHO_3$	----	0.84
Procaine HCl	----	0.10
Heparin (Units)	5000 *	5000 *

Table I

* omitted in specific gravity measurements
** 12.5 grams/liter used in specific gravity measurements

DMSO was pre-balanced with the salts of solution, in the same manner that distilled water is pre-balanced with salts to form the base perfusate. This was done on a volumetric basis; i.e., the same constituents were added to one liter of DMSO as would have been added to one liter of water. A small fraction of the salts failed to dissolve; further tests will be required to determine which of the salts are not dissolved by DMSO (the salts were not added separately -- all the dry constituents were added simultaneously).

DMSO (pre-balanced) was added to the base perfusate on a weight ratio basis. The idea was to achieve a weight balance between DMSO and water components, so the effect of the salts was neglected. The specific gravity of both water and DMSO were measured, corrections were applied to the hydrometers, and factors were computed to bias volumetric ratios for the desired effect.

Pre-balanced DMSO was then added to base perfusate by specific gravity biased volumetric measurements.

Several corrections were used in this series of measurements which were omitted in the earlier work cited previously (1). In earlier measurements, the DMSO was not pre-balanced with salts. Also, concentrations were v/v rather than w/w. In other respects, however, the procedures were similar. Specific gravity was measured with calibrated hydrometers. Temperature measurements were made simultaneously by insertion of thermister probes into the hydrometer cylinders. A mixture of methanol and dry ice was used to cool the samples and prevent warm-up of the hydrometer cylinders.

For the convenience of those who may wish to replot curves, smooth data, employ least squares methods, etc., the raw data taken is presented in Table II. For measurements of specific gravity less than 1.050, the limiting resolution was 0.0005. For greater values of specific gravity, the limiting resolution was 0.002.

"Limiting resolution" means the finest lines on the hydrometer (separation approximately one millimeter), seen through a hydrometer jar against the surface tension curvature of the hydrometer stem penetrating the fluid. "Splitting the divisions" was attempted but was guesswork at best. Condensation on the hydrometer jar and turbidity in the higher DMSO concentrations further reduced readability. This description is intended to give the user of the data a better perspective as to its probable accuracy.

The data of Table II is plotted in Figure 1. The curves have been fitted to the points, and oriented so as to exhibit maximum parallelism with other curves. For this, it was necessary to assume nominal errors associated with each data point and a certain fraction of data points (circled) having substantial errors. The validity of this can only be established by additional data. The author would welcome comparison with results obtained by others.

DMSO %	TEMP. °C	SPECIFIC GRAVITY
0	17.5	1.0175
	8.0	1.0187
	6.5	1.0185
	3.0	1.0180
5	18.0	1.0235
	8.5	1.0252
	6.0	1.0248
	2.0	1.0250
	-1.0	1.0245
10	19.0	1.0290
	9.0	1.0325
	5.0	1.0313
	1.5	1.0310
	-2.0	1.0315
15	20.0	1.0355
	10.0	1.0390
	5.0	1.0400
	1.0	1.0400
	-3.0	1.0405
20	24.0	1.0415
	10.0	1.0460
	5.0	1.0468
	0.0	1.0475
	-6.0	1.0483
30	25.0	1.0560
	11.0	1.0610
	6.0	1.0640
30	0.0	1.0660
	-8.0	1.0670
40	26.5	1.0670
	10.0	1.0760
	5.0	1.0770
	0.0	1.0800
	-16.0	1.0860
	-21.0	1.0880
50	27.0	1.0760
	12.0	1.0890
	6.0	1.0920
	1.0	1.0950
	-5.0	1.0980
	-11.0	1.1020
	-22.0	1.1100
	-31.0	1.1100
	-35.0	1.1200
	-34.0	1.1200
60	27.5	1.0880
	10.0	1.1000
	6.0	1.1000
	0.0	1.1020
	-6.0	1.1060
	-14.0	1.1100
	-33.0	1.1240
	-41.0	1.1300
	-39.0	1.1180
	-52.0	1.1360

Table II

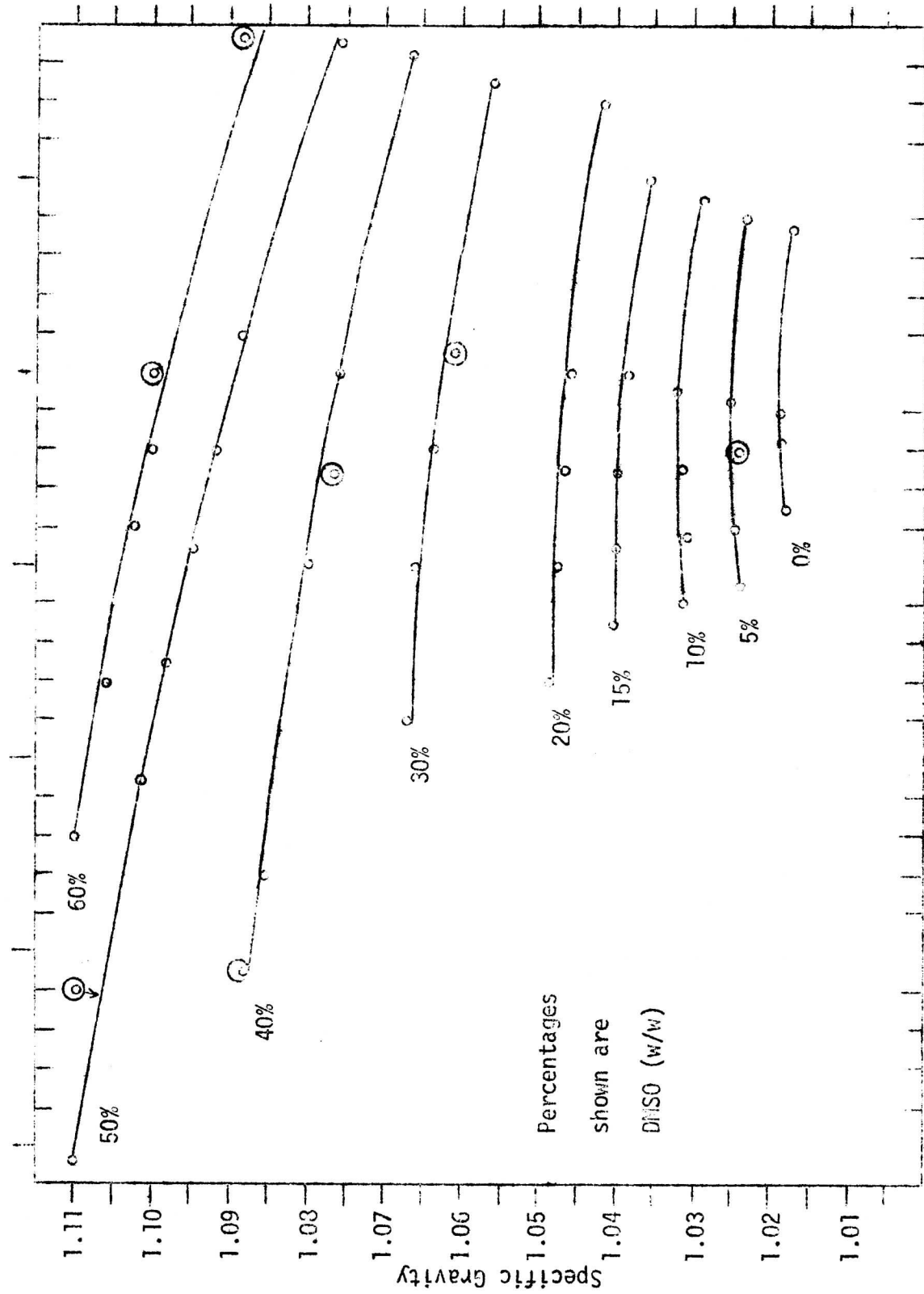

Figure 1: Specific Gravity vs Temperature for Quaife's (Q-3) Solution with DMSO

A most important parameter yet to be derived from the data presented is the change of specific gravity with change of DMSO concentration. Preliminary comparisons with earlier data indicate that this is relatively independent of the base perfusate. Continued work will include the analysis of both earlier data and that presented in this paper, so that the differential quantity of interest may be accurately specified over all parameter ranges required in Phase II.

References

1. F. Chamberlain, "Specific Gravity and pH of DMSO-Collins' as a Function of Temperature and Concentration", *Manrise Tech. Rev.*, 1:11-12, 1971.
2. A. Quaife, Personal correspondence dated 8-24-72.
3. A. Quaife, "Recommended Modifications to Collins' Solution for Use as the Base Perfusate in Inducing SSH", *Manrise Tech. Rev.*, 2:3-9, 1972.

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≡ EDITORIAL ≡

(continued from page 134)

best to suggest ways around them. The manual is full of suggestions as to acceptable compromises and emergency methods. More of these will be worked out and added with time.

But do not tell us, "I can't do it", or "it's too hard", if this means "I won't try". In that case, you're on your own! Survival is neither simple, nor guaranteed, at this time. Your willingness to work to comprehend new ideas, to build new capabilities and to struggle against unfavorable odds is a measure of your basic entitlement to continued existence.

Linda L. Chamberlain
Frederick R. Chamberlain

1. R. Nelson, S. Stanley, "We Froze the First Man", Dell Publishing Co., 1968.
2. P. Gouras, "Preliminary Protocol for the Preparation of Clinically Dead Human Subjects for Low Temperature Storage", Manrise Tech. Rev., 2:84-89, 1972.
3. A. Quaife, "Mathematical Models of Perfusion Processes", Manrise Tech. Rev., 2:28-75, 1972.

ALCOR ACTIVITIES AND SYSTEMS

by Julianne N. Schultz

Director,
The Alcor Society for Solid State Hypothermia

Alcor is the small companion star to Mizar, the second star in the handle of the Big Dipper. It has been used for thousands of years as a critical test of vision. As an acronym, Alcor represents "Allopathic Cryogenic Rescue". Allopathy is basically that form of medicine which (as opposed to homeopathy) treats the disease by any and all means that may possibly lead to a favorable outcome. Alcor, the organization, was designed to accomplish very specific and unconventional goals. These are discussed.

The Alcor Society for Solid State Hypothermia is a non-profit, tax-exempt "scientific-educational" organization engaging in and promoting technological and scientific research in cryopreservation, cryoinjury, gerontology and cryogenics. In pursuing these objectives, Alcor's Board of Directors is supported by three classes of membership and an auxiliary advisory group.

The organization's activities and systems of operation are rigorously dictated by its purpose and are therefore interelated. For the sake of definition and clarification, both activities and systems shall here be treated as if separate.

ALCOR ACTIVITIES

Alcor activities include membership, research, and cooperation with outside groups and peoples of similar direction. A brief description of each follows:

1. Membership.

The Alcor *General Member* is a dues-paying individual who has made legal (anatomical donation) and financial (insurance, trust fund, etc.) provisions for rescue procedures and suspended animation. The General Membership

classification is applicable to each member's first year of association with Alcor and can, by choice, be maintained indefinitely with payment of insurance policy premiums and increased annual dues.

It is the option of the General Member, during the first year, to train for qualification as a *Working Member*. This is accomplished by successfully completing the Alcor Training Program. The Working Member pays reduced annual dues, and is obligated to volunteer 40 hours of personal effort per year in maintaining skills through refresher courses.

The *Director Electorate*, a third classification of membership, is an annually elected body of Working Members having the only power within the corporation to elect Directors and members of the Director Electorate. In essence, this is the controlling body of Alcor. The Director Electorate allows for a broad but stable basis for control outside the Board of Directors.

2. Research

Research is the means to the achievement of Alcor's goals involving the development of extensive scientific understanding and expertise. To date, the major portion of Alcor's research activities has been dedicated to program formulation and the accumulation and compilation of established scientific and medical data.

Alcor will soon begin development of a fully equipped facility and laboratory to implement research studies supporting a full range of investigation in suspended animation. Priorities will be given to determinations of viability in hundreds of biological cell samples taken from frozen whole organisms.

3. Cooperation with outside groups...

It is of natural importance for Alcor to enjoy the benefit of association with other organizations, societies and individuals having similar scientific objectives. Typically, such groups or peoples are engaged in life extension, preventive medicine, aging reversal, the low temperature sciences, mental and physical health, neurology and space technology programs in hibernation and suspended animation.

Alcor's research results will be coordinated with similar studies by others in whole organ storage for donor transplant, fetal organism freeze-thawing, and so forth. In this, Alcor expects to work closely with Trans Time, Inc. and Manrise Corporation.

As far as association with other cryonics societies, a close working relationship exists between Alcor and the Bay Area Cryonics Society in Berkeley, California. Similar associations will be sought with other cryonics societies striving to develop and maintain high standards.

ALCOR SYSTEMS OF OPERATIONS

Developing Alcor systems has taken the better part of the first year following incorporation in February 1972. In devising these systems the future had to be provided for while planning for the present -- logically, the future depends largely upon the flexibility and operational efficacy of the systems designs.

As a first step, Alcor engaged the cooperation and services of two mortuary facilities, providing a redundant 24-hour availability. Although the mortician and his staff have not been required to assume overall responsibilities, assistance and familiarity with the proceduees are an integral part of their involvement. More mortuaries will be taken into consideration to fulfill maximum geographical coverage as time permits.

As a second step in providing for effective Alcor operations, a communication network was planned and instituted. An around-the-clock monitoring system now provides for the protection of members at all times. This system involves a number of interelated elements, including radio-paging devices and membership identification bracelets.

Each new member in Alcor is issued a specially engraved bracelet. This bracelet gives a brief set of emergency instructions to the rescuer or finder of a member in distress, as well as the member's personal code number and Alcor's emergency phone numbers.

Hopefully, the phone call will be one of the first emergency actions taken by rescuers on the scene. Under most circumstances, the number directly connects the caller with trained Alcor Representatives (Working Members). If Alcor does not promptly answer the call, an emergency medical answering service does. The service operator follows special instructions in receiving and deciphering all calls taken; if the call is an emergency, the operator immediately contacts a paging service (radio transmitting station) which transmits a designated radio signal assigned only to Alcor. Portable receivers carried by members of the Alcor rescue team then emit audio beeping sounds. Each team member carring a paging receiver calls the answering service as quickly as possible and is connected into a "conference call" with the person at the scene. Emergency procedures are explained to the caller and assignments are given to team members.

Presently, three paging devices are carried "on-person" at all times; radio coverage extends over approximately 3000 square miles. Alcor can be alerted and a rescue team with emergency equipment dispatched within minutes of receiving a call. At this time, short of equipping each Donor with a emergency transmitter, a maximum communication capability is in being.

The beeper-bracelet communication system has been planned to accommodate growth on a national scale by extending services to members of other cryonics

societies. In response to this type of emergency call, Alcor would contact the appropriate people anywhere in the United States. The bracelet bearing membership code number facilitates this endeavor in indexing such vital information as member's name, his organization, and the emergency team to be contacted.

The success of an emergency communication system relies heavily upon a qualified emergency rescue team; this is one of the principal purposes of Alcor's Training Program and the Working Membership classification, the next system to be discussed.

Training and qualification of members for responsible roles is a major Alcor system. As previously stated, each member may attempt to qualify for Working Membership by completing the Alcor Training Program. Annually given, it is a four part course educating the member in all phases of administering emergency aid and the procedures for inducing solid state hypothermia.

The first part of the course is primarily concerned with life saving techniques. It covers standard first aid, advanced first aid and cardiopulmonary resuscitation taught by qualified Red Cross and Heart Association instructors.

In part two, training concentrates upon the many facets of cryonics rescue, including sustained cardiopulmonary resuscitation (perhaps over many hours following death), external body cooling, and legal procedures for protecting the member.

Part three of the training course includes learning Phase I of the actual procedure for inducing the low temperature state, and developing the skills for using all applicable equipment. The student will be aided by a detailed instruction manual which contains a thorough and up-to-date treatment of all procedures for inducing solid state hypothermia in humans.

The final part of the course trains the student in all the sophisticated aspects of Phase II (sub-zero) perfusion and the transition to extremely low temperatures for long term storage. This and all parts of the training program will be taught with visual aids, actual rescue equipment, and perfusion apparatus with simulated (hydrodynamic) models.

The student who successfully completes this training program, as evaluated by standards set by the Alcor Board of Directors, becomes a Working Member and is qualified as an Alcor Representative. From that time forward, assuming he maintains the qualification, he is able to assume full responsibility for rescue and other procedures required in cryonics operations.

The completion of Alcor's emergency systems is providing for a fully equipped emergency vehicle. This unit will be a mobile laboratory in every respect, equipped for rescue procedures as well as all operations required

in the induction of solid state hypothermia. For example, capabilities will include mechanical heart-lung resuscitator, electrocardiograph, telemetry systems, and other medical equipment consistent with the qualifications of Alcor's rescuers. Cryonics related instrumentation will provide for remote monitoring of temperature at many points, automatic determination of pH, conductivity, and specific gravity in perfusates. Controlled temperature cryogenic environmental chambers, heat exchangers, and other apparatus will be incorporated into the vehicle. The objective is the most complete cryonics capability possible in a mobile unit.

THE FUTURE

Alcor represents today, 1972, the organization not just seeking the funds to buy and equip their own emergency vehicle and gain more research space, but rather, the organization having the functional intention to gain the technological insight needed in the induction of solid state hypothermia. The tangible realism of this intention is admittedly far reaching, however, Alcor does ascribe to the unlimited application of man's scientific brainpower in control of his universe.

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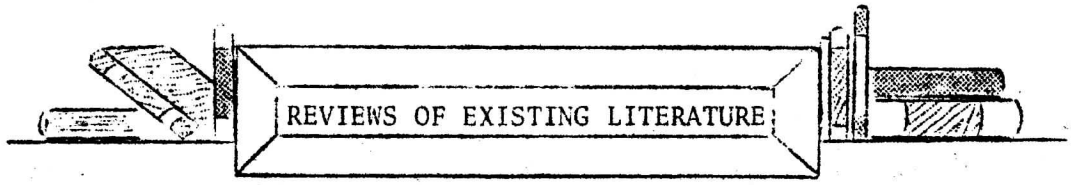

frozen embryos -- living mice

The August issue of MTR (volume 2, number 4) carried a news release from the Los Angeles Times which reported the successful use of frozen and thawed mouse embryos for artificial insemination of (mice) foster mothers. A more detailed report was published and is reviewed below.

["From Frozen Embryo to a Full Life", Medical World News, Nov. 10, 1972.]

Drs. Peter Mazur and Stanley Leibo of Oak Ridge and Dr. David Whittingham of Cambridge University in England have successfully produced living, healthy animals from frozen mice embryos (2-8 cells) developed in foster mothers.

Approximately 3000 embryos were frozen in 7% DMSO with a phosphate buffer. Ten to 20 individual tubes containing the pre-washed embryos were frozen for up to 8 days at temperatures of -80°C, -196°C, and -269°C. The optimum temperature, "the researchers found, was -196°C, and the best cooling rate a drop of less than 2°C per minute". Thawing was carried out at velocities ranging from 4°C/min. to 200°C/min. The optimum thawing rate was found to be 4°C or 5°C/min. During thawing phosphate buffer was again added in stages "to reduce the concentration of DMSO gradually to avoid toxicity from the chemical".

After being thawed, 2500 embryos were cultured in petri dishes to monitor survival rates. 360 embryos were emplanted into foster mothers, each receiving six to eight embryos. 1800 of the cultured embryos developed into blastocysts; 598 of these were also implanted. 621 embryos in all were implanted into 118 female mice. 65% of the female mice became pregnant; 267 embryos developed into fetuses.

57 of the fetuses were permitted to be born spontaneously while 210 fetuses were surgically removed three days before delivery in order to perform intensive laboratory tests. The results of laboratory analysis found "no difference between these mice and those normally conceived".

"Percentage wise", states Dr. Mazur, head of the research team, "the number of 'takes' was the same as would be expected if they had been implanted without freezing. Once the pregnancies started, they continued as though they were the products of natural conception".

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hypothermia and infant heart surgery

Successful open-heart surgery in infants has increased in the last several years. Developments in using "profound hypothermia" (above 0°C) and circulatory arrest have been major contributing factors. The heart of an infant is very small and difficult to operate on. These techniques increase the amount of time available to the surgeon.

["Cold War on Infant Heart Defects", Medical World News, Nov. 10, 1972.]

In this article, sixteen physicians give their views on the techniques of using profound hypothermia and circulatory bypass for correcting congenital heart defects in infants. The purpose of these techniques is to obtain "ideal operating conditions with a still, bloodless, relaxed heart".

The methods of the various teams differed slightly from group to group. Some groups used primarily surface cooling because it was felt that when the heart-lung machine induced "core cooling", capillary shutdown can result and bring about "uneven tissue temperatures and increased metabolic acidosis".

The surgical method of "inducing profound hypothermia", used by the team at Green Lane Hospital in Auckland, New Zealand, involves "surface cooling of the anesthesized patient on a circulating water blanket. At the outset, bags of crushed ice are packed around the child, and over the next hour or so, the nasopharyngeal temperature is monitored in its downward drift. At 24°C, the ice bags are removed and the chest opened."

Input and output tubes are inserted into the heart. These tubes are then connected to the heat exchanger of a pediatric heart-lung machine. "If the surface cooling does not bring the temperature down to 22°C, the pump completes the task". The pump is also used in the rewarming process after the surgery is completed. The surgery itself takes 30 to 45 minutes in most cases.

Brain damage is discussed as it relates to (a) prolonged circulatory arrest, and (b) effects of hypothermia on neural tissues. Dr. Robert White, Director of neurosurgery at Cleveland Metropolitan General Hospital and Professor of neurosurgery at Case Western Research addresses these questions.

Dr. White generalizes by saying "cold retards metabolic activity, and with deep hypothermia, the brain's oxygen and glucose needs decline." In more specific terms, he says, "with body temperatures lowered to 18°C, a baby's brain might escape damage for a half hour, and at 14°C, it might survive for an hour". Obviously, these estimates are conservative, as reflected by the experience in Auckland cited above. As to the question of low temperatures injuring the brain, Dr. White states, "In studies with psychologically trained monkeys, his team is finding that temperatures can be dropped as low as 5°C without injuring the brain".

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anatomical thermostat

The Navy, in attempting to protect its personnel from extreme temperatures, developed a chemical means of altering body temperatures. Further implications of this development are reduced surgical risks (lowered body temperatures), and help in fighting certain infections (raised body temperatures). Lowering the body temperature of terminally ill cryonics donors might reduce cellular deterioration taking place before SSH procedures begin.

["Changing the Body's Temperature", Random Developments, Industrial Research, October, 1972.]

The hypothalamus, located at the base of the brain, regulates body temperatures. A "normal" and unchanging "set point" is determined by the balance of calcium and sodium ions in the hypothalamus. Although the set point

remains stable, body temperatures do vary when upset by such factors as exposure to cold or infection. The body continually attempts to maintain temperatures equal with the set point through mechanisms like shivering, sweating and so forth.

Perfusion techniques have been used to vary the calcium/sodium balance within the brains of experimental animals. An increase of calcium ions results in lowered set points whereas increased sodium ions result in higher set points. The highest temperature reached was about 43°C (109°F) and the lowest about 31°C (87.8°F).

One animal was kept at low temperatures (specific temperature not stated) for several days by using continuous perfusion. In most cases the new set points were maintained for an average of 12 hours. Tests were conducted to determine whether the chemically altered set points would hold. In all cases, the new set points remained stable.

This article forecasts the eventual use of temperature control by physicians through simple injections or maybe even by giving the patient a pill.

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geriatric pharmaceutical under study

Does procaine hydrochloride retard the aging process? This controversy has existed since 1952 when Dr. Anna Aslan first began an investigation of this drug at the Institute of Geriatrics in Bucharest, Romania. A California pharmaceutical firm is seeking FDA approval of a compound containing this drug, Gerovital H3, which is presently being sold in Europe.

["Small Firm May Have Aging Answer?", Western Financial Journal, volume 5, number 3, March, 1972.]

Studies published by Dr. Aslan concluded that treatments of procaine in aged patients resulted in "increased energy, vitality and a positive influence on the central nervous system".

Procaine hydrochloride, when injected into a biological system in pure form, breaks down rather quickly; this diminishes the effectiveness of the

drug. To provide for longer durations of effect, a new compound called Gerovital H3 was developed. It reportedly remains stable after injection.

Rom-Amer Pharmaceuticals, 233 S. Beverly Drive, Beverly Hills, California 90212, has undertaken to finance studies in this country to "develop acceptable evidence, under government regulations, relating to the safety and effectiveness of Gerovital H3 injections and tablets as a new drug for use in reducing and slowing down some of the deteriorative aspects of aging."

These studies, depending on the results, could lead to the approval of the Food and Drug Administration (FDA). The study results could also help resolve widespread disagreement in the medical and scientific community concerning the effectiveness of this drug.

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FORUM

Question: In paragraph 61.1 of the manual, you refer to clearing "all substances (solid and liquid) using a stomach pump.....". We question the practicality of getting the solid constituents out this way. Also, in 61.4.1 mention is made of both aspirator tubes and respiratory tubes being used at the same time. Is that even possible?

Answer: Getting out all the solids may not be practical. We should indicate this in revising the manual. As to "double-tubing" the patient, an intubation accessory (giving good visability in the area of the epiglottis) should make this relatively simple. If difficulty is encountered, the stomach purging operation could be postponed until after artificial ventilation is discontinued.

Question: In the manual's paragraph 61.4.1, the "drilled cork" doesn't seem like a good idea. Getting out solid matter is very difficult, as things are, and any sealing will make it practically impossible.

Answer: The idea was to try to do several things at once, principally, to monitor rectal temperatures, purge the intestines, and do it without an uncontrolled flushing of waste to the surrounding area. The question of even the advisability of clearing the lower tract is not resolved; it may turn out to be of minimal benefit from a standpoint of minimizing damage and we may eliminate the procedure. Further, even if the overwhelming opinion is finally that the intestines should be purged, considerable trial and error will probably be involved with devising the most practical and effective methods.

Question: We've never inserted these bladder catheters. If there's any trick to it, you'd better give some instructions in the manual (61.4.3) here.

Answer: Since catheterization is typically done only to living persons, there may be new difficulties in its use post-mortem. As far as we know, no one has ever used this procedure in a cryonics context to date. Strong arguments pro or con on this and other purging operations have not been offered yet, by biologists, M.D.'s, etc. Some have recommended that purging be performed, and purging is therefore included on this somewhat preliminary basis.

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BACK ISSUES

VOLUME 1 - NUMBER 1 (September, 1971)

ORIGINAL ARTICLES

"Brief History and Overview of Methods Used for Induction of Solid State Hypothermia (SSH)", L. L. Chamberlain, F. R. Chamberlain.

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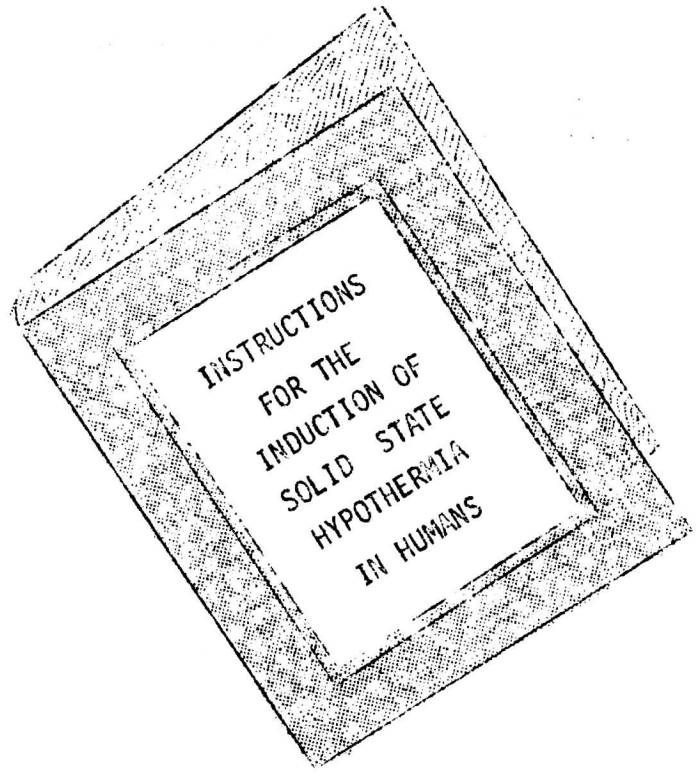

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