CRYONICS

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Contents:

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Editorial Matters

CRYONICS has grown in both volume and scope beyond our original expectations. Recently it appears that it may have grown more than justified by the markey it serves. Lately the Bay Area Cryonics Society (BACS), our largest group subscriber, voted to make subscriptions to CRYONICS optional with its members, and to stop buying extra copies for information requests. What this means is an almost immediate decrease in revenue for CRYONICS of about 30%. Alcor, our other large subscribing group, has experienced reductions in its mailing list and is also purchasing fewer copies. Therefore it is certain that our cash flow will be reduced in the coming months.

To be practical, we will have to alter the quantity and scope of our coverage in the immediate future. It may mean fewer feature articles, and it certainly means a shorter average issue length, with double issues (which we were putting out about every four months) becoming rare or non-existant. This is unfortunate since we already find it necessary with almost every issue to eliminate or postpone written work from our contributors which is, in our opinion, both high quality and important to anyone with a serious cryonics interest. We are sorry for this cutback, but the deficit we operate at cannot significantly exceed the $50 per month it is running now. We hope you will bear with us during this transition, and we will make every effort to reach more people and broaden our subscription base. If we have some luck to accompany the work involved in attracting more subscribers, perhaps no parmanent cutbacks in the nature of our newsletter will be necessary.

If you enjoy CRYONICS as it is now, you can help by doing two things: renew your subscription when the time comes, and encourage others you know who may be interested to subscribe. Even with our own best efforts, we need your help!

Cryonics Conference in Los Angeles????

The excellent Cryonics Conference hosted by the Chamberlains last Labor Day Weekend was enjoyed and appreciated by virtually all who attended. Unfortunately, the Chamberlains have said they will not be able to repeat the effort this fall.

The idea has surfaced to have a similar meeting in the Los Angeles area instead. This could acquaint members of the Northern California groups with the organizational and physical changes that have occurred (or will occur by then) for both Alcor and Cryovita.

IABS is willing to host such an event, provided that there is sufficient interest to warrant the effort and that participants are willing to pay a registration fee to allow us to rent the necessary meeting space. A likely date would again be Labor Day weekend, and a tentative schedule might include a reception at the home of a local cryonicist, general business meetings of the groups involved, a tour of the facilities at Cryovita Labs (which have undergone considerable change recently), and a day of ethical and legal panel sessions hopefully involving participants from all cryonics groups in the U.S. The following Monday could hold a visit either to Disneyland, Knotts Berry Farm, or any other local site we hear interest expressed about. If we receive enough encouragement as a result of this suggestion we will pursue locating a conference room and making inquiries about motel rates in the Orange County area. Please, let us know if you would be interested in coming to such a meeting.

Trans Time Raises Whole Body Storage Rates

At the March board of directors meeting of Trans Time, Inc. a resolution was passed to raise the annual fee for whole body storage from $2,600 to $2,900 per patient per year. Charges for neuropreservation donors were left unchanged.

The $300 increase in yearly whole body storage charges comes on the heels of the previous increase of $200 which went into effect several months ago. Members of the various nonprofit groups who have suspension arrangements with Trans Time as the subcontractor should be mindful that they will have to increase their life insurance, trust, or other financial arrangements to accommodate the increased yearly storage charges. For example, the new charges call for a whole body suspension client with financial arrangements of $75,000 (the current minimum recommended by Trans Time) to increase those arrangements to $80,000, according to Art Quaife, president of Trans Time. It is also important to note that this is the minimum required to satisfy yearly storage fees. Obviously, unforeseen circumstances could result in a smaller trust fund than was expected being present to start out with (legal bills, difficulty involving expense in recovering or shipping the patient after death, and so on). Needless to say, this leaves unconsidered the contingencies of inflation, adverse economic climate and increases in costs of an unforeseen nature.

Art Quaife also stated recently that even this rate increase does not put Trans Time on a breakeven basis as the operation is currently structured. Trans Time will thus likely be increasing the rates for yearly storage to a significant extent again in the foreseeable future. Individuals covered by Trans Time who wish to avoid frequent and time consuming adjustments in their insurance or trust arrangements should take this into account when deciding on the amounts they will have to set aside for long term care.

IABS Acquires Multi-Patient Storage Dewar

On the weekend of February 21 Allen Lopp and Mike Darwin drove to Houston, Texas to pick up a used Minnesota Valley Engineering A-8000 cryogenic storage dewar which IABS has purchased. The dewar is a liquid nitrogen storage vessel of rugged stainless steel construction which has the capacity to store five human neuropreservation patients. The dewar offers outstanding economy when fully occupied. The dewar will be used in the interim as a back up storage unit for both research and clinical material currently being stored in the MVE 2542 at Cryovita Laboratories. We are very pleased to have the dewar, and believe that it offers us an extra margin of safety in caring for any donors which IABS may accept and will additionally allow maximum flexibility in pursuing commercial services for patient storage. Thank you to all the donors who made the purchase of the dewar possible.

"And can we, in heaven's name, call anything
human long? Grant the very latest term of life;
suppose we reach the age of the king of Tartessus---
it is recorded that Arganthonius of Cadiz ruled
eighty years and lived a hundred and twenty---
still nothing that has an end is long."

Cicero

LETTERS TO THE EDITORS

Dear Editors,

I enjoyed Stephen Bridge and Michael Darwin's article, "The High Cost of Cryonics." I hope that it will stimulate questions and other commentary. In increasingly difficult economic times, the costs of necessities become paramount concerns. Most of your readers probably consider cryonics to be a necessity. I hope all of us can afford to pay the actual cost of cryonics in the future. I would like to take this opportunity to comment on some parts of your article and add some thoughts of my own concerning the high cost of cryonics.

Perhaps your readers will identify me as an advocate of applying high technology to the field of cryonics. I am responsible for increasing the cost of cryonics by requiring the use of modern medical techniques at Cryovita Laboratories. It is not surprising that the advocates of using high technology are generally represented as individuals who have backgrounds in biology, medicine, or technology, while those who are willing to use lower technology are businessmen or organization men, who are market oriented and cost conscious. These kinds of differences are to be expected, considering the expertise and orientation of these two factions. Ideally, neither the technical nor the business practices of cryonics should remain unchallenged. We should strive to keep an open and free dialog going between these points of view that exist within the cryonics community. Both have something of value to offer toward achieving a common goal: survival. The biologists and businessmen in cryonics should not be in conflict, since we share a common goal; however, the need for increasing technology cannot be understood in terms of dollars and cents. The demand for technology can only be delineated by reference to medicine and cryobiology.

Biological viability--survival--can be affected by our use of technology. My use of supplies for suspension cases can be supported by reference to documented evidence from the biomedical literature. The use of a particular drug or device must be supported by the evidence and the criteria for dissuading us from its use for suspension patients cannot be based on the fact that it will cost $12.50 more. Cryovita Laboratories sells most of its supplies used for suspension patients at or below actual market value. This may be contrasted with hospital practices, where typical markups are 100% of purchased price. The criterion for increasing costs is the attempt to increase cell viability--again, survival. The attempt to increase survival is what makes cryonics a viable business and prevents it from being a fraud. The "good" which we want to achieve is survival; therefore, both the "good" business practice and the "good" biomedical practice are bound by the same limits. In cryonics, good biology is good business.

There is one form of argument concerning the high cost of cryonics that was laid to rest in the early days of cryonics, before technology was applied. Apparently it has been exhumed for these difficult economic times. In its explicit form the argument states: "Increased costs for cryonics services will discourage new memberships in cryonics organizations and thereby threaten the long range success of cryonics. Therefore, it is permissable to give minimal treatment and storage, at lower cost, to insure the long range economies of scale that will follow increased suspension memberships. Economies of scale will make the appropriate high technology affordable to future suspension patients." In other words, today's suspension patients should be used to subsidize tomorrow's suspension patients. However, the subsidy is too high and no one should be asked to pay this kind of subsidy.

If cost was the primary factor determining the acceptance of cryonics, then cryonics should have been more of a success in the early 1970's when costs were unrealistically low. The increased costs of today's high technology suspension should have caused a diminishing suspension membership. In today's setting the least costly cryonics program, offered by Cryonics Institute (CI), would be expected to have a larger suspension membership than the higher priced program, such as offered by Bay Area Cryonics Society (BACS). However, just the opposite is true today: BACS has 290% more suspension memberships than CI. Trans Time, Inc., a company providing high technology suspension services, at greater cost than CI, has responsibility for 475% more suspension members and is currently maintaining 600% more whole body patients than CI. Based on current statistics, it would seem that members of the cryonics community have elected to purchase a perceived higher technology cryonics, in spite of the higher costs. There are more people signed up for cryonic suspension today than ever before.

Whatever level of technology one chooses to pay for, in terms of perfusion and storage, I think everyone signed up for cryonic suspension expects to be perfused with a cryoprotective agent and maintained in suspension at liquid nitrogen temperature. Any organization advertising "full suspension services" should be able to provide perfusion and storage services, or have a contract covering all their members with someone who can provide those services. It is too late, in terms of good patient care, to aquire equipment for perfusion or storage after the death of a suspension member. In Part 2 of "The High Cost of Cryonics" (CRYONICS, February 1982, p. 8) you quote Bob Ettinger as saying, "CI members...need not fret about liquid nitrogen storage in case of death before the unit is ready." (The "unit" referred to here is not yet developed, in terms of their design goals.) "Liquid nitrogen storage will be provided for any member with a fully executed, operational contract... if necessary, by preparing an emergency unit of lesser efficiency or by buying or renting a commercial unit." CI does not have liquid nitrogen storage capability. Liquid nitrogen storage of patients in instantly fabricated, home-made dewars that have never been built before on the scale intended, much less tested, is inviting disaster. The reference to buying or renting a "commercial unit" is unclear. If by "commercial" Ettinger means the manufacturer or vendor of cryogenic dewars, then I must warn him that neither of these sources rent dewars. The manufacturer of the only proven system for whole body storage, Minnesota Valley Engineering, has refused to provide additional dewars for use in cryonics. This means some manufacturer will have to be located to build a custom unit it has never built before, without the benefit of the confidential design specifications from MVE, and do a perfect job the first time. Past experience has shown that it would require about a year to take delivery of a unit aquired in this fashion. Additional time and money will be required to test a new unit. If by "commercial" Ettinger is referring to a unit belonging to a commercial cryonics company, then he will have to go to Trans Time, the only company with dewars capable of whole body storage. Trans Time is not willing to sell or rent its dewars. Trans Time will provide storage at their Emeryville facility by contract. Cryonics Institute can provide lower cost storage by using volunteer labor, but this savings will be lost if it uses commercial cryonics services. There is inadequate funding for CI patients to be stored at commercial storage facilities. A storage

unit purchased by CI now could provide them with immediate storage capability and a back-up unit when they have developed, constructed, and tested their own unit. It is also highly likely they could sell a two-patient dewar at cost if they wanted to liquidate it at a later date. Therefore, it would seem prudent for CI to purchase a two-patient dewar, both in terms of the savings it would achieve by not paying the cost of commercial storage and by avoiding the prospect of no immortality, should an instantly fabricated unit fail.

The actual cost of cryonics is not being paid by most cryonic suspension members. The costs not being paid are development costs, the costs of research needed to test and improve current techniques. Normally an enterprise pays for its research and development (R&D) out of profits. Since no one is making a profit from a cryonics enterprise, most R&D is paid for by a few who can afford to donate extra money to research and, I might add, by a few who can't afford the donation. Last year I gave $15,000 of my own money to Cryovita Laboratories to support all aspects of its operation. The main purpose of Cryovita is research in low temperature biology, including suspended animation. Michael Darwin and I are currently doing research, using animal models, to improve perfusate designs and perfusion protocols. This work will be published in CRYONICS at a later date. Most of this research is paid for out of our own pockets. I would like the cost of cryonics to be lower, but I would also like to see cryonics break even in terms of the actual costs. The fact is, most members of the cryonics community are paying less than the market value of what they are receiving.

Sincerely yours,
Jerry D. Leaf, President,
Cryovita Laboratories.
President, I.C.E.
Director, T.T. Suspension Teams.
Research Associate, UCLA Medical
School, Dept. Surgery, Div. of
Thoracic Surgery.
Not a professional perfusionist,
as reported in The Immortalist.

Dear Editors,

Saul Kent's stupid and vicious attack on the Cryonics Institute is the sort of thing I thought we had left behind. There seemed to have developed an understanding that we would agree to disagree, respect each other's viewpoints, and refrain from backbiting. If this is not so, if your passion for candor requires you to publish that kind of garbage, then relations between organizations may deteriorate.

Saul's drivel doesn't really deserve a public response; but some people may take him seriously, since he has been around a while--long enough to know better, and long enough to brag about his many failures--so I'll tick off a few points.

First, a reminder about history and motivation. CI was formed a few years ago by Michigan people who, after long watching the cryonics scene, reluctantly concluded that no previously existing organization was adequate, and we could improve our chances with our own organization.

This is still our feeling, and our only reason for existence. Certainly I personally don't need the work and worry; without CI, I could enjoy a very pleasant retirement...except for the prospect of senility and death for myself and those close to me. I am trying to do what needs to be done, in my best judgement, for both the near and more distant future.

Now a little on price. Saul doesn't "believe" that our use of unpaid help, our ownership of our properties, and other advantages can produce significant savings. But it isn't a matter of belief: a glance at an annual report from CI, compared with that from another organization, will prove it. Our reports are of course supplied to members and are available to prospective members. While the future is always in doubt, we have so far seen no reason to revise our price schedule and still hope to cut it back further.

Most scurrilous is Saul's warning that CI might experience a catastrophe comparable to that of Cryonic Interment, Inc. in California, with bankruptcy and thawed patients. This is pure libel, since it implies that in adverse circumstances we would use up our money, keep our membership in the dark, then go somewhere and hide. In fact, CI is the safest and soundest of all the organizations, with zero debt, a commitment to continued zero debt, and the tightest legal paperwork of any. Also, we accept no patients on a year-to-year basis, only fully prepaid. If finances somehow worsen, we will get higher prices or/and fall back to a lower level of services, with due notice; but we will not compromise the balance sheet.

As for CI's level of services and future services--members and prospective members interested in extra detail are welcome to visit, by arrangement, talk things over, and look things over. What it boils down to, in my opinion, is that CI offers the best buy and the best bet around.

Robert C.W. Ettinger, President
Cryonics Institute

Dear Robert,

Our editorial policy remains the same. We hope to provide a forum where problems of cryonics may be questioned and answered. We are not responsible for the views of persons writing articles or letters to this newsletter. However, we probably would not have printed a letter as accusatory as Saul Kent's if it had not come from him. Certain people have been involved with cryonics for enough years that their views deserve to be heard, whether we agree with them or not. Both you and Saul are among the leaders who should always have access to our pages.

Regarding the present controversy: our views remain unchanged from those at the end of "The High Cost of Cryonics." With no one dying, CI certainly has a major advantage in financial stability. What the situation would be if CI had several patients in storage cannot be predicted. Only time will tell. I for one do not believe that CI has any intentions of dishonesty or fraud. Whether or not CI's assumptions and philosophies will prove to be <u>correct</u> is still open to question. S.B.

Dear Editor,

In response to the various comments made about the Cryonics Society of South Florida, Inc. by the editors and contributors of CRYONICS, I would like to offer the following realistic appraisal of our group for the sole purpose of enlightening your readers to our attributes and deficiencies:

Like most cryonics organizations, our small group of fourteen suspension members consists mostly of people who have been actively involved for at least the last ten years in acquiring and improving cryonic suspension capability for the primary purpose of self-perpetuation.

We have been fortunate in that many of our members are affluent enough to contribute substantial amounts of money to our cryonics program.

One of our members purchased a five story office building and donated one floor for our new perfusion laboratory. The remaining floors will be used for other life extension purposes.

When we found that our suspension capability had become antiquated in relationship to the new techniques developed by Jerry Leaf, we proceeded to raise the funds necessary to upgrade our facilities in accordance with the current state of the art protocol. Our gratitude is extended to Jerry Leaf and Mike Darwin for the technical assistance they rendered us while we were setting up our new laboratory.

In our last fiscal year, we raised over $30,000.00 to finance the new laboratory. This year we will raise over $20,000.00 to complete it. We are only waiting on a few pieces of supplemental equipment to call our suspension facility "complete". Then we will proceed to train the suspension team on the technical procedures outlined in Jerry Leaf's suspension protocol.

Our suspension team will consist of 100% paid professional medically experienced personnel. None of our suspension members will participate in the perfusion process except for running errands and handling legal paperwork.

Of course, it would be considered ideal to have at least some cryonicists on the suspension team. Unfortunately, our members lack the time and expertise to train and perform state of the art perfusions. Since there are so few people in this area interested in cryonics, it could be a long time before someone like Jerry Leaf joins our group. A realistic view of our location and disposition dictates we continue to "pay" the members of the suspension team.

The advantage of using paid professionals is that these people work in the medical field and/or hospital operating room on a routine basis and can contribute years of technical experience to the perfusion process. The drawback to this setup is expense, and the fact that we can't expect every paid professional to act with the enthusiasm of a cryonicist. However, the medical people who have agreed to work on the suspension team do seem very excited about performing cryonic suspensions.

Our suspension facility truly resembles a hospital oper-

ating room in physical appearance. Functionally, we feel our capability is as close to Jerry Leaf's Cryovita Laboratories as possible.

We have no storage facilities or capsules and will depend on Trans Time, Inc. to provide long term storage until we develop an alternative.

Our current minimum price for a whole body suspension and perpetual maintenance is $75,000.00. Most of our members have over $100,000.00 of insurance coverage. Our initiation fee is $500.00, the annual dues are $100.00.

At this time, our members all reside in Florida. We anticipate signing up new suspension members in the Eastern United State and Europe once we attain full suspension capability since our proximity would enable us to begin the perfusion process much faster than if the patient were flown to California.

Anyone interested in further information about our group can write the Cryonics Society of South Florida at 6570 SW 47 Court, Ft. Lauderdale, Florida 33314.

Sincerely,
William Faloon
CRYONICS SOCIETY
OF SOUTH FLORIDA

Dear Editor,

In the article "RIP for RNA?" by Mike Darwin (CRYONICS--March, 1982), you tell your readers to "beware" of products containing RNA. Apparently, your primary reason for doing so is that the leading proponent of RNA therapy--Dr. Benjamin Frank died recently after making claims about the anti-aging benefits of this type of therapy.

The fact that Dr. Frank died from the complications of juvenile diabetes is no reason to condemn RNA products. Juvenile diabetes is a severe disease that generally leads to premature death. RNA therapy is clearly not a cure for juvenile diabetes. So far as I know, Dr. Frank never claimed that it is.

Further, your condemnation of products containing RNA was made without knowledge of the products to be offered.

It's true that we will be offering two products containing RNA, as well as two other products, in the near future. However, if you wish to evaluate these products, or the claims made for them, I suggest that you wait until after you know something about them.

We are offering nutritional supplements through the LIFE EXTENSION FOUNDATION for three reasons:

1. Because many of our members asked us to do so;
2. Because we believe that our products promote health and vigor;
3. Because we feel that the sale of such products can raise money for life extension research.

If any reader of CRYONICS would like to know more about the products we offer, or about any aspect of our program, please

write to: LIFE EXTENSION FOUNDATION 2835 Hollywood Blvd., Dept. C, Hollywood, Florida 33020.

For Longer Life,
Saul Kent
Hollywood, Florida

Dear Saul,

As you point out, juvenile diabetes is a serious illness with many complications. Perhaps it was unfair of me to indict Dr. Frank's diet solely on its ineffectiveness in preventing his death from complications attendant to his diabetes. Nevertheless, I feel it important to point out that Dr. Frank apparently never conducted any controlled studies to determine the effectiveness of either his diet or DNA/RNA products in extending the lifespan of either humans or animals. I know of only one study on the effects of nucleic acids on lifespan and this study employed six animals as the experimental population! This hardly constitutes enough evidence to draw any conclusions about clinical application.

I look forward to hearing more about the products your organization plans to market. I will particularly be interested in seeing the results of controlled animal and/or clinical studies on the impact of nucleic acids on lifespan and degenerative disease. M.D.

ALCOR LIFE EXTENSION FOUNDATION MAY-JUNE 1982 MEETING CALENDAR

1:00 PM - ALCOR Investment Club
3:00 PM - Regular ALCOR meeting

The MAY meeting will be at the home of:

(SUN, 2 MAY 1982) Eugene Hartnell
7801 Slater Ave. Apt. #1
Huntington Beach, CA 92647
Tel: (714) 847-0936

DIRECTIONS: Take Interstate 405 (San Diego Fwy) to Beach Blvd. (Hwy 39) in Huntington Beach. Go South on Beach Blvd. approx. 1-2 miles to Slater Ave. Turn right (West) on Slater. 7801 is less than 1 mile on the North side of the street.

The JUNE meeting will be at the home of:

(SUN, 6 JUNE 1982) Paul and Maureen Genteman
535 S. Alexandria #325
Los Angeles, CA 90020
Tel: (213) 386-2265

DIRECTIONS: Depending on the direction from which you are coming, take either Interstate 10 (Santa Monica Fwy) or Hwy 101 (Hollywood Fwy) and exit at Vermont Ave.
From the Santa Monica Fwy: Go North on Vermont approx. 2 miles to 6th St.
From the Hollywood Fwy: Go South approx. 1 mile to 6th St. Go West on 6th 4 blocks to Alexandria. Turn right on Alexandria. 535 is the first apartment building on the West side of the street.

THE CASE FOR NEUROPRESERVATION

by Michael Darwin Federowicz and Stephen Bridge

Cryonics companies offer two basic methods of cryonic suspension. The most commonly advertised type is "whole-body preservation," in which the donor's entire body is perfused and then suspended in liquid nitrogen. The recommended donation of funds for whole-body preservation by Trans Time (via BACS, IABS, Alcor, or other non-profit groups) is currently $75,000 with future increases likely. The second method is a comparatively recent development in cryonics procedures--"neuropreservation," in which only the donor's head or brain is suspended. The recommended donation of funds for neuropreservation is only $35,000 and, even though increases may occur, it is likely to remain less than half of the cost of whole body suspension.

It is a common reaction for people to be taken aback when first encountering the notion of neuropreservation. After all, in previous human history decapitation was always a very certain and frightening end to life, and several science fiction movies about disembodied brains have done nothing to improve the image. Still, when they have gotten over that first emotional response, many people may conclude that there are several very practical reasons to consider neuropreservation. For many people cost is a primary consideration as to whether or not they get involved in cryonics at all. This is especially true for people with family responsibilities. It is impossible to predict how high the actual cost of cryonic suspension may rise in the next few years. Clearly any alternative which can reduce the cost of this procedure, offer the benefits of conventional preservation methods, and not carry any disadvantages in respect to loss of memory and identity should be carefully considered.

Let us first point out that the odds that even whole-body methods will lead to future revival are totally unknown. In fact, with existing technology it must be conceded that the odds may be extremely low. There is much evidence that current freezing techniques, even with cryoprotectants, still contribute a great deal of injury to whole organs and presumably to human patients. It should also be noted that in the past most donors have not been presented for suspension immediately upon clinical death, as would be most beneficial, but instead have waited for hours or even days after clinical death, frequently without premedication, resuscitation, or controlled cooling. Even then the biological damage from pre-freezing delays and from freezing itself is only an addition to the ravages the donor's body may have already suffered from aging, disease, or accident. It is clear that artificial organs and other prosthetic devices will frequently be required for future revivals. In most cases massive repairs which call for alteration or replacement of nearly all of the body's cells may be necessary. Even the simplest of current suggestions for accomplishing these repairs are complex indeed (e.g., the "anabolocyte," a modified white blood cell which could appropriate the nuclear information of a damaged cell and build itself into a duplicate of the original healthy cell). Any sort of mass repair technique would require an extremely sophisticated technology and a nearly complete control over genetic material.

It seems very likely that the comparatively simple techniques involved in cloning will be perfected before the more complex cellular repair procedures. Frogs, mice, and several other animals have already been cloned and the basic techniques are fairly well understood. Social constraints and a relatively few minor technical developments are apparently all that stand in the way of human cloning. If the suspended body is badly enough damaged to require massive cellular repair, it seems sensible to suppose that future researchers would think it simpler to merely put the brain in a new body cloned from the donor himself. If the body is very severely damaged or if workable cellular repair methods are not developed, cloning may be the only alternative to keeping the patient in storage for hundreds of additional years. In any case, it does not appear that a neuropreservation patient will be at any disadvantage.

It is now almost universally agreed that the brain is the repository for all primary identity information (memories, response patterns, etc.). The preservation of memory and identity must be the first goal of any cryonic suspension, for the preservation of self is the primary reason for most donors' desire to be suspended. Thus the brain is the one structure which must be preserved if the individual is to have any chance of recovery. Luckily, a couple of recent discoveries make us more optimistic that the brain can be preserved. First, it has been discovered that the brain is much more resistent to damage, particularly at somewhat reduced temperatures, than was previously believed. Secondly, it appears that most or all of the brain's information is "redundant," that is, it is stored in more than one place in the brain.

One serious objection to preserving only the head of the donor is that in order to do this, it is necessary to sever the spinal cord. Until recently, it was an absolute that trauma or severing of the spinal cord would result in permanent paralysis below the point of the break. Although the problem is by no means solved, several recent papers (see "Spinal Cords Regenerated?", CRYONICS December 1981.) make it clear that spinal cord regeneration can occur in mammals with comparatively simple medical assistance. Apparently the main impediment to self-repair is the formation of scar tissue at the point of the break. In one research project at Texas A & M University, this condition was prevented by treatment with DMSO and hyperbaric oxygen, and mice with severed spinal cords were able to regain nearly complete function. This and other present research is very hopeful and indicates that spinal cord regeneration for humans is almost a certainty within a few years.

If that difficulty can be solved, there is a strong possibility that neuropreservation will actually be biologically superior to whole-body preservation. Different organs, and indeed different cell types, have radically varying requirements for cryoprotectants and freezing rates. Although nearly every type of cell has been successfully frozen and thawed, a technique which may work well for one cell type may be ineffective for or even destroy another type. Attempting to achieve good cryoprotection for a whole body demands that a number of compromises be made with respect to most of the cell types, including the brain. Additionally, the attention required to adequately treat the whole body may mean that less than adequate attention is paid to the brain. It would seem to make little sense to compromise the only organ which cannot be replaced. Developing procedures for treating the brain

alone would seem to increase the chances for the survival of memory and identity.

Finally, there are the financial and logistic advantages which neuropreservation has over conventional whole-body treatment. Cost alone is a huge factor. Materials cost for perfusing only the head can be expected to be only about 25% of the costs for a whole body, although personnel and equipment requirements are approximately the same. The reduction in storage costs -- the largest portion of cryonic suspension expenses -- is even more striking. Current estimates for whole-body storage containers (dual patient) for use with liquid nitrogen range from $8,000 to $25,000. Liquid nitrogen boils off from these units at about 5 liters per day per patient. Additionally, these containers must be made to order and typically have lead times to delivery of four to eight weeks, while the donor is being stored on dry ice.

In contrast, storage containers for heads are standard line items and may be purchased with little delay. Their cost is much lower, from $900 to $4,400, which permits purchase in advance of need and eliminates long delays in getting the patient's remains to LN_2 temperature. The $4,400 model is a unit which could store at least ten donors with an LN_2 boil-off rate of only ½ liter per day per patient, a savings of 90%.

Neuro-containers have other logistic advantages besides ease of purchase. Whole-body storage units are tall and massive and very difficult to move quickly in case of emergency. Putting a patient into or removing one from these units requires a crane, a large open space above the unit, and a lot of back-breaking labor from several people. In comparison, the smaller head-only units are more easily movable. They can even be strapped into the back of a pickup truck for transfer to a different building or city. Transfer of a patient from one unit to another is a quick one-person operation.

Despite the fact that the end result of the successful revival of a neuropreservation patient will be in no way different from that of a whole-body patient, many people balk at the idea. Aesthetic or emotional reasons may be primary with some people, while others cite concern over the loss of identity which may be possibly stored elsewhere than in the brain. Lack of confidence in the feasibility of spinal cord repair may result in objections. The social and emotional impact that this seemingly bizarre procedure may have on the donor's family deserves consideration as well. Certainly this is not a decision which should be made without long discussion and thought. However, we at IABS feel that the financial and biological advantages more than outweigh the social and emotional considerations. Besides, since you may have to have a new body cloned for your revival anyway, you may as well save on the storage costs. For these reasons, IABS at this time is willing to accept for suspension only those members who wish to be suspended with the neuropreservation method.

MEMORY AND NEURON LOSS IN ALZHEIMER'S DISEASE by Thomas Donaldson

Many of us must expect eventually to suffer some kind of senile dementia; of aged people over 65, about 7 percent suffer from Alzheimer's disease specifically. We can therefore be very interested in this condition. Alzheimer's disease, together with the other senile dementias, interests us as cryonicists much more than as simply one more of the many conditions we can expect to undergo before our suspension; Alzheimer's disease involves a loss of memory function and possibly even a loss of memory substrate, so that unlike other fatal condtions such as cancer, it may not merely cause our deanimation but also the actual erasure of our memories of our past lives.

As yet the exact loss of memory, or even whether this memory loss is a loss of function only as distinct from a loss of the stored memory traces, isn't yet known to any exactitude. However a very interesting paper in SCIENCE (215 (1982) 1237) has just presented some quite precise evidence on the type of neuronal loss which happens in Alzheimer's disease, evidence which not only gives us some further hold on what might be done about the problem but very importantly for cryonicists gives us better evidence that the memory loss in Alzheimer's disease is not a loss of the central memory trace but rather a loss of function.

Peter J. Whitehouse et al report their results of counting the neurons of one particular brain region, the nucleus basalis of Meynert. As readers may know, Alzheimer's disease is associated with a defect in acetylcholine usage in the brain . Since acetylcholine is one of the major nerve transmitters, we would expect severe brain derangements to follow. Whitehouse et al observed that the neurons of the nucleus basalis used particularly large amounts of acetylcholine, that they had connections directly to the cerebral cortex, and finally that destruction of similar regions in rats would cause a degenration in acetylcholine brain metabolism similar to that seen in human beings with Alzheimer's disease. They therefore undertook a direct count of the acetylcholine neurons of the nucleus basalis. In postmortem brains from each of 5 patients, all of whom had Alzheimer's disease, their count revealed a severe selective loss of the neurons of the nucleus basalis, with maximum cell densities reduced by 73 percent and the total number of neurons reduced by 79 percent. Furthermore, there was no overlap whatever between the control patients and the AD patients.

Whitehouse et al conclude that this specific loss of neurons underlies a good deal of the degeneration in the cerebral cortex of human patients, just as it does in rats. They point out also that the nucleus basalis, from analogous studies on animals, may play a critical role in integrating memory processes, and that they may control the speed of thinking and memory. While as yet we still lack any absolute proof that memory substrate survives in Alzheimer's disease, this work presents some strong suggestions that it does. For instance, loss of these particular neurons is unlikely to entail loss of the memory, since the memory is unlikely to be stored in the nucleus basalis. Loss of neurons in the cortex, which does occur in aging, doesn't come near to comparing in magnitutde with the loss of neurons from the basalis nucleus which Whitehouse and his coworkers have found, so that the continued existence of most neurons suggests that the memory defect may lie in loss of processing ability (through the loss of anatomical structures such as the nucleus basalis) rather than a loss of the actual substrate.

FURTHER UPDATE: PROPOSED LEGISLATION TO MODIFY UNIFORM ANATOMICAL GIFT ACT

Our efforts to have the California version of the UAGA modified to explicitly encompass cryonic suspension have suffered a setback. State Senator John Holmdahl, who originally agreed to introduce the legislation one year ago, has recently been named to the State Court of Appeals by Governor Brown. In a recent letter to Dr. Paul Segall, Senator Holmdahl states that in spite of his interest in sponsoring this legislation, his short remaining time in the Senate will prevent him from introducing and carrying the legislation through to conclusion.

This setback places us back to about Square 2. We are off Square 1 in that we have prepared amendments to the UAGA and other California statutes, precisely tailored to permit and encompass our cryonic suspension program. We now need to find another Senator or Assemblyman to sponsor this legislation. I have just contacted the office of State Senator Ollie Speraw, (Room 4082, State Capitol, Sacramento CA 95814) who has taken an avid interest in the Uniform Anatomical Gift Act, including holding two hearings around the state requesting input to improve the Act, and forming an advisory committee to recommend legislative changes. His aide Jack Germain told me that he thought the Senator could sponsor our legislation, after letting his advisory committee review it. This was a first conversation and not a firm guarantee, but we have placed him in touch with Senator Holmdahl's office for possible transfer of sponsorship of the legislation to Senator Speraw's office.

California residents can also contact their own representatives to support this legislation. Again I will be happy to supply a copy of our file of correspondence with Senator Holmdahl, including the draft legislation.

Art Quaife

When Billy was small
I sang to him
Of births & beginnings
Of new things coming
& Of course it was springtime

When he was a young man
I spoke to him
Of life & strength
Of things he needed to know
& Of course it was summer

When he was older
I whispered to him
Of endings & sorrow
Of joys he'd known as a child
& Of course it was fall

When he was old
I couldn't warn him
but he learned . . .
Of coldness & ice
Of death & his accomplices
& Of course it was winter

Kristen Leaf

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