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CRYONICS

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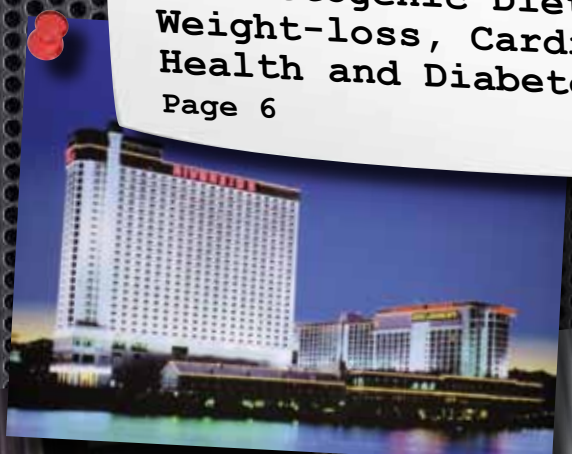

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CRYONICS

COVER STORY: PAGE 10

Society for Venturism End Death Convention 2014 Report Part I

For the second year in a row, the Society for Venturism organized an ambitious cryonics and life extension conference at Don Laughlin's Riverside Hotel and Casino in Nevada. Michael Perry contributes a detailed report which will appear in this magazine in two installments.

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CRYONICS

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QUOD INCEPIMUS CONFICIEMUS

Photo: Cryo-Care Equipment Corporation at 2340 E. Washington St., Phoenix, AZ. Dr. Bedford's "home" in 1970 or 1971.

DECONSTRUCTING FUTURE SHOCK By Aschwin de Wolf

There is a growing consensus in the cryonics community that for many people it is not technical feasibility but fear of an unknown future that makes them uncomfortable with the idea of cryonics. In fact, to some of them the future is not just "unknown" but they fear that by the time they will be resuscitated their skills and knowledge will have become obsolete, they will no longer own any assets, and worse, all their family and friends will be gone.

If we want to effectively counter these fears, or at least provide some reasons for optimism, we need to dig a little deeper into this issue. First of all, we should not treat all (potential) cryonics patients as a homogenous group. Someone who was cryopreserved in the mid-20th century will face a much longer period of non-participation in society than a young person who has just made cryonics arrangements and who will be cryopreserved at a time which is closer to when the first resuscitation attempts will be made. It should also be mentioned that the ease of adapting to a new society is itself a function of age. If history is any indication, younger people usually adapt more easily to a changing society.

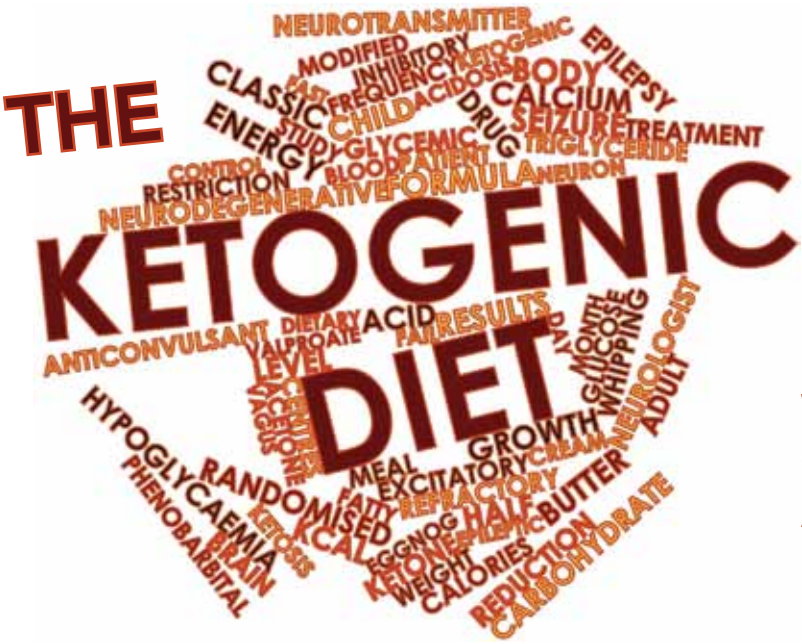
Which in turn draws attention to a much neglected point about cryonics. Cryonics patients will be resuscitated in a youthful state without the typical challenges and ailments that are associated with old age. We should expect a resuscitated patient to have at least the youthful vigor and brain plasticity of a young person, albeit with perhaps more "wisdom."

A credible cryonics organization will not have as its only mandate just to keep the patient in cryostasis but also to successfully rejuvenate the person and re-integrate him/her into society. It is important in our communication to emphasize that reintegration does not start after the person has been resuscitated but should start as soon as the patient has been placed in long term care. The person's assets can be managed in a trust and real estate can be maintained, or acquired, to ensure it will be up-to-date to the prevailing era's preferences and standards. If proper thought is given to this issue, the person should at least have access to a modern home and money in the prevailing currency of the time (if "money" as we know it has something like the same significance then).

The biggest worry, however, concerns the prospect of being introduced to an era with radically different morals, conventions, and forms of human interaction. There is a good reason to believe, however, that such changes might actually be quite modest. Our morality has been shaped over millions of years of evolution and it is not realistic to assume fundamentally different forms of morality will dominate in the next century, even if humans increasingly merge with technology. Also, humans have proven themselves quite able to adapt to radically different environments.

All this still assumes that the cryonics organization does not play a proactive role in the mental re-integration of cryonics patients. I think that the longer that cryonics organizations will be around, and the closer we get to a time where advanced molecular medicine is feasible, the more thought will be given to minimizing future shock for their patients. The aim of cryonics organizations is not just the restoration of a patient's physical health but also his/her mental health—and that implies minimization of stress and alienation.

And what about friends and family? Will they not be left behind? Well, I think the more assurance about the future a cryonics organization can provide for potential members, the lower the threshold for whole groups of people to make arrangements. It will be the person who does *not* make cryonics arrangements who makes the odd, solitary, decision. At that point, the human tendency to conform will start working in our favor. ■



PART 1:
WEIGHT-LOSS, CARDIOVASCULAR HEALTH AND DIABETES

By Carrie Wong

INTRODUCTION

As a part of the life-extension community, cryonicists have come across a number of different diets and lifestyles. Some of these diets may appear extreme to outsiders, for example the CRON diet (Calorie Restriction with Optimal Nutrition). Other diets, like the Mediterranean diet have reached public consciousness. Low carbohydrate diets have become popularized in the last few decades with the explosion of popular books like *Dr. Atkins' New Diet Revolution* and more recently, *Wheat Belly* or *Grain Brain*. Dr. Atkins' book sold 15 million copies and was a subject of controversy for many years because mainstream medicine rejected the idea that a high-fat diet could be healthy[1]. Most people have heard of the Atkins Diet, but they may have not heard the term "ketogenic."

The Atkins Diet is one form of the ketogenic diet. Generally speaking, the ketogenic diet (KD) is the first scientifically developed modern diet based on high-fats and low-carbohydrate intake, intended to put the body into a state of ketosis[1]. I intend to expand on what ketosis is in the body of this article. Most people undertake low-carbohydrate diets in an attempt to lose weight and there is a growing body of evidence to support this new dietary paradigm. The obesity epidemic is no trivial detriment to the health of millions, but there is emerging evidence that ketogenic diets (KD) have other life extending benefits. Within the cryonics community, there are a few well-known individuals who are on the ketogenic diet, including Ben Best and Parijata Mackey.

HISTORY

The ketogenic diet (KD) is well-documented in the medical establishment; it was originally designed in 1924 by Dr. Russel Wilder at the Mayo Clinic to treat epilepsy. It was highly effective for treating epilepsy until new anticonvulsant medications were introduced in the 1940s. Once these medications came on the market, the diet waned in popularity. The medical use of the KD decreased greatly and there were only a handful of studies published on this diet from 1970 to 2000[2]. However, there were a number of people who did not respond to the anticonvulsants. One of the patients who did not respond was a toddler named Charlie Abrahams, the son of Hollywood producer Jim Abrahams. Charlie had daily seizures despite trying all available medications and enduring a futile brain surgery. The Abrahams family discovered a reference to the KD in an epilepsy guide for parents and brought Charlie to the Johns Hopkins Hospital, which was still offering the KD as a therapy. After being put on the diet, Charlie's epilepsy improved greatly and he was able to continue life normally. This inspired his family to create the Charlie Foundation to promote the KD and fund research.

The KD achieved national media exposure in 1994, when NBC's *Dateline* television programme reported on the case of Charlie. With funding from the Charlie Foundation, a multicentre prospective study began that same year. The results of that study were presented to the American Epilepsy Society in 1996 and were published in the journal *Archives of Neurology* in 1998[3]. This media attention resulted in the resurgence of interest in the KD within the medical community and general public. The KD was established as highly effective in treating epilepsy and in some cases even more effective than many of the available anticonvulsant medications. In follow-up studies with children on this diet, it was found that there were some adverse effects including acidosis, hypoglycemia, gastrointestinal distress, dehydration and lethargy[4]. These effects were typically transient and manageable for most patients. For people undertaking this diet, it is important to consume enough

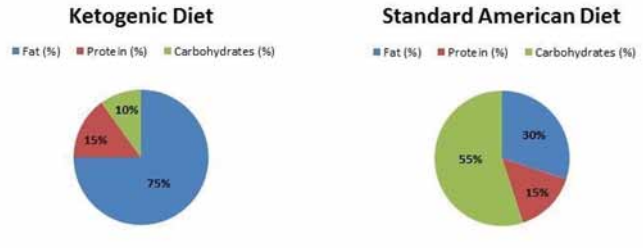


Figure 1: This figure shows a typical ketogenic diet breakdown by calorie percentage.

water and monitor nutritional intake. It is worthwhile to note that children are within a vulnerable developmental cohort and adults going on this diet would suffer fewer adverse effects, for example, slowed developmental growth would not apply. For children on the KD longer, adverse effects include significantly increased risk of kidney stones and dyslipidemia. Kidney stones frequently occurred to children on the KD but this risk was successfully managed with the oral intake of potassium citrate to alkanize the urine[4]. Notably, children who suffered from epilepsy at a young age who were on the KD for a few years remained seizure-free for long periods of time even after stopping the KD. Some of the patients were completely cured.

The KD started off as an effective treatment for epilepsy, but in the last few decades there has been emerging evidence for efficacy in treating other diseases. Some of these include treatment of neurodegenerative disorders like Alzheimer's, Parkinson's, autism and depression. Other studies have shown success in treatment of metabolic disorders like type 2 diabetes mellitus and polycystic ovary syndrome[4]. I won't be able to touch on all of the possible benefits of the KD in this article, but I will touch on a few exciting new findings. The KD is not without risks, but the benefits far outweigh the detriments of the diseases it has cured and the full potential of the KD has yet to be realized.

THE MECHANISM OF KETOSIS

The ketogenic diet (KD) is high in fat, supplies adequate protein and is low in carbohydrates. By restricting carbohydrates and supplying fat instead, this diet forces the body to burn fats rather than carbs for energy. Our bodies typically convert carbohydrates into glucose for energy or store it as glycogen in liver and muscle tissue. Glucose is particularly important in fueling brain function. However, if there is an inadequate supply of carbohydrates in the diet (typically below 50g per day), our bodies are able to adapt to burning fats. This only occurs after the glucose stored as glycogen in our liver and body are depleted. The liver converts fat into fatty acids and ketone bodies. These ketone bodies include β-hydroxybutyrate (BHB), acetoacetate and acetone. These ketones pass through the blood-brain barrier and replace glucose as the main energy source[5]. Ketosis is the metabolic state where most of the body's energy supply comes from ketone bodies as opposed to glucose. Ketosis is an extremely fascinating biological phenomenon. The idea that our brains could simply shift fuel sources entirely was quite a discovery for me.

The use of ketone bodies is not uncommon during human development since they are a primary postnatal source of energy. Ketone bodies contain greater stored energy than glucose, and ketones (especially acetone) are the preferred substrate for the synthesis of neural lipids. It is hypothesized that the effective use of ketone bodies stabilizes cellular membrane potential. The combined effects of enhanced fuel efficiency and increased mitochondrial reserves may explain the neuro-protective properties of this diet.[6]

BENEFITS OF THE KETOGENIC DIET

Weight-Loss

There is an obesity epidemic in North America and the direct cost of this disease to the healthcare system will be astronomical. This is not even mentioning the years of healthy lifespan lost and the economic impact of opportunity cost due to disability from obesity. Healthcare professionals point to a variety of reasons why people are gaining weight, from epigenetics, sedentary lifestyle to simply eating too much. Although there may be merit to a number of different approaches, the ketogenic diet (KD) offers a relatively easy solution. There have been numerous personal accounts from people who swear by their low-carb diets. The scientific community is starting to tally the results of the KD and have come to some favorable conclusions.

In a systematic review with meta-analysis in the British Journal of Nutrition, it was found that very-low-carbohydrate ketogenic diets (less than 50g of carbohydrates), were more effective at long-term management of obesity than the low-fat diet[7]. These researchers (Bueno N.B. et al. 2013) went through 3,123 potentially relevant papers and only found twenty-five that met the basic criteria: randomized controlled trials that assigned adults to a very-low-carbohydrate ketogenic diet (VLCKD) or a low-fat diet (LFD) with 12 months or more of follow-up. From the initial twenty-five publications, twelve were excluded after full-text analysis. The remaining thirteen studies with a total of 1,415 patients were included in this quantitative meta-analysis.

The primary focus of this meta-study was weight outcome (1,415 patients), but secondary outcomes were also examined including postprandial triacylglycerol, HDL-cholesterol, LDL-cholesterol, systolic and diastolic blood pressure, glucose, insulin, HbA and C-reactive protein levels. The last few secondary outcomes (glucose, insulin, HbA and C-reactive protein levels) were examined in less than ten of the studies and did not show statistically significant results. In summary, the researchers found that patients assigned to the VLCKD achieved greater long-term reductions in body weight than patients assigned to the LFD. Furthermore, this paper makes reference to two other meta-studies which confirm the superior weight outcomes on the KD[8,9].

Cardiovascular Benefit

In the same systematic review with meta-analysis in the British Journal of Nutrition, secondary outcomes were also examined including postprandial triacylglycerol (1,258 patients), HDL-cholesterol (1,257 patients), LDL-cholesterol (1,255 patients), systolic and diastolic blood pressure (1,298 patients)[7]. Postprandial triacylglycerol (TAG) and diastolic blood pressure decreased significantly with patients on VLCKD. HDL-C, "the good cholesterol," increased under VLCKD. This is a promising result for those who fear a high-fat diet would lead to cardiovascular disease. However, there was also a greater increase in LDL-C levels over a treatment follow-up period of 12 months or more. One very short-term study shows that high fat with carbohydrate restriction raises the level of larger LDL-C particles which are less harmful than the small and dense LDL-C[10]. In another small study focusing on the KD's effect on biomarkers for cardiovascular disease, researchers found favorable results[11]. In this study, there were significant decreases in TAG, postprandial lipemia and fasting serum insulin. LDL-C levels were unaffected while HDL-C increased on the KD. In subjects with a predominance of small LDL-C particles, there was a significant increase in mean and maximum LDL particle diameter size.

According to a number of recent studies and meta-studies, the KD does not appear to pose a cardiovascular risk in the short-term. In fact, these studies suggest there are improvements in biomarkers for cardiovascular disease overall. These findings are in direct opposition to the mainstream advice of avoiding fats to lose weight and improve cardiovascular health.

Cardiovascular disease is the number one cause of death in North America and the typical American high-carb diet is not solving this problem.

DIABETES TYPE 1 & 2

As a result of the research being conducted on controlling obesity, the ketogenic diet (KD) has started to be used to treat type 2 diabetes mellitus. Reasonable weight control is required in effective diabetic management, and in the previous section I covered how the KD is more effective at weight-management than the LFD. There haven't been extensive meta-studies conducted on the KD's efficacy in managing diabetes type 2, but I will cover some very interesting recent results.

Researchers (E.C. Westman 2008) compared the effects of the very-low carbohydrate ketogenic diet (LCKD) less than 20g carbohydrates per day) and the calorie-restricted low-glycemic index diet (LGID)[12]. Initially there were 97 randomized potential participants, but a number of them did not complete the study or failed to follow the diet. A total of 21 (55%) participants completed the low-carb ketogenic diet (LCKD), while 29 (63%) participants completed the low-glycemic index diet. Both diets resulted in the following measurements: fasting glucose, hemoglobin A_{1c}, fasting insulin and weight-loss. However, the LCKD resulted in greater improvements in hemoglobin A_{1c}, body weight and HDL cholesterol. Diabetes medications were reduced or eliminated in a whopping 95% of patients on the LCKD compared to 62% of the LGID[12]. Surprisingly there was greater weight-loss on the LCKD despite the LGID participants consuming significantly fewer calories. Participants on LGID had a 500kcal per day deficit from the calories required for weight maintenance.

Another recent study (T.A. Hussain 2012) was conducted to compare the low-carbohydrate ketogenic diet (LCKD, to a low-calorie diet (LCD) for the treatment of obese patients. There were 363 obese patients recruited for a 24-week diet intervention and 102 of them had type 2 diabetes. The results were not randomized; the participants were able to choose either LCKD or LCD. Body weight, body mass index, changes in waist circumference, glucose level, changes in hemoglobin and glycosylated hemoglobin, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglycerides and other biomarkers were determined before the diets. These metrics were also re-measured every 4 weeks for a total of 24 weeks after the administration of the diet. Although the LCD improved the measured metrics, once again the LCKD was significantly more effective in eliminating body-weight, improving body mass index and changes in waist circumference. The blood sugar levels decreased in both groups, but it was greater in the LCKD group. The researchers were surprised to see the glycosylated hemoglobin (HbA_{1c}) levels change favourably for patients on LCKD in such a short period of time. HbA_{1c} levels show how well diabetes is being managed overall by providing blood glycation levels typically over three months. Once again, LCKD improved the overall lipid profiles more than LCD: there was a decrease in the level of triglycerides, total cholesterol, an increase in HDL lipoprotein and decrease in LDL lipoprotein.

Diabetes Mellitus Type 2 is reversible with the right diet and lifestyle. So far I have made the case that the ketogenic diet is more effective than even a low-calorie diet. Low-calorie diets are grueling for obvious reasons, the patients undergoing such diets are consuming less food overall and probably feeling less satisfied. The majority of people with diabetes have Type 2 Diabetes. In Type 1 diabetes, the body's immune system destroys the islet cells that produce insulin. It is generally considered irreversible; it can only be managed with continuous insulin injection in order to consume carbohydrates. In the next section, I will cover the only case study I have come across about reversing late-onset Type 1 Diabetes.

MANAGING TYPE 1 DIABETES: A PERSONAL ACCOUNT

My partner has late onset Type 1 Diabetes; he became diabetic when he was 17. He has tried numerous diets and lifestyle changes to manage his condition. One of these attempts came about when he came across Dr. Gabriel Cousens who advocated a raw-food vegan diet. He watched a documentary produced on this treatment which reversed the diabetes of a few type 2 diabetics and improved the condition of one type 1 diabetic. He was a raw-food vegan in his early 20s for an entire year in an attempt to cure himself, but he experienced brain fog and ultimately did not succeed. There are a number of alternative news sources that claim to have cured diabetes type 1 with a drastic change in diet but we continued to be skeptical without properly documented results. However, it is possible to manage diabetes type 1 with a high fat, very low carbohydrate diet with very little insulin. It is well-established that exercise improves insulin sensitivity. The increase in muscle glucose transport induced by exercise is independent of insulin[14]. Hypothetically, a person who consumes very few carbohydrates and exercises frequently can regulate their blood-glucose levels. Although I can see how diet and exercise can aid in the management of diabetes type 1, it has not been established that a type 1 diabetic can in fact reverse their diabetes with dietary modification except in one case.

My partner and I were ecstatic to find a case report that came out late last year that documented a young man being cured of his type 1 diabetes mellitus (T1DM)[15]. The patient, a 19-year-old man was newly diagnosed with T1DM and was put on the Paleolithic ketogenic diet (PKD). The Paleolithic ketogenic diet is a low-carbohydrate diet without dairy products. The researchers altered the classic ketogenic diet to exclude dairy because consumption of cow's milk has been shown to increase the risk of T1DM. They hypothesize that the bovine milk protein potentially triggers autoimmune processes that eventually lead to T1DM. After twenty days on the paleolithic ketogenic diet, the patient discontinued insulin entirely[15]. There was a three-fold increase in his C-peptide levels, indicating restored pancreas insulin production. After 6.5 months the researchers followed up with the patient and he was still on the diet without any apparent side-effects and without any need for insulin. The researchers concluded that an early intervention with the Paleolithic ketogenic diet could halt or even reverse T1DM. This young patient probably still had a few active insulin-producing islet cells left and these researchers were able to stop his autoimmune processes from destroying the rest.

Armed with the literature on this subject, my partner and I embarked on the ketogenic diet. We have been in ketosis for two months, but we have not been strictly adhering to a non-dairy KD. It is difficult to begin with; we started by throwing out all the processed food in our home. There are very few pre-packaged foods that are not high in either carbs or sugars. My partner's blood sugar

levels have stabilized and his insulin doses have dropped dramatically (from 50 units to 20 on the insulin pump). We hope to slowly phase out dairy and further reduce our carbohydrates from our current levels (<50g of carbs per day). Our goal is to reduce insulin intake further and perhaps find a way to restore islet cells using precursor pancreatic stem cells[16].

On a personal note, I found myself losing weight on KD despite consuming the same number of calories. I have been tracking my food intake, every single day, for about 200 days. I have been tracking calories and nutrition loosely for about three years on the app myfitnesspal. I did not undertake the ketogenic diet in an attempt to lose weight so I had to consume 10% more calories just to maintain my weight. It was really easy for me to go into ketosis because I was already on a calorie-restricted-optimal-nutritional (CRON) diet, but it was more akin to a calorie-restricted sub-optimal nutrition diet in practice. Basically calorie-restricted (CR) individuals have smaller glycogen supplies. So good news for CRON folks thinking about trying KD, ketosis will happen faster. Some CRON proponents combine CR with KD. There's also combining CR, KD and intermittent fasting, but I won't go into that in this article. I feel very satiated and satisfied on KD. Neither of us have had any negative effects.

CONCLUSION

In this article, I was able to cover the history and basic mechanism of the ketogenic diet. I was also able to cover how the KD is more effective at treating obesity or diabetes than a low-fat diet. Even calorie-restricted diets were less effective than KD in treating diabetes from the articles I referenced. Along with the growing body of evidence showing cardiovascular benefit, medical professionals are exploring many lines of inquiry. In the next article, I plan to cover the neuro-protective and potentially anti-aging effects of this diet. The next article *The Ketogenic Diet Part 2: Neuro-Protection, Cancer and Anti-Aging benefits* will appear in the March issue of *Cryonics*. I will also offer more practical advice on the various different approaches to the ketogenic diet. The ketogenic diet is not without potential detrimental side-effects, so care must be taken in any drastic diet change. I covered some of these risks briefly in the History section of this article. Although risk is present in KD, the risk of people continuing on the standard American diet has been well-documented: an epidemic of obesity, diabetes and cardiovascular disease. ■

Carrie Wong is a young Canadian cryonicist. She graduated in 2011 with degree in geology from The University of British Columbia and worked in gold exploration for a few years. In addition to writing for Cryonics Magazine, she is also writing for geologyforinvestors.com and running a cartography business.

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End Death Convention 2014

PART 1 OF 2

By Michael Perry

INTRODUCTION

I was privileged to attend the End Death Convention, held in the Starview Room at the Riverside Hotel and Casino, Laughlin, Nevada, Nov. 7-9, 2014, sponsored by the Society for Venturism. Several often intersecting but different strands of end-death thinking and initiatives were represented: cryonics, life- and health-extension, and transhumanism.

An event like this requires a tremendous effort. Especially to be thanked are David Pizer and Mark Plus, principal organizers, and the host Don Laughlin who furnished the location. Credit is due to a few others who were there and helped with registration and sales of Venturist-related materials: Bruce Cohen, Jerry Searcy, and yours truly. About 100 people attended, 30 from Alcor, 15 from the Cryonics Institute, 2 from Oregon Cryonics, maybe 25 Venturist cryonics members, 10 media people, 15 from other countries.

Laughlin Riverside Hotel and Casino. Credit: advertising photo.

SUMMARY OF PRESENTATIONS

Approximately two dozen presenters gave their talks over a two-day period, starting Friday morning Nov. 7 and concluding the following evening. (Natasha Vita-More, Ph.D., was to have presented her very interesting work showing the survival of memory in the nematode worm *C. Elegans* after cryopreservation, warming, and restoration to healthy functioning. Dr. Vita-More had to leave due to a family emergency, and her place was taken by Charles Platt, who by luck happened to have slides with him for his talk which is summarized here.) Times are approximate, based mainly on the printed program.

Friday, Nov. 7. Morning session, 9:35 a.m. - noon. David Pizer gave opening remarks welcoming attendees, and Roen Horn briefly mentioned his "Eternal Life Fan Club" (more about this in Part II).

Optimizing Your Prospects for Cryopreservation: Cairn Idun.

Cairn briefly summarized her extensive work and projects in cryonics, including organizing the Teens and Twenties events and Options for Safe, Secure and Legal Asset Preservation (OSSLAP). Another of her projects, the Peaceful Tolerance Initiative, aims at becoming "free of coercive denial of the best cryopreservation which is premortem." Another initiative, SWIVEL (Singles Week in Vegas for Extended Life), aims to attract more women to cryonics.

She then focused on her main topic, what you the cryonicist can do to optimize your chances for the best cryopreservation. It boils down to three Ts: (1) Time—every minute saved reduces damage. (2) Temperature—immediate cooling to 2°C, just above water ice temperature, is ideal. (3) Technique—ideal if performed by a trained team, good if by people who have been given detailed instructions.

Your provider team should be at your bedside. If you have good reason to think you have only a few weeks or months left, notify your provider! When you are going in for any medical procedure that requires sedation, notify your provider. Find out where support teams are when you are traveling. What if you deanimate without a team at your side? Make an appointment (in advance!) with the local coroner or ME, state preference for no autopsy. Join the Venturists, a US-recognized religious organization, which issues a do-not-autopsy card. Since autopsy cannot always be avoided, give instructions for what to do in case. It should be done as soon as possible, with the body stored at 2°C beforehand. It should be non-invasive if at all possible, for example, using electronic means (CT scans).

Your will should have incentives to immediately call your provider in case of emergency. Prepare those close to you with instructions on what to do if you are found near death or postmortem. Cooling immediately is super-important. Patient (yourself!) should be packed in ice if deanimated, head first, then armpits and groin, rest later. Whoever is physically next to you has most control over you. You may

want to consider providing a directive on how close someone is allowed to be to you when you are close to death.

Another important consideration Cairn emphasized is to have an automatic dial-out alert pulse monitor. This device would be worn 24/7 to send out an alert in case of an emergency such as cardiac arrest.

Chana Phaedra talks about Advanced Neural Biosciences

New Research at Advanced Neural Biosciences: Chana Phaedra, Company President.

Advanced Neural Biosciences (ANB), is mainly (and reassuringly!) focused on cryonics-related research. (Chana now works there full-time, and, she says, still works well with former husband Aschwin De Wolf.) A number of ambitions, ongoing and sometimes overlapping projects were outlined, in varying stages of development, including many apparently in early startup only, plus some with interesting results already. Here is a brief rundown.

- Cryoprotective perfusion model. Rat model to evaluate impairment and ice formation in neural tissue under various scenarios including ischemia.
- Brain slice electrophysiology. Using brain slices to study spontaneous neural activity after slice is exposed to a particular treatment protocol.
- Electron Micrographs. Interesting results have already been obtained involving electron microscopy (EM) of rat brains after long-term ischemia (lack of blood flow, using whole-body rats). Brain "looks okay" after a few hours of warm ischemia but then slides downhill. Okay after 1 hour, not after 81 hours. With cold ischemia (near 0°C, above freezing) results are much better. Okay after a few weeks but definite deterioration after 6 months.
- 3D reconstructions of neural architecture and vasculature of long-term ischemic brains and freezing damage.
- Stabilization medication evaluation. Among the targets are Alcor anticlotting agents including heparin. Chana says they have eliminated ice formation in 48-hour cold ischemic rats.
- Whole brain electrophysiology model. They plan to use a whole-brain electrophysiology setup to evaluate the effects of cryopreservation on the brain. So far they have some preliminary results indicating the superiority of washed red blood cells over aqueous solutions as perfusates for recovering EEG after cryopreservation. They can maintain an EEG for 1 hour versus only 5 minutes with aqueous counterparts. The next step is to evaluate perflurocarbon emulsions, which should permit even longer viability times.

Cryonics Movie: Jake McCurdy.

Jake's short movie gave a quick introduction to what people are saying about cryonics. Chana Phaedra, Max More and Steve Harris were among the knowledgeable proponents. Many others also gave their views; for one it was "just weird;" for another, in response to whether you could bring back a cryonics patient, "absolutely maybe." Among the advocates was youthful cancer patient Kim Suozzi, who decided to opt for cryonics when she was found to be terminal. (A few months later she was cryopreserved at Alcor.)

First afternoon session, 1:30-3:00 p.m.

Peter Voss.

Artificial Intelligence and the Future: Peter Voss, founder and CEO of Adaptive AI, Inc.

Peter's talk covered four areas: (I) the current state of AI, (II) human level AI and beyond, (III) how and when do we achieve human level?, (IV) implications for cryonics.

I. Current state: here are major approaches in AI today:
   1. Logical: start with propositions and go from there. Avoids messiness but is not workable by itself.
   2. Big Data: Uses statistical methods for crunching large amounts of data. Has no real understanding of what it is doing.
   3. Neural networks: Roughly simulates neural architecture. Has useful applications. Problem is it is opaque, hard to understand.
   4. Brain inspired: more like the actual brain.
   5. Cognitive: try to imitate human thinking at a high level.
   6. Natural language processing (NLP).
   7. Interdisciplinary: take from all the above.

II. Human level: the "strong" variety, Artificial General Intelligence, AGI, would be a device with reasoning capacities comparable or superior to the human level. Desirable AGI characteristics include: (1) cheap

to replicate, (2) communicates instantaneously, (3) works 24/7, (4) no distractions, (5) perfect memory. It is not yet achieved but promises great advantages for us, properly managed. Possible features of an AGI would be: intelligence, creativity, a mind, consciousness, free will, and qualia (feelings).

III. How and when: What are the present main barriers to AGI? Do we have the right hardware already, so that it is a matter mainly of programming? Or is it possible we have the right programs but not hardware? (Or maybe neither?) According to Peter most knowledgeable people think we already have adequate hardware so the problem is one of software (and he concurs). So how do we get better software leading to our goal? Two possible approaches are bottom-up and top-down. For bottom-up, start with perception, acquire knowledge and skills as humans and animals do. For top-down you start with language. Try to gain knowledge and skills from this. Start with symbols and try to fill in. Overall there is likely no easy path to AGI but with enough funding and focus we could achieve it in 10-25 years.

IV. Cryonics implications: AGI could help with everything from better cryonics protocols to directing resuscitation.

Mormon Transhumanism: Lincoln Cannon, President of the Mormon Transhumanist Association.

Lincoln described Mormonism as an "immersive discipleship of Jesus Christ." Mormons try to live like Christ. This means they want to become Gods and saviors with Jesus. Mormonism has an unusual metaphysics. God was not always God, and persons can become Gods. Mormons in general are positive about the uses of technology for human betterment, Mormon transhumanists (which certainly exist!) especially so.

An interesting feature of Mormonism is seen in its theodicy or resolution of the problem of evil—why a benevolent God allows suffering. According to Mormon thinking God is optimizing for something other than the mitigation of suffering—instead, to create more Gods. You have suffering but also real opportunities for betterment and meaning in life.

In the Mormon account of the future, now is the "fullness of time"—greater wonders will follow. The living will be transformed into immortal beings and the dead will be resurrected to similarly embodied immortality. Both could grow in both knowledge and compassion to finally take their place as Gods themselves.

Mormon transhumanists have started the Mormon Transhumanist Association or MTA, with 478 members as of 7 Nov. 2014. Most MTA members are members of the LDS Church (the main Mormon religious establishment), though not all, and most are theists, though again, not all.

Some interesting perspectives on religion were noted. One, "postsecular religion," holds that "God" might be a "posthuman projection," the "asymptote of human perfection." Some Mormon transhumanists endorse this. MTs however do not just look to secular roots for sources. Early Christians sometimes taught that people should become Christlike. Fedorov, a Christian, advocated resurrection of the dead through technology. A more recent Christian, Teilhard de Chardin, advocated a "noosphere"—a world beyond death and suffering created through scientific means—as the outcome of civilization's progress.

MTs have many visions of the future, and acknowledge they could be wrong about many things. They are not necessarily believers in a coming Singularity though many are. Many wonder if the predicted "return" of Christ will be like the noosphere of Teilhard de Chardin. MTs in any case find strong parallels between their ideas about a transhuman future and more traditional notions of heaven.

Lincoln spoke of his "New God Argument": Humanity will not go extinct before evolving into superintelligent post-humanity. So the existence of God may correlate with our future. We may, as future Gods, go on to create many worlds ourselves, and if we do, we are probably in a simulation run by a God or Gods. Most MTA members who are theists think God continues to progress in knowledge and power rather than thinking he is already perfected.

Mark Plus.
Credit: author's rendition based on photo by Desireé Duffy and other images at https://www.facebook.com/mark.plus.54/photos_all, accessed 16 Jan. 2015.

Death Avengers Assemble! Robert Ettinger on the Science of Superhumans: Mark Plus, Secretary, Society for Venturism.

Robert Ettinger is well-known as the principal founder of cryonics; his main ideas were offered to the world in 1964 with publication of *The Prospect of Immortality*. But a few years later, in 1972, Ettinger published another book, *Man into Superman*, which goes beyond the bedrock of cryonics and the goal of just living longer to consider a transhuman and then posthuman future. In fact Ettinger in this book anticipates much of the transhumanist ideas that have been advocated by others in the decades since. Mark found *MIS*, read it, and became a cryonicist some years later. It is, he notes, a very idea-rich book, with something to say on everything from man-machine interfaces to the social acceptance of "polyamory."

Today however we have a dichotomy. A substantial number of transhumanists are not signing up for cryonics. "Communication of the cryonics idea has gotten fuzzy, and people don't understand it like they should." Mark wonders if we should resort to a "Cryonics for Dummies" book. Ettinger's own judgment was "greed and jealousy to the rescue." Can that work for us?

Second afternoon session, 3:30-5:00 p.m.

Make It So! Improving Cryonics Communications with the Public: Joe Kowalski, Director, Cryonics Institute.

Joe noted that cryonics pioneer Robert Ettinger founded the Cryonics Institute in 1976 to be an ambulance to the future for as many as possible. Cryonics, he emphasized, is not trying to "raise the dead" any more than defibrillation after cardiac arrest would be. Ettinger, he noted, was brilliant and kind but also a curmudgeon who appealed to aficionados but not the general public.

So how do you present a "weird" idea like cryonics to a public that might be highly skeptical or hostile? Talk about familiar things first, gardening or some other thing your audience is interested in. Use language they are comfortable with, talk about what they want to discuss, be positive and encouraging.

To lead to the subject of cryonics, you can talk about the possible use of cryopreservation of organs for transplants. In fact, the Cryonics Institute presently has an Organ Cryopreservation Prize for the first person or group which successfully freezes, stores, and revives one of several mammalian organs. Cryonics is not in the "circle of acceptance" of government funded projects, but cryopreservation for organ transplantation is. Currently about 80% of donated kidneys are actually used, due to limited shelf life after harvesting, and only 30% of hearts. Having a way of preserving organs indefinitely would be of great medical significance and might save many lives.

Something you can do, even if you are not in a position to win the prize (by a breakthrough in organ preservation) is to *donate* to the prize fund, www.cryoprize.info.

Vital Signs Alarm for Cryonicists: Ben Best, President Emeritus, Cryonics Institute.

Sudden, unattended death is one of the worst things that can happen to a cryonicist given that you want to get the best preservation. Often cryonicists live alone and are found "dead on the floor" for hours or days. Historically, less than half of cryonicists who made arrangements for standby actually received standby. Ben in his talk reviewed the difficulties cryonicists face in avoiding lengthy ischemic insults before they can be cryopreserved, and some promising developments that could remedy or at least significantly reduce the problem.

Increasingly affordable technologies monitor vital signs and send out alarms when a danger point is reached. The Electronic Caregiver, a system of monitoring and detection devices installed in one's home, will summon a team of EMTs in event of emergency (fall, cardiac arrest, et cetera). It is good for an elderly person living alone but Ben "wouldn't recommend it otherwise."

Some attention was devoted to systems that would sound an alarm if you arrest in your sleep. Systems with a chest strap are probably most reliable but most people don't want to wear them. (Robert Ettinger for one would not wear a chest strap as he approached his deanimation in 2011.) Devices are needed that are unobtrusive (no chest strap) with continuous monitoring and low power consumption. Two units now available, the Nexus-5 and the Mio-Alpha monitor, deserve special mention. There are other technologies under development, such as "smart" watches and ongoing improvement in the outlook can be expected. Be attentive.

Funding Cryopreservation in the Face of a Currency Crisis: Mark Voelker, Ph.D.

Mark noted that "the monetary and banking system is an existential threat to cryonicists." Why? Because of currency inflation. Many cryonicists are funded with life insurance. If a fixed death benefit is paid, it may be much less than its original value, determined by its face amount, by the time it is needed, and thus be completely inadequate. No currencies in the world currently have any physical backing, which causes creeping inflation over time and could result in hyperinflation—essentially the currency becomes worthless. What is needed is to rely not on currency but something of more robust value: stocks, real estate, and precious metals such as gold and silver.

Mark thinks there will be a currency crisis in the not-too-distant future severe enough to induce serious "hard times." Prices of gold and silver are "managed"—manipulated—and do not reflect real conditions. Gold is running out for the U.S. government. When it does "you won't see stable prices, like today, but rising prices." The money supply has quintupled in the last seven years. So far it is mostly sequestered. When it is released to the public, a major upheaval could happen.

Evening session, 7:00-8:00 p.m.

David Pizer.
Credit: Roen Horn

Ways to Protect Your Cryonic Suspension: David Pizer, President, Society for Venturism.

David spoke about why being a Venturist Member could help you get a better cryopreservation, first outlining some benefits of being a Venturist.

1. Our members carry a "Religious Objection to Autopsy" card.
2. Our members are covered by the Venturist Suspension backup trust fund.
3. You can help us in creating a library devoted to cryonics history and a museum.
4. The museum will include a Hall of Fame and History for cryonics and other life-extension-related events.
5. The Society for Venturism can serve as trustee or co-trustee for your own personal cryonics reanimation trust.
6. We were established in 1986. We have a history of support with integrity.
7. We offer support for cryonicists, and our Members run the organization.

The organization now has $50,000 in the Backup Trust Fund, with a goal of $1,000,000. We have also raised funds for needy cryonics cases. Some donations came from outside the Venturist organization.

More about the Venturist Backup Trust:

- If you are a Venturist Member at the

time of your cryonic suspension,

- and, if your suspension was fully funded at the time you were suspended and all required paperwork was properly documented,
- and if any time before you are reanimated your cryonic suspension company has problems, and cannot keep you cryopreserved,
- the Society for Venturism will make a good-faith effort to rescue you from disaster and get you moved to another storage facility.
- Any rescue attempt will be based on our best guess as to whether it is feasible.

Venturist do-not-autopsy card: the Venturist organization is formed as a church so our Members' religious objection to autopsy, as expressed on the card, is authentic.

Promoting Cryonics through Reference to Medical Hypothermia: Aaron Drake, Alcor Medical Response Director.

Aaron noted that, while doctors are often prejudiced against cryonics, we now have an ongoing paradigm shift because most doctors are receptive to mainstream medical applications of hypothermia. Aaron spoke about his personal experience as a paramedic and firefighter in Lincoln, Nebraska, before coming to Alcor. He worked on an ambulance and handled 7-15 patients a day, giving them saline intravenously. Though it seemed to be doing them a favor to give warm saline rather than cold ("patients were happy,") he and the crew learned "that was the worst thing for them." Colder saline gave better survival rates, and more generally people survived better under hypothermic conditions, with cold water drownings for instance.

Aaron told about the visit to Alcor of Dr. Peter Rhee, who used hypothermia to save the life of U.S. Congresswoman Gabrielle Giffords, who was shot through the head. In discussing his methods, Dr. Rhee noted that with hypothermia he was able to boost survival rates of trauma code victims (who suffered cardiac arrest) from 2% to 87%. Further afield, in Norway hypothermia is being incorporated into cardio-pulmonary resuscitation with positive effects: cooling is first done, then restoration of circulation, oxygenation, and medication, all on-site.

Overall, "it is amazing where hypothermia is going." Aaron advises "let your medical provider know about cryonics." One hopeful consequence of the acceptance of hypothermia is that it should be easier to get cooperation from medical personnel for the initial stages of a cryonics procedure. The more of this that can be done on-site or "in the field" the better.

Saturday, Nov. 8. Morning session, 9:30 a.m.-noon.

A Liquid Ventilation System: Charles Platt, Author, Researcher and Cryonics Technician.

Charles made the point that, while it is certainly critical for cryonics, cooling the body is not just a cryonics activity but has uses in mainstream medicine (as Aaron noted). Sometimes it is done clinically but it doesn't work as well as it should because it is hard to cool down a whole human body from the surface inward, which is the usual method used.

Mike Darwin and Steve Harris of Critical Care Research Institue (CCRI, Rancho Cucamonga, Calif.) worked on a liquid ventilation system for more rapid cooldown. This approach, which had also found a mainstream application in treating the bends, uses a reservoir of cold, breathable liquid—oxygenated perfluorocarbons—to get cooling from the inside rather than just the surface. You need a heat exchanger to keep the liquid cold, and to control the flow of liquid into and out of the subject. The latter is difficult because the liquid is electrically inert. You also have to know the temperature of the liquid.

Lungs are not sterile, you just have to be clean. You also want the (heavy) liquid to be on the same level as the subject. The system uses a lot of current (45 amps at 12 volts). Charles reported he made a system that worked well—his client wanted another one. He worked in Florida, with Suspended Animation, Inc., then worked in California with CCRI, in both cases supported by Saul Kent. His next employment was in northern Arizona. Though it seemed desirable to have a computer-controlled system there were complications and he ended up doing a manual system due to problems with microcontrollers. But a unit he built is still operational in Rancho Cucamonga, "getting good results." It can do cooling in 5 minutes that would take 2 hours by the surface-only method. The system did not seem to cause permanent lung damage. Charles didn't know if it could also be used for warming. In the end the further work was "maybe beyond what I can do" and he went back to writing books on electronics. But liquid ventilation seems a promising alternative to the surface cooldown approach now mainly used in cryonics. (One wonders why it is not more widely applied.)

Promoting and Funding Cryonics: Rudi Hoffman, CFPTM, Cryonics Financial Planner.

Rudi's talk had two parts: how to promote cryonics among the reluctant, and funding cryonics with life insurance.

For the difficult task of promotion, Rudi recommended a book, *Crucial Conversations: Tools for Talking When the Stakes are High* by K. Patterson, J. Grenny, R. McMillan, and A. Switzer, with foreword by S. R. Covey. This is not a book about cryonics but rather a good general guide for handling situations where stakes are high as the title indicates, opinions vary, and emotions run strong. Avoid silence and violence (not just physical), these are dialog killers. Avoid ad hominem attacks. Ask yourself if an argument you are about to commit to is really worth arguing about. Remember this is about "you." What are we trying to preserve? There is only one of you.

To fund cryonics Rudi recommended indexed universal life insurance (IUL), which can counter inflation (though not hyperinflation) and minimize risk to you. It can be coupled to, for example, the Standard and Poors 500 stock index to return gains when the index gains but not penalize you when it loses. It has a cash accumulation component, which can be withdrawn on a tax-free basis. The death benefit can also be adjusted in response to moderate inflation. Rudi noted a "rule of 72" which provides a quick approximate estimate of how long it takes funds to double if invested at x% annual compound interest, or alternatively, how long it takes currency to lose half its value if it declines x% per annum: divide x into 72. So, for a 2% increment/decline it takes about 36 years, for 6% about 12 years.

Parting advice: choose your cryonics funding with care. "It's in your moments of decision that your destiny is shaped."

Neal Van De Ree reports on the Church of Perpetual Life.

A Transhumanist Church, the Church of Perpetual Life: Neal Van De Ree, Officiator.

Neal reported on the newly established Church of Perpetual Life, started with backing from Bill Faloon and Saul Kent and located in Hollywood, Florida. Why a "church?" It's "a little bit of work" but is intended to bring together a group to form a "family" devoted to the search for indefinite lifespan. The Russian nineteenth-century religious philosopher Nikolai F. Fedorov advocated the conquest of death through technology as the "Common Task" that ought to be embraced by the whole of humanity. COPL, taking Fedorov as their prophet, intends to complete that mission, and opens its doors to persons of different religious persuasions and also to atheists. Like Fedorov COPL holds that eliminating death is following the Creator's will. Neal noted however that "Creator" can be broadly interpreted to mean the process of creation rather than requiring belief in a Supreme Being. Purposes of COPL are:

1. Provide fellowship for immortalists through regular services, holiday services, and memorial services for self-preserved individuals.
2. Educate and espouse the plan that humanity evolve to achieve physical immortality.
3. Accelerate the plan of the Common Task of Humanity, which is to cultivate technology that will facilitate the transformation of life into an environment of perpetual duration or existence.
4. Enable information sharing amongst fellow immortalists that will facilitate the Creator's ***Common Task.***
5. Create a sense of belonging (which most humans seem to require), a common bond amongst like-minded individuals, and communal volunteer support for fellow church members who fall ill, who are hospitalized, or otherwise face imminent self-preservation.
6. Institutionalize the concept of self-preservation and physical immortality so that others are enlightened and can contribute to the ***Common Task of Humanity.***
7. Create a tradition through regular services and holiday services that will involve friends and family to join together towards this ***Common Task.***
8. Provide a tangible foundation and physical structure to demonstrate the commitment of the **Church of Perpetual Life** to provide perpetual support to deanimated immortalists (Cryonicists) and advance the field of biomedical research to achieve the plan of the ***Common Task of Humanity.***
9. Provide group support, peer encouragement, and rational persuasion for Church members and guests to make **self-preservation** arrangements and contribute to the ***Common Task.***

Building: COPL holds services in a church building acquired for the purpose. The upstairs where the services are held can legally seat 288 people (far more than presently attend). The downstairs has a refreshments hall and a library.

Services: COPL in its services offers information and encouragement about life-extension and health-promoting products. (It is strictly non-commercial, no products are offered or advertised for sale.) Bill Faloon speaks at most of the services; Neal officiates. After a service refreshments are served. Recently there was a presentation on tissue regeneration nanotechnology. Cryonics, the "ultimate peace of mind," is advocated. Each year around Christmas there is a "Remembrance of the Resurrectables" service to honor those in cryopreservation.

Neal closed his talk by wishing perpetual peace, prosperity, and longevity to all. ■

(Pictures are from author's personal collection unless otherwise credited.)

From left: Andy Popper and Venturist volunteer helpers Bruce Cohen and Jerry Searcy.

Alcor RESEARCH & Development UPDATE

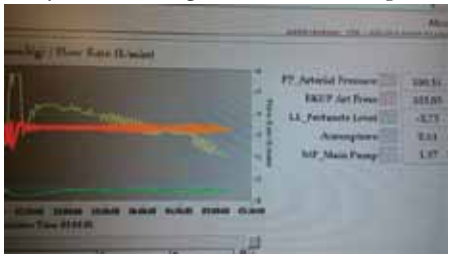
By Steve Graber

IN-HOUSE DESIGN – EASY-LOAD II MASTERFLEX PUMP – PORTABLE

Here's an interesting project I've been working on recently. This is a very compact peristaltic pump with an Easy-Load twin head for L/S 13, 14, 16 and 25 tubing. It will run on batteries or a power supply and weighs roughly ½ of the traditional Masterflex pump with the same degree of speed control and higher potential pump rotation speeds. The light weight, small size and ability to be controlled via either a manual knob or using computer controller is quite interesting and we have a number of projects under way where we might see this being implemented. I sourced the miniature servo drive and designed and 3D printed the adapter/mounting bracket. And it's less than ½ the cost of a Masterflex but again, this one is portable while there are no portable compact peristaltic pumps available on the market that I am aware of.

MAIN PUMPS FOR WHOLE BODY AND NEURO O.R. SYSTEMS BOTH NOW UNDER COMPUTER CONTROL

Due to the successful integration of the Whole Body table pump speed control with the Data Acquisition and control system, I decided to work on integration of the main arterial pump into the Neuro Cryoprotection system in the O.R. This task has now been completed. The main pumps for both Whole Body and Neuro procedures are integrated and we are now prepared to perform both Neuro and Whole Body perfusions with either main pump under computer control. This is a big deal!



Finney Cryoprotection Graph

HAL FINNEY – FIRST ALCOR PATIENT TO BE CRYOPRESERVED WITH THE MAIN PUMP UNDER COMPUTER CONTROL

The cryoprotection surgical procedure for Hal Finney was performed with the main pump operating under a PID tuned pressure feedback loop. I believe that this is the first time that any patient surgical procedure at Alcor has had the pump under computer control. All previous cryoprotections to this point had been performed using a manually operated pressure control system where a perfusionist watches an analog pressure gauge and varies the pump speed manually. In this case we used a wheatstone bridge pressure transducer reading the pressure signal from the arterial line. We fed the realtime system arterial pressure data into our data acquisition and control program and the program took control of regulating the main pump speed to maintain that pressure. You can see in the included screengrab of Hal Finney's cryoprotection how the system tracked PP_Arterial Pressure in orange vs MP_Main Pump speed in yellow. The keen observer will note that the pump speed displays a ringing oscillation effect as it attempts to achieve correct pressure during our -3°C portion of the procedure. This is due to the ever increasing viscosity of the cryoprotectant and decreased temperature. Thanks to feedback from Brian Wowk I expect to be able to further fine tune the proportional and integral terms of the feedback loop in order to decrease the oscillation. Even with this small oscillation in pump speed our actual pressure is now much better controlled than even the best manual pump technique could hope to achieve.

I should also mention that placing the pumps under computer control is the second computer hookup of three main sections required for more fully automated perfusion. Those 3 sections are temperature, pressure and refractive index.

O.R. PROCESS LN2 CHILLER REBUILD

During a recent case I noticed that each time our process chiller unit LN2 solenoid triggered it was blowing bubbles up through the Ethylene Glycol. This indicated to me that somewhere within the chiller the heat exchange pipes that

Liquid Nitrogen Process Chiller

Enermax Water Heater Unit

are submerged in the E.G. had developed a leak allowing nitrogen gases to escape to the fluid side. The unit itself continued to function normally throughout the procedure so I waited until after the case to tear it down and give it a full inspection. What I found was that the copper innards of the heat exchange tubing between LN2 and E.G. were highly corroded, and many of the soldered fittings were loose, which was where the gases were escaping.

Brazetech Heat Exchange Unit

Rather than rebuild the chiller back to the original specification I took this as an opportunity to rethink the equipment and work on improving its reliability and performance.

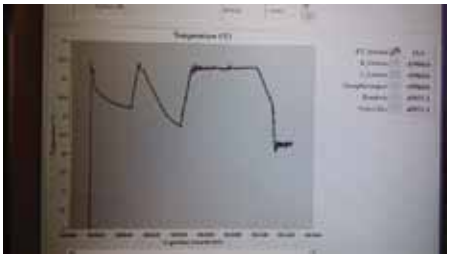
Our rebuilt process chiller now uses a commercially available Enermax 2,400 watt inline instant water heater unit. This is the same type you might find underneath a standard sink. It's quite compact, but has more than enough power for our needs. In fact its performance is vastly superior to the original open heater element found in the original design. In addition it has several built-in safety features such as thermal overload switch and flow sensor as well as a thermostat to limit the maximum temperature internally.

The LN2 to E.G. heat exchanger is no longer a series of hand bent and welded copper tubes submerged within a bath of E.G. The new unit is a Brazetech 30 plate brazed stainless steel unit specifically designed as a heat exchanger and rated to LN2 temperature, with an astronomical 350,000 BTU/hr exchange rate.

The tubing is designed to be easily replaceable and allows for easy removal and installation of replacement components if/when that is ever required. The pump was carried over from the previous design.

The final item in the redesign is a custom built stainless steel expansion/fill tank to which I had NPT inlet and outlet fittings TIG welded. A tank like this costs around $270 through McMaster-Carr but I made this one up for under $75.

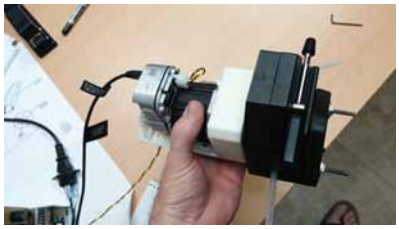
My first test of the rebuilt chiller (as seen in the graph) indicated a significant improvement in heat exchanger performance. The key indicator is the angle of slope for both heating and cooling. Faster than 1°C/minute.



Heat Exchanger Performance Graph

ATAGO CM-780N-EG PROCESS REFRACTOMETER – TEST UNIT

One of the biggest hurdles I've encountered in attempting to implement the new computer controlled perfusion system has been the very real problem with the three AFAB refractometers falling out of calibration as the temperature drops below the 0°C threshold. The entire process depends on accurate refractive indexing so without dependable units we have a real problem. I understand that there are people who can and do spend a lot of time working on the calibration of their AFAB refractometers but I simply don't have the aptitude (or also the attitude) to spend hours calibrating these units prior to receiving a patient into the O.R… Late last year I was on a quest to find a more user friendly unit and this Atago CM-780N-EG went into my test rig in December. It has a 4-20mA output and



Masterflex Pump

Atago Refractometer Display

was fairly straightforward to integrate into our existing control system—see report that follows.

ATAGO CM-780N-EG PROCESS REFRACTOMETER – TEST UNIT

I incorporated an ATAGO CM780-EG refractometer into our main data acquisition system using 4-20mA output. It was calibrated along with the remaining 2 AFAB refractometers using our existing in-house calibration method with sampling fluid chilled to 3 degrees C. (Note this method does not follow Brian Wowk's detailed calibration instructions.) I then ran a ramp test from 0% to 60% starting at 3°C and dropping the solution temperature to -3°C at the 30% mark. At each 5% change in Brix I also manually sampled the refractive index using our tried and tested digital pocket refractometer which has a sample accuracy comparable to Hugh's tabletop analog refractometer. The ATAGO unit maintained a near linear response even with the 6 degree drop in temperature and its measurement results were within a couple of tenths percent across the tested sample range. As expected the AFAB units tracked well during the initial portion of the test but experienced a very large deviation at the 6°C temperature drop and did not provide accurate refractive index readings after that point. My initial conclusion is that the ATAGO does not suffer from the same temperature compensation issues that we are seeing with the AFABs.

Sper Refractometer Unit (left), Atago Unit

Mounting Refractometers for Whole-Body System

ATAGO DIGITAL REFRACTOMETERS – INTEGRATION INTO WHOLE BODY TABLE

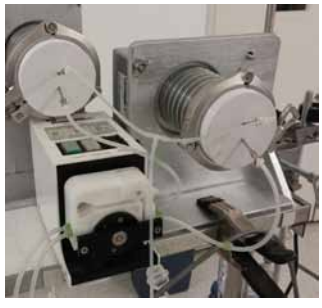
With both the main pump and the perfusate chiller temperature subsystems now under computer control it is time for me to begin integration of our Atago CM-800α refractometers into the Labview based data acquisition and perfusion control system. In this photo you can see I have chosen the general location of these two rather large units. They will be inserted into the table through holes drilled into the side of the clear Plexiglas table. The perfusion tubing, which is visible inside the table, will then be connected to each of these units. Once the new refractometers are installed and connected to the data acquisition system we will begin our evaluation phase. The final goal of complete computer control (with constant human monitoring) over the entire perfusion process could be achieved sometime in 2015 based on our case load and ability to test and confirm the validity of the refractometry data.

Refractometers after Mounting (Whole-Body System)

In this photo you can see I have chosen the general location of these two rather large Atago CM-800α refractometer units. They are now inserted into the table through holes drilled into the side of the clear Plexiglas table. This area is down at the foot end of the whole body table. A removable access panel has been cut into the top of the table. This will provide access to the tubing, allow the refractometers to be easily removed for cleaning and servicing, and as a bonus also gives us a way to access other wiring and tubing that in the past has been very difficult to access in this area.

ATAGO DIGITAL REFRACTOMETERS – INTEGRATION INTO NEURO PERFUSION SYSTEM

I also integrated these high performance units into the neuro system. Neuro venous sampling is taken from the jugulars and in our perfusion process this is a very low flow area. The stock Atago sampling heads are designed for much larger tubing size which is optimal on the higher flow rate of whole body table system. I had to design a different flow head. Using our 3D modeling software I copied the shape of the clamping outer shell on the Atago design, but created an inner chamber shape specifically suited for the lower flow rate required by the neuro sampling system. The design was printed on our in-house 3D printer and within several hours we were up and running with a fully functional neuro sampling system that utilizes the whole body refractometers.



Neuro System Refractometers

Two of our most recent cases have both utilized this new system and the refractive index readings have been rock solid from start to finish.

3D-Printed Adapter (left) for Neuro Refractometer

My next step will be to work towards integration of this equipment into the process control algorithm and M22 concentrate addition ramp pump control. This gets us towards an ever closer goal of controlling the entire perfusion process via computer. ■

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Options for Safe, Secure and Legal Asset Preservation for Post-Resuscitation Access

The Sixth Annual *Young Cryonicists* Gathering

Teens & Twenties 6 2015: Getting to Know You - You Getting to Know Each Other - All While Being Updated On the Latest Scientific Research

Fri-Sun; April 24-26, '15 Las Vegas NV Host: *Life Extension Foundation* SCHOLARSHIPS AVAILABLE

★★

Greetings to *Young Cryonicists*,

You are receiving this invitation because you are among the future leaders in cryonics.

All attention will be focused on:
our getting to know you and
you getting to know each other.
PLUS: an update on the latest emergency response technologies and revival strategies.

Who is Eligible?

Fully signed up young cryonicists from all cryonics organizations aged *13-30 as of April 26, 2015* - may apply to attend. *Cryonicists aged 13-17 must be* accompanied by their parent(s) or guardian. In Vegas those *under* 21 must room with someone *over* 21.

Parents/guardians of attendees aged 18-19 are also encouraged to accompany their child. All attending parents will be put in touch with each other should they choose to have their own "get together" during the "young cryonicists" gathering.

Program

Some individuals are social butterflies. This is not so for everyone. And we want *everyone to meet everyone.* Therefore, I have designed a diverse range of "getting to know you" activities. *If* you would enjoy participating in these various getting acquainted activities, all while being updated on the latest scientific research, *then* this is for you.

Enjoy this exciting & fulfilling weekend.

SCHOLARSHIPS:

Life Extension Foundation, through a generous education grant, is offering *40 scholarships* that pay for ALL of the following:

- U.S. airfare to/from Las Vegas (or up to $1000 for origin outside the U.S., $1350 for Australia)
- Hotel accommodations for Friday and Saturday nights. Plus Thursday and Sunday for *attendees* who room together.
- Meals and beverages on Friday night, all day Saturday, & Sunday breakfast & lunch
- Registration fee - $350 - also covered

Please click on this website for a full packet with details & application forms.

http://www.alcor.org/T2_6_2015_details.pdf

Forever,

Cairn Erfreuliche Idun
Founder/Director: T2

Bill Faloon: The Life Extension Foundation

Some attendees to T2 enjoy spending *extra time in Las Vegas* - especially since their flight is already paid for via their scholarship.

This is at their own expense for additional food and lodging.

We look forward to getting to know you.

Nanorobots to Fight Cancer

Dr. Ido Bachelet, of the Mina and Everard Goodman Faculty of Life Sciences and Institute of Nanotechnology and Advanced Materials, recently brought good news to London. Clinical trials may soon begin on the nanorobots he has developed to fight cancer. The tiny robots, which can be injected into patients, are able to identify and kill cancer cells without affecting healthy cells. So far, the robots can recognize a dozen types of cancer, including leukemias and solid tumors, the *London Jewish Chronicle* reported. Bachelet revealed the news to a group of distinguished guests—mostly Russians—who've settled, or have homes, in London. The research being conducted today at the Goodman Faculty of Life Sciences "could revolutionize everything we know as medicine," said Bachelet. He has given three demonstrations of the robots to the US Food and Drug Administration.

Bar-Ilan News
11 Nov. 2014
http://www1.biu.ac.il/indexE.php?id=33&pt=20&pid=117&level=2&cPath=33&type=1&news=2258

New Non-Invasive Method Can Detect Alzheimer's Early

No methods currently exist for the early detection of Alzheimer's disease, which affects one out of nine people over the age of 65. Now, a team of Northwestern University scientists and engineers has developed a noninvasive MRI approach that can detect the disease in a living animal—and at the earliest stages of the disease, well before typical Alzheimer's symptoms appear. Led by neuroscientist William L. Klein and materials scientist Vinayak P. Dravid, the research team developed an MRI (magnetic resonance imaging) probe that pairs a magnetic nanostructure (MNS) with an antibody that seeks out the amyloid beta brain toxins responsible for onset of the disease. The accumulated toxins, because of the associated magnetic nanostructures, show up as dark areas in MRI scans of the brain. This ability to detect the molecular toxins may one day enable scientists to both spot trouble early and better design drugs or therapies to combat and monitor the disease. And, while not the focus of the study, early evidence suggests the MRI probe improves memory, too, by binding to the toxins to inhibit further damage.

Megan Fellman, Northwestern University
22 Dec. 2014
http://www.northwestern.edu/newscenter/stories/2014/12/new-non-invasive-method-can-detect-alzheimers-disease-early.html

New Technology Makes Tissues, Someday Maybe Organs

A new instrument could someday build replacement human organs the way electronics are assembled today: with precise picking and placing of parts. In this case, the parts are not resistors and capacitors, but 3-D microtissues containing thousands to millions of living cells that need a constant stream of fluid to bring them nutrients and to remove waste. The new device is called "BioP3" for pick, place, and perfuse. A team of researchers led by Jeffrey Morgan, a Brown University bioengineer, and Dr. Andrew Blakely, a surgery fellow at Rhode Island Hospital and the Warren Alpert Medical School, introduces BioP3 in a new paper in the journal *Tissue Engineering Part C*. Because it allows assembly of larger structures from small living microtissue components, Morgan said, future versions of BioP3 may finally make possible the manufacture of whole organs such as livers, pancreases, or kidneys. Honeycombs of bioengineered tissue can be stacked and arranged to build larger living structures.

Brown University
22 Dec. 2014
https://news.brown.edu/articles/2014/12/biop3

Optogenetics Captures Neuronal Transmission in Live Mammalian Brain

Neurons, the cells of the nervous system, communicate by transmitting chemical signals to each other through junctions called synapses. This "synaptic transmission" is critical for the brain and the spinal cord to quickly process the huge amount of incoming stimuli and generate outgoing signals. However, studying synaptic transmission in living animals is very difficult, and researchers have to use artificial conditions that don't capture the real-life environment of neurons. Now, EPFL scientists have observed and measured synaptic transmission in a live animal for the first time, using a new approach that combines genetics with the physics of light. Their breakthrough work is published in *Neuron*. Aurélie Pala and Carl Petersen at EPFL's Brain Mind Institute used a novel technique, "optogenetics", that has been making significant inroads in the field of neuroscience in the past ten years. This method uses light to precisely control the activity of specific neurons in living, even moving, animals in real time. Such precision is critical in being able to study the hundreds of different neuron types.

Ecole Polytechnique Fédérale de Lausanne (EPFL) / Eurekalert!
24 Dec. 2014
http://www.eurekalert.org/pub_releases/2014-12/epfd-ocn122314.php

Human Trials of DNA Nanobots

At the British Friends of Bar-Ilan University's event in Otto Uomo October

2014 Professor Ido Bachelet announced the beginning of the human treatment with nanomedicine. He indicates DNA nanobots can currently identify cells in humans with 12 different types of cancer tumors. A human patient with late stage leukemia will be given DNA nanobot treatment. Without this treatment the patient would be expected to die in the summer of 2015. Based upon animal trials they expect to remove the cancer within one month. Within 1 or 2 years they hope to have spinal cord repair working in animals and shortly thereafter in humans. This is working in tissue cultures. Previously Ido Bachelet and Shawn Douglas have published work on DNA nanobots in Nature and other respected science publications. One Trillion 50 nanometer nanobots in a syringe will be injected into people to perform cellular surgery. The DNA nanobots have been tuned not to cause an immune response, and can be adjusted for different kinds of medical procedures, some quick and some lasting many days.

NextBigFuture
27 Dec. 2014
http://nextbigfuture.com/2014/12/ido-bachelet-announces-2015-human-trial.html

A Bendable Implant Taps the Nervous System without Damaging It

Medicine these days entertains all kinds of ambitious plans for reading off brain signals to control wheelchairs, or using electronics to bypass spinal injuries. But most of these ideas for implants that can interface with the nervous system run up against a basic materials problem: wires are stiff and bodies are soft. That motivated some researchers at the École Polytechnique Fédérale, in Lausanne, Switzerland, to design a soft, flexible electronic implant, which they say has the same ability to bend and stretch as dura mater, the membrane that surrounds the brain and spinal cord. The scientists, including Gregoire Courtine, have previously showed that implants can allow mice with spinal injuries to walk again. But the rigid wires ended up damaging the mice's nervous systems. So Courtine joined electrical engineer Stéphanie Lacour to come up with a new implant they call "e-dura." It's made from soft silicone, stretchy gold wires, and rubbery electrodes flecked with platinum, as well as a microchannel through which the researchers were able to pump drugs.

Antonio Regalado / MIT Technology Review
8 Jan. 2015
http://www.technologyreview.com/news/533971/a-bendable-implant-taps-the-nervous-system-without-damaging-it/

A Roadmap to Resuscitation

Successful rejuvenation of cryonics patients will require three distinct technologies: (1) A cure for the disease that put the patient in a critical condition prior to cryopreservation; (2) biological or mechanical cell repair technologies that can reverse any injury associated with the cryopreservation process and long-term care at low temperatures; (3) rejuvenation biotechnologies that restore the patient to good health prior to resuscitation. OR it will require some entirely new approach such as (1) mapping the ultrastructure of cryopreserved brain tissue using nanotechnology, and (2) using this information to deduce the original structure and repairing, replicating or simulating tissue or structure in some viable form so the person "comes back."

The following list is a list of landmark papers and books that reflect ongoing progress towards the resuscitation of cryonics patients:

Jerome B. White, "**Viral-Induced Repair of Damaged Neurons with Preservation of Long-Term Information Content,**" Second Annual Conference of the Cryonics Societies of America, University of Michigan at Ann Arbor, April 11-12, 1969, by J. B. White reprinted in *Cryonics* 35:10 (October 2014), 8-17.

Michael G. Darwin, **"The Anabolocyte: A Biological Approach to Repairing Cryoinjury,"** *Life Extension Magazine* (July-August 1977):80-83. Reprinted in *Cryonics* 29:4 (4th Quarter 2008),14-17.

Corey Noble, **"A 'Realistic' Scenario for Nanotechnological Repair of the Frozen Human Brain,"** in Brian Wowk, Michael Darwin, eds., *Cryonics: Reaching for Tomorrow,* Alcor Life Extension Foundation, 1991.

Ralph C. Merkle, **"The Molecular Repair of the Brain,"** *Cryonics* 15(January 1994):16-31 (Part I) & *Cryonics* 15(April 1994):20-32 (Part II).

Ralph C. Merkle, **"Cryonics, Cryptography, and Maximum Likelihood Estimation,"** First Extropy Institute Conference, Sunnyvale CA, 1994.

Aubrey de Grey & Michael Rae, **"Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime."** St. Martin's Press, 2007

Robert A. Freitas Jr., **"Comprehensive Nanorobotic Control of Human Morbidity and Aging,"** in Gregory M. Fahy, Michael D. West, L. Stephen Coles, and Steven B. Harris, eds, *The Future of Aging: Pathways to Human Life Extension,* Springer, New York, 2010, pp. 685-805.

Chana de Wolf (now Phaedra), **"Reconstructive Connectomics,"** *Cryonics* 34:7 (July 2013), 26-28.

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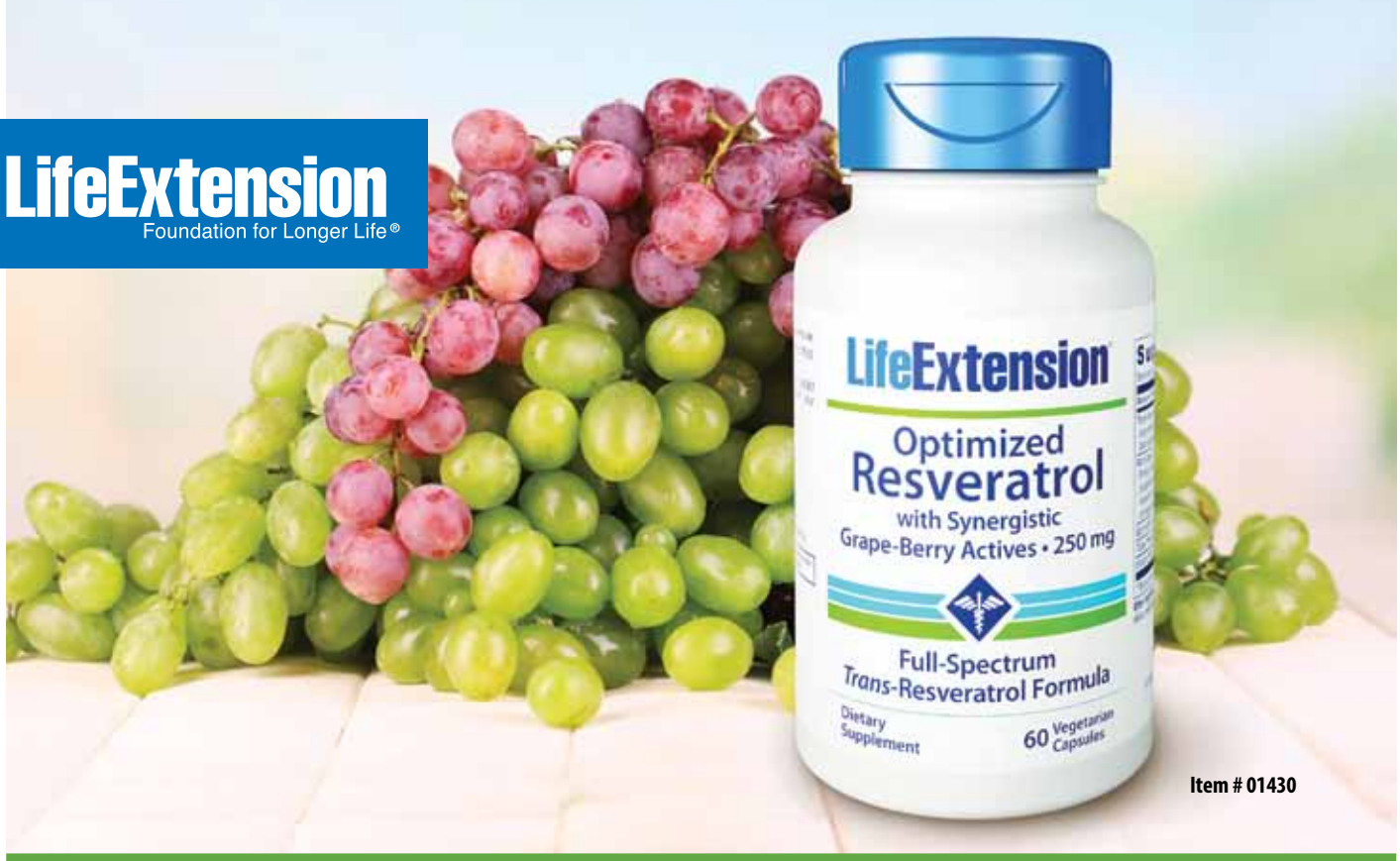

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In **2003**, the **Life Extension Foundation**® introduced a standardized ***resveratrol*** extract shown to favorably alter genes implicated in the aging process—many of the same genes that respond to **calorie restriction**.

Since then, we have identified additional compounds that simulate calorie restriction's ability to trigger youthful ***gene expression***—the process by which genes transmit signals that slow certain aspects of aging.

Compelling evidence reveals that certain compounds found in berries, such as **pterostilbene** and **fisetin**, possess potent "longevity gene" activators that work in synergy with **resveratrol**. For example, **fisetin** (found in strawberries) has been shown to ***stabilize*** resveratrol in the body by shielding it from metabolic breakdown,[1-10] thus extending its beneficial effects.

CAUTION: If you are taking anti-coagulant or anti-platelet medications or have a bleeding disorder, consult your healthcare provider before taking this product.

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Life Extension® members gain access to standardized ***trans*-resveratrol** combined with botanical extracts that favorably influence longevity gene expression. Unlike many commercial formulas, Life Extension standardizes to ***trans*-resveratrol**, which researchers contend is the most active constituent.

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The suggested dose of one capsule a day provides:	
Trans-Resveratrol	250 mg
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Quercetin	60 mg
Trans-Pterostilbene	0.5 mg
Fisetin	10 mg

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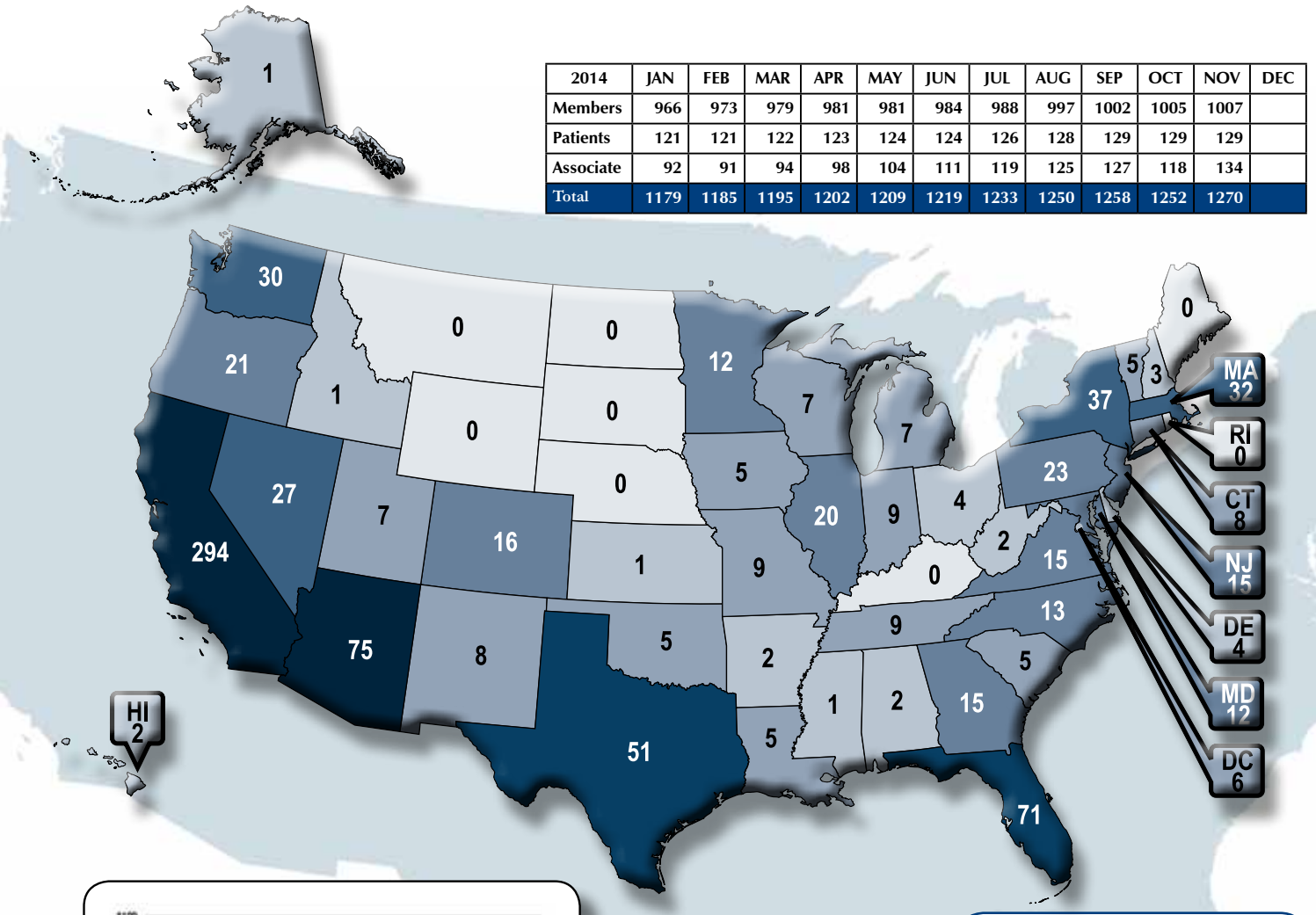
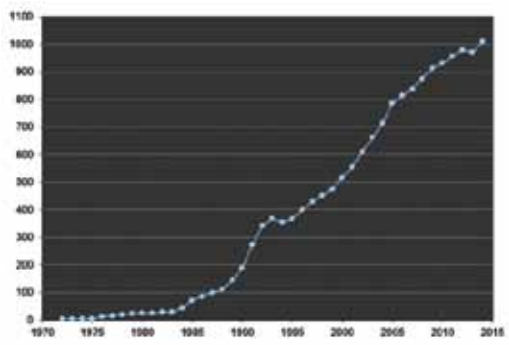
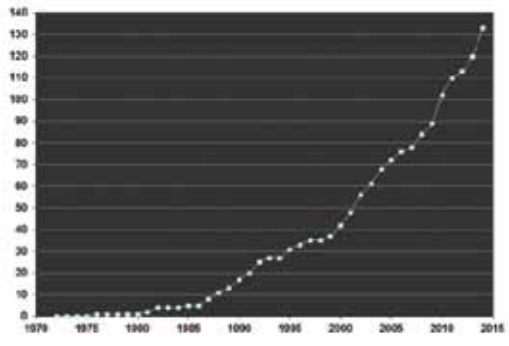
Membership Statistics

2014	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Members	966	973	979	981	981	984	988	997	1002	1005	1007	
Patients	121	121	122	123	124	124	126	128	129	129	129	
Associate	92	91	94	98	104	111	119	125	127	118	134	
Total	1179	1185	1195	1202	1209	1219	1233	1250	1258	1252	1270	





Number of Alcor members



Number of Alcor patients

- 0 Members
- 1–4 Members
- 5–9 Members
- 10–24 Members
- 25–49 Members
- 50–74 Members
- 75+ Members

International

Country	Members	Patients
Australia	10	3
Canada	43	2
Germany	5	0
Hong Kong	1	0
Israel	1	1
Italy	3	0
Japan	2	0
Mexico	4	0
Monaco	1	0
Netherlands	2	0
New Zealand	3	0
Norway	1	0
Portugal	4	0
Singapore	1	0
Spain	3	1
Thailand	3	0
United Arab Emirates	1	0
United Kingdom	23	2
TOTAL	111	9

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AMPK Activator

A New Paradigm in Controlling Aging

AMPK is an *enzyme* that serves as the body's "**master regulating switch**." It inhibits multiple degenerative factors by *revitalizing* aging cells.[1]

Found in every cell,[2,3] **AMPK** promotes ***longevity factors*** that have been shown to extend life span in numerous organisms.[1,4] Increasing AMPK signaling "turns off" many damaging effects of aging, thus enabling cells to return to their youthful vitality.[5]

Life Extension® scientists have compiled years of research to create **AMPK Activator**, a specialized *dual-extract formulation* that supports **AMPK** activation for health optimization. This natural formula supports AMPK enzymatic activities required to safely support a more youthful cellular environment.

Importance of AMPK

Greater **AMPK** (*adenosine monophosphate-activated protein kinase*) activation has been shown to help target damaging factors of aging.[5] Studies show **increased** AMPK activity supports reduced fat storage,[6] new mitochondria production,[7] and the promotion of healthy blood glucose and lipids already within normal range.[4]

Gynostemma Pentaphyllum

An extract of the plant *Gynostemma pentaphyllum* was traditionally used in Asian medicine to promote longevity and scientists now know why — *G. pentaphyllum* promotes **AMPK** activation![8-10] In one of many studies showing a wide variety of benefits, researchers documented a one-inch reduction in **abdominal circumference** in overweight individuals who took **450 mg** daily of *G. pentaphyllum* extract for 12 weeks.[11]

Trans-Tiliroside

Trans-tiliroside, extracted from plants such as **rose hips**, also boosts **AMPK** activation, but triggers different downstream metabolic benefits than *G. pentaphyllum*.[12-14] Among its many benefits, a low human equivalent dose of **56 mg** daily *trans*-tiliroside has been shown by researchers in preclinical studies to promote healthy blood glucose levels and body weight already within normal range.[15]

The suggested daily dosage of **AMPK Activator** is to take two capsules with the first meal of the day and one capsule with the second meal. Three vegetarian capsules provide:

ActivAMP™ *Gynostemma pentaphyllum* extract (leaf)	**450 mg**
Rose hip extract	**1,120 mg**
Standardized to ***trans*-tiliroside**	**56 mg**

Anti-Aging Discovery That Cannot Be Overlooked

Scientists uncovered the cell-energizing effect of **AMPK** in the 1970s. Since then, an exponential volume of data (over 7,500 published studies) has documented the critical role that activated **AMPK** plays in maintaining life-sustaining cellular functions.

Those seeking to meaningfully extend their healthy life span should ensure they optimally activate their cellular **AMPK**. The reason this is so important is that in response to aging, excess calorie consumption, and/or low levels of physical activity, AMPK activity markedly declines.

A targeted way of **reversing** cellular depletion of this critical enzyme is to take the new **AMPK Activator** formula that comprises a dual-extract, plant-based formulation.

A bottle of 90 vegetarian capsules of the new **AMPK Activator** retails for $48. If a member buys four bottles, the price is reduced to **$33** per bottle.

ActivAMP™ is a trademark of Gencor.

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MEETINGS

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The Alcor Life Extension Foundation is a nonprofit tax-exempt scientific and educational organization dedicated to advancing the science of cryopreservation and promoting cryonics as a rational option. Being an Alcor member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day, 365 days a year.

Alcor's Emergency Response capability includes specially trained technicians and customized equipment in Arizona, northern California, southern California, and south Florida, as well as many additional certified technicians on-call around the United States. Alcor's Arizona facility includes a full-time staff, and the Patient Care Bay is personally monitored 24 hours a day.

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This group meets monthly, usually in the third week of the month. Dates are determined by the activity or event planned. For more information or to RSVP, visit http://cryonics.meetup.com/45/ or email Lisa Shock at lisa@alcor.org.

AT ALCOR:

Alcor Board of Directors Meetings and Facility Tours—Alcor business meetings are generally held on the first Saturday of every month starting at 11:00 AM MST. Guests are welcome to attend the fully-public board meetings on odd-numbered months. Facility tours are held every Tuesday and Friday at 2:00 PM. For more information or to schedule a tour, call Marji Klima at (877) 462-5267 x101 or email marji@alcor.org.

CALIFORNIA

LOS ANGELES:

Alcor Southern California Meetings—For information, call Peter Voss at (310) 822-4533 or e-mail him at peter@optimal.org. Although monthly meetings are not held regularly, you can meet Los Angeles Alcor members by contacting Peter.

SAN FRANCISCO BAY:

Alcor Northern California Meetings are held quarterly in January, April, July, and October. A CryoFeast is held once a year. For information on Northern California meetings, call Mark Galeck at (650) 969-1671, (650) 534-6409 or email Mark_galeck@pacbell.net.

FLORIDA

Central Florida Life Extension group meets once a month in the Tampa Bay area (Tampa and St. Petersburg) for discussion and socializing. The group has been active since 2007. Email arcturus12453@yahoo.com for more information.

NEW ENGLAND

CAMBRIDGE:

The New England regional group strives to meet monthly in Cambridge, MA—for information or to be added to the Alcor NE mailing list, please contact Bret Kulakovich at 617-824-8982, alcor@bonfireproductions.com, or on FACEBOOK via the Cryonics Special Interest Group.

PACIFIC NORTHWEST

A Yahoo mailing list is also maintained for cryonicists in the Pacific Northwest at http://tech.groups.yahoo.com/group/CryonicsNW/.

BRITISH COLUMBIA (CANADA):

The contact person for meetings in the Vancouver area is Keegan Macintosh: keegan.macintosh@me.com.

OREGON:

The contact person for meetings in the Portland area is Aschwin de Wolf: aschwin@alcor.org

See also: https://www.facebook.com/portland.life.extension

ALCOR PORTUGAL

Alcor Portugal is working to have good stabilization and transport capabilities. The group meets every Saturday for two hours. For information about meetings, contact Nuno Martins at n-martins@n-martins.com. The Alcor Portugal website is: www.alcorportugal.com.

TEXAS

DALLAS:

North Texas Cryonauts, please sign up for our announcements list for meetings (http://groups.yahoo.com/group/cryonauts-announce) or contact David Wallace Croft at (214) 636-3790 for details of upcoming meetings.

AUSTIN/CENTRAL TEXAS:

We meet at least quarterly for training, transport kit updates, and discussion. For information: Steve Jackson, 512-447-7866, sj@sjgames.com.

UNITED KINGDOM

There is an Alcor chapter in England. For information about meetings, contact Alan Sinclair at cryoservices@yahoo.co.uk. See the web site at www.alcor-uk.org.

If you are interested in hosting regular meetings in your area, contact Alcor at 877-462-5267, ext. 113. Meetings are a great way to learn about cryonics, meet others with similar interests, and introduce your friends and family to Alcor members!

What is Cryonics?

Cryonics is an attempt to preserve and protect human life, not reverse death. It is the practice of using extreme cold to attempt to preserve the life of a person who can no longer be supported by today's medicine. Will future medicine, including mature nanotechnology, have the ability to heal at the cellular and molecular levels? Can cryonics successfully carry the cryopreserved person forward through time, for however many decades or centuries might be necessary, until the cryopreservation process can be reversed and the person restored to full health? While cryonics may sound like science fiction, there is a basis for it in real science. The complete scientific story of cryonics is seldom told in media reports, leaving cryonics widely misunderstood. We invite you to reach your own conclusions.

How do I find out more?

The Alcor Life Extension Foundation is the world leader in cryonics research and technology. Alcor is a non-profit organization located in Scottsdale, Arizona, founded in 1972. Our website is one of the best sources of detailed introductory information about Alcor and cryopreservation (www.alcor.org). We also invite you to request our FREE information package on the "Free Information" section of our website. It includes:

- A fully illustrated color brochure
- A sample of our magazine
- An application for membership and brochure explaining how to join
- And more!

Your free package should arrive in 1-2 weeks. (The complete package will be sent free in the U.S., Canada, and the United Kingdom.)

How do I enroll?

Signing up for a cryopreservation is easy!

Step 1: Fill out an application and submit it with your $90 application fee.
Step 2: You will then be sent a set of contracts to review and sign.
Step 3: Fund your cryopreservation. While most people use life insurance to fund their cryopreservation, other forms of prepayment are also accepted. Alcor's Membership Coordinator can provide you with a list of insurance agents familiar with satisfying Alcor's current funding requirements.
Finally: After enrolling, you will wear emergency alert tags or carry a special card in your wallet. This is your confirmation that Alcor will respond immediately to an emergency call on your behalf.

Not ready to make full arrangements for cryopreservation? Then **become an Associate Member** for $10/month (or $30/quarter or $120 annually). Associate Members will receive:

- *Cryonics* magazine by mail
- Discounts on Alcor conferences
- Access to post in the Alcor Member Forums
- A dollar-for-dollar credit toward full membership sign-up fees for any dues paid for Associate Membership

To become an Associate Member send a check or money order ($10/month or $30/quarter or $120 annually) to Alcor Life Extension Foundation, 7895 E. Acoma Dr., Suite 110, Scottsdale, Arizona 85260, or call Marji Klima at (480) 905-1906 ext. 101 with your credit card information. You can also pay using PayPal (and get the Declaration of Intent to Be Cryopreserved) here: http://www.alcor.org/BecomeMember/associate.html

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