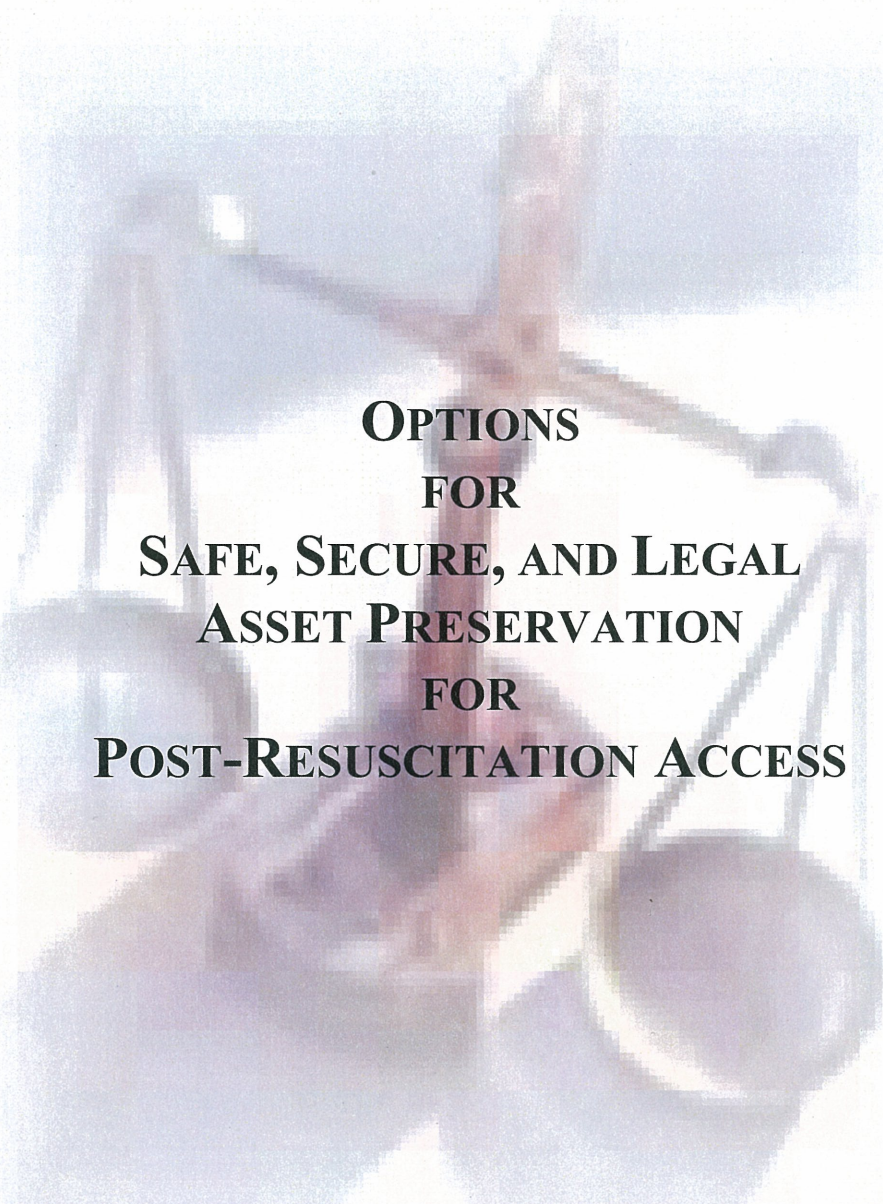


# Cryo-Documentation: Vital Statistics



**OPTIONS  
FOR  
SAFE, SECURE, AND LEGAL  
ASSET PRESERVATION  
FOR  
POST-RESUSCITATION ACCESS**

**Lorraine J. Rhodes, CLA  
Terasem Movement, Inc.  
August 30, 2008**

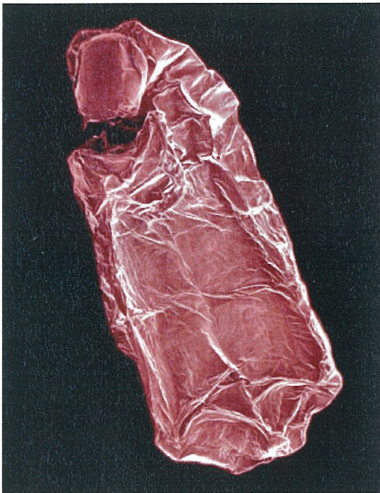
# Cryo-Documentation: Vital Statistics

## Dead or Alive? / "Living Matter"

One of the hottest questions today within the discussions about cryonics<sup>1</sup> is whether a person so preserved is truly and forever lost (dead), or is that person, by some definition or standard of science and law, technically alive as cryonics has merely forestalled a resuscitation until such time when science and technology perfect a viable manner to eradicate that which threatened a person's existence?

An article of particular relevance published in a recent issue of *Science News*<sup>2</sup> may aid in the understanding and support of cryonics where those in biostasis<sup>3</sup> are alive, having made a conscious decision to utilize something instinctively found in nature to ensure survival. The latest advances in cryonics, vitrification<sup>4</sup>, is analogous to what the African fly accomplishes below, where the potentially damaging crystal stage of freezing is bypassed and a subject is taken directly into the glass stage.

### Live Another Day: African insect survives drought in glassy state



READY FOR SPACE. Curled up into a 4 millimeter-long mummy, this fly larva can suspend its life for years, withstanding severe drought and extreme temperatures. D. Tanaka/National Institute of Agrobiological Sciences in Japan

"Some invertebrates, when severely dehydrated, go into a state of suspended animation in which their metabolisms completely cease. When conditions are right, the critters come back to life. The larvae of the African fly (*Polypedilum vanderplanki*) scrounge a living by eating detritus at the bottom of rain puddles but can survive up to 17 years of drought waiting for the next abundant rains." **[Emphasis added].**

"During desiccation, trehalose replaces water in the cellular fluids and is presumed to turn into a glassy state, much like melted sugar will solidify into candy drops. The glassy sugar would keep cellular structures from falling apart."

"Infrared imaging of desiccated larvae showed that trehalose is uniformly distributed throughout their bodies. And when the researchers turned the temperature up, they noticed a peak in the larvae's heat absorption at around 70 degrees Celsius. The peak was characteristic of a phase transition at which solid sugars begin to melt, demonstrating that the sugar had been in a glassy state..."

<sup>1</sup> Cryonics - the practice of using very cold temperatures to stop the dying process when ordinary medicine can no longer sustain life. This is done with the intention of saving a patient's life until a cure for their illness can be found, and means developed to reverse the cryonics process. The technology to reverse cryonics is still theoretical.

<http://alcor.org/FAQs/faq01.html#cryonics> May 22, 2008 12:13PM EST

<sup>2</sup> Castelveccchi, Davide. "Live Another Day: African insect survives drought in glassy state," *Science News* 29 Mar. 2008: 197.

<sup>3</sup> Biostasis - The word is also used as a synonym for cryostasis or cryonics. It is found in organisms that live in habitats that may encounter unfavorable living conditions (i.e. drought, freezing, a change in pH, pressure, or temperature). <http://en.wikipedia.org/wiki/Biostasis> May 16, 2008 10:56AM EST

<sup>4</sup> Vitrification - the combination of rapid cooling and high cryoprotectant concentration to completely avoid ice formation, first suggested in the paper, "Vitrification as an Approach to Cryopreservation" (*Cryobiology* 21, 407-426 (1984)). <http://www.alcor.org/FAQs/faq02.html#vitrification> May 22, 2008 1:51PM EST

## Cryo-Documentation: Vital Statistics

The distinguished Austrian Physicist and Nobel laureate, Dr. Erwin Schrodinger<sup>5</sup>, in his 1944 science classic, *What Is Life?*<sup>6</sup>, defined living matter as that which “evades the decay into equilibrium”. By making a conscious decision to preserve one’s body through the evolving science of cryonics, people are hoping to accomplish just that by thwarting an **irreversible** cessation of life.

More than fifty years later, Schrodinger’s theory is supported by many writers, particularly the respected science fiction writer, James L. Halperin<sup>7</sup>, in his 1998 book, *The First Immortal*<sup>8</sup>, where Mr. Halperin avows, “Such is the beauty of cryogenic suspension: It virtually halts every retrogressive biological effect of time’s passage.” Under Dr. Schrodinger’s definition, and certainly in the case of the African fly, those who are cryogenically preserved, in a state of suspended animation, or in biostasis **are to be regarded as ‘living matter’**.

Also within his insightful book, Mr. Halperin depicts how future developments in nanotechnology<sup>9</sup> may be employed to revive people from biostasis:

“...we’d built a series of replicators and disassemblers/assemblers that seemed suited for biostasis reversal; the first units capable of both dis- and reassembly that were also small enough to penetrate frozen bloodstreams. The D/A’s each contained a tiny computer capable of holding slightly more information than human DNA does. These in turn were connected by acoustic communication devices to a network of much larger central computers.”

In his book, Mr. Halperin skillfully describes a procedure for revival of a vitrified subject through insertion of disassemblers and reassemblers (D/A’s) via “a microscopic perforation in...the chest. The machines received no help from the frozen bloodstream, yet within seconds spread their way though the...veins, arteries, and capillaries. The cryo-protectant removal was accomplished in 128 minutes.”

“The machines returned to their positions, guided by nearly a billion nanocomputers interspersed among them, each a thousand times larger than the D/A’s themselves. (The concoction now weighed only eleven ounces.) This army of machines would require sixteen hours to effect repairs, and to thaw and revive [the vitrified subject]. “

Halperin, James L. *The First Immortal*. New York: Ballantine Books, 1998: 266-270.

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<sup>5</sup> Dr. Erwin Schrodinger - an Austrian - Irish physicist who achieved fame for his contributions to quantum mechanics, especially the Schrödinger equation, for which he received the Nobel Prize in 1933. In 1935, after extensive correspondence with personal friend Albert Einstein, he proposed the Schrödinger’s cat thought experiment. [http://en.wikipedia.org/wiki/Erwin\\_Schr%C3%B6dinger](http://en.wikipedia.org/wiki/Erwin_Schr%C3%B6dinger) April 4, 2008 8:24PM EST

<sup>6</sup> <http://dieoff.org/page150.htm> April 4, 2008 10:26PM EST

<sup>7</sup> James L. Halperin - an American author and businessman. He also authored two futurist fiction books, *The Truth Machine* (1996) and *The First Immortal* (1997), both international science fiction bestsellers that were also optioned as films. [http://en.wikipedia.org/wiki/James\\_L.\\_Halperin](http://en.wikipedia.org/wiki/James_L._Halperin) April 4, 2008 11:00PM EST

<sup>8</sup> *The First Immortal - Halperin, James L. The First Immortal*. New York: Ballantine Books, 1998: 270.

<sup>9</sup> Nanotechnology - refers to a field of applied science and technology whose theme is the control of matter on the atomic and molecular scale, generally 100 nanometers or smaller, and the fabrication of devices or materials that lie within that size range. <http://en.wikipedia.org/wiki/Nanotechnology> April 5, 2008 9:02AM EST