



Newport Biotech Consultants

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On Thinking Outside the Box

By K. John Morrow, Jr. President
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In researching the accompanying article, which was published last year in Genetic Engineering and Biotechnology News, I was astonished to encounter some amazing little critters known as Tardigrades (see photo). Colloquially referred to as water bears, these tiny invertebrates (*Macrobiotus hufelandi*) are about a millimeter, and I guess, pretty ubiquitous throughout our planet.



SEM Microphotograph by L. Michalczyk & L. Kaczmarek, courtesy of www.tardigrada.net

The most fascinating feature of these tiny beasties is that they have evolved a means of surviving total desiccation and can last indefinitely in this condition. Of course it has long been known that viruses and bacterial spores can be maintained in this fashion, but it had never occurred to me (nor, I bet, to you) that a differentiated organisms containing billions of cells and elaborate organs could pull off such a feat.

In September last year, Tardigrades were launched into space aboard a Russian satellite, and sent out in the cold to face the rigors of an outer space vacuum, extreme dehydration, freezing temperatures, weightlessness and blastings from both cosmic and solar radiation. They made it through with flying colors and came

home to reproduce.

The secret of their success under these conditions (and I'm sure there are other factors) appears to be the use of the sugar trehalose which they produce as a cryoprotectant and various genetic factors.

I find it mystifying that the biotechnology industry hasn't brought forth a company intent on pursuing this strategy as a way of eliminating the need to freeze cell lines in liquid nitrogen. While it would certainly be a challenge, it could be worth billions, and lead to many other applications such as preservation of everything from plant seed stocks to mammalian embryos.

Just a thought for this month.

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