

From National Geographic magazine. July 2006, US edition.

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TAKING A METABOLIC TIME-OUT

In science fiction, astronauts go unto suspended animation to kill time crossing interstellar space. Now everyday people are getting interested in suspended animation. The Wall Street Journal recently reported that rich folks are making special funeral arrangements: They name themselves as their own heirs, get frozen, and hope to thaw out sometime in the future to reclaim their millions (plus interest).

It's not a workable idea yet. People, like certain kinds of pasta and salad, don't freeze well. Just for starters, ice crystals in your tissues produce a horrible case of freezer burn.

There are, however, some workable plans in nature. "Metabolic flexibility" allows a sort of suspended animation throughout the animal kingdom: sharks that can survive out of water, seemingly dead but merely quiescent; squirrels that hibernate at temperatures just below freezing, breathing only a few times a minute.

Oxygen is fundamental in helping animal cells turn food into energy. But it's also volatile. Being alive is a bit like being on fire. Oxygen-based metabolism creates radical oxygen species, sometimes called free radicals: molecules that batter your cells and play a key role in aging. A mouse placed in an enclosure with an atmosphere of pure oxygen will be dead in three to four days. Premature babies can suffer damage from oxygen-rich air delivered by ventilators.

Mark Roth, a biologist with the Fred Hutchinson Cancer Research Center in Seattle, compares oxygen to rocket fuel: "It can take you to the moon, but too much too fast, and you burn out."

Roth has come up with a strategy for neutralizing oxygen burn in cells. Our bodies make hydrogen sulfide, which, he hypothesizes; helps keep oxygen in check by occupying cellular spaces that the oxygen would normally inhabit. The hydrogen sulfide, Roth says, acts like a "chemical warfare agent in our bodies to regulate the degree to which we burn."

He experienced by putting a mouse in a chamber filled with hydrogen sulfide. Its respiration dropped from 120 to 10 breaths a minute, it used ten times less oxygen, and its body temperature dropped 40 degrees. Six hours later, exposed to fresh air, it warmed up and was back to normal.

"We turned it into a reptile and made it come back," Roth said.

Where will this research lead? Maybe it will keep donated organs alive longer before surgery. Soldiers wounded on the battlefield or victims in traffic accidents might stay alive longer while awaiting transport to a hospital. But no one knows exactly where science will take us. Someday, hibernation might become fashionable in certain social circles.

Many of us need to slow down.

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