

ANTI-FREEZE FOR YOUR VEINS?

Two hundred years ago a suggestion that virulent diseases could be eliminated with injections of a modified version of the disease itself, would have classified you as a practitioner of witchcraft.

Yet in 1798 Dr. Edward Jenner proved his vaccine could prevent small-pox. Today that dreaded disease is a rarity everywhere. Other vaccines have been developed that have markedly reduced the incidence of cholera, typhoid, tetanus, tuberculosis, polio, influenza and measles.

Vaccine therapy works on the principle of stimulating the inherent healing powers of the body to conquer infection by increasing available anti-bodies to attack invading bacteria or viruses.

Since you don't get drowned today for practising witchcraft (even after my two years experience in Haiti) I am going to state what might have been even more dangerous back in the 1700s -- if they could have even understood what I was talking about -- that some day an injection that will be developed to prevent or delay the human body from freezing in the cold. And, once injected the body will be protected for life.

Here is why one I be so bold. Among the fish that can stay year-round in the supercold waters of the North Atlantic are two unique species: the ocean pout and the winter flounder. These fish can stay in water that is below freezing, although such cold is a sure killer for all other fish. Even the hardy ocean salmon moves out when temperatures approach the freezing level of 32 degrees F or 0 degrees C. This dowdy flatfish has within that dull body an antifreeze protein that lowers its blood's freezing temperature by retarding the growth of ice-crystals!

With gene manipulation now occurring in laboratories around the world it is just a matter of time until that thermal gene will be transferrable to other living organisms. Memorial University's Marine Sciences Research Laboratory high on a barren Atlantic oceanside cliff in Newfoundland (where I saw my first giant squid years ago, pickled in formaldehyde) is blazing a trail.

Governments would never approve of it? Sorry. Six months ago (January 1989) the U.S. Government gave scientists permission to transfer foreign genes into human beings.!! Sure there are chances being taken. But remember that someone in America is dying from cancer every minute (485,000 last year) and they must risk taking risks. Gene manipulation appears worthwhile.

But back to organic anti-freeze: In that Newfoundland laboratory, scientist Arnie Sutterlin is currently working to make such a development reality for local hard-pressed fishermen. He wants to make Atlantic salmon to survive and thrive in icy Newfoundland winter waters where only the blood chemistry of the winter flounder survives when water temperatures drop below freezing.

Sutterlin is taking up the needle, not only for fading chasers of wild salmon but also for the future of aquaculture along the whole Canadian east coast. No use raising pens of farm-bred salmon if an icy wave can kill them all overnight.

According to fish physiologist Garth Fletcher of the same institution, the flounders' liver was responsible for the excretion of this biological magic. So the answer was simple: find "the anti-freeze gene".

Thanks to the wonders of biotechnology, the project is well underway. They have implanted the anti-freeze gene in Atlantic salmon eggs. Now not only are such scientists trying to make salmon grow larger, more rapidly at lower cost but they want them to grow where they have never grown before -- in freezing water! Such gene-manipulated eggs would hatch into salmon which would have the anti-freeze gene in every body cell.

Of course this didn't just happen. Fellow scientist, Malaysian-born Choy Hew had previously been working on flounder protein structure involved with the then-unknown anti-freeze gene in 1981. With modern communications he had learned that scientist, Peter Davis of Queen's University in Kingston had also successfully isolated the first of the flounder's 40 anti-freeze genes. The total package started to come together. Later intestinal bacterium known as E. coli was injected with the flounders' alien gene. Generations of non-union bacteria, working 24-hours a day, produced millions of copies of the desired gene.

Today Fletcher and his colleagues believe that ten percent of his gene-manipulated salmon have "taken" the gene. If the gene can be transferred naturally as they reproduce a new more sophisticated salmon will ply the North Atlantic. Of course, this has not yet been proved but the process has come a long way in a relatively short time. Nature might have taken a billion years to isolate and transfer the anti-freeze by accident.

Biologist Kenneth B. Storey of Carleton University in Ottawa has recently found another animal -- the painted turtle -- that regularly freezes in winter and thaws out in the spring with no harmful results. It appears that the turtle knows how to dehydrate by removing damaging freezing water from its cells which would normally puncture and fatally damage blood cells. When warm weather returns, the shrunken cells absorb the thawing water and revive.

Storey is taking another tack: he believes that someday this knowledge may make it possible to refrigerate human transplant organs for weeks or months. He does not believe it will be possible to freeze a whole human body because of the complexity involved. But then 20 years ago he wouldn't have believed what he is doing now.

Another astounding feat in the same field has just now been accomplished at the National Research Council's Plant Biotechnology

Institute in Regina. They have succeeded in taking the flounder gene mentioned above and transplanting it into the well-known canola (or rapeseed) plant! Soon on the prairie "freezing" may not always mean 0°C or 32°F .