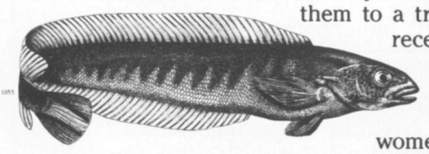
Biomedicine

Can fish oil prolong pregnancy?

Fish-oil capsules taken during the third trimester of pregnancy may extend gestation, according to a new study. If scientists confirm that preliminary finding, doctors may one day prescribe fish-oil supplements or recommend a fish-rich diet for pregnant women at risk of delivering a premature baby.

Epidemiologist Sjúrdur F. Olsen at the University of Aarhus in Denmark and his colleagues began their experiment with the knowledge that women living in the harsh Faroe Islands — a group of Danish islands in the North Atlantic — experience longer-than-average pregnancies. The team speculated that the islanders' diet, which includes a lot of fish, plays a role in extending gestation by several days. Olsen thinks the omega-3 fatty acids in fish may influence the onset of labor.

To test that theory, the team recruited 533 healthy Danish women in their third trimester. They randomly assigned 266 of them to a treatment group that received daily capsules containing omega-3 fatty acids. A control group of 136 women got daily capsules containing olive oil. The remaining 131 women served as a second control group and received no capsules.



Pregnancies in the fish-oil group lasted an average of four days longer than those in the olive-oil group, the researchers found. Fish-oil babies also averaged about 107 grams heavier than their olive-oil peers. Olsen says fish-oil babies put on the weight simply because they stayed in the womb longer.

Pregnancies in the control group that got no capsules lasted about 2.4 days longer than those in the olive-oil group. Olsen says women in the no-treatment group may have been adding fish to their diet during the study because of the perceived health benefit of a fishy diet. By contrast, the olive-oil group didn't know whether their capsule contained fish or olive oil and thus were less likely to boost their fish consumption.

When the researchers divided the women into groups based on how much fish they included in their diet at the study's start, they discovered that women who reported consuming the least amount of fish showed the biggest response to fish-oil supplementation. Women in that group had pregnancies that lasted more than a week longer than women in the same low-fish category who were assigned to the olive-oil group.

Nobody understands the mechanism behind fish-oil's action, but Olsen speculates that the omega-3 fatty acids in fish may affect the body's production of prostaglandins, a group of hormone-like substances involved in pregnancy duration.

The new study, reported in the April 25 LANCET, focused on healthy women, Olsen notes. So scientists don't know if fish-oil capsules would benefit women at risk of preterm delivery. The Danish team plans a second fish-oil study that will enroll women with a history of premature delivery, he says. Babies delivered prematurely often suffer from serious health problems.

Until the additional data come in, Susan E. Carlson, a fish-oil researcher at the University of Tennessee in Memphis, warns pregnant women against popping fish-oil capsules. Such supplementation might cause complications, she speculates.

Another fish-oil expert, Artemis P. Simopoulos of the Center for Genetics, Nutrition and Health in Washington, D.C., agrees. However, Simopoulos believes that further research will eventually prove fish oil's benefits. While she shies away from recommending fish-oil tablets, she says pregnant women can increase their consumption of fish. Nobody knows whether that strategy will prevent preterm labor, Olsen says. However, eating more fish will — at the very least — provide a delicious addition to help vary the diet, he says.

Materials Science

Elizabeth Pennisi reports from San Francisco at the spring meeting of the Materials Research Society

Super hot, superconducting thin film

By making copper-oxide materials one layer of atoms at a time, Japanese materials scientists have created thin films that hint at record-high transition temperatures for superconductors.

In recent years, researchers have failed to push transition temperatures — above which a material ceases to conduct electricity with no resistance — much higher than 125 kelvins. So like other scientists, Tomoji Kawai of Osaka University and his co-workers have sought a better understanding of superconductivity by controlling ever more precisely the structure and composition of copper-oxide thin films.

For the research, this Japanese group uses a technique called laser molecular-beam epitaxy. First, the researchers put the ingredients for the superconductor into a reaction chamber. Atoms knocked off these ingredients by the laser then settle onto a substrate and build up into a thin film. The researchers control the chemical makeup of the film by varying the timing and number of pulses aimed at each ingredient.

The researchers can stack up any number of layers of copper-oxide molecules. They have discovered that they can adjust the spacing between the layers of this so-called infinite-layer structure by sandwiching calcium and strontium atoms in different proportions between the layers. These sandwiched atoms prompt oxygen to squeeze in as well. The addition of oxygen improves superconducting properties, says Kawai. He and his colleagues also found that lowering the temperature of the film's substrate improves transition temperatures.

Thus, by inserting calcium as well as strontium between the layers and lowering the substrate temperature, they observed reliable indications of superconductivity up to 120 kelvins, he reports. That transition temperature represents a record for these layered copper-oxide materials, he adds. Kawai and his group have also observed unusual magnetic and resistance behavior in the film at 180 kelvins. But before he will believe that those observations suggest higher superconducting transition temperatures, "I need to see 150 kelvins," Kawai says.

Polymeric protection for valuables

In the war against corrosion and decay, gaseous sulfide and chloride compounds are guerrillas that infiltrate even protected environments. In clean rooms used in electronics manufacturing or in museum storage cases, these substances may exist in concentrations of just a few parts per billion; yet they can still do damage, says John P. Franey of AT&T Bell Laboratories in Murray Hill, N.J. Eventually, they will tarnish a silver surface or pit an electronic device.

The polyethylene film that curators often use as protective wrapping for artifacts "is merely a piece of cheesecloth with holes that you cannot see," he adds. And another type of protection, activated charcoal, only temporarily captures these molecular terrorists, releasing them when temperatures rise.

To halt such corrosion, Franey invented a "reactive" polymer system. When making a polymer film or resin, for example, he chemically inserts scavenger molecules that neutralize any corrosive gas seeping through the polymer. "It's a copper-like material that is bound up in the polymer," he explains.

So after five years in a reactive polymer bag, a silver spoon looked as if it had been polished that day, while a similar spoon not bagged for that time was black with tarnish, he reports. The polymer darkens as pollutants exhaust its scavenging ability, but Bell Labs' studies show that a bag no thicker than a plastic garbage bag would last about 30 years before needing to be replaced. Other polymers made with this technology, called Intercept, protect sensitive electronic devices from electrostatic discharge, Franey adds.