

Searching out how a severe diet slows aging

Toxicologists want to redefine aging. While some people remain spry, alert and relatively healthy into their 90s, others succumb to degenerative ailments in their 60s or earlier. Since chronological age offers an unreliable gauge of senescence, 14 research teams are now examining thousands of well-cared-for mice and rats — half of them receiving just 60 percent of what the others eat. The rationale: Because studies have shown that restricted diets can extend the life of rodents, age-related biomarkers of disease and degenerative change should vary between the well-nourished but chronically hungry animals and their shorter-lived, full-fed littermates.

The National Institute on Aging, which funds this biomarkers search, has just announced details on one of the first products of its program — a preliminary catalog of age-related tissue abnormalities in four strains of mice. “The biggest surprise to me is just how widespread this [diet restriction] effect is,” says study director Roderick T. Bronson at the Agriculture Department’s Human Nutrition Research Center on Aging at Tufts University in Boston.

Previous studies, generally done in just one or two rodent strains, found that chronically hungry animals develop

Although preliminary, these findings raise questions about the wisdom of relying on vessel-dilating drugs for people like George, who have arteries choked with plaque, Wallace says. If his team’s findings are confirmed, doctors might reduce their patients’ risk by turning to treatments that provide longer-lasting relief — such as bypass surgery, in which surgeons shunt blood around a clogged coronary artery.

Wallace emphasizes that his study remains preliminary, however, and may not result in altered treatment for years. Indeed, the new study should not discourage people from continuing nitroglycerine therapy, Wallace asserts. “It’s a critical medication that is vital to their survival.”

If future research solidifies the link between free radicals and heart damage, researchers might test antioxidants such as vitamin E to see if they protect the heart from long-term injury, adds David Janero of Ciba-Geigy Corp. in Summit, N.J. However, the road to antioxidant therapy remains murky. For example, while one preliminary study showed vitamin E protects bypass-surgery patients from heart damage (SN: 11/24/90, p.333), other research on the vitamin’s heart-protection prowess has yielded inconclusive results.

— K.A. Fackelmann

fewer tumors and kidney problems. But nobody examined the whole range of degenerative changes that occurs throughout tissues, notes Bronson.

He and USDA colleague Ruth D. Lipman compared the occurrence and timing of 136 different tissue changes — representing all organs — in 1,100 mice, half of them on the restricted-calorie diet. Diet restriction postponed or diminished nearly all of these changes, the pair will report later this year in *GROWTH, DEVELOPMENT AND AGING*.

For instance, full-fed mice typically die at about 25 months. But among females in this group surviving to 30 months of age, all possessed tumors — some multiple tumors. By contrast, just 17 percent of the diet-restricted females had tumors. Diet differences produced similar changes in the male mice.

The Boston scientists conclude that not only do the chronically hungry mice live 15 to 50 percent longer (depending

on the breed) than hunger-sated littermates, but they also remain healthier. The very lean rats also remain livelier and look better, Bronson says.

These findings “emphasize the universality or global effect of dietary restriction” — both within a single animal and across varying breeds, says Arlan Richardson of Audie Murphy VA Hospital in San Antonio. And “while there’s still a question of whether any rodent study will translate to long-lived humans,” he says, the diet restriction’s global effects “provide more evidence that they will be applicable to humans.”

What explains a restricted diet’s anti-aging effects? Ronald W. Hart, who heads FDA’s National Center for Toxicological Research in Jefferson, Ark., reports that studies from the biomarkers program at his lab indicate that dietary restriction protects DNA from damage (double-strand breaks), increases enzyme-mediated repair of DNA and significantly reduces the expression of proto-oncogenes — genes that when altered can cause cancer.

— J. Raloff

No treaty in sight at climate negotiations

Negotiators have now consumed half the 16 months allotted for drafting an international treaty addressing global warming. But with a June 1992 deadline looming ever closer, they still have little to show for their work.

During the most recent round of talks in Nairobi last month, delegates from around the world had hoped to hammer out a basic negotiating text to take home for examination before the next session in Geneva in December. But after two weeks, delegates left the Kenyan capital without the expected document, raising concern that they will not have a strong treaty ready for signing at a major United Nations conference in Brazil next year.

During the Nairobi discussions, the United States remained firm in its opposition to setting specific targets and timetables for limiting emissions of carbon dioxide—a position that sets it apart from almost all other industrialized countries.

The world’s richest nations, excepting the United States, now present a more unified front than earlier this year, says Scott A. Hajost, international counsel for the Washington, D.C.-based Environmental Defense Fund, who observed the meeting. “In appearances, you’ve got Japan lining up more with the Europeans,” he says. In general, these countries call upon the developed nations to stabilize their emissions of carbon dioxide at 1990 levels by the turn of the century.

At a briefing last week, the U.S. chief negotiator at Nairobi, Robert Reinstein, downplayed the differences between the United States and other industrialized nations, spotlighting instead the split between the globe’s north and south. At

Nairobi, developing countries expressed growing insistence that the treaty guarantee substantial financial and technical assistance to help the less developed nations reduce their greenhouse gas emissions.

Cornelia Quennet, the principal negotiator for Germany, says developing and developed countries have quite different ideas on financial support the poorer nations should receive. “The amount of money they imagine [receiving] is just not feasible,” she told *SCIENCE NEWS*. However, she notes that a prior treaty, designed to protect the ozone layer, resolved similar assistance issues.

The September meeting was the third out of five scheduled negotiating rounds, which started in Washington in February (SN: 3/30/91, p.200). Procedural matters took up the initial session and part of the second, so the Nairobi talks offered the first forum wholly devoted to negotiations.

Although the United States did not waver in its opposition to strict commitments, it explained this stance more fully than previously. Reinstein stated that economic analyses indicate the United States would need to spend more than other nations to reach emissions targets, given its dependence on domestic coal.

However, a report from the National Academy of Sciences, released in April, concludes “the United States could reduce its greenhouse gas emissions by between 10 and 40 percent of the 1990 levels at a very low cost.” A major portion of these cheap actions would specifically reduce carbon dioxide emissions.

— R. Monastersky