Deep Down, Exercise Helps Keep You Young

Take a good look at those runners in this month's Boston Marathon—you may be seeing them around for a long time. New research suggests that phrase “running for your life” may apply literally when it comes to endurance athletes such as marathoners, whose exercise habits seem to have anti-aging effects deep down at the cellular level. It's among the most intriguing findings from a flurry of new studies showing how exercise contributes to healthy aging (see story below).

Publishing their results in Circulation, Ulrich Laufs, MD, of Saarland University in Germany and colleagues compared signs of aging on the cellular level among active and sedentary subjects in two age groups. The younger group, in their 20s, consisted of professional track-and-field athletes—mostly on the national team, training about 45 miles a week—and sedentary individuals of the same age. The older group included middle-aged marathoners and triathletes—average age 51, with a typical training regimen of 50 miles a week—and their couch-potato peers.

Even before sampling the participants’ white blood cells for testing, researchers could see a difference in the older marathoners. Christian Werner, MD, a co-author of the study, recalled in an interview, “It was striking to see in our study that many of the middle-aged athletes looked much younger than sedentary control subjects of the same age.”

Those apparent differences persisted right down to the cellular level, when scientists measured biological—as opposed to chronological—aging. They compared the lengths of telomeres, caps on the end of DNA strands that get snapped when cells divide and replicate. Shorter telomeres are a sign of biological aging; the discovery of telomeres' function earned the 2009 Nobel Prize in medicine. (The omega-3s in fish oil may also protect telomeres in heart patients—see page 1.)

The telomeres of both younger groups were about the same length. Researchers speculated that the study population may have been too small to detect subtle differences between the young athletes and sedentary controls. But the difference in the older athletes was striking. At the telomere level,

Exercise Improves Your Odds of Healthy Aging, Bones and Brain

Still need a nudge to get going? A quartet of new studies in the Archives of Internal Medicine should provide a scientific shove, out of your easy chair and into an exercise regimen.

Exercise has previously been linked to beneficial effects on arthritis, falls and fractures, heart disease, lung disease, cancer, diabetes and obesity, according to Jeff Williamson, MD, MHS, and Marco Pahor, MD, of University of Florida-Gainesville, in an accompanying commentary. “Regular physical activity has also been associated with greater longevity as well as reduced risk of physical disability and dependence—the most important health outcome, even more than death, for most older people.” These new findings, they add, “move the scientific enterprise in this area further along the path toward the goal of understanding the full range of important aging-related outcomes for which exercise has a clinically relevant impact.”

Midlife Exercise Linked to Better Health in Later Years

The first new finding is the broadest: Exercise now to be healthier later. Among women who live to age 70 or older, those who regularly participated in physical activity during middle age appear more likely to be in better overall health.

Qi Sun, MD, ScD, of the Harvard School of Public Health, and colleagues analyzed data from 13,535 participants in the Nurses' Health Study. The women reported their physical activity levels in 1986, at an average age of 60. Among those who had made it to age 70 or older as of 1995 to 2001, those who had higher levels of physical activity at the beginning of the study were less likely to suffer chronic diseases, heart surgery or any physical, cognitive or mental impairments. Only 1,456 women qualified as “successful survivors,” meaning they reached 70 free of cognitive and physical disabilities and 10 chronic conditions.

The most-active one-fifth of the women were nearly twice as likely to be “successful survivors” compared to the most sedentary group. Even those in the middle in activity level improved their chances of a healthy old age by 37%. Successful survivors walked 32% more and had overall higher physical activity levels.

Exercise Strengthens Bones, Reduces Falls

Another way exercise can improve your odds of aging well is to strengthen your bones and reduce the risk of falls. In a second study, women age 65-plus assigned to an exercise program for 18 months were found to have to have denser bones and
On Patriots Day, April 19, the 114th Boston Marathon will involve up to 25,000 runners in the world’s oldest annual marathon. The 2010 race will mark John Hancock Financial’s 25th year as principal sponsor. Once again, too, the marathon field will include several hundred participants in the Tufts President’s Marathon Challenge, which raises funds to support nutrition, medical and fitness programs. This year’s goal is $400,000. See <www.tuftsmarathonchallenge.com>.

the 50-ish marathoniens were barely “older” than the 20-somethings, with telomeres only about 10% shorter. Overall, telomere loss in the middle-aged runners was reduced by about 75%. The sedentary 50-year-olds, by contrast, had telomeres 40% shorter than the younger group.

Dr. Werner cautioned, “Notably, this calculation is limited by the cross-sectional design, the small sample size and the selection of rather extreme groups in the study, but it does prove the principle that long-term intense exercise goes along with a protection of telomeres. The extent of this effect may vary between individuals and depend on a number of other factors such as lifestyle.”

“This is direct evidence of an anti-aging effect of physical exercise,” said Dr. Laufs. “Our data improve the molecular understanding of the vascular-protective effects of exercise, and underline the potency of physical training in reducing the impact of age-related disease.”

A newly published study in Mechanisms of Ageing and Development adds support to the idea that a high level of aerobic fitness protects against the damage of advancing years. Scientists at the University of Colorado led by Thomas J. LaRocca tested four groups of younger (ages 18-32) and older (55-72) endurance-trained and sedentary adults, totaling 57 participants. To more objectively assess fitness, the researchers determined the subjects’ maximum aerobic capacity by measuring their oxygen consumption during maximal exercise and compared that to telomere length. They found that fitness in middle age and beyond was associated with longer telomeres—a reduction in the biological effects of aging.

The findings may help explain why exercise seems to help keep you youthful. “Our results indicate that telomere length is preserved in healthy older adults who perform vigorous aerobic exercise and is positively related to maximal aerobic exercise capacity,” LaRocca and colleagues concluded. “This may represent a novel molecular mechanism underlying the ‘anti-aging’ effects of high aerobic fitness.”

But do you have to run marathons to turn back the clock? The answer isn’t clear, said Dr. Werner: “One can only speculate whether any form of exercise that is regularly performed over a long period of time” would benefit telomeres. In any case, given the multiplicity of ways keeping active helps keep you young, becoming more physically active seems the surest way to outrun Father Time.

TO LEARN MORE: Circulation, Dec. 15, 2009; abstract at <circ.ahajournals.org/cgi/content/abstract/120/24/2439> . Mechanisms of Ageing and Development, online ahead of print; abstract at <dx.doi.org/10.1016/j.mad.2009.12.009>.

Resistance Training May Boost Cognitive Skills in Older Women

Could weight-lifting and other resistance-training exercises help keep your brain sharp as you age? Another study found that a year of once- or twice-weekly resistance training not only strengthened the muscles of older women but also improved some cognitive functions.

Teresa Liu-Ambrose, PhD, PT, of Vancouver Coastal Health Research Institute and the University of British Columbia, and colleagues studied 155 women age 65 to 75. Participants were randomly assigned to participate in resistance training once a week or twice a week or to twice-weekly balance and tone training, a control group. After a year, women in both resistance training groups significantly improved their scores on tests of selective attention (maintaining mental focus) and conflict resolution.

Active Elderly at Reduced Risk of Cognitive Impairment

In another study suggesting exercise helps keep you in shape above your neck as well as below, German researchers reported a link between moderate or high physical activity and lower risk of cognitive impairment in older adults. Thorleif Etgen, MD, of Technische Universität München and colleagues examined physical activity and cognitive function in 3,903 participants over age 55 for two years.

At the beginning of the study, 418 participants had cognitive impairment. After two years, 207 of the remaining unimpaired subjects developed cognitive impairment. People who were moderately active at the start of the study were less than half as likely as sedentary participants to develop cognitive impairment, and those with the highest activity level were even less at risk.

Looking ahead, Drs. Williamson and Pahor announced a clinical trial that could provide more definitive results: The Lifestyle Interventions and Independence for Elders (LIFE) study will follow 1,600 sedentary seniors, randomly assigned to either an exercise program or a health-education control group, for four years.
