Genetics May Affect How Older Adults Respond to Exercise

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New research suggests why some older adults who exercise have better physical function than others. Surprisingly, researchers found that an enzyme involved in blood pressure regulation may also influence how the body responds to exercise. The findings, by researchers at Wake Forest University School of Medicine and colleagues, are reported today in the Journal of the American Medical Association.

“Our results reinforce the importance of exercise, but also may explain a mechanism for why it seems to benefit some individuals more than others,” said Stephen Kritchevsky, Ph.D., professor of gerontology at Wake Forest, who led the study.

The study is the first to show that a gene that controls levels of angiotensin converting enzyme (ACE) in the body may be associated with physical function in older adults.

The researchers found that older exercisers who inherited a gene combination associated with the lowest ACE production were 45 percent more likely to develop difficulties with climbing stairs or walking a quarter-mile than exercisers with gene combinations associated with higher levels of ACE.

“Overall, ACE genotype seems to be associated with how well activity helps preserve function,” said Kritchevsky. “This finding may offer new opportunities to explore treatments to help older adults maintain their function.”

The results are from the ongoing Health Aging and Body Composition Cohort Study, conducted in the metropolitan areas of Memphis, Tenn., and Pittsburgh, Pa. The study involves 3,075 well-functioning, community-dwelling adults ages 70 through 79. Participants were enrolled in 1997 and 1998.

The current data are from 2,966 participants who were followed for up to 4.1 years. About a third (31.3 percent) of the group was active, burning more than 1,000 calories a week in exercise; the others were inactive. The researchers found that the exercisers were significantly less likely (33 percent) to report mobility problems than the non-exercisers.

More than a third of the United States population who are 70 and older report having difficulty walking a quarter-mile or climbing 10 stairs. Previous research has shown that these mobility difficulties often proceed to physical disability. Older adults reporting these difficulties are at four times the risk of entering a nursing home and three times the risk of dying over a two-year period compared with those reporting no difficulty.

“Research has consistently found that exercise is associated with lower risk for physical decline,” said Kritchevsky. “But despite exercise’s benefit, individual responses vary and our current findings about the ACE genotype may help explain why.”

The same ACE gene combination associated with better function in exercising older adults has been associated with superior muscle strength and power in young elite athletes. The current study was designed to test whether ACE production also affects physical function in older exercisers.

The gene that controls ACE production can be inherited in three different combinations. Only about 19 percent of study participants had

the combination associated with lower ACE production and did not benefit as much from exercise as others. However, they still did better than those who didn't exercise.

"The results underscore the need to learn more about how the ACE system influences human health," Kritchevsky said.

Source: Wake Forest University School of Medicine

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