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Scientists find genetic mechanism linking aging to specific diets

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Your best friend swears by the Paleo Diet. Your boss loves Atkins. Your sister is gluten-free, and your roommate is an acolyte of Michael Pollan. So who's right? Maybe they all are.

In new research published this month in *Cell Metabolism*, USC scientists Sean Curran and Shanshan Pang identify a collection of genes that allow an organism to adapt to different diets and show that without them, even minor tweaks to diet can cause premature aging and death.

Finding a genetic basis for an organism's dietary needs suggests that different individuals may be genetically predisposed to thrive on different diets – and that now, in the age of commercial gene sequencing, people might be able to identify which diet would work best for them through a simple blood test.

"These studies have revealed that single gene mutations can alter the ability of an organism to utilize a specific diet. In humans, small differences in a person's genetic makeup that change how well these genes function, could explain why certain diets work for some but not others," said Curran, corresponding author of the study and assistant professor with joint appointments in the USC Davis School of Gerontology, the USC Dornsife College of Letters, Arts and Sciences, and the Keck School of Medicine of USC.

Curran and Pang studied Caenorhabditis elegans, a one-milimeter-long worm that scientists have used as a model organism since the '70s.

Decades of tests have shown that genes in C. elegans are likely to be mirrored in humans while its short lifespan allows scientists to do aging studies on it.

In this study, Curran and Pang identified a gene called alh-6, which delayed the effects of aging depending on what type of diet the worm was fed by protecting it against diet-induced mitochondrial defects.

"This gene is remarkably well-conserved from single celled yeast all the way up to mammals, which suggests that what we have learned in the worm could translate to a better understanding of the factors that alter diet success in humans," Curran said.

Future work will focus on identifying what contributes to dietary success or failure, and whether these factors explain why specific diets don't work for everyone. This could be the start of personalized dieting based on an individual's genetic makeup, according to Curran.

"We hope to uncover ways to enhance the use of any dietary program and perhaps even figure out ways of overriding the system(s) that prevent the use of one diet in certain individuals," he said.

Provided by University of Southern California