https://doi.org/10.1027/1864-9335/a000535

Electronic Supplementary Material 1

Experimental Stimuli

To ensure that effects were not specific to the subject of the news articles used in the study, we randomly presented one of the three articles below. Note that gendered pronouns were adjusted according to the randomly assigned scientist gender condition:

Against the tide: Fish quickly adapt to lethal levels of pollution

Evolution is allowing some urban fish to survive in a lethal, human-altered environment, according to new results by Professor Davis from the University of Vermont.

While environmental change is outpacing the rate of evolution for many other species, Dr. Davis found that Atlantic killifish living in four polluted East Coast estuaries turn out to be remarkably resilient, having adapted to levels of highly toxic industrial pollutants that would normally kill them.

“We found that killifish were up to 8,000 times more resistant to this level of pollution than other fish”, he says. “I wondered what makes Atlantic killifish so special, and found extremely high levels of genetic variation, higher than reported for any other vertebrate.” The more genetic diversity, the faster evolution can work. “That's one reason insects and weeds can quickly adapt and evolve to resist pesticides, and pathogens can evolve quickly to resist drugs created to destroy them”, he says.

"Some people will see this as a positive and think, 'Hey, species can evolve in response to what we're doing to the environment!'" said Dr. Davis. "Unfortunately, most species we care about preserving probably can't adapt to these rapid changes because they don't have the high levels of genetic variation that allow them to evolve quickly."

He sequenced the genomes of nearly 400 Atlantic killifish from 4 different polluted and non- polluted sites in the northeast. At the genetic level, the tolerant Atlantic killifish populations evolved in very similar ways. “This adaptation suggests that these fish already carried the genetic variation before the sites were polluted, and that there may only be a few evolutionary solutions to pollution, he says.

"If we know the kinds of genes that can confer sensitivity in another vertebrate animal like us, perhaps we can understand how humans, with their own mutations in these important genes, might react to these chemicals," he says.

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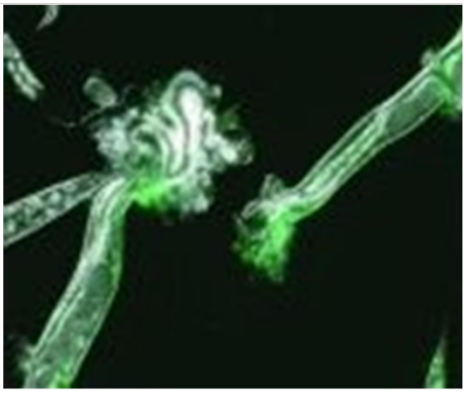
Genes for age-related cognitive decline found in adult worm neurons



A research team from University of Vermont led by Professor Davis has developed a new method for isolating neurons from adult worms. Dr. Davis and his colleagues identified genes important for age-related cognitive declines in memory in worm neurons that could point the way toward therapies to extend life and enhance health in aging human populations.

"The newly discovered genes regulate short-term memory as well as the ability to repair damaged neurons," he says. "Identifying the individual factors involved in neuron health in the worm is the first step to understanding human neuronal decline with age."

Dr. Davis and his research group found mutations in the insulin/IGF-1 signaling (IIS) pathway can affect the worm lifespan. Similar mutations in humans have been found in long-lived humans.

"We developed new methods that enabled us to study gene expression specifically in adult neurons, the cells that govern memory and nerve-regeneration," he says. "Prior to this work, researchers were only able to examine gene regulation either using whole worms or individual tissues from young worms."

Until now, the known targets of the insulin longevity pathway were located mostly in the intestine and skin of the worm. Dr. Davis discovered that the IIS mutant worms express genes that keep neurons working longer, and that these genes are completely different from the previously known longevity targets.

"We also discovered a new factor responsible for nerve cell regeneration in adult worms, which could have implications for human traumatic brain injury," he says.

"Our study provides a more complete picture of how the IIS pathway controls healthy neurons," Dr. Davis said. "These discoveries provide new insights for enhancing memory with aging."

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Shell of plant virus sparks immune response against cancer

A common plant virus can trigger the immune system in mice to wipe out tumors and provide systemic protection against metastases, Professor Davis from University of Vermont reports.

Dr. Davis and her colleagues tested a 100-year-old idea called in-situ vaccination. The idea is to put something inside a tumor and disrupt the environment that suppresses the immune system, thus allowing the natural defense system to attack the malignancy.

“The cowpea virus-based nanoparticles act like a switch that turns on the immune system to fight against the tumor – and to remember it,” said Dr. Davis.

“The particles are shockingly potent,” she says. “They’re easy to make and don’t need to carry antigens, drugs or other immune-stimulatory agents on their surface or inside.”

The immune system’s ability to detect and destroy abnormal cells is thought to prevent many cancers. But when tumors start to develop, they can shut down the system, allowing tumors to grow and spread. Dr. Davis employed the cowpea virus shell, after she removed its infectious components, to trigger antigen-specific immune responses.

“Because everything we do is local, the side effects are limited,” she said.

Dr. Davis and her colleagues are now trying to understand how the virus shell stimulates the immune system. She states, “This approach may eventually be used in combination with other therapies tailored to individual patients.”

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Participants in the “female scientist pictured” condition saw one of the following images in place of the images in the articles listed above:

https://doi.org/10.1027/1864-9335/a000535

Participants in the “male scientist pictured” condition saw one of the following images in place of the images in the articles listed above: