ruby. Those electrons then shed the energy as light in a coordinated manner to create an intense, 1-wavelength beam of radiation.

In silicon atoms, however, excited electrons generally lose their energy as heat rather than as light. That tendency has defeated efforts to create lasers from the material.

To get around this drawback, Jalali and his colleagues tapped a different atomic response in the celebrity semiconductor. In a process known as Raman emission, incoming energy stimulates atomic vibrations, which then decay, in part, into photons.

To build its laser, the UCLA team applied microfabrication techniques to a silicon chip to create a wire 2 centimeters long and only micrometers across. By pumping light from another laser into the wire, the researchers made the silicon lase at infrared wavelengths. When 8 meters of optical fiber linked the wire's ends, the light recirculated through the wire, stimulating the emission of more light. Jalali and his coworkers expect to soon replace the clumsy bundle of fiber with a disk-shaped microcomponent that will shrink the laser to a size that will fit on a chip, Jalali says.

The new laser will be the first that fits on a chip and can emit certain infrared wavelengths, Jalali says. Potential uses for such a laser range from detecting chemical and biological agents to transmitting wireless Internet data at ultrahigh rates.

With its present requirement of another laser, the new device falls short of an ultimate goal for a silicon laser—conversion of a microchip's electric power directly into laser light. Getting there, say Soref and others, will take some time. —P. WEISS

Dangerous Times

Guppies don't follow rules for old age

A new study of wild guppies could unsettle a decades-old idea about the role of danger in the evolution of aging.

Biologists in the 1950s predicted that in a treacherous habitat, creatures would evolve so that they'd age rapidly, explains David N. Reznick of the University of California, Riverside. However, when he and his colleagues compared guppies from streams with many predators with streams posing few threats, the prediction failed. In the absence of predators, the guppy lineages from the menacing steams didn't tend to die early, he and his colleagues report in the Oct. 28 *Nature*. "The classical theory is incomplete," says Reznick.

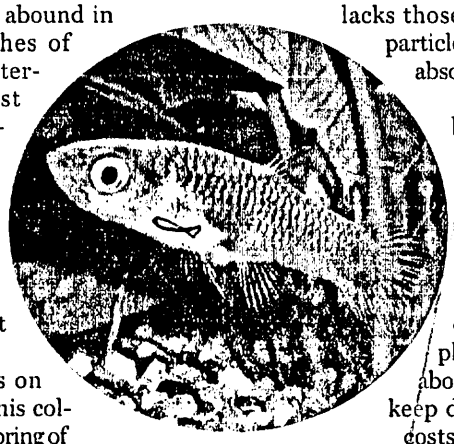
"It's the first test with species that evolved under natural conditions," says senescence researcher Marc Tatar of Brown University in Providence, R.I. He praises the new guppy project as "a Herculean effort."

The idea of linking danger and fast aging goes back decades to such theorists as medical Nobelist Peter Medawar. He proposed in 1952 that in dangerous places, early deaths keep natural selection from purging mutations that are harmful later in life.

As another explanation, evolutionary biologist George C. Williams suggested that danger favors early reproduction, which would sap resources that otherwise might have been available for later life.

A variety of studies in several species of animals, including fruit flies, linked early mortality to evolution in the presence of dangers.

Reznick and his various collaborators have been analyzing Trinidad's wild guppies for some 20 years. Cichlids, tetras, and other predatory fish abound in the lowland stretches of watersheds, but waterfalls prevent most predators from invading upstream waters. Earlier work by Reznick's team found that guppies in the more menacing locales did indeed tend to start reproducing early.



GUPPY SUPERGRANNY Pictured shortly before her death, this guppy reached the age of 4 years and 64 days.

To test for effects on aging, Reznick and his colleagues raised the offspring of guppies from high- and low-predator waters in the laboratory for two generations. This extended period eliminated lingering effects of such nongenetic factors as food supply in the wild.

The guppies in lineages from the dangerous places didn't tend to stop reproducing earlier or to die sooner than those in lineages from safe havens did, the researchers found.

One sign of early aging did appear. In tests of guppy responses to a golf ball plunked against the aquariums, the high-danger lineages lost their swimming edge faster with age than the low-danger lineages did.

A few theorists, including Peter Abrams of the University of Toronto, had contended that the early view of aging was too simple. Until now, work such as Abrams' has largely been ignored, says Tatar. He predicts that the mixed results of Reznick's work will encourage theorists to consider more-complex models. —S. MILIUS

Double Credit

Iron-fortified salt cuts anemia

A form of table salt manufactured to contain iron can fight off anemia among children, nutrition researchers working in North Africa have shown. That advance could expand the role of salt fortification, already an important global tool against iodine deficiency.

Scientists have long considered salt to be an ideal vehicle for delivering nutrients because it's cheap and nearly all people consume it daily. In recent decades, most governments have required iodization of salt, which has reduced the worldwide prevalence of mental retardation from iodine deficiency.

Adding iron to salt has proved a more enduring challenge. One chemical form, ferrous iron, causes reactions that eliminate iodine, turn salt yellow-brown, and sometimes produce a rusty taste. Ferric iron, the other form of the metal, generally lacks those drawbacks, but its particles are too large to be absorbed well by the body.

To improve the bioavailability of ferric iron, Michael B. Zimmermann of the Swiss Federal Institute of Technology in Zurich and his colleagues ground particles of ferric pyrophosphate to a diameter of about 2.5 micrometers. To keep down manufacturing costs, they used a simple, unpatented milling apparatus. They then mixed the particles with iodized salt.

Working in northern Morocco, the researchers gave the doubly fortified salt to 75 children for 10 months. The blood concentration of iron-rich hemoglobin in kids receiving the iron-fortified salt increased by 16 grams per liter, and the prevalence of anemia fell from 30 percent to 5 percent. A similar group of children that received regular iodized salt didn't show any change in hemoglobin concentration or anemia incidence, the team reports in the October *American Journal of Clinical Nutrition*.

The results demonstrate that doubly fortified salt could combat anemia and benefit health and economics in poor nations, says food chemist Levente Diosady of the University of Toronto.

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