

## Younger stars and an older, bigger cosmos

The oldest stars in the Milky Way may be considerably younger than astronomers had thought, and the universe about 1 billion years older, according to a new analysis of stellar data from the Hipparcos satellite. The calculations also increase the estimated size of the cosmos by about 10 percent.

Scientists announced these findings Feb. 14 at a meeting of the Royal Astronomical Society in London. Hipparcos has fixed the positions of 120,000 nearby stars 100 times more precisely than is possible from the ground. These measurements also enable astronomers to deduce stellar distances from the tiny seasonal shifts in position caused by Earth's motion around the sun.

The new findings put globular clusters, the oldest groupings of stars in the Milky Way, at 11 billion years old, thus helping to resolve a cosmological controversy. Several previous studies indicated that globular clusters are, on average, 14.6 billion years old—or several billion years older than the universe, according to a recent estimate (SN: 10/8/94, p. 146).

An analysis of the Hipparcos data, collected from 1989 through 1993, eliminates this discrepancy by refining a yardstick often used to measure cosmic distances, says Robin M. Catchpole of the Royal Greenwich Observatory in Cambridge, England. That yardstick relies on the luminosity of variable stars called Cepheids, which wax and wane in brightness over periods of days to weeks.

The rate at which a Cepheid's brightness varies is closely tied to its luminosity: Those with longer periods are intrinsically brighter. By measuring the period of a Cepheid and its apparent brightness, astronomers can deduce the distance to the star and to the galaxy in which it resides.

Catchpole and Michael W. Feast of the University of Cape Town in South Africa reexamined the period-luminosity relationship for Cepheids, using Hipparcos to measure the distances to 26 of the nearest such stars. Even those Cepheids are too far for Hipparcos to obtain accurate, individual distances, but by averaging results, the researchers found that the stars reside farther away than previously estimated.

This revision, in turn, increases the distances to nearby galaxies containing Cepheids by about 10 percent, Feast reported at the London meeting. For example, the Large Magellanic Cloud galaxy would lie about 179,000 light-years from Earth rather than the standard value of about 163,000.

Because calculated distances to more remote galaxies often depend indirectly on the Cepheid yardstick, the new calibration may increase the estimated size of the entire universe, Feast

and Catchpole speculate. That would make the universe about 10 percent older.

Applying the Cepheid results to our own galaxy, the astronomers recalibrated the brightness of RR Lyrae stars, another type of variable star. They deduced that RR Lyrae stars in several globular clusters are brighter and younger than had been assumed. Since all stars in a globular cluster are presumed to have formed at the same time, this gives a more youthful age for the clusters.

The finding agrees with the results of a recent report that arrived at a younger

age for globular clusters by a different means (SN: 12/14/96, p. 374).

Floor van Leeuwen of the Royal Greenwich Observatory cautions that the Cepheid measurements represent the very limits of what Hipparcos can do.

In his own study, also based on Hipparcos data, van Leeuwen and his collaborators calibrated the distance to the Large Magellanic Cloud using the positions of Mira variables, yet another class of variable star. Depending on his team's method of calculation, Van Leeuwen finds that the galaxy resides at either 166,000 or 171,000 light-years away, farther than the standard estimate but not as far as Catchpole and Feast calculate. —R. Cowen

## Fish oil gets a garlic chaser for the heart

Fish oil is a dietary wonder. It appears to lower the chances not only of developing breast cancer and autoimmune disease but of having heart attacks. It's one of the few substances known to lower concentrations of triglycerides, or fatty substances that pose a cardiovascular risk, in the blood.

Yet many physicians have been reluctant to advocate consuming fish oil in large quantities because this natural fat has the drawback of increasing the proportion of cholesterol shuttled through the blood in low-density lipoproteins (LDLs), another major risk factor for heart disease.

Now, a Canadian study appears to have found a way to redeem fish oil's therapeutic promise—by marrying it to garlic, a food previously shown to possess a mild propensity for lowering LDL cholesterol.

Bruce J. Holub and Adam J. Adler of the University of Guelph in Ontario randomly assigned a dozen men each to three daily treatments: 900 milligrams of garlic (in the form of three sugar-coated pills), 12 grams of fish oil (in 1-gram capsules), or a combination of the two. A fourth group received garlic-free sugar pills and capsules of a vegetable oil.

The volunteers, each about 45 years old, appeared healthy. However, Holub observes, on the basis of their blood lipids—principally their concentrations of triglycerides and LDL cholesterol—each man faced a moderately high risk of heart disease.

Over the 12-week trial, LDL cholesterol concentrations dropped, as expected, by about 14 percent in men taking garlic only, the researchers report in the February *AMERICAN JOURNAL OF CLINICAL NUTRITION*. Similarly, fish oil capsules reduced a man's triglycerides by some 37 percent, but at the expense of increasing LDL cholesterol concentrations by 8.5 percent.

However, among men getting both fish

oil and garlic, triglyceride concentrations fell some 34 percent and LDL cholesterol dropped 9.5 percent.

Currently, Holub says, people at risk of heart disease often receive advice to modify their diet—specifically to lower their consumption of saturated fats and cholesterol and increase their intake of vegetables and fiber. If this doesn't reduce their blood lipids sufficiently, the next step is usually prescription drugs.

"We'd like to change that approach," he says. Before switching patients to expensive drugs, he thinks, physicians "should consider nutritional supplements that have been shown effective and safe," like this garlic-fish oil combination.

"I find this pairing really exciting," says nutrition scientist Penny M. Kris-Etherton of Pennsylvania State University in State College. Not only does it erase the LDL concern that has dimmed fish oil's cardiovascular prospects, she says, it indicates that even for people who follow today's conventional dietary guidelines, "there is more that can be done."

Indeed, she argues, this study ushers in the prospect that other foods beneficial to the heart—such as tofu, oat bran (SN: 2/1/97, p. 71), or insoluble fiber—might be added to fish oil and garlic or taken in new combos as improved, natural strategies to fight heart disease.

David G. Robertson of Emory University in Atlanta expresses more tempered enthusiasm. An endocrinologist whose research focuses on cutting heart disease risks, he notes that the magnitude of changes seen in this fairly short trial is "impressive" for nondrug therapies but still leaves lipid concentrations "at least 15 percent above where they ought to be." Such nutritional supplements may still need to be coupled with some drug therapy, he cautions.

Moreover, says Robertson, fish oil and garlic supplements can be as costly as prescription drugs. —J. Raloff