

Carbon ratio shows Halley may be alien

Comet Halley is an oddball of the solar system, according to a research report in the April 1 *ASTROPHYSICAL JOURNAL*. Scientists say the comet's ratio of carbon-12 to carbon-13 deviates from the ratio found in other solar system matter. Susan Wyckoff, Eric Lindholm and Peter Wehinger of Arizona State University in Tempe and colleagues say their analysis suggests Halley may be an alien body, born fairly recently outside the solar system and captured in a close encounter with the sun.

Current theory holds that comets originated near the orbits of Saturn and Uranus as the solar system condensed from a gaseous cloud about 4.6 billion years ago. Gravity flung the comets outward, leaving many in orbits far past the outer planets. Gravity from a passing star can disturb a comet's orbit and send it on a path swinging close to the sun at one end and far away at the other. Halley's comes about as close to the sun as Venus every 77 years.

During its 1986 flyby, Wyckoff's team measured Halley's carbon-12/carbon-13 ratio using a telescope and spectrometer on Australia's Mt. Stromlo. They found it to be about 65 to 1, compared with the 89 to 1 ratio measured in the solar system's planets and meteorites. Halley's higher proportion of carbon-13 is closer to that measured in interstellar gas and dust.

Wyckoff says some scientists believe the interstellar medium keeps getting richer in carbon-13 relative to carbon-12. When the solar system condensed, its ratio would have frozen in place while the ratio beyond it continued to evolve. Wyckoff and her colleagues say Halley may have solidified out of the interstellar gas and dust much more recently than the solar system, explaining its richer levels of carbon-13.

To join the solar system, the comet would have had to drift about as close to the sun as the inner planets — considered an unlikely event. But Wyckoff says it is also unlikely Halley originated with the rest of the solar system, because the comet revolves around the sun in the opposite direction from the planets.

As an alternative to the capture hypothesis, the researchers say, a supernova might have enriched the rest of the solar system with carbon-12 while relatively little of the isotope reached distant Halley.

Other comet experts remain skeptical of the capture idea. The carbon isotope ratio is difficult to measure in comets, notes astrophysicist Paul Feldman of Johns Hopkins University in Baltimore. He says scientists need more comet measurements to determine if Halley is truly an adopted child. — *F. Flam*

Clot-buster's cost-effectiveness questioned

Two patients share a hospital room for a couple of days after suffering a heart attack. Both do well, thanks largely to treatment with clot-dissolving drugs within the first few hours after their initial attacks. One received recombinant tissue plasminogen activator (rt-PA) and the other received streptokinase.

Tests reveal that in both patients, coronary arteries are again supplying blood and oxygen to the heart, and the all-important measures of left ventricular function are close to normal again. Indeed, according to a study in the March 30 *NEW ENGLAND JOURNAL OF MEDICINE*, the only apparent difference between the two patients' recoveries may be in their hospital bills. A course of streptokinase costs about \$200, while rt-PA goes for more than \$2,200.

The multicenter study, performed in Auckland, New Zealand, adds fuel to a growing controversy over the relative value of different clot-dissolving therapies for heart attack patients. It appears to contradict previous research that showed benefits of rt-PA over the cheaper streptokinase. "Streptokinase and rt-PA, when given within three hours of the onset of a first myocardial infarction, have similar effects on the preservation of left ventricular func-

tion" and show no significant differences in other measures of cardiac recovery, the researchers conclude in their study of 270 patients.

But the report generates as many questions as answers, researchers say. What, for instance, is the ideal indicator of a drug's effectiveness? Of three studies directly comparing rt-PA and streptokinase, including this latest report, each used a slightly different measure of cardiac recovery taken at somewhat different intervals. And each came to a slightly different conclusion, although differences in outcome between the two groups have generally been subtle.

The real indicator of drug superiority — mortality reduction — requires larger and longer-term clinical trials than those performed to date. Researchers hope one such trial, now underway in Italy, will provide useful data in 1990.

"If one agent is superior to another in terms of benefit to the patient, then cost is less of an issue," writes the New Zealand research team, led by Harvey D. White of the Green Lane Hospital. "But if two agents are similar, cost may be a major consideration." Given the available data, they conclude, "the lower cost of streptokinase is an important factor in its favor." — *R. Weiss*

Nicotine boosts a busy body's metabolism

Why do smokers tend to weigh less than nonsmokers and gain weight when they give up the habit?

Contrary to "common knowledge," nonsmokers do not generally eat more than smokers, nor do they exercise less, studies find. Research performed on smokers at rest indicates that nicotine itself can increase basal metabolic rates, meaning smokers burn more calories than nonsmokers during periods of inactivity. But surveys suggest most smokers smoke not while completely at rest, but while performing light activities such as desk work that can increase metabolic rates by two or three times. Unless nicotine's metabolic effects increase proportionally with metabolic rates, its influence on weight might be insignificant.

Now a study in the April 6 *NEW ENGLAND JOURNAL OF MEDICINE* shows that nicotine's effects on body-fuel consumption do indeed increase proportionally with increases in activity. "These results indicate that the metabolic effect of nicotine may play a greater part in accounting for body-weight differences between smokers and nonsmokers than was previously believed," say Kenneth A. Perkins and his colleagues at the University of Pittsburgh School of Medicine.

The researchers administered a nicotine nasal spray to individuals performing light work — in this case pedaling an exercise bicycle modified to allow easy pedaling while subjects remain seated in a comfortable armchair. The activity raised resting metabolic rates two to three times.

By analyzing air exhaled, the researchers calculated energy expenditures in the armchair bicyclists before and after administering the nasal spray and compared the relative changes with those in controls given placebo nasal sprays. Relative to their baseline bicycle expenditures, individuals in the nicotine group expended considerably more energy than did controls while doing the same amount of work. With nicotine, Perkins says, "it's as if the body is becoming much less efficient in using its stored calories."

While the results may seem discouraging to smokers who'd like to quit without gaining weight, Perkins notes that "walking an extra mile a day should make up for the difference" in metabolic efficiency. And he says smokers would have to gain "well more than 50 pounds" to counterbalance the health risks of continued smoking. — *R. Weiss*