

# Image of a Planet: Too Hot to be True?

"Hubble takes first image of possible planet around another star and finds a runaway world." That was the title of a headline-making press release issued by NASA 13 months ago. At a space agency briefing in May 1998, astronomer Susan Terebey of the Extrasolar Research Corp. in Pasadena, Calif., unveiled Hubble Space Telescope images that she said might show a planet born to a pair of stars 450 light-years from Earth (SN: 6/6/98, p. 357).

Although astronomers roundly criticized NASA for highlighting an extremely tentative finding, the stakes were admittedly high. The images could go down in history as the first ever of a planet outside the solar system.

Now, several astronomers have told SCIENCE NEWS that new data reported by Terebey at two recent meetings strongly suggest that the object is too hot to be a planet. Instead, it is "almost certainly a normal reddened star," says Keith S. Noll of the Space Telescope Science Institute in Baltimore.

Terebey told SCIENCE NEWS that she would not talk to reporters until July. By then, she said, she will have had time to assimilate comments from scientists who had seen her new data and submit an article to a peer-reviewed journal.

According to astronomers who attended her latest presentations, Terebey acknowledged that the spectrum she has obtained of the faint object, dubbed TMR-1C, could be that of a star. However, she also suggested that the object might be a failed star, known as a brown dwarf, or it could still be a planet—though hotter and possibly younger than she had thought.

Terebey's spectrum was taken at the Keck Telescopes atop Hawaii's Mauna Kea. She presented the data on June 9 in Flagstaff, Ariz., at a meeting on giant planets and cool stars and on June 17 at a Gordon Research Conference in Henninger, N.H., on the origins of solar systems. Analyzing the Keck data was hard work because the object was so dim, she previously told SCIENCE NEWS.

Examining a faint dot in Hubble images, Terebey and her colleagues last year were intrigued by the object's location, at one end of a bright trail that led to a pair of young stars. The team suggested that the newborn stars were themselves parents and the faint object their offspring, a planet a few times as massive as Jupiter that had been expelled from its birthplace.

The luminous trail, Terebey proposed, was generated by the planet as it barreled into space and pushed dust out of its way. In her team's original scenario,



Proposed planet (arrow) could be just a star.

the planet was about as old as its parents, a few hundred thousand years, and at a relatively cool temperature—no more than 1,500 kelvins.

Terebey's spectrum reveals that the object does not contain water vapor, which should be present if its temperature is lower than 2,500 kelvins, notes Noll. His analysis of Hubble images already hinted at that. Because water is abundant in the cosmos and straightforward to spot in spectra, its absence is a reliable indicator of a high temperature, he adds.

Terebey showed that the spectrum of an ordinary, low-mass star, partly obscured by foreground dust, roughly matches her Keck spectrum of TMR-1C, according to astronomers who heard her Flagstaff presentation.

This "implies strongly" that TMR-1C is just a background star, says Mark S. Marley of New Mexico State University in Las Cruces, an organizer of the Flagstaff meeting. "It is a real stretch of the data to claim anything else."

Still, Terebey told astronomers that it's possible that TMR-1C is a young planet that's hot because it has just formed or is packing on new material as it travels.

Peter Bodenheimer of the University of California, Santa Cruz says that in the unlikely event that the object is a planet, it would have a very different origin from that originally proposed. The trail would have created the planet, instead of the planet having created the trail. He suggests that the planet condensed out of the trail's material, which was ejected from the disks of matter surrounding each of the parent stars.

James W. Liebert of the University of Arizona in Tucson, who also attended the Flagstaff meeting, said it's plausible that planets heavier than Jupiter could be ejected as a solar system forms and

stabilizes. "[But] if the object really were of planetary mass, the nature of the possible ejection event is so unclear [that] I wouldn't necessarily expect that it would have a 'normal' temperature and spectrum for something of that age," he adds.

Noll says, "In my opinion, it is a waste of time and bad science to keep pursuing this idea [of a planet] when a much simpler and more likely alternative—a star—is supported by all the evidence."

Liebert adds that a simple test, one that Terebey suggested last year, could settle the matter. If the object is indeed a planet thrown out by its birth parents, it should be traveling at a fair clip. "Either it keeps on moving . . . or it is a [star], which does not move," Liebert says. Tracking the faint body with a telescope for several years should provide the answer, he concludes.

—R. Cowen

## Cows' milk, diabetes connection bolstered

Many studies have linked cows' milk consumed by babies to subsequent diabetes, but some researchers still doubt that it causes the disease. The association is based on animal experiments, they note, or indirect evidence (SN: 10/19/96, p. 249), such as studies in which parents of diabetic children try to recollect when their babies first started drinking milk-based formula.

Now, Finnish researchers have avoided the vagaries of poor recall by studying children from birth. In so doing, they have added to the case against cows' milk.

By monitoring babies in diabetes-prone families, the scientists find that infants getting formula that includes cows' milk are more likely later to develop the immune reactions associated with juvenile-onset, or type I, diabetes than are babies getting a substitute. The scientists reported the findings this week in San Diego at the 59th Annual Scientific Sessions of the American Diabetes Association.

The researchers tracked, until age 8 months, 173 newborns in Finland who had a close relative with type I diabetes. To augment their mothers' milk, half of these babies received milk-based formula and the rest got a formula in which the cows' milk proteins had been broken into fragments called peptides. The two formulas taste and smell the same, so parents and researchers didn't know which one a baby was drinking.

Babies' immune systems largely ignore cows' milk proteins that have been chopped up. However, contact with one

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## Lead and bad diet give a kick in the teeth

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intact protein in cows' milk, bovine insulin, may set off a destructive process, suggest immunologist Outi Vaarala and her colleagues at the University of Helsinki. The immune system would attack pancreas islet cells that make human insulin, which resembles bovine insulin, and would produce antibodies.

At 2 years of age, 10 of 89 children getting cows' milk formula had formed antibodies associated with type I diabetes. However, only 3 of 84 babies receiving the treated milk showed these antibodies, says Hans K. Akerblom, a pediatrician at the University of Helsinki.

These autoimmune antibodies, or autoantibodies, are made by immune B cells and appear to dispose of damaged pancreatic islet cells, says Hans-Michael Dosch, an immunologist at the Hospital for Sick Children in Toronto. The antibodies indicate that bovine insulin might be spurring an immune system T-cell reaction against the child's own islet cells, he says. Insulin regulates sugar metabolism in the body.

Research had already determined that having one type of autoantibody to insulin indicates that a baby has roughly a 4 in 10 chance of contracting type I diabetes within the next decade, says study coauthor Suvi M. Virtanen, a nutritional epidemiologist at the University of Tampere in Finland. Having more types of these autoantibodies is a sign of greater risk; having three imparts an 80 to 90 percent likelihood of getting type I diabetes. In this study, 3 of the 10 children in the cows' milk group who had diabetes-related autoantibodies showed one type of such antibody, and the rest had two or more.

The precise cause of diabetes remains unclear. The children in the study were genetically predisposed to it, but most will never get the disease. Something in the environment or diet may trigger it.

Some researchers suggest that changing a predisposed child's diet might derail the disease. However, the proteins and calcium in cows' milk impart great benefits, Akerblom says. "None of this [research] is strong enough . . . to start changing habits about how mothers raise children," he warns.

Dosch agrees but notes that the evidence against cows' milk is piling up. As an example, he cites research from Puerto Rico. There, fewer than 5 percent of mothers breast-feed their children. Instead, nearly all use formula made from cows' milk. Meanwhile, type I diabetes incidence in Puerto Rico is roughly 10 times the rate seen in Cuba, where breast-feeding is nearly universal.

Such findings suggest that the problem may be cows' milk ingested in the first few months of life. After all, Dosch says, "we are the only species that drinks another species' milk. It's a weird thing. We have not evolved to be exposed to [bovine insulin] protein." —*N. Seppa*

For decades, the prevalence of childhood cavities has plummeted, thanks mostly to fluoridated water. But for some children, especially in northeastern U.S. cities and among the most economically disadvantaged, tooth decay remains common. A new study implicates lead as a likely cavity culprit.

The finding adds to a series of health problems for which lead may be to blame, including anemia and impaired mental development. Two other studies, also released this week, suggest that shortages of calcium and vitamin C may put children who are already at the greatest risk for lead exposure in double jeopardy.

In the cavity study, Mark E. Moss of the University of Rochester (N.Y.) Medical Center and his colleagues analyzed data from a nationally representative sample of 24,901 children, part of the Third National Health and Nutrition Examination Survey (NHANES III).

Most of the children's blood contained only a few micrograms of lead per deciliter, and the current federal guideline for blood-lead concentrations is 10  $\mu\text{g}$  per deciliter. For children ages 5 to 17, an increased lead burden of 5  $\mu\text{g}$  per deciliter of blood corresponded to an 80 percent jump in cavities, Moss and his team report in the June 23/30 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (JAMA)*. They estimate that cavities of 2.7 million U.S. youngsters result from lead, about 10 percent of all cases in that age group.

"We've been thinking about tooth decay in a way that's almost like blaming the victim—if your children have tooth decay, it's because you don't brush their teeth right, or maybe their snacking habits are bad," Moss says. "This study says that maybe it's beyond that. Maybe children who are exposed to lead need extra precautions, such as more fluoride or better hygiene habits, than the average."

Previous studies on people hinted at a link between lead and cavities but were inconclusive. William H. Bowen, who heads another research group at the University of Rochester, comments that the new study bolsters that research, as well as his group's finding that lead exposure causes cavities in rat pups (*SN*: 9/6/97, p. 149). "When you put the whole package together, you've got an extraordinarily convincing story," he says.

The new study doesn't prove that lead causes cavities, Moss notes. Further research will examine whether, as Bowen's rat research suggests, lead stunts development of the glands that produce saliva, which protects teeth from harmful acid and bacteria. Alternatively, lead might hinder enamel growth, perhaps by blocking fluoride's activity.

Children acquire lead primarily from two sources: lead-based paint, which is

common in homes built before the mid-1970s, and contaminated soil, a remnant of leaded gasoline exhaust. Because eliminating lead from the environment would be expensive, if not impossible, John D. Bogden of the University of Medicine and Dentistry of New Jersey in Newark, suggests that the best hope for averting lead poisoning in children may be the reduction of lead absorption in their gastrointestinal tract. This can be achieved by boosting the calcium in their diets.

In the June *ENVIRONMENTAL HEALTH PERSPECTIVES*, however, Bogden and his coworkers report insufficient calcium intake among children living in areas where lead exposure is high. Of the children whose blood concentrations of lead had been measured, almost half exceeded the federal guideline.

Bogden's team found that the diet of 31 percent of 175 children ages 1 to 3 years regularly fell below the federally recommended intake of 500 milligrams of calcium per day. Moreover, 59 percent of 139 children 4 to 8 years old took in less than the recommended 800 mg daily. In both age groups, calcium in the diets of about 7 percent of children fell far below the requirement for good health. These children took in less than 200 mg calcium per day.

"It's depressing," Bowen comments. "It's another health burden for the people who are least able to bear it."

However, Bogden's group also found many children whose calcium intake was well above the recommended level. "With attention to including dairy foods in the diet, it's very doable," he says.

A third study, also in the June 23/30 *JAMA* and using NHANES III data, finds a link in both children and adults between decreased blood concentrations of lead and increased concentrations of ascorbic acid, or vitamin C. If the finding holds up, increasing vitamin C intake could be "a reasonable, cost-effective way to control lead levels in the population," says author Joel A. Simon of the University of California, San Francisco.

Even if lead hampers the absorption of vitamin C, rather than the vitamin flushing out lead, "the bottom line is the same," Simon asserts. People at high risk for lead toxicity should eat more fruits and vegetables and consider taking a vitamin C supplement, he says.

In an accompanying editorial, Thomas D. Matte of the Centers for Disease Control and Prevention in Atlanta warns that a dietary fix shouldn't replace efforts to purge lead from the environment. Even if a nutritional strategy works, he asserts, "reliance on such an intervention places most of the burden for prevention on those most affected and least responsible for the underlying environmental causes of lead toxicity." —*S. Carpenter*