

Astronomy

Ron Cowen reports from Seattle at a meeting of the American Astronomical Society

Gamma-ray bursts: Upping the ante

Like cosmic flashbulbs, gamma-ray bursts are intense flares that last just a few seconds and then vanish, usually forever. The origins and properties of these celestial bursts have remained a mystery since their discovery 20 years ago.

Early results from NASA's Gamma Ray Observatory add a new twist to the puzzling phenomenon. Since the April 5 launch of this orbiting observatory, its detectors have recorded about one gamma-ray burst per day—a rate higher than that detected by any other satellite, says Gerald J. Fishman of NASA's Marshall Space Flight Center in Huntsville, Ala.

Fishman explains that the eight detectors placed around the craft's perimeter, where they monitor bursts throughout the sky, form a larger collecting area and thus can detect fainter bursts than detectors on other satellites. The study, called the Burst and Transient Source Experiment (BATSE), indicates that gamma-ray bursts occur randomly and have a widespread distribution, Fishman says. He adds that the duration of gamma bursts detected by BATSE has varied from seconds to hundredths of seconds—suggesting that the flashes may have several different types of sources.

Other scientists have recently analyzed gamma-ray data recorded by three French-Soviet satellites. In the May 23 NATURE, researchers led by J.L. Atteia of the Center for the Study of Space Radiation in Toulouse, France, report that the distribution of gamma-ray bursts concentrates in the plane of our galaxy and falls off with distance—a possible sign, they say, that the bursts originate in the Milky Way.

Over the next six months, says Fishman, BATSE may detect enough bursts to indicate their origin.

Studying one galaxy by looking at another



Center for Astrophysics

A haze of dust prevents astronomers from clearly viewing the center of the Milky Way. But by observing Andromeda, the nearest similar galaxy, researchers have identified features that may mimic those at our own galaxy's core.

The X-ray picture at left, taken last year by the U.S.-British-German research satellite ROSAT and released last week, depicts Andromeda's X-ray core in unprecedented detail. It shows about 70 bright X-ray sources at the core, including 14 dense star regions known as globular clusters. Only 38 of these sources—eight of them globular clusters—appeared in observations by the orbiting Einstein Observatory in 1979 (image on right), note Francis A. Primi and Michael R. Garcia of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. This mismatch suggests that some X-ray sources might vary considerably over a 10-year period, they say.

The observations analyzed by Primi and Garcia were conducted during ROSAT's early, calibration phase and lasted for 30,000 seconds. Other ROSAT researchers plan to observe Andromeda for 200,000 seconds this July, using a detector less precise in locating star positions but more precise in determining the energies of the X-rays emitted.

In anticipation of the July observations, Eugene A. Magnier of MIT and his colleagues are analyzing Andromeda images made in visible light with the 1.3-meter telescope at the Michigan-Dartmouth-MIT Observatory near Tucson, Ariz. They hope to identify visible-light counterparts for many of the X-ray sources that astronomers expect ROSAT to find.

Biomedicine

Berries battle bladder bugs

Drinking cranberry juice has long served as a popular home remedy for mild urinary tract infections. Scientists have uncovered hints that its infection-fighting prowess is real (SN: 9/17/88, p.187), but the drink's mode of action remained elusive until 1989, when Israeli researchers discovered that cranberry juice contains a compound that prevents bacteria from anchoring themselves in the bladder.

Now, the tangy red berry faces some competition. Preliminary studies by the same research team indicate that blueberry juice also contains the as-yet-unidentified compound.

Researchers led by Nathan Sharon of the Weizmann Institute of Science in Rehovot, Israel, found that the compound inhibits the sticking ability of *Escherichia coli* bacteria, a common culprit in urinary infections. *E. coli* normally live quietly in the gut, but can cause an annoying infection if they take hold in the urinary tract, where they use tiny, hair-like appendages to adhere to bladder cells.

Both blueberries and cranberries grow on shrubs of the genus *Vaccinium*. The researchers tested a variety of juices, including grapefruit, mango, guava, orange and pineapple, but only blueberry and cranberry contained this compound, they report in the May 30 NEW ENGLAND JOURNAL OF MEDICINE.

While the findings lend credence to the cranberry's role in folk medicine, scientists at Ocean Spray Cranberries, Inc., of Lakeville-Middleboro, Mass., note that laboratory studies alone cannot prove that either juice flushes *E. coli* from the bladder. "We absolutely are not making any claims for this," says Lawrence N. Kuzminski of Ocean Spray.

Best time to beat breast cancer?

Women who schedule breast cancer surgery to coincide with certain days of the menstrual cycle may improve their chance of long-term survival, according to a controversial new report.

Ian S. Fentiman and his colleagues at Guy's Hospital in London, England, based their hypothesis on the knowledge that some breast tumors need the hormone estrogen to grow, and that the hormone progesterone counteracts estrogen's growth message. They speculated that women with breast tumors who undergo surgery on days when the body produces lots of estrogen but little or no progesterone would run the greatest risk of a deadly cancer recurrence. Unopposed estrogen, they reasoned, could fuel the proliferation of any tiny "seeds" of cancer that eluded the surgical knife.

To test the hypothesis, they studied the medical charts of 249 women with breast cancer tumors removed between 1975 and 1985. The team identified 75 women in this group who had gone into surgery three to 12 days after their last menstrual period began—a time when estrogen is plentiful and progesterone is scant. They then compared the long-term survival rates of these patients with those of the 174 women whose operations had been performed at all other times of the cycle. At the time of surgery, the latter group had either very low estrogen levels or high levels of both estrogen and progesterone.

On average, the women undergoing breast surgery on days 3 to 12 had a 54 percent chance of surviving for another 10 years, while the rest of the group had an 84 percent chance of 10-year survival, the team reports in the May 25 LANCET. The gap in death rates showed up even when the researchers statistically controlled for other factors, such as tumor size, that can affect longevity after breast cancer surgery, they say.

The team now advises physicians to schedule breast cancer surgery during the second half of a patient's cycle.

Others remain unconvinced. F. Andrew Dorr of the National Cancer Institute notes that previous findings do not support the new results, and questions the precision of menstrual data based on patients' recollections.