ASTRONOMY

The X-ray ghoul

Because of its conspicuous variations in brightness, medieval Arab astronomers called it the spectre, Algol (the same word as the English ghoul). It has become one of the most widely studied variable stars, a classic example of an eclipsing binary (actually multiple) star system, in which eclipses by a dark companion account for changes in the bright star's intensity.

Now, according to observers at the Center for Astrophysics in Cambridge, Mass. (H. W. Schnopper and seven others), it has the distinction of being the first of a new kind of stellar X-ray source to be detected. Previously discovered types of stellar X-ray sources are binary systems in which a compact member (neutron star or possibly black hole) draws matter from its companion, a more or less normal star. The X-ray emission is attributed to heating of this matter.

But Algol is a well studied system, and it shows no evidence for such a compact body among its components. Nevertheless, the Cambridge observers report that X-rays in the energy band between 2 and 6 kilo-electron-volts were detected from the Algol system by the X-ray observing satellite SAS-3. The proposed mechanism in this case is that two members of the system are continually exchanging matter, and that waves and shock fronts set up in this back-and-forth flow of ionized gas account for both the previously seen radio flares and the now-discovered X-rays. The report is in the Center's preprint No. 582.

Remnant of a medieval supernova

It is no wonder that around the turn of the millenium many people thought the world was about to end. The sky was full of all manner of portents. One of these was certainly the supernova of the year 1006, which took place in what modern astronomers call the constellation Lupus. Optical observation of the remnant of that supernova is reported in the Aug. 15 ASTROPHYSICAL JOURNAL LETTERS by Sydney van den Bergh of the University of Toronto.

A supernova is the explosion of a star when its own gravitation has rendered it energetically unstable. The explosion throws out a splash of hot matter that forms a glowing nebulosity that gradually fades away over the centuries. The most easily seen remnant is the Crab nebula from the supernova of 1054.

The Lupus remnant consists of delicate wisps of filamentary nebulosity that show up about 10 minutes of arc northwest of the radio source that represents the core of the exploded star. They were found on red and blue plates taken by the 4-meter telescope at the Cerro Tololo Inter-American Observatory, and their similarity to the remnant of Tycho's supernova leads van den Bergh to conclude that they are the remnant of the Lupus explosion.

Does Mercury have a liquid core?

Space probes have shown that the planet Mercury has an intrinsic magnetic field. Theory usually attributes the generation of planetary fields to electric currents in a molten core. So the question arises: Does Mercury have a molten core?

In the August 26 NATURE, S. J. Peale of the University of California at Santa Barbara proposes an experiment to find out. His suggestion is based on the assumptions that the core, if it exists, is not coupled to the 88-day rotation period of the planet's surface, but is linked to its 250,000-year precession period. He then calculates the dynamics of the situation and comes up with some numbers that should determine the existence of the molten core. Some of these could be measured by fly-bys; others would require a sophisticated lander. The experiment would be expensive, but worth it, he feels.

BIOMEDICINE

Skin test for insect allergy

An estimated one million Americans are so allergic to insect stings that they can suffer shock or, in some instances, death from a sting. Yet most of them are not aware of their allergy until they are stung, and then it is too late. A skin test to pinpoint potential victims has now been developed by scientists at Johns Hopkins University School of Medicine. The test should become commercially available in a year or so.

The test, developed by Lawrence Lichtenstein and his colleagues, uses solutions prepared from minute concentrations of pure venom from bees, hornets, wasps and yellow jackets. A solution of each venom is injected at different sites beneath a person's skin. If he is allergic to any of the venoms, he will develop within 15 minutes a small red welt at those sites where the venom has been injected. Some individuals are allergic to only one stinging insect, indicated by swelling at a single injection site, others to more than one. Reactions to yellow jackets and hornets are the most common.

Once insect-allergic persons are alerted, of course, they may still not necessarily be able to avoid being stung. So the ultimate answer to their allergy is really a vaccine against it. The Johns Hopkins team is also working on such a vaccine.

Enzyme therapy for childhood leukemia

Since the cancer cells of childhood leukemia need the amino acid asparagine to survive, and the enzyme asparaginase destroys this amino acid, researchers theorized that injections of large amounts of the enzyme into children with leukemia might starve their cancer cells and hence cure them. They tried the treatment on some patients; it looked promising. However, there were several serious drawbacks, one of which is that patients may develop life-threatening allergies to the enzyme.

A strategy around this particular problem has now been devised by Stuart J. Updike and co-workers at the University of Wisconsin. It consists of entrapping the enzyme in red blood cells from a patient before the enzyme is injected into him. This way the patient's body should not recognize the enzyme as something foreign and trigger an autoimmune (allergic) reaction to it. Their primate studies also show that an enzyme coated by red cells acts slower than a noncoated enzyme does. Such action may produce safer and more effective therapeutic results than multiple enzyme injections.

This approach to enzyme therapy may likewise benefit patients receiving enzymes to correct fat and sugar metabolism diseases, the researchers conclude in the Aug. 20 SCIENCE.

Actin: More than one origin

It has been known for some time that the protein actin is an essential component of muscle cells and is required for muscle contraction (SN: 12/16/72, p. 394). During the past few years, however, it has become apparent that actin is present in other tissues as well. In fact, it appears to be present in the cytoplasm of all eukaryote cells and to assist in cell movement, adhesion, division and development.

So an intriguing question arises: Have all these actins evolved from the same structural gene? Robert V. Storti and Alexander Rich of the Massachusetts Institute of Technology conducted experiments to find out. As they report in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, two actins at least—those from chick brain and muscle—are coded by two different messenger RNAs. Therefore they arise from different structural genes.

Storti and Rich predict that more than one actin gene will eventually be found even within the same organism.

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