

Reshaping views of how young stars evolve

When young stars blast their own matter into space, the mass rushes outward in spherical, concentric shells, carrying roughly the same amount of material in every direction. At least that's what theory predicts. But British and Canadian astronomers say they may have found an exception to the rule.

Their radio mapping of one of the brightest stars in the Milky Way indicates the object has jettisoned mass mainly in one direction, at several times the presumed rate of other young stars.

Using a sensitive array of radio telescopes at the Nuffield Radio Astronomy Laboratories in Macclesfield, England, Richard J. Davis and his co-workers monitored the activity of AS431, a member of the Wolf-Rayet group of young, hot stars. They observed two distinct, unusual radio sources — each as large as the entire solar system — associated with the star. One source coincides with the star's optical image, and the other, warmer source indicates the presence of a companion object, Davis and his colleagues report in the Aug. 10 *NATURE*. They speculate that a collision of ejected mass from AS431 with the star's apparent companion may explain the unexpected radio emissions.

AZT helps in early AIDS

A new study shows for the first time that zidovudine (AZT), the only drug to gain U.S. approval as a treatment for AIDS, can slow disease progression in people with early AIDS-related complex (ARC). Moreover, the drug triggered far fewer side effects in ARC patients than it has in individuals with full-blown AIDS. The 29-center clinical trial — sponsored by the National Institutes of Health in Bethesda, Md., and Burroughs Wellcome Co. of Research Triangle Park, N.C., the drug's maker — shows zidovudine benefits individuals with early symptoms of AIDS such as moderately depressed T4 lymphocyte counts and oral infections.

After reviewing the data, the FDA may opt to broaden its recommendations for prescribing zidovudine — a move that could spur U.S. insurers to reimburse zidovudine's \$7,000-per-person annual expense for an estimated 100,000 to 200,000 people with ARC.

The findings heighten a dilemma for at-risk individuals. Officials say the newly demonstrated benefits of early drug intervention should encourage those at risk to get tested for the AIDS virus. But many remain wary of testing because of the discrimination that has often followed people who test positive.

Researchers have begun studies of zidovudine's usefulness in asymptomatic people infected with the virus. □

The warmer temperature of the companion-related radio source, the researchers find, is double the temperature associated with stars that shed mass in spherical layers. Surprisingly intense X-rays previously detected by other astronomers may emanate from this source. Davis' team asserts that a unidirectional blast of mass from AS431 — energetic enough to set up shock waves between the young star and its apparent companion — is a plausible explanation for the radio and X-ray wave activity in and around the star, located approximately 6,000 light-years from Earth.

"Usually, a normal star blows off its outer regions dramatically but steadily in a spherical shell. [But] here there is an asymmetry, a [directed] shock wave the size of the solar system, much larger than the star itself," says Davis, who collaborated with other astronomers at Nuffield; England's University of Cambridge; the

Lancashire Polytechnic in Preston, England; the British Antarctic Survey in Cambridge; and the University of Calgary in Alberta.

Validating the team's theory of a unidirectional ejection will require future observations. If the warmer source emits its radio waves as a result of collision with mass ejected from AS431, the intensity of its signals should diminish or even fizzle out over a few years.

The findings, if confirmed, would have several implications for other young stars, Davis says. If newly formed stars lose mass in different ways and more rapidly than theorized, their lifetimes may differ from calculated values, because less massive stars generally burn more slowly and last longer. In addition, he says, if stars eject unexpectedly large amounts of matter that later cools, this could account for some of the so-called "dark matter" in the universe — mass believed present but hidden from view because it does not radiate at observed wavelengths. — R. Cowen

More veggies join fight against lung cancer

In a dietary survey, epidemiologists have teased out previously unsuspected edible entities that may help prevent lung cancer in humans. The study provides the strongest evidence yet that vegetable constituents other than beta-carotene — the nutrient focus of almost all previous lung cancer-dietary research — help protect against the disease, says study leader Loïc Le Marchand of the Cancer Research Center of Hawaii in Honolulu.

The most surprising result indicates that routine consumption of all the vegetables listed on the study questionnaire offers stronger protection than consumption of any one kind of vegetable or nutrient. "That suggests to us that we need to look at the additive and interactive effects of these [vegetable] components," Le Marchand says.

The new evidence "will require future investigators to consider that the prime factor in [lung cancer] risk is not necessarily beta-carotene but may be some other constituent of vegetables," says Saxon Graham of the School of Medicine and Biomedical Sciences at the State University of New York at Buffalo. "But it takes a great many [epidemiologic] studies to establish a finding."

Le Marchand and his co-workers also discovered that tomatoes, dark green vegetables and cruciferous vegetables, such as broccoli and cabbage, lower lung cancer risk at least as much as vegetables high in beta-carotene. This suggests that constituents "such as lutein, lycopene, indoles and others may also protect against lung cancer in humans," write the researchers in the Aug. 2 *JOURNAL OF THE NATIONAL CANCER INSTITUTE*.

No numerical estimates exist for the

amounts of lutein and lycopene in foods, so the group based its intake estimates on subjects' consumption of foods known to contain these nutrients. Lutein appears primarily in dark green vegetables; tomatoes represent the chief source of lycopene. Researchers have shown that indoles and other nonnutritive constituents of cruciferous vegetables prevent tumor formation in animals. Cruciferous vegetables have been linked to decreased colon — but not lung — cancer risk in humans, Le Marchand says.

His team asked 230 male and 102 female lung cancer patients, as well as a healthy, age-matched group of 597 males and 268 females, about their smoking habits and food, vitamin and alcohol consumption. The researchers determined the lung cancer risk of the 25 percent with the lowest intake of a given food or nutrient and compared that with the risk of the 25 percent with the highest intake. They found high beta-carotene intake associated with a three-fold risk decrease in females and a two-fold decrease in males. Risk was down seven-fold in females and about three-fold in males who ate lots of vegetables in general.

Echoing previous studies, the group found that neither vitamin C nor A seemed to affect lung cancer risk and that fruits (other than tomatoes) seemed to play no protective role.

No vegetable or vegetable group on the questionnaire increased lung cancer risk, but previous studies have shown that other foods high in cholesterol or fat can increase this risk. Thus, Le Marchand suggests, smokers who cannot kick the habit "might want to consider improving their diet." — I. Wickelgren