# Seeking new worlds: More from 'Beta Pic'

The star Beta Pictoris is a leading figure in what has become one of the most tantalizing quests in astronomy: the search for planets orbiting stars other than our own. None have been seen, but a disk of material discovered around "Beta Pic" in 1984 has drawn increasing interest as a possible planetary breeding ground.

The disk appears to consist primarily of tiny, dust-sized grains, but some astronomers now suggest far larger chunks are immersed within it. The disk seems oriented nearly edge-on to earth, so that earth-bound astronomers see it as long features extending from the star in opposite directions. On one side, notes Bradford Smith of the University of Arizona in Tucson, it resembles "a long, thin spike," about 1150 astronomical units (nearly 107 billion miles) in length. In the other direction, however, besides being shorter – about 900 AU, according to Smith – it is also variable in thickness, "suggesting the presence of a perturbing body."

That is not the same, however, as asserting some large object is there, Smith adds.

It remains unclear what materials make up the disk. Smith and colleague Richard J. Terrile of the Jet Propulsion Laboratory in Pasadena, Calif., report the disk to be a "very neutral" color, except for a "downturn" in the violet end of the spectrum. This, Terrile noted this week in a presentation to a group of scientists meeting at the Space Telescope Institute on the Johns Hopkins University campus in Baltimore, Md., is consistent with the color of dark, carbon-rich material like that found in some places in our own solar system, including some meteorites. Furthermore, the researchers find, light reflected from the disk shows a large amount of polarization, a characteristic not usually associated with bright, shiny particles such as ice.

On the other hand, three European researchers on leave at the Institute (Pawel Artymowicz of the Copernicus Astronomical Center in Warsaw, and Christopher Burrows and Francesco Paresce of the European Space Agency's Astrophysics Division) reported indications that particles in the disk are quite bright and icy indeed. The group did not have the polarization measurements to go by, but they were able to compare their earth-based visible-light observations with others made in the far infrared portion of the spectrum by the Infrared Astronomy Satellite (IRAS).

Furthermore, Artymowicz concludes, the disk's particles may indeed include more than just little grains. "If there were no large bodies, of the order of asteroid mass, the dust particles would collide with themselves, and the result would be the quick flattening of the disk into one even thinner than we see, like Saturn's rings. I conclude that sub-planetary masses are present in the Beta Pic disk." No such bodies in the portion of the disk covered by the European observations are likely to be as large as, say, Jupiter, says Artymowicz, because planets of such size would leave visible evidence by creating gaps in the disk. But, he maintains, "I infer from indirect dynamic analysis that there may be hundreds of lunar-sized objects." Is Beta Pic thus a planetary system in formation? It may well be, Artymowicz says, "that there is a planetary-like system already formed," with the smaller particles perhaps producing tiny "microcraters" on the larger ones. *– J. Eberhart*

# Proteins point to roots of baldness

That scourge of male self-esteem – the receding hairline – is beginning to shed some of its biochemical mystery. Researchers have isolated three proteins that critically regulate the balding process, or lack of it, in adult men, according to a report presented at a meeting of the Society for Investigative Dermatology in Washington, D.C., last week.

A treatment to reverse hair loss based on the discovery is, however, "far off in the future," says research dermatologist Marty Sawaya of the University of Miami (Fla.) School of Medicine.

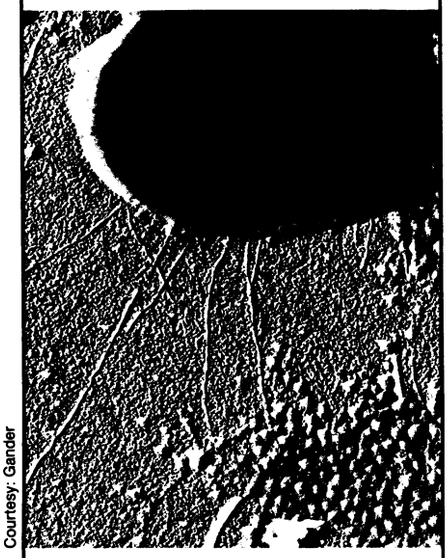
Sawaya and her colleagues studied discarded scalp tissue taken from 60 middle-aged men undergoing hair transplant surgery. They isolated two forms of protein that serve as receptors for the male sex hormone testosterone in hair follicles and oil-secreting cells.

The smaller of the two proteins is associated with the balding process, says Sawaya. Bald hair follicles contain twice as much of the smaller protein compared with the larger protein, while the ratio of the two proteins is nearly equal in active hair follicles. In addition, the researchers find that testosterone binds in much greater quantities to the smaller protein.

The Miami scientists have isolated a third protein that suppresses the amount of male hormone binding to the smaller scalp protein. This "inhibitor protein" is significantly more abundant in active hair follicles, thus preventing a testosterone buildup. "Bald follicles just don't have enough of the inhibitor," says Sawaya. "This protein may play a significant role in the development of male baldness."

Work is now underway to purify the inhibitor protein and develop an antibody to the small protein related to hair loss. The next step, says Sawaya, is to see if hair loss and growth can be induced in animals. *– B. Bower*

# Rare hairs may make this bug more toxic



Courtesy: Gander

Vibrio vulnificus, *the bacterium pictured here (magnified 25,000 times), inhabits warm seawater – like that along the Gulf Coast of the United States. If allowed to enter the body, through open wounds or the ingestion of contaminated shellfish, it can cause blistering, tissue damage, even death. Despite its prevalence, however, it causes relatively few infections. Why? Electron microscopy by pathologists at the University of Texas Health Science Center in Houston suggests the presence of filamentous appendages, like those pictured here, may distinguish the more virulent forms.*

*Rita M. Gander and Mark T. LaRocco found that 70 to 90 percent of the* V. vulnificus *populations isolated from human blood or wounds contained cells with the hair-like protrusions. By contrast, only 30 percent of the* V. vulnificus *cultures isolated from seawater, sediment and shellfish contained them. Moreover, even where the environmental isolates showed bacteria with the thread-like appendages, the proportion of such bacteria was far smaller than in cultures from infected humans.*

*Since several other bacteria, including* E. coli, *use similar appendages to anchor themselves to their host cells, the Texas researchers decided to look at the relative adherence properties of* V. vulnificus *from different sources. Their data, presented this week at the American Society for Microbiology annual meeting in Miami Beach, showed the bacterial strains isolated from human wounds were dramatically more likely to adhere to human epithelial cells than were the bacteria from seawater. This suggests the hair-like projections may help "establish infections in [humans] by promoting adherence to human cells," Gander says.*

*News of the week continued on p. 318*