Paternity question in lung cancer

Immune system cells rather than lung cells should be blamed for a particularly vicious form of lung cancer, say National Institutes of Health researchers who have found identical proteins on the surfaces of white blood cells and lung cancer cells.

The finding suggests that small-cell lung carcinomas (SCLCs) arise from an infiltration of immune system cells rather than from the lung tissue itself, they say. But their conclusion is not sitting well with other lung cancer researchers.

A person diagnosed with SCLC, if untreated, will live an average of 5 to 7 weeks; treatment, which can be lethal, extends the life span to 10 months. Roughly one-quarter of lung cancers in the United States are of this type.

Michael R. Ruff and Candace B. Pert found four proteins on the surface of lung cancer cells that they also found on scavenger cells called macrophages, a type of white blood cell. That they could not find these proteins on normal lung cells suggests, they say in the Sept. 7 SCIENCE, that these lung cancer cells actually are the progeny of white-blood-cell-producing cells in the bone marrow.

Smoking, exposure to asbestos or coal dust, and other environmental insults are known to damage the lungs and draw macrophages to the injured site. "Under [this] constant onslaught in the lungs over a period of time, we think it's these cells that cause the disease," says Ruff. "We hypothesize that the cells that come into the lung become transformed cells."

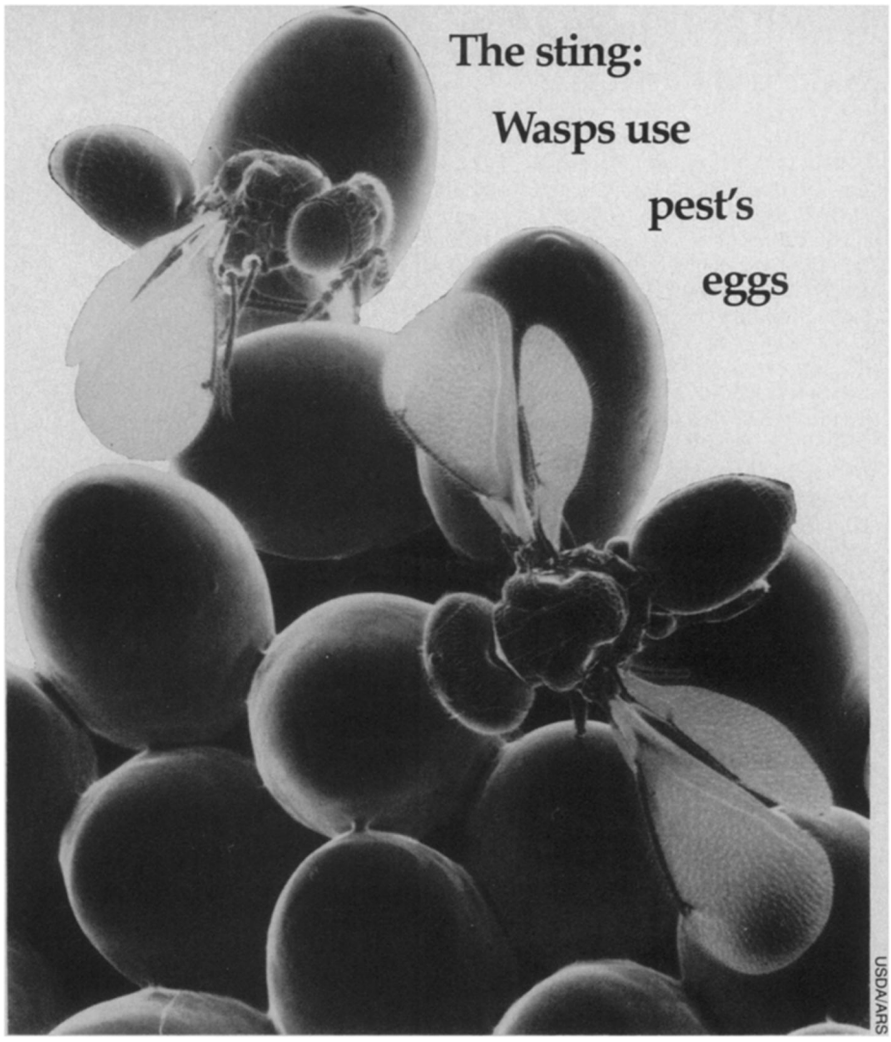
Transformation into cancerous cells could occur in the lung, or, says Ruff, the cells could become cancerous in the marrow and colonize in the lungs. "Macrophages are a kind of cell that travels around, and that's one of the factors of the tumor — it appears all over the body very quickly," he says.

"This would be entirely new," says John Minna of the National Cancer Institute (NCI) in Bethesda, Md., who also studies lung cancer. While he believes that Pert and Ruff have shown that the proteins are on the lung cancer cells, he doesn't believe the cells have the same parents as the macrophages. "It's like saying because a car is black with chrome it has to be a Rolls Royce."

Paul Bunn, also of NCI, looked for one of the proteins, or antigens, Ruff and Pert checked and found it in only 8 of 30 SCLC samples. "You can't jump from finding antigen to the cell of origin," he says, adding that many cells could show the same antigen and not be related.

But the macrophage-SCLC theory, says Ruff, is consistent with the association between the cancer and chronic lung injury, as well as with SCLC's rapid metastasis.

— J. Silberner



"It's almost like watching a carpenter with a drill," observes University of Maryland entomologist Michael Athanas. He's describing the way the petite South American wasp, Edovum puttleri *(above), bores into the eggs of one of agriculture's most noxious pests, the Colorado potato beetle. With its microscopic syringelike egg layer, the gnat-sized* Edovum *pierces a beetle egg—sometimes as many as 50 times—stopping occasionally to dine on the egg's contents. The goal is to insert a single egg of its own into the host egg. Within two to three weeks a mature wasp emerges, not the loathsome beetle. And for that wasp to reproduce, more beetles must die. That explains why U.S. horticulturists are so interested in making this immigrant feel at home.*

"The potato beetle seems to be the single most spectacular example of an insect that's developed resistance to pesticides," explains Athanas. Today the small, dull-yellow beetle with black-striped wing covers ranks as the nation's leading destroyer of potatoes, tomatoes and eggplants.

Edovum *was introduced to the United States in 1980 by Ben Puttler, a scientist with the Agriculture Department's (USDA's) Biological Control of Insects Research Laboratory in Columbia, Mo. Having heard of the wasp's parasitic relationship with a South American cousin of the Colorado potato beetle, Puttler reasoned that the wasp might prove a willing nemesis to the U.S. scourge as well. It did. More important,* Edovum *appears to have no interest in the eggs of beneficial U.S. insects.*

In 1981, Puttler shared some of the wasps with Robert Schroder at USDA's Beneficial Insect Introduction Laboratory in Beltsville, Md. Since then, Schroder and Athanas have been refining techniques to mass-rear the insects for use in field trials that Schroder is heading.

A battery of biological support troops—including the bacterium Bacillus thuringiensis *and the fungus* Beauvaria bassiana*—is being considered to aid the wasp in its first sorties of the growing season, when it seems to have the hardest time getting established (the wasp is not winter hardy). Once the wasp settles in, however, Schroder's studies show it can neutralize 80 percent or more of the incubating beetle eggs. Together with careful use of other chemical and biological agents, Schroder says,* Edovum *"stands an excellent chance of controlling this beetle." Until now, he points out, "there's been no control of it."*

— J. Raloff