INSIGHTS

Rutgers researchers uncover new knowledge in the sciences and humanities.

Cancer's Kamikaze Cells

RESETTING A SELF-DESTRUCT BUTTON

Floating weightlessly in the warm water of the womb, an embryo at six weeks is smaller than her mother's little toe. Her heart has started the vigorous pumping of blood, and her delicate hands and feet look like miniature paddles, with webbing—a reminder of our primeval past—stretching between the fingers and toes. As the embryo grows into a fetus, this webbing will disappear, just as tadpoles lose their tails as they mature into frogs and toads.

This genetically programmed phenomenon —apoptosis, or programmed cell death—plays a fundamental role not only in the shedding of webbing and tails but also in the pathogenesis of many diseases, most notably cancer. Eileen White, associate professor of biological sciences, has earned an international reputation for her research in apoptosis and its role in the formation of tumors. Arnold J. Levine of Princeton University, an authority on apoptosis, says that "Dr. White is a real leader in this research and one of the best young people in the field."

Scientists believe that the incapacitation of a protein called p53 contributes to half of all cancers.

Science has long held that cancer is triggered by a series of missteps in the body's regulation of cell growth. When an extraordinary event such as the uncontrolled cell division that presages cancer occurs, cells are genetically programmed to self destruct. This programmed cell death, or apoptosis, keeps the body free of tumors. White explains that sometimes apoptosis gets "shut off" by the inactivation of its genetic trigger, a protein called p53. When this happens, abnormal cell division goes unchecked and malignancies can form. Scientists believe that the incapacitation of p53 contributes to half of all cancers.

White found that a second protein, E1B, prevents the p53 protein from triggering apoptosis. With apoptosis shut off, another protein, E1A, is free to induce the uncontrolled cell growth that results in cancer. Currrently, White and her assistants are trying to discover how E1B manages to take p53 out of commission.

Understanding apoptosis is important not only in cancer, but also in other genetic disorders such as AIDS, lupus, and Lou Gehrig's disease. "The hunt is on to identify all the biochemical events that control programmed cell death," says White, who is also on the faculty of Rutgers' Center for Advanced Biotechnology and Medicine. "The ultimate objective is to cure cancer and other diseases in which it is an important issue."—*Barbara Dawson*

Natural Born Killers?

WESTERN INFLUENCE ON THE YANOMAMI INDIANS

In the mountains along the border of Brazil and Venezuela, 24,000 Yanomami Indians live much as did their forebears, in a primitive society of hunter-gatherers. The Yanomami, whose geographical isolation helped them escape the obliteration that fell to most other Amazonian peoples, have been portrayed by Westerners as engaging in almost constant warfare over women, status, and revenge. In the 30 years since they were "discovered," the Yanomami have been used as an anthropological laboratory for the study of natural aggression in human society.

But R. Brian Ferguson, an associate professor of anthropology at Rutgers–Newark who specializes in the study of collective violence, argues in his new book, *Yanomami Warfare*, that far from living in pristine isolation, the Yanomami have been subject to interaction with other tribes and periodic

Illustrations by Chris Spollen

waves of Western encroachment for the past 350 years. Jumping into one of the hottest anthropological debates in decades, Ferguson takes issue with Napoleon A. Chagnon, the world's most recognized scholar of the Yanomami people, who argues that the bloody conflicts of the Yanomami are indicative of the true nature of tribal societies in the absence of Western influence.

"It's more the opposite," counters Ferguson. "As early as the 1630s, there were slave raiders in the region. A rubber boom in the 1850s brought

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Colonialists, and tribes saw firsthand the value of steel cutting tools. Some tribes...traded their hammocks and handmade artifacts for cookery, guns, and medicine or received handouts from missionaries and scientists. Tribes fought to gain possession of these valuable Western commodities."

But whether the violence of the Yanomami is attributable to the absence or presence of Western influence is less important than whether they will survive, says Ferguson. In recent years, between 2,000 and 3,000 Yanomami have died from introduced diseases while others have perished in skirmishes with the 50,000 miners who have flooded Yanomamoland to search illegally for gold. "For too long the Yanomami have been treated like zoo specimens," says Ferguson. "It's time the Brazilian and Venezuelan governments as well as the rest of the world concentrate on the most important thing—their human rights."—*Bill Glovin*

North and South

Regional Effects on Cancer Rates

Before legislators cut welfare and food-stamp programs, they might want to review a new national study by two Rutgers–New Brunswick professors who found that African-Americans from the southern United States die of cancer in greater proportion than do populations in the rest of the country. The study, says principal investigator Dona Schneider, ties the high cancer rate to income status rather than race. It concludes that because so many blacks born in the South suffer poverty, they are more vulnerable to nutrition deprivation and inferior sanitary and food-storage practices. Moreover, such regional risk factors as a higher incidence of smoking and consumption of salty meats only compound the cancer rate among people born in the South.

"We are in danger of setting up a generation of nutritionally deprived children who are not going to have the education and health opportunities needed to help them succeed and make us a strong country," says Schneider, an assistant professor of urban studies. "We hope this study will show legislators that what happens early in life can set the stage for disease later in life."

Schneider, who conducted the study with Michael Greenberg, a professor of urban studies, analyzed data from the 1990 census, death certificates, and the National Center for Health Statistics mortality files. Their analysis showed that, for African-Americans born in the South, the annual mortality rate from lung cancer was 117.7 per 100,000, compared with 93.8 for those born in the Northeast. For prostrate cancer, the most common cancer in men, the mortality rate for African-Americans born in the South was 51.1 per 100,000, compared with 34.5 for those born in the Northeast. The biggest regional differences were for cancers of the cervix, esophagus, lung, prostate, and stomach.

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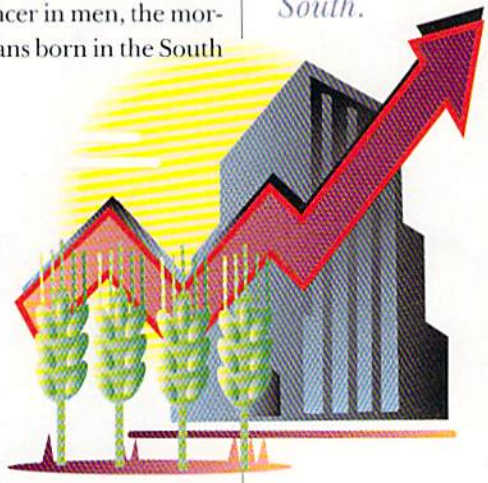

"When it comes to cancer, how you lived in the past is more important than where you live when you are diagnosed with the disease," says Schneider. She says that New Jersey, like other states in the Northeast, has gotten a bad rap as a "cancer state" because people with cancer often migrate to the region and then die. The study found, for example, that of the 23,000 African-American residents of New Jersey who died of cancer between 1979 and 1991, only 5,105 were born in the state.—*Bill Glovin* ❑