# Deadly duo leads to cancer of the cervix

New research suggests sex hormones aid and abet certain viral invaders in the complex microdrama that leads to cervical cancer, a disease that kills about 4,400 women in the United States each year.

The viruses are part of the human papillomavirus (HPV) family. More than 60 kinds of HPV exist and cause a variety of growths, including the harmless plantar wart as well as genital warts. Several types of sexually transmitted HPVs, including HPV-16, can lead to a very aggressive cancer of the cervix.

Some previous epidemiological studies have linked the use of oral contraceptives, which contain the sex hormone progesterone, to an increased risk of cervical cancer, particularly in women infected with HPV. Now, a Canadian team provides some of the details that may underlie the apparent partnership between HPV and hormones.

Molecular virologists Mary M. Pater, Alan Pater, and their colleagues at the Memorial University of Newfoundland in St. John's had conducted an earlier study in which they inserted genetic material from HPV-16 into rat cells. When the team exposed those cells to sex hormones, the cells turned malignant.

That finding, reported in 1988, suggested that hormones such as progesterone play a crucial part in cases where HPV infection progresses to cervical cancer. The team wanted to find out whether that same observation would hold true if they exposed human cervical cells to sex hormones.

The researchers began their experiment by inserting the DNA for HPV-16 into human cervical cells growing in culture, a model designed to resemble early HPV infection in humans, Mary Pater says. Next, they bathed the cells with either dexamethasone, a synthetic hormone, or progesterone, a sex hormone that surges during the last half of a woman's menstrual cycle. After 48 hours, the team discovered a dramatic increase in the amount of HPV messenger RNA, which codes for certain cancer-causing proteins. Such proteins may shut off the action of some tumor suppressor genes, including the cell's retinoblastoma gene, which codes for a protein product that helps prevent uncontrolled cell division.

Infection with HPV-16 is often silent, producing nearly invisible "flat warts." Although not cancerous, the cells that make up these slightly raised bumps appear abnormal when viewed under a microscope. The Canadian team believes that hormones may transform slightly abnormal HPV-infected cells to wildly dividing cancer cells.

The Canadian team found that the controversial abortion pill (RU-486) demonstrated an ability to block the deadly march to cancer, at least in the test tube. Again, the researchers bathed human cervical cells with dexamethasone or progesterone, but this time they added RU-486. They discovered that RU-486, which blocks the action of such hormones, inhibited HPV messenger RNA and thus the production of cancer-causing proteins. The researchers report their data in the January Obstetrics & Gynecology.

This result suggests that gynecologists might one day use RU-486 to prevent cervical cancer in high-risk HPV-infected women, Mary Pater speculates. Although RU-486 is widely available in Europe, anti-abortion sentiment has barred its sale in the United States.

The results of this study and previous reports raise concern about women with HPV infection – especially those with precancerous changes in the cervix – who are taking progesterone-rich oral contraceptives, she adds.

At this point, researchers don't know enough about birth control pills and the risk of cervical cancer to make any recommendations to women worried about malignancies, cautions epidemiologist Mark Schiffman at the National Cancer Institute in Bethesda, Md. The evidence linking these pills to cervical cancer remains controversial and far from definitive, he notes. *– K.A. Fackelmann*

# South Pacific invasion of the sexual geckos

The wall-climbing invaders arrive in the South Pacific islands with four sticky feet and a hankering to sample the tastiest local insects. As fast as they can, they flock to the best sites for catching flavorful flying morsels; within a few years, they vastly outnumber their slithery native cousins.

This ecological takeover – played out between two species of geckos, a type of lizard – has puzzled scientists because the invading species conquers despite a significant disadvantage: While each native gecko can generate offspring on its own, through a process called parthenogenesis, the invaders must team up and have sex in order to reproduce. The necessity for two to tango should have slowed the growth of the invading population, researchers reasoned, allowing the native species to maintain their dominant status much longer, perhaps indefinitely.

So why do the invading geckos triumph that quickly? Through meticulous studies of the behavior of the two species, three ecologists from the University of California, San Diego, have now determined that the sexual geckos – which happen to be a bit larger than the nonsexual natives – have a competitive edge: The natives avoid them at feeding areas.

The finding – reported in the Jan. 15 Science by Kenneth Petren, Douglas T. Bolger, and Ted J. Case – sheds light on the factors that underlie an invading species' competitive success. A better understanding of these factors could help ecologists and conservation managers develop new ways to protect some native species, such as Hawaii's endangered flora and fauna (SN: 11/7/92, p.314), from alien species that threaten their continued existence.

Petren says the South Pacific invasion of alien geckos – fostered by human travel and commerce – offers an excellent example for studying the dynamics of species competition. Geckos are small and relatively easy to study in large numbers.

National Museum of Natural History

*A mourning gecko clings to a tree.*

To conduct their experiments, Petren and his colleagues placed two types of geckos in 18 abandoned aircraft shelters at a naval air station on Oahu, Hawaii. Each shelter received either house geckos – the species now invading South Pacific islands – native mourning geckos, or both. Half of the shelters contained a light to attract insects.

Over a period of five months, Petren's group found that while the house geckos gained weight in the presence of light and the mourning geckos, the mourning geckos tended to grow thinner when house geckos were around. In contrast, neither species thrived in the dark.

By observing the behavior of the two types of geckos more closely, the researchers determined that the house geckos tended to cluster around the light, crowding out the mourning geckos and preventing them from capturing as many insects. But surprisingly, the house geckos did not actively chase the mourning geckos away from the food source. Instead, the mourning geckos stayed away on their own, choosing a lower food intake over standing their ground.

George R. Zug, curator of amphibians and reptiles at the National Museum of Natural History in Washington, D.C., says the study shows that the struggle between alien and native species does not always boil down to a direct competition for resources, something ecologists might keep in mind when planning conservation strategies. *– C. Ezzell*