

Estrogen flips testosterone gene switch

Talk about an odd couple. A new study suggests that estrogen, frequently considered the quintessential female hormone, can turn on genes by binding to the same protein that responds to testosterone and other androgens, the so-called male hormones.

This unexpected union only activates genes in the presence of a matchmaker protein called ARA₇₀, however, reports a research group led by Chawnshang Chang of the University of Rochester (N.Y.). He and his colleagues describe their study in the May 12 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

The new finding hints that estrogen may play a significant role in the development of male sex organs, the investigators contend. They also speculate that estrogen's apparent ability to mimic androgens could help explain how some prostate cancer cells thrive despite treatments that eliminate androgens, which are usually necessary for prostate cells to survive.

"Our finding provides one alternative explanation for why totally blocking androgens doesn't completely block androgen receptor activity," says study coauthor Shuyuan Yeh.

While scientists reject a simplistic categorization of estrogen and testosterone as female and male hormones—both sexes make various forms of estrogens and androgens—the hormones were thought to regulate largely distinct groups of genes. Estrogens latch onto so-called estrogen receptors, which in turn bind to and activate select genes. Similarly, testosterone and related hormones bind to androgen receptors, which turn on a different array of genes.

Chang's group, which years ago discovered the androgen receptor, more recently found that the presence of ARA₇₀ magnifies the receptor's response to androgens. The researchers then decided to reexamine whether estrogens can turn on genes controlled by the androgen receptor. Past studies had indicated that estrogen could do so only when present in much higher concentrations than those found naturally in the body or when the androgen receptor has a mutation that makes it responsive to estrogen.

Working with cells genetically engineered to make ARA₇₀ and the androgen receptor, the investigators found that, in the presence of ARA₇₀, one form of estrogen activates some of the genes normally turned on by the receptor in response to androgen.

Further test-tube experiments identified a mutation in the androgen receptor that blocks estrogen's ability to turn on those genes—without affecting an androgen's ability to do so. The team also discovered that a man with

abnormally developed reproductive organs had the same mutation. His androgen receptor's inability to respond to estrogen may help explain those developmental problems, the investigators suggest.

Several androgen researchers contacted by SCIENCE NEWS questioned whether the new findings truly establish that estrogen interacts with the androgen receptor in the body.

"This won't be enough to get people to accept that estrogen acts through the androgen receptor, but it raises the pos-

sibility. It's provocative," says Steven P. Balk of Beth Israel Hospital in Boston, who studies the role of androgens and their receptor in prostate cancer. "It won't be trivial to prove that this particular pathway is important."

The researchers are in the process of creating mice with a defective ARA₇₀ gene, animals they hope will help further elucidate estrogen's relation to the androgen receptor. If estrogen does activate genes controlled by the androgen receptor, drugs that interfere with the function of ARA₇₀ may block this process and thus prove a useful addition to treatments for prostate cancer, notes Yeh.

—J. Travis

Dust buster eyes fireworks in nearby galaxy

Ten million light-years from Earth lies the nearest galaxy with a heart of fire. Powered by a central black hole that sucks in stars and gas, the giant, radio-emitting galaxy Centaurus A got a further jolt several hundred million years ago when it swallowed a disk-shaped galaxy.

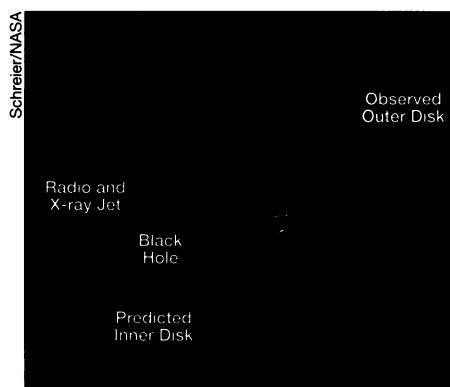
With such an example of cosmic violence close to home, astronomers should have a field day studying black holes and galactic mergers. However, a stripe of dust girdling the galaxy has clouded efforts to observe the maelstrom.

leagues presented the images May 14 at a briefing in Washington, D.C. They describe their study in the June 1 ASTROPHYSICAL JOURNAL LETTERS.

If there are disks aligned in different directions, "it may mean that the gravitational pull of the . . . galaxy is stronger than the gravitational pull of the black hole," says Schreier. If that's the case, the black hole, estimated to weigh as much as 1 billion suns, may have slightly less mass than predicted.

An analysis of images taken by the Infrared Space Observatory may bolster that interpretation. Although the observatory, which ended its mission in April, had a lower-resolution telescope than Hubble, it recorded emissions at longer infrared wavelengths, which penetrate dust more easily. The images indicate that most of the radiation comes from the birth of stars rather than from material spiraling into the galaxy's black hole, notes I. Félix Mirabel of the Centre D'Études de Saclay in Gif-sur-Yvette, France.

—R. Cowen



This schematic, based on Hubble images, shows a disk of hot gas orbiting the center of Centaurus A. The disk is tilted with respect to an unseen, inner disk of gas.

Partially penetrating the dust with a near-infrared camera, the Hubble Space Telescope has now recorded the first detailed portrait of the galaxy's nucleus. Images unveiled this week show that a disk of gas extending 130 light-years in diameter and coming within 7 light-years of the center encircles the black hole. Curiously, the disk is tilted with respect to the black hole's axis, like a loose wheel around an axle. The axis is defined by a jet shooting from the core.

The newly found disk may be linked to an unseen, inner disk of gas that is aligned with the axis and fuels the black hole, notes study collaborator Ethan J. Schreier of the Space Telescope Science Institute in Baltimore. He and his col-

Centaurus A, as seen by the Infrared Space Observatory. Yellow denotes emissions from gas surrounding the black hole.

