a small tumor. For this reason, says Livingston, it is not clear how to assess the finding that radiation patients have a "somewhat higher" rate of local recurrence of their cancer.

Another factor is that surgery seems to be improving. With new techniques, most younger patients may come through the operation with their potency intact. Patrick Walsh of Johns Hopkins University School of Medicine reported at the consensus conference on a surgical technique that involves a small incision made between the scrotum and the rectum that does not cut the tiny, weblike nerves that control potency. Of 340 men operated on by Walsh and his colleagues, 74% who were potent before the operation were also potent afterwards.

Walsh warns, however, that "age is a very important factor." Of the men who were in their 30's, all were potent after the operation. But only 14% of those aged 70 to 79 were potent afterwards and, says Walsh, "after age 70, it is highly unlikely that a man will be potent after a radical prostatectomy."

The standard radiation treatment, which is to irradiate the prostate 5 days a week for 7 to 8 weeks, can cost $7000 to $8000. Costs vary throughout the country, but surgery typically costs twice as much as radiation. So if the two methods are indeed comparable, it would certainly be more cost-effective to treat with radiation. A good clinical trial comparing surgery and radiation is on the panel's list for future research.

Other of the panel's suggestions for future research address the profound lack of good data available. For example, the panel wants clinical researchers to "accept a uniform method for data reporting and statistical analyses that will allow meaningful comparisons of treatment results reported by various disciplines," and to "agree upon a uniform clinical and pathological definition of stage A1 [the earliest stage] prostate cancer."

The panel says in its statement that patients should have available information on "the probability of cure, mortality, complications, and other side effects of radical prostatectomy and radiation therapy, the risk of impotence and incontinence for either treatment, psychosocial consequences of either choice, the extent and risk of pretreatment staging assessment tests, and the economic consequences of each form of treatment." But considering the dearth of information at the consensus conference, patients may have to await another consensus conference several years from now before they can have the more definitive information this panel deems essential. ■ GINA KOLATA

Cytokines Alter AIDS Virus Production

A central question in AIDS research is why an infected but otherwise healthy person suddenly develops signs of disease. The answer depends, at least in part, on understanding why cells that are silently infected with the AIDS virus suddenly begin to produce virus. Anthony Fauci and Thomas Folks of the National Institute of Allergy and Infectious Diseases (NIAID) find that cytokines, substances normally produced by activated lymphocytes and cells of the macrophage line, can stimulate a latently infected cell that carries the silent form of the AIDS virus in its genome to produce mature virus particles.

"Any of a number of things—mitogens, antigens, other viral infections, and normal physiological stimuli like cytokines—can convert a latent infection to a productive one," said Fauci in an interview at the recent AIDS meeting.* "So we are now at the molecular level and can give some scientific basis for conversion of latency to productivity."

In order to demonstrate the cytokine effect, the NIAID group first developed a line of cells that could carry the latent form of the AIDS virus (human immunodeficiency virus or HIV) in its genome and would suddenly produce virus with the appropriate stimulus. Their new U1 cell line fit the bill. Derived from a line of monocyte precursor cells that is chronically infected with HIV, the U1 clone also carries a latent virus infection.

The next step was to identify what factors trigger virus production from the chronically infected U1 cells. After finding that tissue culture fluid containing a mixture of cytokines stimulates HIV production, Fauci and Folks then identified which specific cytokine was active. "We tested recombinant lymphokines—interleukin-1, interleukin-2, gamma-interferon, tumor necrosis factor, and granulocyte/macrophage colony-stimulating factor (GM-CSF)," says Folks. "And only GM-CSF stimulates HIV production from infected U1 cells." In vivo, activated T lymphocytes produce GM-CSF, and in the U1 in vitro system the factor stimulates HIV production three- to fourfold. Folks also reports that gamma-interferon has the opposite effect because it strongly inhibits virus expression from the latently infected promonocyte cells.

A similar approach toward understanding interactions among cytokines and HIV infection led the NIAID researchers to a second conclusion: not only do cytokines appear to regulate the production of the AIDS virus from infected cells, but the reverse is also true. Latent infection of the U1 cells with HIV leads to increased cytokine production.

"The infection of U1 cells with the AIDS virus is associated with the regulation of gene expression for interleukin-1β (IL-1β), a cytokine normally made by activated monocytes," says Fauci. "So you have both sides of the coin. Some cytokines increase the expression of the AIDS virus, and the virus increases the expression of certain cytokines."

Ken Heinen

Anthony Fauci *reports that certain cytokines stimulate or inhibit AIDS virus production from infected cells in vitro.*

This increased production of IL-1β is at least somewhat specific to HIV infection because a more general stimulus—again, tissue culture medium containing a mixture of cytokines—does not have the same effect. What does mimic the effect of virus infection, however, is stimulation with phorbol myristate acetate (PMA), a drug that is known to activate the intracellular enzyme, protein kinase C. PMA also has an additional action; namely, it induces virus production from HIV-infected cells.

The new information means that normal physiological stimuli, in this case, cytokine synthesis and function, help to regulate the active production of the AIDS virus from latently infected cells. The new results also show that viral infection can trigger cytokine production. How the two phenomena are coordinated in vivo, specifically in an AIDS patient, is still unclear. ■

DEBORAH M. BARNES

*The III International Conference on AIDS was held 1 to 5 June in Washington, D.C.