Bumpers bill that has alarmed researchers.

All three bills give the Department of Health, Education and Welfare responsibility for regulation, and the administration bill and that introduced by Sen. Howard M. Metzenbaum (D-Ohio) promulgate the NIH guidelines as at least initial interim standards. Under the administration bill HEW would license research facilities and register individual projects.

The subcommittee has yet to meet in executive session to decide how to handle the bills. However, there is some time pressure. If the final bill authorizes money, for example for inspection of facilities, it must have action on the floor of at least one house by May 15. □

Switching cancer cells back to normal

More and more evidence is accumulating to show that cancer is not necessarily stable, but can be reversed and modulated, according to a variety of evidence reported at the annual meeting of the Federation of American Societies for Experimental Biology in Chicago last week. Under a variety of laboratory conditions, cancer cells lose their malignant characteristics and revert to normal, researchers from five laboratories reported. These results suggest clinical methods might be sought to return cancer cells to normal control.

The most dramatic experiments were those in which one type of tumor cell that had been grown by transplantation from mouse to mouse for eight years was injected into early mouse embryos. The embryos were then implanted into surrogate mothers. The cells derived from the tumor could, in the embryo, differentiate normally into the many types of mouse tissue. The healthy tumor-free mice that resulted often had cells from both the tumor and the original embryo. "The father was a tumor," jokes pathologist Henry C. Pitot. Genes, such as the one for fur color, that had not been expressed during the eight years of the tumor's existence were once again operating in an orderly and controlled manner. Although other types of tumors may arise by changes in the genes, the malignancy in this type of tumor, called a teratoma, is apparently not due to a mutation of the DNA but to a reversible loss of control of normal gene expression, researcher Beatrice Mintz concludes.

Mintz first performed these experiments at the Institute for Cancer Research in Philadelphia. Now M. W. McBurney of the University of Ottawa also reports experiments showing normalization of cancer cells transplanted into early mouse embryos.

Another method of switching cells between cancerous and normal states was described by Selma Silagi of Cornell University Medical College. Silagi adds small amounts of the chemical 5-bromodeoxyuridine to the culture medium of cells from a pigmented mouse tumor. That chemical is incorporated into the cells' DNA in place of the natural component thymine. Cells derived from the tumor, after three cell divisions in the presence of 5-bromodeoxyuridine, are incapable of forming tumors in adult mice. The reverted cells also lose other characteristics of tumor cells, such as production of pigment and of a protein-destroying enzyme. But if the chemical is removed from the medium and is eventually replaced with thymine in the DNA, the cells resume their tumor characteristics and again cause tumors when injected into mice.

An aspect of this work that may have great clinical relevance is that the treated cells, which no longer cause cancer, can prevent untreated cells from inducing tumors. If the two cell types are mixed together before they are injected into mice, the mouse's immune response to the treated cells kills the tumor-causing cells as well. Inoculation with treated cells will also prevent a later injection of cancer cells from causing tumors. Now the researchers are isolating components of treated cells' membranes that will provoke the immune response, so as to avoid having to inject living cells. Silagi believes this research will lead both toward a better understanding of malignant cells and toward a method for immunizing patients after surgery to prevent recurrence of their tumors.

Reversion of cancer cells, although shown in animals only recently, has been observed in plant cells for over 20 years, Frederick Meins Jr. of the University of Illinois points out. Research on plant tumors revealed that their uncontrolled growth can result from inappropriate production of a substance called cell division factor. Researchers have devised ways to manipulate how much of this factor is produced by cells grown in culture outside of a plant. The most recent work by Meins shows that the change of a plant cell from normal to a tumor is progressive. There is a gradual increase of the growth factor production. The change is also reversible. The researchers find that if a tumor cell's production of the cell division factor is momentarily blocked, the cell returns to normal control. These findings indicate that the tumor cells retain their potential for normal growth and development.

Finally Pitot, of the University of Wisconsin, suggests on the basis of research on liver cancer that very early in cancer development cells may be converted to normal tissue, whereas later, when the cells exhibit marked alterations in their chromosomes, the cells may be irreversibly transformed into cancer. The prevailing hypothesis had been that initiation, the first stage in cancer development, is irreversible.

The researchers told a news conference that finding cancer is not always irreversible is no panacea, but it is one ray of light that in the future may be important.

The ability of cancer cells to become normal is also providing a new tool for experimental study of human genetic diseases. Mintz and co-workers are deliberately producing mutations in tumor cells growing in culture. The researchers then select cells with specific biochemical changes known to be involved in certain diseases. These cells are injected into mouse embryos where they participate in forming the body tissues. Sperm and eggs derived from the altered cells can create a mouse model of the corresponding human disease. □

A functioning artificial penis

To date, penis construction in female-to-male transsexual operations has left massive scarring and awkward-appearing organs with little or no sexual functions. A first-time combination of several known techniques and some novel techniques by surgeons at the University of Missouri Columbia Medical Center has led to the creation of a more aesthetic and sexually functioning artificial penis.

The nine-month procedure, performed by Charles L. Puckett and Joseph Montie of the medical center on a female transsexual wanting to become a male, was reported last week at the 23rd annual Urology Seminar in Kansas City, Mo. Urologists at the meeting described the results as "beautiful" and "fantastic."

Prior to penile construction, the patient underwent four years of hormone treatment, mastectomies and removal of female reproductive organs. A groin skin flap from the patient was then used to form a penile shaft. The groin flap, often used in other plastic surgery, has many advantages over the abdominal and chest skins used for earlier sex organ construction. It is quite similar to the actual penile tissue, eliminates disfiguring scars and the need for grafts and is hairless.

In earlier penile constructions, no attempts were made to sculpture a realistically shaped penis. In Puckett and Montie's operation, however, tucks were made at the tip of the penis to imitate a glans. Tactile sensations were also achieved by moving the clitoris, much enlarged by hormone treatment, and placing it at the exterior base of the penis. This step provided sensations not achieved in past operations. As in earlier procedures, though, a scrotum and artifical testes were constructed.