

Update report blasts cigarettes

Warning: The Surgeon General has determined overwhelmingly that cigarette smoking is dangerous to your health. Such an update on the cigarette pack statement would reflect the encyclopedic report released last week by Surgeon General Julius B. Richmond. The report covers 30,000 articles in the scientific literature and, Richmond says, "provides overwhelming evidence connecting cigarette smoking with disabling and fatal diseases."

The tobacco industry attacked the report, even the day before it was released, calling it "more rehash than research." An antismoking lobbying group also charged the report as "criminally deficient," claiming, for instance, that it did not document the addictive nature of cigarettes.

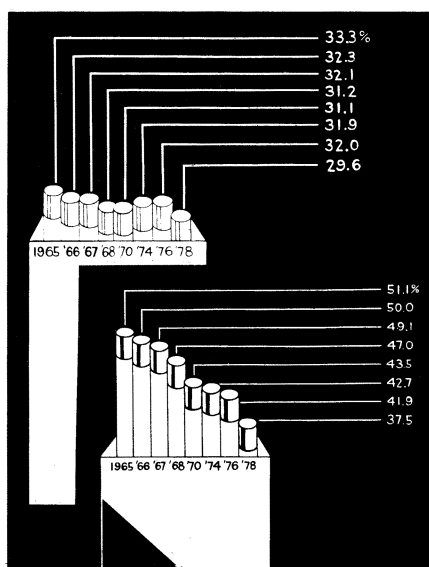
In a press conference, Joseph A. Califano Jr, Secretary of Health, Education and Welfare, emphasized some of the topics that distinguish the new, 1,200-page report from its 1964 predecessor. In the earlier report little information was available about women and smoking, but the 1979 report details increased heart disease, lung cancer and overall death rates among smoking women. If present trends continue, for women by about 1984 the age-adjusted death rate from lung cancer will exceed that from breast cancer. "Women who smoke like men die like men who smoke," Califano says. "And women who smoke during pregnancy face the possibility of creating long-term irreversible effects on their babies."

Workers in asbestos, rubber, coal, textile, uranium and chemical industries face increased risks from smoking, according to another part of the report. The review also links cigarette smoking to a growing list of diseases, including cancers of the mouth, esophagus and bladder and most kinds of heart disease.

Richmond points out to smokers of low "tar" and nicotine cigarettes that, although evidence suggests those brands are less hazardous, the dangers of other smoke constituents, such as carbon monoxide, have not yet been defined.

The study also compiled information on smokers and former smokers. It reports that 100,000 U.S. children (under age 13) are regular smokers and that teenage girls have been catching up with the boys in smoking rates. Approximately 29 million people have given up smoking since 1964, and the studies show that for most health hazards the risk for a person who has not smoked for 10 to 15 years approaches that for a nonsmoker.

Califano is convinced that smokers do respond to publicity of smoking risks. He says that cigarette consumption dropped after the original Surgeon General's report, again between 1967 and 1970 when radio and television antismoking announce-



The fraction of U.S. adults who are smokers is dropping, more sharply for men (bottom pack) than for women (top pack).

ments were common, and also during the HEW campaign last year. The estimated drop in total U.S. consumption for 1978 is 2 billion cigarettes, giving the lowest per capita consumption in 20 years. □

Gene splicing gives growth hormone

Bacteria genetically coaxed to produce animal protein are in themselves no longer hot news — after bacterial production of somatostatin (SN: 11/12/77, p. 310), insulin (SN: 9/16/78, p. 195) and egg white protein ovalbumin. Yet steady steps toward materials of great clinical need still engender excitement.

One such step is bacterial production of rat growth hormone, reported in the Dec. 21/28 NATURE by scientists at the University of California Medical Center in San Francisco. Howard M. Goodman told SCIENCE NEWS that the gene for the human variety of growth hormone also has been reproduced in bacteria, and the researchers expect within months to have bacteria making a protein containing the human hormone.

Growth hormone has been used experimentally to treat pituitary dwarfism in children. Because only the human hormone is active in regulating a person's growth, currently the sole critical source is human cadavers (50 cadaver pituitaries provide enough hormone to treat a single child for one year). Preliminary tests suggest that growth hormone may also be useful in aiding wound healing and controlling gastrointestinal bleeding, but the scarcity of the protein now prohibits clinical trials.

The successful production of rat growth hormone, which is four times the size of insulin, indicates that bacteria can syn-

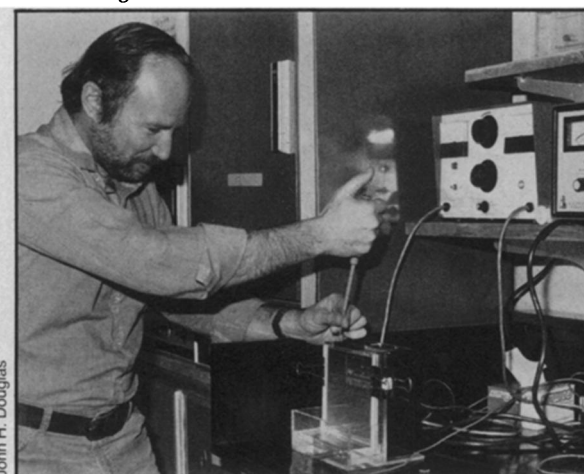
thesize large animal proteins, Goodman and John D. Baxter say. Copies of the rat gene for the natural precursor of growth hormone were linked by recombinant DNA techniques to the bacterial gene for the enzyme beta lactamase on a plasmid. The combined gene codes for a hybrid protein of almost 400 amino acids. That protein was identified in the bacterial system by its size and by binding to antibodies to rat growth hormone. The researchers estimate each bacterium produces about 24,000 molecules of the hybrid protein. Goodman and colleagues did not determine the biological activity of the protein; they plan to wait to do that test on the human hormone.

The recent revisions of the National Institutes of Health recombinant DNA guidelines (SN: 12/30/78, p. 437) have facilitated work on bacterial production of human growth hormone. These experiments were classified as requiring maximum containment (P4) facilities, but Goodman expects them to be reclassified P 2.

By linking the rat hormone gene to the gene for a secreted bacterial product, the researchers hoped growth hormone would be expelled from bacterial cells. Although that trick worked in the research on rat insulin, the hybrid (growth hormone precursor-beta lactamase) protein apparently cannot be excreted. Control of secretion is one scientific problem that may be examined in developing a method for growth hormone production.

Goodman anticipates three major challenges before human growth hormone, produced by bacteria, will be available for clinical trials. The first is to find a method to trim the hybrid protein into the desired hormone. If researchers cannot find an enzyme that makes the appropriate cut, they may piece together a synthetic gene. Next, Goodman and colleagues need to devise methods to "scale up" their operation to handle large volumes of hormone-producing bacteria. Finally, the investigators will have to get approval from the Food and Drug Administration for human growth hormone for clinical use. □

Goodman: Significant step toward production of large hormones for medicine.



John H. Douglas