Chemistry

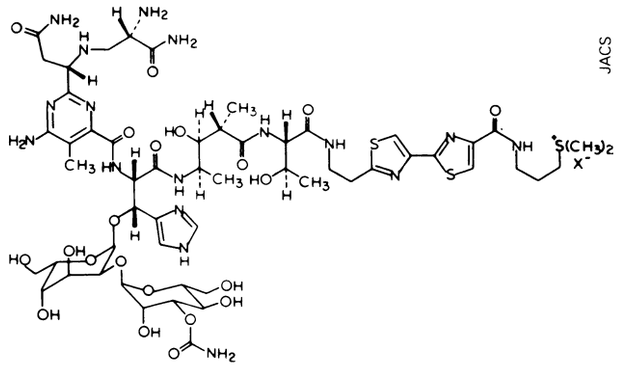
Anti-cancer drug synthesized

A complex anti-cancer chemical that was first discovered in the soil microorganism *Streptomyces verticillus* now can be reproduced in the laboratory using a relatively simple synthetic scheme. Sidney M. Hecht and colleagues of the University of Virginia at Charlottesville report this straightforward construction of the intricate anti-tumor drug, bleomycin, in the Oct. 6 JOURNAL OF THE AMERICAN CHEMICAL SOCIETY.

The significance of the new synthesis of this drug is that the scheme can be easily manipulated, allowing researchers to make subtle changes in the structure of the final product. This ability to produce variations on the bleomycin theme could lead to drugs "that can be used against a broader spectrum of cancers or perhaps analogs that are less toxic," Hecht says.

Bleomycin is a potent fighter of certain soft tissue cancers such as lung and skin cancer. But, says Hecht, in its natural form, bleomycin can cause serious damage to lung tissue and it can be inactivated by certain enzymes in the body.

Hecht and colleagues already have synthesized one analog, called deglycobleomycin, that lacks the sugar components of the parent compound. While deglycobleomycin is not therapeutically important, its availability is permitting another research group — Claude F. Meares and associates of the University of California at Davis — to examine the structure-activity relationships of bleomycin. For example, Meares and cohorts have found that bleomycin is far superior to deglycobleomycin in preferentially zeroing in on tumor cells (rather than healthy tissue); its sugar components may have something to do with this ability. Such structure-activity findings ultimately will prove useful in the search for a superior analog of bleomycin, Hecht says.



Structure of bleomycin.

Arsenic and the emperor

Was Napoleon Bonaparte assassinated by chronic administration of arsenic? The idea of such a conspiracy first became popular in the 1960s when British researchers reported finding high levels of arsenic in several samples of Napoleon's hair. Now, however, results of two independent studies published in the Oct. 14 NATURE cast doubt on the murder-by-arsenic theory.

In one study, by G. V. Hancock and colleagues of the University of Toronto in Canada, another sample of Napoleon's hair was analyzed by neutron activation analysis — a technique that involves bombarding a sample with neutrons to create an artificially radioactive substance and using the resulting decay patterns to identify elements in the sample. This was the same procedure used in the earlier hair analysis, but the technique now is vastly improved, Hancock says. Results obtained with the improved technique show normal arsenic levels. And the findings of a study by David E. H. Jones of the University of Newcastle upon Tyne and colleagues suggest that such levels of arsenic in Napoleon's body could have come from pigment in the wallpaper at his home during his exile on the island of St. Helena.

Science & Society

Final lead rules—no small-refiner break

Final lead-in-gasoline regulations, announced Oct. 28 by the Environmental Protection Agency, are even tougher than those that had been proposed in August (SN: 8/28/82, p. 135). Effective Nov. 1, large refiners will still be limited to using no more than 1.1 grams per gallon of leaded gasoline produced. And, as proposed earlier, small-refiner waivers from the 1.1 g/gal ceiling will be withheld from firms that incorporated after Oct. 1, 1976 (a group almost exclusively composed of gasoline blenders). What's new is that the small-refiner waivers will be temporary (with a July 1, 1983, cutoff) and smaller than initially proposed — 1.9 g/gal instead of 2.5g/gal. According to EPA Administrator Anne M. Gorsuch, airborne lead will be reduced 34 percent more by 1990 as a result of this rule than if existing rules had stayed in effect.

Corporate R&D—slower growth ahead

American companies will spend about $37 billion for research and development in 1982, 10 percent more than last year, according to a recently published National Science Foundation survey. But citing pessimism over the economy, these firms expected their R&D spending to grow an average of only 7 percent next year. Healthiest were the chemical and professional/scientific-instrument industries, with R&D growth of 14 percent or more each this year. The motor-vehicle and aircraft/missile industries fared worst, with growth of only 5 percent in 1982.

VA's Agent Orange exams criticized

The Veterans Administration's physical examinations of and follow-up programs for Vietnam veterans who believe their health problems may have resulted from exposure to the herbicide Agent Orange often have been inadequate, according to a recently released report from the General Accounting Office.

Since 1978, the VA has provided examinations for more than 89,000 veterans concerned about the possible effects of exposure to Agent Orange, a dioxin (toxic contaminant)-containing defoliant that was used during the Vietnam conflict. Upon hearing that these veterans generally have been dissatisfied with their care, Rep. Thomas Downey (D-N.Y.) and Sen. John Heinz (R-Pa.) asked the GAO, an investigative arm of Congress, to check into VA's Agent Orange examination program.

The results of that study, a two-and-one-half-year look at 14 of the VA's 178 medical facilities, appear to confirm veterans' complaints. For example, "only 1 of the 14 facilities ... visited was adequately following up on the health problems reported by veterans," the GAO report states; "furthermore, only about 10 percent of the examination records documented a complete medical history." But VA Chief Medical Director Donald Custis says the GAO only reviewed records of examinations conducted from May 1979 through December 1980. He says, "because these represented VA's first efforts to be responsible to a new concern among veterans," GAO's findings do "not reflect the changes that began to take place after VA central office conducted its own survey of veterans in late 1980."

Lift coyote poison ban, says EPA judge

Environmental Protection Agency Administrative Law Judge Spencer T. Nissen recently recommended that EPA lift its ban on the use of the poison Compound 1080 against coyotes (SN: 10/16/82, p. 248). Nissen said the agency should allow trained government employees to use 1080 in small meat baits and in toxic collars (poison-containing rubber collars worn around sheeps' necks) to help ranchers protect their livestock. Defenders of Wildlife, a public interest group that opposes 1080 use, is appealing the decision, so the final ruling on Compound 1080's use as a predator poison rests with EPA's administrator.