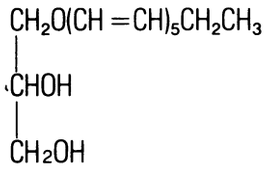
called "(s)-3-(1,3,5,7,9-dodecapentaenyloxy)-1,2-propane diol," was first identified by David Kingston, Tracy D. Wilkins and colleagues of Virginia Polytechnic Institute and State University in Blacksburg; this group presented its findings at the recent American Chemical Society meeting in Kansas City, Mo. Shortly after the Kingston team had put the finishing touches on its structural determination, another group, led by W. Robert Bruce of the University of Toronto, reached the same conclusion. Bruce and cohorts presented their results at the recent 13th International Cancer Congress in Seattle, Wash.

It was the Canadian researchers who initially discovered that a component of certain fecal samples is mutagenic. Then, microbiologists on the Virginia research team showed that the component was a bacterial product: When mutagen-containing fecal samples were incubated under appropriate microflora-growing conditions, the concentration of the mutagen increased. Now that the structure of at least a part of this mutagenic component has been identified, it can be synthesized in large quantities to be used in animal tests to determine whether it causes colon cancer.

In a previous study, Wilkins and research colleagues in South Africa discovered that levels of the mutagen component were significantly higher in a sample of white South Africans — a population with a high risk of colon cancer — than they were in a sample of black South Africans — a population with a low risk of colon cancer. "There is thus some indication that this mutagen may be related to the onset of colon cancer," Kingston says. On the other hand, Pelayo Correa of the Louisiana State University Medical Center in New Orleans has found that persons with intestinal polyps — who are believed to be at a high colon cancer risk — do not necessarily have higher levels of the mutagen.

"We don't know if [the mutagen] will turn out to be a carcinogen," says Bruce. Still, he says, "It's a very exciting finding that a simple lipid like this can be a mutagen." The recent structure determination of the mutagen, Bruce says, "opens our minds to the possibility that other simple compounds, which we previously might not have considered," could play a role in colon and other cancers. — *L. Garmon*



The structure of the colon mutagen (s)-3-(1,3,5,7,9-dodecapentaenyloxy)-1,2-propane diol.

How many kidneys are enough?

Scientists have long believed that when a person donates a kidney for transplantation or loses one through injury, a remaining healthy kidney can take up the extra workload without a long-term loss of overall kidney function. Now a preliminary survey of twenty-five kidney donors has challenged these assumptions, revealing that over half the donors studied have acquired small but significant biochemical abnormalities that are sometimes associated with a decline in renal function. Barry Brenner of Harvard Medical School and Brigham and Women's Hospital in Boston presented his study earlier this month at a symposium on nutrition and hypertension held in Washington, D.C.

While Brenner stresses that the findings are "very preliminary," they do join a growing list of animal studies in suggesting that loss or destruction of kidney mass may cause a dangerous elevation of blood flow and pressure in the surviving kidney tissue, possibly leading to progressive kidney deterioration.

The finding is especially significant for the treatment and counseling of past and prospective kidney donors. Prospective donors are routinely advised that removal of a kidney will result in no long-term impairment of renal function. But according to Brenner, this advice has been based largely on two unpublished studies by life insurance organizations, which monitored the health of patients for periods of up to six years after the removal of a kidney — "follow ups too short to tell much about long-range consequences," Brenner says. "Long-term studies ... are required to address this issue," he writes in the Sept. 9 New England Journal of Medicine. Ira Greifer, head of the National Kidney Foundation, cautions that, "at the moment, people shouldn't get alarmed." But he agrees on the need for more information "before we can assure people that there's absolutely no long-term risk involved in donating a kidney."

Meanwhile, Brenner's work could bring about a reevaluation of some therapies currently in use for patients with one kidney. Cortico-steroid drugs used to suppress kidney rejection in transplant recipients, for example, also raise renal blood flow — an effect that, according to Brenner's hypothesis, may ultimately injure the new kidney. And Brenner is recommending that doctors place people with one kidney on low-protein diets. He bases this proposal on recent experimental evidence that dietary protein raises intra-renal blood pressure. — *R. Pollie*

Beefed-up synthetic castration vaccine

A vaccine that prevents sperm production might be useful in disparate endeavors. It could serve as a human male contraceptive, a possibility considered rather remote. Or, in a more immediate application of recent European research, it could improve beef production.

Generally the highest-priced, finest-textured beef comes from male animals castrated at a young age. Half of the 32.8 million cattle marketed in the United States each year are steers. Now scientists are looking at a substitute for actually removing the testes of the animals. The new prospect is a vaccine that makes the body produce antibodies to a reproductive system hormone called LHRH (luteinizing hormone-releasing hormone; SN: 5/24/80, p. 331). The antibodies cause atrophy of sperm-producing structures of the testes, a process that can be considered immunological castration.

An inexpensive vaccine against LHRH is likely, according to scientists in Paris at the National Center of Scientific Research and the Pasteur Institute. C. Carelli, Louis Chedid and colleagues report in the September Proceedings of the National Academy of Sciences success in immunologically castrating mice with a synthetic vaccine. The hormone LHRH is a chain of only ten amino acids, so it can be made in a laboratory from simple chemicals. However, when the hormone is injected by itself into animals, including sheep and cattle, it produces only a weak response. Substantial antibody production requires repeated injections of the hormone mixed with an emulsion called Freund's complete adjuvant, a concoction frequently used by immunologists to increase immune system response. But injection of livestock with that emulsion would not be acceptable. Freund's adjuvant contains oil that is not metabolized and bacteria that cause side effects.

The solution to this problem is to use a single glycopeptide instead of Freund's adjuvant. Carelli and colleagues attached the glycopeptide called muramyl dipeptide to laboratory-synthesized LHRH. They were surprised to observe that the hormone-glycopeptide when injected into mice had a stronger, more rapid effect than the hormone mixed with Freund's adjuvant.

"These results are encouraging for the purpose of practical application of LHRH immunization in veterinary practice," the scientists conclude. "More generally, the production of synthetic bacterial or viral vaccines could certainly benefit also from [this] model." Scientists in other laboratories are working to devise synthetic vaccines to such diseases as hepatitis. These vaccines would avoid the untoward side effects due to irrelevant microbial material in vaccines produced using bacteria and viruses. — *J.A. Miller*