

CHEMISTRY

New vitamin D metabolite

The already critical and extensive role of vitamin D in the body has recently been further defined by the discovery of yet another of its metabolic products. The specific nature and location of this latest "link" in the body's metabolic chain for vitamin D is still to be determined. H.F. DeLuca, Deborah Harnden and Rajiv Kumar of the University of Wisconsin report in the June 1 *BIOCHEMISTRY* that the new metabolite comes mainly from 1,25 dihydroxyvitamin D₃, the product of action on vitamin D by first the liver, then the kidney.

A team headed by DeLuca first discovered in 1968 (SN: 10/19/68) that the liver acted on the vitamin to produce an active agent, 25 hydroxyvitamin D₃. This result allowed bone-diseased patients whose own bodies are unable to process the raw vitamin to receive direct injections of the active ingredient.

Despite the uncertainty, it would be safe to conclude, says Kumar, that the metabolic reaction occurs after the transformed vitamin has found its way to the intestines. The study was also unable to determine whether the new metabolite is a more active or a degradative product of its precursors.

Seaweed versus viruses

The seaweed, a popular delicacy among health food enthusiasts, also has potent medicinal properties according to two researchers reporting in a forthcoming issue of the *JOURNAL OF PHYCOLOGY*. Douglas Ehresmann and E. Frank Deig of the University of California's Naval Biosciences Laboratory and School of Public Health tested 28 species of red, green and brown seaweed. They found that the red group (Rhodophyta) alone contains species with an active agent that is able to prevent the multiplication of the herpes simplex virus (types 1 and 2). These two viral forms are responsible for the common cold sore, herpes keratitis (a severe eye infection) and genital herpes, a venereal disease more common than syphilis.

Not only did the seaweed extract almost totally prevent virus infiltration in vaccinated specimens, it slowed the rate of spread by at least 50 percent in human cells infected by the virus beforehand. The scientists estimate that two years of data are needed before the algoid substance can be recommended for human therapy. They plan to test the seaweed extract on other related herpes viruses and initiate similar studies on the thousands of remaining seaweed species.

Cooking plants for energy

Although the original scheme for burning plants to fuel a power generator has received serious consideration since 1973, it suffers from economic impracticability. The large land masses required to grow the "plant fuel" (about 370 square miles for 1,000 megawatts) and the low power yield per acre per year have caused the idea's unpopularity. The carbon dioxide generated by such a power station could be "fed" back to the plants nearby thus hastening the growth of the next batch of fuel, according to W. Conrad Fernelius of Kent State University.

By increasing the yearly production of an acre of land, the efficiency and economics of such a scheme are correspondingly improved, he said at a recent meeting of the American Chemical Society. His own experiments have obtained ten-fold increases in the growth rates of corn and sunflower plants using a controlled atmosphere with about one-half percent carbon dioxide. Our normal atmosphere contains only .03 percent CO₂ and under certain conditions this low concentration is the factor that limits plant growth rate. To further enhance the scheme's feasibility, said Fernelius, foodstuffs would be salvaged before incinerating the nonedible bulk of the harvest.

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BIOMEDICINE

Malaria organism cultivated in test tube

The way is now open to the long-sought goal of a vaccine against the world's most widespread disease—malaria (SN: 1/18/75, p. 44). Researchers at Rockefeller University have achieved the first continuous propagation in vitro of any species of the prevalent, tropical, malaria parasite.

William Trager, head of the University's parasitology laboratory, and research associate James Jensen explain that the cultivation of *Plasmodium falciparum* frees further experimentation from dependence on infected humans or on the accessibility of the owl monkey, the only suitable host until now. "One needs only a source of normal human blood, an appropriate, readily available culture medium and simple laboratory equipment" to maintain a consecutive supply of the parasite.

The original parasite material, derived from an infected monkey, continues to reproduce in a normal, asexual cycle of approximately 48 hours and remains infective, even though it has been diluted over 100 million times by addition of human erythrocytes.

Tobacco allergy and heart disease

During the past few years several studies have suggested that allergy to tobacco might lead to heart disease. One showed that smokers with sensitivity to injected tobacco extracts experienced changes in blood circulation. Another showed that repeated injection of foreign protein into blood vessels produced arteriosclerosis, suggesting that a tobacco antigen might react with antibodies to damage blood vessels in a similar way.

Now further evidence that such allergy may lead to heart disease is reported in the May *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES* by C.G. Becker and colleagues at Cornell University. They have isolated and purified an antigen from tobacco leaves which, when injected, triggered sensitivity in 12 out of 31 volunteers. The antigen is a glycoprotein of molecular weight 18,000. Immunochemically similar material was demonstrated in, and purified from, cigarette smoke condensate (tar) and cigarette smoke.

Biofeedback for arthritis relief

The ancient Oriental concept that mind control is the basis of well-being has metamorphized into its updated, technological version—biofeedback. The technique has now been shown to reduce the symptoms of one kind of arthritis, Helen Emery of the University of Washington reported this week at the meeting of the Arthritis Foundation in Chicago.

The latest medical feat attributed to biofeedback became evident in work done with a small group of patients with Raynaud's disease, a cold bluish hand condition which accompanies some rheumatic diseases. All 12 patients were given 10 half-hour training sessions and all successfully raised their hand temperature by at least 4°C.

The cold hands are caused by constriction of the small blood vessels resulting from impaired peripheral blood circulation. Biofeedback techniques, it seems, allow the subject to monitor and therefore control the rate of blood circulation.

"Patients were given no instructions except to concentrate on warming their hands," Emery explained. "We simply assured them that the machine would tell them when they did things correctly." The subjects concentrated on warming their hands, and sure enough, it happened.

"All patients reported that they felt better," Emery said. Many were able to resume activities that had become too painful for them to do.

361