

PHYSIOLOGY

New Blood Clotting Theory

Natural tryptase of blood is believed to be "missing link" in the activation of prothrombin to thrombin. May aid war use of plasma substitutes.

➤ A NEW THEORY of how blood clots is announced by Dr. John H. Ferguson, of the University of Michigan (*Science*, April 9).

Although many loose ends are still to be brought in line, Dr. Ferguson states, he is presenting his theory now as a working hypothesis because it may aid in the war production of plasma substitutes and substances to check bleeding.

The essential feature of blood-clotting, it has long been agreed, is the conversion of a protein part of the plasma, called fibrinogen, to fibrin. This is accomplished by thrombin which in turn is produced from an inactive substance in the plasma called prothrombin. One of the big unsolved mysteries has been what makes prothrombin turn into thrombin to clot blood when it is shed.

The natural tryptase of the blood is, according to Dr. Ferguson's theory, the "missing link" in the activation of prothrombin to thrombin. Normally this ferment or enzyme is present in an inactive state. But "damage," that is, colloidal disturbance such as may occur when blood is shed and comes in contact with foreign surfaces outside the blood vessel walls, introduces new conditions which favor activation of the

ferment. It then activates the conversion of prothrombin into thrombin.

Many practical applications of the new theory are suggested by Dr. Ferguson. It may, for example, help solve the problem of transfusion reactions and anaphylactic shock. It may lead to satisfactory treatment for hemophiliacs, sufferers from the hereditary bleeders' disease. The blood ferment readily clots hemophilic blood in the test tube. Danger of coagulating all the blood in the veins at present "offers an insuperable obstacle" to the use of the ferment by injection into the veins for checking hemorrhage, but "ways of overcoming this serious obstacle may be found," Dr. Ferguson states.

The ferment, serum-tryptase, accounts for the instability and spoilage of plasma and plasma protein preparations. These difficulties are being overcome very satisfactorily at present in the war production of plasma substitutes and substances to check hemorrhage, but the methods have been worked out on a trial and error basis and Dr. Ferguson suggests that the new theory of blood-clotting may furnish a more rational basis for solving such problems.

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MEDICINE

Egg and Avidin Fails

Combination, widely hailed as possible treatment for cancer, did not help two patients on whom it was tried for 30 weeks.

➤ RAW EGG whites and avidin, widely hailed as a possible treatment for cancer, failed to help two patients on whom it was tried for 30 weeks, Dr. C. P. Rhoads and Dr. Jules C. Abels, of Memorial Hospital, New York, report (*Journal, American Medical Association*, April 17).

The basis for the treatment is the idea that because several types of cancer contain abnormally large amounts of a vitamin chemical, biotin, and may require this chemical for their life and

growth, feeding raw egg whites and the avidin from them would starve the cancer to death.

Avidin is an anti-biotin chemical. It apparently combines with biotin so that animals fed large amounts of avidin or raw egg white cannot use the biotin in their diets and get sick. The same kind of sickness from lack of biotin has been reported in humans who were given large amounts of raw egg whites and avidin.

The New York cancer patients were

given from 16 to 40 times the amount of avidin necessary to bind the limited amounts of biotin in their diets. They did not, however, show signs of biotin deficiency.

One of the patients had an advanced cancer of the breast which had spread to the liver and the armpit. The cancer spread further while she was on the avidin-raw egg white treatment and she died four weeks after the experiment was completed.

The other patient had the cancer-like disease, chronic lymphatic leukemia. He still had pronounced signs of the disease after the avidin treatment and was then given X-ray treatment which brought some improvement in both the blood and lymph gland condition.

In spite of the failure of the avidin and raw egg white treatment in these two patients, the New York doctors state that this does not mean necessarily that it will prove to be valueless in the treatment of patients with cancer.

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CHEMISTRY

Wastes from TNT Plants Hard to Get Out of Water

➤ TNT IN quantities undreamed-of during World War I is being produced in our chemical factories, to fill missiles all the way from the deadly little 20-millimeter aircraft cannon shells to the enormous block-buster bombs. But this devastation for the enemy is not being prepared without some inconvenience to ourselves. At the meeting of the American Chemical Society in Detroit, problems connected with the disposal of wastes from TNT production were detailed by two U. S. Public Health Service scientists, Dr. Stuart Schott and Dr. C. C. Ruchhoft.

TNT wastes flowing into rivers are especially difficult to dispose of, they pointed out, because they are actually dissolved in the water, not suspended as fine solid particles. Hence, filtering is of little effect. The dissolved chemicals are of such nature that bacteria do not care to feed on them, so this biological method of disposal is out. Treatment with activated carbon would be prohibitively costly.

Most promising treatment thus far tried seems to be chlorination, which has resulted in a considerable reduction. Further work along this line is being undertaken. Disposal through sewage plants also offers some possibilities.

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