MEDICINE

Cure for Leukemia Found?

One of the causes and possibly a cure for leukemia may have been found. Leukemia patients are deficient in two necessary blood substances, Gloria Ball reports.

➤ ONE OF THE CAUSES and possibly, just possibly, a cure for leukemia have been found, a research team from Toledo, Ohio, reported to the Federation of American Societies for Experimental Biology in Atlantic City, N. J.

Dr. Bernard Steinberg, Dr. Frank H. Cheng and Ruth A. Martin of the Institute of Medical Research at Toledo Hospital have discovered that two blood substances regulate the production of platelets, the corpuscles that control blood clotting and hemorrhage. Leukemia patients, among whom more than 50% of the deaths are due to hemorrhage because there are not enough platelets, are deficient in one or both of these substances, the team has found.

One of these substances, now called megakaryopiesin, was found to manufacture and mature megakaryocytes, cells located in the bone marrow. Megakaryocytes manufacture platelets. The second regulator substance, now labeled thrombopiesin, controls production of platelets in the megakaryocytes.

Noting that leukemia patients have few or no megakaryocytes, as well as a low platelet count, Dr. Steinberg's team injected megakaryopiesin into several human patients no longer responding to any other treatment.

Megakaryocytes did form in the bone marrow, but they did not go on to form platelets.

When the second regulator substance, thrombopiesin, was then injected, however, the platelet count in the leukemic patients went up to normal and one or two injections kept it there for two to four weeks.

It may be that this technique is a cure for leukemia in the sense that insulin is a cure for diabetes. At present, however, Dr. Steinberg is unwilling to call it "cure," fearing that he will be deluged with requests from leukemia patients. When asked by SCIENCE SERVICE how many persons had received the injections, he would only say "a few, more than ten."

He does say this: "These experiments show that the two regulators are necessary to restore the platelet content to normal in patients with leukemia. The experiments were not designed to evaluate this particular treatment of leukemia.

"The purpose of the study was to determine if a deficiency of these regulators exists in leukemia and whether the administration of the regulators will correct the deficiency.

"No adequate supply of the regulators is now available for treatment nor have all the facets of treatment been investigated."

It takes large quantities of blood serum to get a small amount of the regulator substances, Dr. Steinberg said. A quart of serum yields enough regulator for one injection.

So far, to avoid factors that might confuse the picture, only human serum has been used as a starting material. Whether regulators for human use can be taken from another animal, the rhesus monkey, for example, is unknown. This will not be determined until the Toledo team knows more about the chemistry and immunology of the regulators.

The regulators do exist in other animals, Dr. Steinberg said. The studies leading to their discovery were carried out in both humans and animals.

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GENETICS

Genes' Role Foreseen

➤ AN OLD CHEMISTRY technique used for a new purpose may spur the discovery of how genes dictate hereditary traits.

Dr. Waldo Cohn, an Oak Ridge National Laboratory biochemist, said he and his collaborator, Dr. Joseph Khym, have rediscovered an old chemical technique for systematically chopping portions of the nucleic acids—DNA and RNA—so that the genetic, or message-carrying portions, can be identified.

"The carrying and transfer of information is considered to lie in the nucleic acid molecules," said Dr. Cohn. "Efforts to read the code—that is, to determine the order of the bases along the chain—have been hampered by inability to take the chain apart, one link at a time."

The bases are four slightly different nitrogen-containing compounds, Dr. Cohn reported at the Federation of American Societies for Experimental Biology meeting in Atlantic City.

There are two kinds of nucleic acids, ribonucleic acid (RNA) and deoxyribonucleic acid (DNA). DNA is thought to be the gene, the master molecule that determines the color of our eyes or the shape of our nose. RNA is thought to direct the synthesis of protein, after first receiving its information from DNA.

But there are in turn several kinds of RNA and DNA, depending on the way each of the four nitrogen bases are arranged and distributed along the molecule. A word picture of a nucleic acid molecule would be: base-sugar (ribose or deoxyribose)-phosphate, repeated thousands of times, remembering that there are four kinds of bases. DNA's all contain deoxyribose; RNA's all contain ribose.

Drs. Cohn and Khym have worked out a way to chop the end base from a nucleic acid molecule. The method splits the molecule between the sugar and the phosphate, separating the end base-sugar combination from the rest of the molecule.

"So we've finished only half the problem," Dr. Cohn said. "Before we can get to the rest of the molecule we have to get rid of the phosphate molecule that blocks further degradation."

He thought the problem was licked with the isolation of a specific enzyme called a phosphatase, which splits phosphate from nucleic acid molecules. The drawback was that the enzyme was not specific for the end phosphate, as originally thought. It instead penetrated the molecule, breaking it up into smaller parts, confusing the issue.

Dr. Cohn thinks, however, that the discovery of the proper phosphatase is imminent. When that is accomplished, a long step will have been taken toward understanding the intimate molecular mechanism of heredity.

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FASTEST CAMERA—A developmental RCA tube serves as an electronic shutter capable of shutter speeds up to two and a half billionths of a second. The camera, developed by Space Technology Laboratories, Inc., Los Angeles, Calif., can make pictures twice as fast as any previous photographic method.