BIOCHEMISTRY

Testosterone Measured

By changing testosterone from a male to a female hormone, scientists can measure it. This should lead to an understanding of certain musculinizing diseases.

THE AMOUNT OF TESTOSTERONE, a male sex hormone, in human blood can now be measured by changing this substance to a female hormone.

This is expected to help give an understanding of certain types of masculinizing diseases in women and young girls, and to explain precocious puberty in boys. It will also present a method for studies of normal male puberty, and the loss of the sexual function in older men. It should also aid in the diagnosis and evaluation of certain diseases related to the testes, the ovaries and the adrenal glands.

Dr. Ralph I. Dorfman, director of laboratories at the Worcester Foundation for Experimental Biology, Shrewsbury, Mass., told SCIENCE SERVICE at the First International Congress of Endocrinology in Copenhagen that the method of measuring testosterone was a result of team work done by his co-workers, Drs. Michael Finkelstein, Enrico Forchielli and himself.

Since the concentration of testosterone in the blood is extremely small, Dr. Dorfman said, it was necessary to partially isolate the testosterone and convert it to a female sex hormone, estradiol, by means of an enzyme derived from the human placenta. Estradiol can then be determined in the blood by an exceedingly sensitive color reaction with concentrated phosphoric acid, Dr. Dorfman said.

The concentration of estradiol found in the blood is 1.5 micrograms per liter of human male blood, it has been found.

Whenever the male sex hormone is a dominant factor in human development or disease, the activity is due to testosterone. Although testosterone is the most active of all the male sex hormones, it is present in body fluids at the lowest concentration of all the male sex hormones.

Until now there has been no method for measuring the concentration of testosterone in the blood.

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BIOCHEMISTRY

How to Adjust Abnormal Hormone Secretion

A NEW APPLICATION of an older principle may help doctors understand how to adjust abnormal levels of hormone secretion in cases of illness, pregnancy and infertility, Dr. Ejgil Bojesen, head of the division of endocrinology at the University of Copenhagen, told SCIENCE SERVICE.

Dr. Bojesen said that scientists in his division have succeeded in measuring steroid hormones in the blood that are present only in very minute quantities. This was not possible until an analytical principle based on isotopes first developed in the United States was used, he said.

Dr. Bojesen called this principle the isotopic derivative method. He said it was applied to steroid hormones in the blood because it is more sensitive and possibly more specific than other analytical methods. However, he said, it is difficult and expensive.

As a result of using this method for measuring the steroid hormones in the blood, it will be possible to find out more about the mechanism that regulates the hormone secretion rate.

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THRUST IMPROVER—A process for producing spherical powders has been developed by the Linde Co., a division of Union Carbide Corp. Powders of metals and metal alloys, such as tungsten, shown above at 100 magnification, can be used as additives to improve thrust of solid rocket fuel propellants. Spherical powders may also improve burning stability and reduce handling sensitivity.

GEOLOGY

Natural Cement May Ruin Bathing Beaches

A RELATIVELY UNKNOWN geological formation may be threatening valuable bathing beaches around the world. Dr. Richard J. Russell, director of the Louisiana State University Coastal Studies Institute, has reported that sand, gravel, boulders or anything else that happens to be in tropical or subtropical beaches somehow become tightly cemented with a form of calcium carbonate or lime and form rock-like strips beneath the surface of beaches. When this "beach rock" becomes exposed, it can ruin swimming beaches.

Dr. Russell began studying beach rocks in 1956 while in the Caribbean on another research project and he has been studying them ever since.

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ROCKETS AND MISSILES

Spherical Powders May Boost Rocket Propellants

SOLID FUEL ROCKET propellants may get a boost from spherical powders of metals and metal alloys with particles ranging in size from 20 to 150 microns and free from such defects as voids, cavities and inclusions. A process for producing spherical powders has been developed by the Linde Co., a division of Union Carbide Corp.

Since solid rocket fuel propellants gain significant additional thrust from additives such as aluminum, the use of spherical powders as additives may improve burning stability and reduce handling sensitivity as well.

Spherical powders are used, in the main, where their uniform spherical shape is an advantage. For example, such powders may be used to fabricate sintered bodies requiring controlled porosity. This suggests use in filters, burner plates, porous piston rings and sweat cooled nozzles.

The company now has a total of six different powders available in limited quantities — these include copper, aluminum, nickel and tungsten.

It is also pointed out that highly reactive powders may be handled with less hazard when they are in spherical shape, and have as a result the lowest possible surface-to-volume ratio.

In the laboratory, spherical powders can be very accurately separated into various particle size ranges. Since most particle size analyzing equipment assumes that all powder particles are spherical, a sample of spherical powder can be used as a standard to calibrate the equipment.

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