

MEDICINE-PHYSIOLOGY

# Successful Gland Transplant Made in Addison's Disease

## Meeting of Association for the Study of Internal Secretions Hears of New Research on Gland Functions

**S**UCCESSFUL transplantation of a woman's adrenal gland tissue into a man suffering from dreaded Addison's disease restored his health and prolonged his life for eight months.

This latest medical achievement was reported by Dr. Max A. Goldzieher, of New York City, at the meeting of the Association for the Study of Internal Secretions in Kansas City. Associated with Dr. Goldzieher in this case were Dr. H. Koster, of Brooklyn, N. Y., and Drs. F. A. Hemsath and S. B. Barishaw of Jersey City, N. J.

The results in this case, Dr. Goldzieher said, seem to prove the value of gland transplantation in the treatment of Addison's disease. This condition, characterized by bronze skin color, extreme weakness and wasting, is due to disease, injury or destruction of the cortex of the adrenal glands which lie one above each kidney. Heretofore the most successful treatment of the disease has been with extracts of adrenal gland cortex, which help the patients somewhat as insulin helps diabetics.

### Transplanted Tissue

The transplanted tissue was taken from the cortex of an adrenal gland removed from a woman whose symptoms of virility showed her adrenal glands were over-active, producing too much cortical hormone. When the patient died, eight months after the transplantation, it was found that his own adrenal glands had no cortex tissue at all, but that the transplanted tissue was well-preserved.

The patient had been treated for three years before the gland transplantation with various brands of cortical extract, with some improvement. But he still showed signs of Addison's disease, such as the skin color and low blood pressure and low blood sugar.

Within ten days after the gland transplantation, he left the hospital visibly improved, with higher blood pressure, more strength and less skin discoloration. Injections of pituitary gland extract were given to stimulate the activity of the transplanted adrenal gland tissue. Except for one sudden attack of weak-

ness, from which he recovered after two weeks' hospital treatment, he did very well. He felt perfectly normal, was able to work, and lost the bronze skin color entirely. He died suddenly eight months after the transplantation.

### Prevents Self-Poisoning

How the adrenal glands keep the body from poisoning itself with a normal and necessary constituent of its own cells was disclosed at the same meeting.

The automatic antidote-like action of the glands was discovered in research on cats, guinea pigs, rats and mice conducted by Drs. Raymond L. Zwemer and Richard Truszkowski of Columbia University College of Physicians and Surgeons.

Potassium is the substance with which the body would poison itself if it were not for the action of the cortex of the adrenal glands. Discovery of this role of the glands suggests a new step in treatment of Addison's disease which is due to lowered activity of the cortex of these glands. The discovery was made possible by the development of a method for determining potassium in very small amounts of blood.

It is well known, Dr. Zwemer explained, that potassium is toxic if an excess is present in the fluid part of the blood, yet 20 times the amount normally present in blood plasma may be present in the cells of the body with no harmful effects. The adrenal glands play an important role in regulating the level of potassium in the blood, the studies reported show.

A diet low in amount of potassium salts should be important in treating Addison's disease, Dr. Zwemer said. A high level of blood potassium has been reported in this condition. Furthermore, Drs. Zwemer and Truszkowski found that animals suffering from underactive adrenal gland cortex died when given in their food small amounts of potassium which were harmless to normal animals.

Shock, auto-intoxication, asthma and fatigue are also associated with high blood potassium and have been successfully treated with adrenal gland cortex

extracts. These extracts would seem, as a result of the present report, to be useful in treating a number of other diseases in which high blood potassium has been reported.

### Protect Against TB

Extracts of adrenal gland cortex help protect the body against tuberculosis, at least in the case of guinea pigs. Drs. F. M. Pottenger, Jr., and J. E. Pottenger of the Pottenger Sanatorium, Monrovia, Calif., reported studies showing this protective action in guinea pigs. Besides the evidence from the guinea pig studies, the Pottengers found that children who had been given adrenal gland hormones for asthma lost sensitivity to tuberculin. This is a substance produced by the tuberculosis germs and when these germs infect the body, the body becomes sensitive to tuberculin. Loss of this sensitivity after doses of adrenal hormones suggests, the Pottengers believe, that there is a relation between the hormones produced by the adrenal glands and specific defense of the body.

### Bearded Lady Refeminized

The first operation on the pituitary gland performed in the hope of refeminizing a bearded lady was reported by Dr. H. Lissner of the University of California Medical School.

Similar operations have been performed for the removal of adrenal gland tumors which had been the cause of virilism.

The operation was successful for the first year. The patient lost her beard and other symptoms of the pituitary disorder from which she suffered following removal of part of the pituitary gland.

During the second year after operation the beard grew back and some other signs of the original condition reappeared. A tumor was found in the part of the gland removed.

### Parents' Glands Important

How the parents thymus glands affect the rate of growth and development of the offspring, at least in rats, was demonstrated to members of the Association.

The function of this gland, located in the chest, was largely a matter of guess until three years ago, when the astonishing experiments reported were undertaken by Drs. L. G. Rowntree, J. H. Clark, N. H. Einhorn and Arthur Steinberg of Philadelphia and Dr. A. M. Hanson of Faribault, Minn.

The thymus gland is large in children but grows smaller with age. It was supposed therefore to (Turn to page 318)

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play a part in growth but no one previously knew just how it acted. Then Dr. Hanson found a way to prepare a potent extract from the gland and Dr. Rowntree and associates started feeding it to successive generations of rats. The accruing speed with which successive generations of young rats grew and developed into large, healthy, mature rats is truly amazing even to scientists.

The experiments, carried now through the twelfth generation, shows the function of the parent rat thymus gland to be concerned with the rate of growth and development of the young.

As further proof of this, Dr. Rowntree and associates reported that removing the thymus gland in five successive generations of parent rats markedly slowed the rate of growth of the offspring and also slowed somewhat the rate of development and maturation.

This slowing effect of thymus removal, however, can be overcome and the growth and development speeded up once more by either giving doses of thymus extract or by transplanting thymus gland tissue.

Experiments along the same line have been started by these scientists with the object of possibly clearing up another gland mystery, the function of the pineal gland. This small gland in the head was once called the "seat of the soul." Experiments reported suggest that it is more likely the seat of a potent mechanism that may play a part in keeping us all from growing into giants. The experiments have not gone far enough for any conclusions, Dr. Rowntree said, but Dr. Hanson's pineal extract has been given to six successive generations of parent rats. As a result, growth has been so slowed and development so speeded in the offspring that "precocious dwarfism" has resulted.

### Explode Blood Pressure Theory

One theory of a cause of high blood pressure was exploded by experiments reported by Prof. A. T. Rasmussen, University of Minnesota Medical School.

The theory was that high blood pressure might be caused by over-activity of or increase in numbers of so-called basophilic cells in the pituitary gland. The pituitary gland has an effect on blood pressure, but the studies reported show that its basophilic cells have nothing to do with the matter.

Prof. Rasmussen reported counts of these cells in 89 cases of sudden death, and also referred to similar study, by another investigator, of these cells in 70

cases of patients who had all had very high blood pressures. The results of these studies, he said, do not warrant blaming high blood pressure on over-proportion or over-activity of the basophilic cells. Incidentally, it takes nearly an entire day to determine, with the necessary accuracy, the relative number of the different types of cells in one human pituitary gland.

Persons with a constitutional tendency to overweight may, however, be able to blame it on the basophilic cells. Prof. Rasmussen found a "strong suggestion of a positive correlation" between the two, but lacks enough evidence for any definite conclusion.

### New Light on Thyroid

Mimicking in the chemical laboratory the thyroid gland's natural chemistry by which it produces its powerful hormone, thyroxin, Dr. William T. Salter of Harvard Medical School was able to discover why iodine gives striking relief to patients suffering from one form of thyroid disease.

In the particular disease Dr. Salter studied, the thyroid gland sends too much of its hormone into the body, and the patient is in a sense poisoned by this overdose of thyroxin. His body processes proceed at too rapid a pace, he becomes thin and nervous, with popping eyes, rapid pulse, indigestion and other troubles. It seems paradoxical that doses of iodine relieve the condition, because iodine is one of the constituents of the thyroid hormone, thyroxin.

When iodine is given the gland immediately starts to manufacture more thyroxin to use up the fresh supply of iodine. This manufacture proceeds by stages, however, during which an intermediate hormone product is stored in the gland. During this storage period, the amount of hormone in the blood is lessened and the patient improves.

Meanwhile the primary cause of the thyroid over-activity continues "in vain to summon forth thyroid secretion," Dr. Salter explained. When no more new hormone protein can be stored in the goiter, however, the primary cause of the trouble may succeed eventually in producing an "escape" from the iodine effect, and the patient will be ill again.

Dr. Salter was able by chemical methods to obtain a substance representing the first-stage product in the natural manufacture of the hormone, and then by further treatment he converted this into another substance like the next natural product in thyroxin making.

Science News Letter, May 16, 1936