

INSULIN.

Diabetes mellitus.

Diabetes mellitus became known as a disease comparatively late in this country, *i.e.*, in the seventeenth century, but it was known in China a very long time ago and was described by an Indian physician about the year A.D. 500. It is a fairly common disease and is responsible for from 1 per cent. to 2 per cent. of the deaths in the U.S.A. and in England for a little less than 1 per cent., but it is on the increase. It is liable to develop at any age and, prior to the discovery of insulin, the younger the patient the more likely to succumb quickly. It attacks the middle and upper classes, rather than the poor, a characteristic which it shares with appendicitis. In people of middle age it may be due to some form of over indulgence, but this cannot be said of children, especially those under one year old. At present the cause of the disease is not known. The symptoms are weakness, polyuria, thirst, loss of weight, emaciation. Sugar is present in the urine and very often acetone as well. Acetone bodies are present in the blood. The breath of these patients has a "fruity" smell.

Experiments which led to the discovery of insulin.

Diabetes mellitus first came to be associated with the pancreas in 1889 when it was discovered that when the pancreas was removed from an animal it died with symptoms of diabetes. In 1907 a substance was manufactured from the pancreas which, although it decreased the blood sugar, made the patient very ill. In 1922 Doctors Banting and Best published the results of their experiments. They tied the pancreatic duct of a dog and found that after a time only the "islet" tissue remained of the substance of the pancreas. The pancreas consists of two kinds of tissue, that which secretes the pancreatic juice, and the "islets of Langerhans." In some of the lower animals the islet tissue is associated, not with the pancreas, but with the gall-bladder. Banting found that with the extract of the islet tissue he could diminish blood sugar. He experimented with a substance made from the pancreas of a foetal calf and later from that of adult cattle. In the preparation of insulin the pancreas has to be taken as soon as possible after death and cooled rapidly, as otherwise the trypsinogen of the pancreatic juice destroys the insulin. Insulin is precipitated in 90 per cent. alcohol. At first the price of insulin was very high, being about 25s. per 100 units, now the same quantity can be had for sixpence. 250 milligrammes can be obtained from 9 lb. of pancreas, and this amount is capable of removing 30 lb. of sugar. Insulin is one of the most active drugs known. The normal blood sugar is about .12 milligrammes per cubic centimetre, when the sugar rises above .18 milligrammes it begins to appear in the urine. In a diabetic patient the blood sugar is much higher than the normal. The effect upon a normal person of 40 grammes of dextrose by mouth is that after one hour the blood sugar will rise to about .16 milligrammes and will probably be excreted in the urine. Then it will again return to normal. In a diabetic, who is unable to cope with anything like this amount of dextrose, the blood sugar will rise rapidly and will not return to normal. Diabetics vary in their susceptibility to insulin.

Effects of insulin.

1. It causes the blood sugar to be converted into glycogen, a form in which it can be stored up in the voluntary muscle and in the muscle of the heart.
2. It enables the body to metabolise sugar.
3. The substances, derived from the incomplete metabolism of fat in the presence of excess sugar, which are the real cause of diabetic coma, are also removed from the blood when the sugar content is decreased by insulin.
4. The air-hunger of the patient becomes less and consequently the amount of carbon-dioxide in the blood goes up.

Hypoglycaemia.

When a patient comes into hospital in a diabetic coma, he is usually given 100 units of insulin. The drug is standardised by injecting it into rabbits. Too much causes the animals to go into convulsions. The effect of too large a dose is to lower the blood sugar too far. The patient feels very hungry and soon fatigue sets in. His expression becomes anxious and worried; later he may become excited, develop diplopia, then delirium may supervene to be followed rapidly by coma and death if the hypoglycaemia is not treated. Sugar is given in the form of glucose or orange juice and this has to be put into the patient's mouth, for, although conscious, the power of muscular co-ordination seems to be lost and the patient will not lift a glass to his mouth. If the patient is in a comatose state it may be necessary to administer adrenalin by hypodermic injection, as this releases into the blood stream the sugar stored as glycogen in the muscles. As an alternative pituitrin may be given.

Diet and Insulin.

The old idea of dieting very strictly for diabetes is being considerably modified since the discovery of insulin. Carbohydrates are not now strictly excluded and more insulin is given to metabolise the sugar. Insulin is not a cure and once begun the patients have always to take it. It is specially effective when given to children and there has been a great decrease in the death rate of people under forty with this disease. In those over 50 this decrease does not show so clearly, but this may be due to the fact that if anyone suffering from diabetes dies the disease is probably named as the cause of death, when in reality some intercurrent infection is the real cause. Diabetics over 40 are liable to suffer from arteriosclerosis.

PROTAMINE INSULATE.

This is a compound of insulin, recently discovered, which acts for a much longer period than insulin itself. It keeps the blood sugar down for a longer time and is therefore useful for those patients who show a great increase of sugar at certain periods of the day."

CAMPAIGN AGAINST CANCER.

The second international Congress of the Scientific and Social Campaign against Cancer will be held in Brussels from September 20th to 26th. The Congress is under the patronage of the King of the Belgians and of Queen Elisabeth, and has the support of the Government.

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