OUR PRIZE COMPETITION.

WHAT IS INSULIN? HOW IS IT PRODUCED? HOW DOES IT AFFECT DIABETES?

We have pleasure in awarding the prize this week to Miss Mary Ramsey, S.R.N., Enmore Road, South Norwood.

PRIZE PAPER.

Insulin is an extract prepared from the normal pancreas in sufficient strength to make good the defect in the diabetic. The pancreas itself, as a whole, is not a ductless gland; its secretions of three or four digestive juices or ferments pass as the pancreatic juice into the intestine; but the Insulin-producing glands, which are known as the Islets of Langerhans, though situated in the pancreas, are seemingly independent of it. These glands secrete this hormone, which does not enter into the pancreatic juice but passes into the blood stream, not through any duct but through the capillaries which surround the Islets. It was found when experimenting upon dogs that the removal of the pancreas instantly caused diabetic symptoms in an acute form to appear but that upon the subsequent administration of an extract made from the Islets there was at once a diminution of the amount of sugar both in the blood and the urine.

For the preparation of Insulin it is necessary to obtain the pancreas in such a condition that there is a sufficiency of islet cells, and this is achieved by the use of fresh material. Any active ferment present must be destroyed, especially trypsin, which destroys the active principle. Fresh pig's pancreas is obtained, the animals having been without food for twenty-four hours before being killed. The fat and connective tissue is dissected away, and the pancreas cut up into small fragments; this tissue is placed in a distillation flask containing alcohol, and the mixture heated up in a water-bath to 60° C. for one hour. The flask is connected up with a vacuum pump and the process of distillation proceeds. As the extraction goes on, the mixture slowly darkens in colour, and this is the chief feature of the process. When this darkening has appeared, the extraction is completed. The contents of the flask is filtered and evaporated down in an electric drying oven. The final product is a hard mass which can be pulverised. The extract is kept in sealed bottles in ice boxes. The powder is soluble in water, but can be kept in solution in sterile saline. There are no proteins or peptones in the extract. It is put up in gelatine capsules in ½ and 1 gr. doses.

The product must be given by subcutaneous or intravenous injection,* and the dosage varied according to the severity of the disease, the body weight, and diet. The dosage must be controlled by frequent blood-sugar estimations in each case until one learns the amount in a given case on a given diet necessary, and to abolish glycosuria permanently. The usual dosage is to divide the daily quantity into three equal parts, each part to be given just before the three chief meals. Adjustments in dosage are often necessary, because a dose which controls glycosuria one day may be excessive or inadequate another.

Insulin has the power of replacing the internal pancreatic secretion; not only is the blood sugar lowered rapidly to the normal concentration but the patient becomes practically a normal individual for a few hours, and capable of taking a quantity of carbohydrate proportionate to the dose of Insulin injected without use of his blood sugar above the normal level. Insulin should never be given during periods of abstinence from food, as even the accidental omission of a meal expected to follow a dose may lead to harm. Glucose reaches the blood very soon after a meal, and continues to do so for two or four hours, varying with the nature of the meal. The effect of Insulin lasts for a period up to eight hours; therefore each injection should be followed by a meal in fifteen minutes, and fresh food should be given every three or four hours subsequently until the Insulin effect has passed beyond such activity as might reduce the blood sugar to a seriously low level. The commonest symptoms of excessive dosage are weakness, nervousness, dizziness, visual disturbance, profuse sweating, and may be removed by taking some cane sugar or fruit juice.

The aim of the Insulin treatment is to supply the patient with sufficient of the active principle to make up for the deficiency of his natural supply, and so to enable him to metabolise an adequate quantity of carbohydrate.

Control of the manufacture of Insulin in the British Isles is vested in the Medical Research Council.

HONOURABLE MENTION.

The following competitors receive honourable mention:—Miss Amy Phipps, Miss Edith Dowding, and Miss Sarah Paterson.

QUESTION FOR NEXT WEEK.

Describe the method of administering pituitrin, and any case in which you have seen it prescribed.

* Intravenous injection is neither so safe nor so effective as the subcutaneous method.—Ed.

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