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The demonstration of a hormone in plant tissues to be known as "glucokinin."

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The demonstration by the writer, in collaboration with MacLeod, Banting, and Best, that active preparations of the internal secretion of the pancreas conferred upon the depancreatized dog the power of glycogen formation led at once to the idea that wherever glycogen occurred in nature, a hormone similar to that produced by the islet cells of the pancreas would probably be found. Three obvious places to look for such a substance were[1] tissues of lower animals rich in glycogen such as the clam,[2] yeast,[3] fungi. The writer[2] was immediately successful in demonstrating the presence of such a hormone in clam tissue. Yeast was also investigated continuously for many months, and on January 26, 1923, after more than a score of failures, an extract of yeast was obtained which produced marked hypoglycemia in a normal rabbit (blood sugar 0.046 per cent). Since that date extracts of yeasts which have similar properties have been prepared by five different methods. The administration of such a potent yeast extract to a depancreatized dog also caused a marked fall in the percentage amount of blood sugar and a great decrease in the hourly excretion of sugar. As the yeast organism is a plant of the least differentiated type in the vegetable kingdom, the idea occurred to the writer that, as all plants are sugar burners as well as producers, the preparation of the sugar molecule for combustion in the protoplasmic fire of the plant cell might be quite a secondary affair and be dependent, as Winter and Smith[3] have suggested, on the preliminary formation of γ glucose, the combustion of sugar or the polymerization of the same being primarily dependent upon presence of the γ form of glucose. If this

[1] Banting, F. G., Best, C. H., Collip, J. B., MacLeod, J. R. R., and Noble, E. C., *Trans. Roy. Soc. Can.*, 1922, xvi.

[2] Collip, J. B., *J. Biol. Chem.*, 1923, lv. XXXIX.

[3] Winter, L. B., and Smith, W., *J. Physiol.*, 1922, lvii, 100.

theory were correct one should be able to demonstrate the hormone in plant tissue which contained neither glycogen nor starch. Professor F. J. Lewis very kindly suggested the onion as a type plant which contains neither glycogen nor starch, and which is also a well recognized glucose burner. The onion was therefore used and the writer was successful in preparing extracts from onion tissue which produced when administered to normal rabbits effects similar to those following the administration of yeast extracts. A depancreatized dog was caused to have a normal blood sugar for a period of many hours by the use of onion extract, and the urine was rendered practically sugar free for a similar period.

Encouraged by these results, the writer investigated tissues of other plants and similar results were obtained in many instances. Extracts made from yeast (either baker's or brewer's), green onion tops, onion roots, barley roots, sprouted grain, green wheat leaves, bean tops, and lettuce have been found to have similar properties.

The demonstration that a substance capable of producing hypoglycemia in normal rabbits and in the few cases tested out, a definite fall in the blood sugar and a decrease in sugar excretion of depancreatized dogs by extracts of plant tissues so widely divergent in character as the above list indicates, justifies one in assuming a hormone present in the above plant tissues and probably universally present in plant tissue. Such hormone would be just as essential to the metabolism of sugar in the plant as a similar hormone, produced in the higher animal by the islets of Langerhans, is to the metabolism of sugar in the animal.

The new substance, although in some ways similar in its properties to the active principle of the pancreas of animals, obviously can not be known as "Insulin." In the official announcement[4] by the Toronto group on the effects of extracts of pancreas on diabetes, the name "Insulin" was given to an extract of animal pancreas prepared by a definite process elaborated by the writer and known as the "Collip method." Therefore it would seem proper to suggest that this new hormone derived from plant sources be called "Glucokinin."

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4 Banting, F. G., Best, C. H., Collip, J. B., Campbell, W. R., Fletcher, A. A., Macleod, J. J. R., and Noble, E. C., *Trans. Assoc. Am. Physicians*, May, 1922.

That this hormone will be useful in the treatment of diabetes mellitus in the human subject there can be little doubt. Judging by the results obtained on diabetic animals it will in some ways be much superior to "Insulin." Its effect develops slowly and is long maintained. The fact that relatively crude extracts of many plant tissues are practically non-toxic is also a factor of great practical importance. A few results are indicated in Table 1.

TABLE 1.

Animal.	Source of extract.	Blood sugar.	
		Control.	Low point.
Normal rabbit	Yeast	0.110	0.046
Normal rabbit	Yeast	0.118	0.046
Normal rabbit	Yeast	0.080	0.038
Normal rabbit	Onion	0.118	0.058
Normal rabbit	Lettuce	0.094	0.056
Normal rabbit	Wheat leaves	0.103	0.065
Normal rabbit	Wheat leaves	0.106	0.058
Normal rabbit	Bean greens.	0.095	0.065
Depancreatized dog	Onion	0.190	0.090

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Evidence of the dynamic importance of auricular systole in man.

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Considerable discussion has arisen as to the dynamic importance of auricular systole. Some of the differences of opinion are no doubt due to the fact that the vigor of auricular contraction varies considerably under different experimental conditions. The idea has occurred to many that evidence of the dynamic importance of auricular systole might be obtained *in man* by comparing the ventricular efficiency during normal action with that found in auricular fibrillation. But nothing has come of this suggestion because no adequate criterion for comparing the ventricular efficiency had been found. In this report we wish to suggest that an accurate study of the duration of total ventricu-