Developing a new carbohydrate exchange diet based on the glycaemic index

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Currently diabetic diets are based on the carbohydrate exchange lists originally developed in the 1950s by the American Diabetes Association (ADA). These exchange lists were developed on the assumption that equal quantities of all carbohydrate foods have an equal effect on blood glucose levels and that simple carbohydrates produce a faster increase in blood glucose compared with complex carbohydrates and should therefore be avoided. Both these assumptions have been shown to be incorrect by the extensive work on the Glycaemic Index (GI) of carbohydrate foods (1). What is now required is a scientifically valid diabetic exchange diet which gives a true comparison of the blood glucose effect of the different carbohydrate foods.

In practice, the GI concept must not only consider the qualitative differences in individual carbohydrate foods, but must also include a means of relating this to the quantity of carbohydrate consumed. Distribution of carbohydrate continues to be advocated as part of the general diabetic diet and is mandatory for people treated with insulin and the sulphonylureas in order to minimise the risk of hypoglycaemia. The specific aims of this project are therefore, firstly, to compare the glycaemic equivalence of different quantities of foods as predicted by their GI, and secondly, to establish the relationship between carbohydrate quantity and blood glucose effect of commonly eaten carbohydrate foods.

Subjects will be fed meals of differing carbohydrate quantities which on the basis of the GI of the individual food would be predicted to have an equivalent blood glucose effect to eating two slices of white bread. This standard has been chosen as representative of a typical two carbohydrate exchange commonly eaten by people with diabetes. The following foods (Table) will be tested (the GI and the carbohydrate quantity to give a predicted blood glucose response equivalent to two slices of white bread is indicated in parentheses):

Food	(GI, amount of carbohydrate)	Food	(GI, amount of carbohydrate)	Food	(GI, amount of carbohydrate)
White bread	(GI 70, 30g)	Rice Bubbles	(GI 90, 23g)	Yoghurt, fruit	(GI 35, 60g)
Multigrain	(GI 44, 48g)	Sweet corn	(GI 60, 35g)	Orange juice	(GI 57, 37g)
Calrose rice	(GI 83, 25g)	Boiled potato	(GI 56, 38g)	Apple	(GI 38, 55g)
Basmati rice	(GI 60, 35g)	Arrowroot biscuits	(GI 66, 32g)	Banana	(GI 55, 38g)
Spaghetti	(GI 41, 51g)	Morning Coffee biscuits	(GI 80, 26g)	Orange	(GI 44, 48g)
Corn Flakes	(GI 80, 26g)	Ryevita	(GI 70, 30g)	Baked beans	(GI 48, 44g)
Wheatbix	(GI 70, 30g)	Ice Cream low fat	(GI 50, 42g)	Lentils	(GI 30, 70g)
Muesli	(GI 55, 38g)	Milk, skim	(GI 32, 66g)	Muesli bar	(GI 61, 34g)

Based on this information, it will be possible to formulate a scientific and rational basis for dietary prescription in diabetes. The end product will be a validated exchange list of quantities of foods which are equivalent in their glycaemic impact. We recognise that macronutrient and energy differences will also need to be taken into account when formulating the new set of exchange lists. This will represent a further advance over currently available exchange lists which do not take this into consideration.

1. Foster-Powell K, Brand Miller J. International tables of glycemic index. Am J Clin Nutr 1995;62:871S-93S.