

# GLYCEMIC INDEX & DIABETES

*making healthy choices easy*



A newsletter from the Glycemic Index Foundation explaining the benefits of low GI and the GI Symbol Program September 2012

The GI was originally developed to improve carbohydrate exchanges so that they more accurately reflected the true physiological effect of foods on postprandial glycemia. It challenged a long-standing belief that sugars should be avoided in favour of starches. Evidence in support of low GI diets in diabetes management is substantial and it continues to grow.

Evidence supporting the potential of healthy low GI diets to prevent type 2 diabetes and reduce the risk of cardiovascular disease is also increasing rapidly.



## Specific benefits of a low GI diet in diabetes

### Improved glycemic control

A healthy low GI diet will improve glycemic control compared to a high GI diet or a measured carbohydrate exchange diet. A systematic review and meta-analysis<sup>1</sup> including 12 randomised controlled trials lasting between 4 wks and 12 months (3 trials in type 1, 8 trials in type 2 and 1 trial in both) showed that low GI diets compared to high GI diets reduce markers of glycemic control. HbA1c levels were reduced by 0.4% points (95% CI -0.7 to -0.2;  $p < 0.001$ ) similar to the reduction seen with oral hypoglycaemic agents.

### Improved insulin sensitivity and reduced insulin resistance

Low GI diets increase insulin sensitivity in type 2 diabetes<sup>2</sup> and have the added benefit of reducing hyperinsulinaemia, thereby preserving  $\beta$ -cell function. In contrast, high GI and GL diets are associated with an increased risk of insulin resistance<sup>3</sup> and the metabolic syndrome<sup>4</sup>.

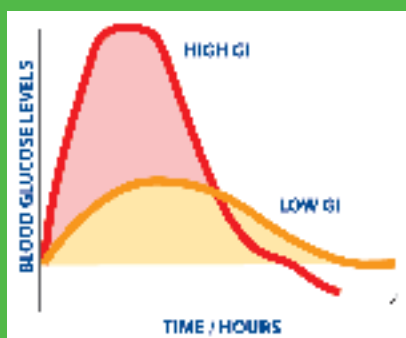
### Reduced risk of vascular disease

Randomised controlled trials (RCTs) show that a low GI diet is associated with improved lipid profiles, specifically higher serum HDL-C and reduced LDL-C<sup>5</sup>. Low GI diets also significantly reduce concentrations of the inflammatory marker, C-reactive protein (CRP)<sup>6</sup>.

### Weight loss

Low GI diets also lead to greater weight loss compared to other healthy diets<sup>7</sup>. In a weight loss study where patients with type 2 diabetes were randomised to a low fat, high carbohydrate vegan diet, or a conventional diet following American Dietetic Association recommendations, the dietary GI was associated with weight loss<sup>8</sup>. GI, which was lowest in the vegan group, predicted changes in weight, where every percentage point decrease in GI lead to a 0.2kg weight reduction. Furthermore, weight loss itself predicted reductions in HbA1c. These improvements were independent of changes in total carbohydrate and fibre.

## GLYCEMIC INDEX



The **Glycemic Index (GI)** is a relative ranking of carbohydrate in foods according to how they affect blood glucose levels. Foods with a low GI ( $GI \leq 55$ ) release glucose into the bloodstream at a slow sustainable rate, and have proven benefits for health.

A low GI diet is not a fad diet but a way of eating that is sustainable in the long term and is backed by over 30 years of scientific evidence. This includes facilitating the management of diabetes, weight loss and weight loss maintenance and reducing the risk of developing type 2 diabetes, diabetes complications and other chronic lifestyle diseases.

To make healthy choices easier we developed the **GI Symbol Program**, a not-for-profit health initiative backed by the University of Sydney and Juvenile Diabetes Research Foundation. The GI Symbol is a powerful tool for quickly and reliably making healthy food choices when grocery shopping. It's your guarantee that the GI value stated near the nutrition information label is accurate and that the food meets strict nutritional criteria.

The free monthly GI Newsletter informs you of the most recent findings from around the world (Register at <http://ginews.blogspot.com>)

### GI in Type 1 diabetes

Low GI diets improve glycaemic control in children and adults with Type 1 diabetes and are now recommended as a part of type 1 diabetes education<sup>9</sup>. By using a continuous glucose monitoring system (CGMS) to measure the blood glucose profiles in people with type 1 diabetes eating macronutrient-matched low- and high-GI meals, researchers observed significantly lower daytime blood glucose when low GI meals were consumed<sup>10</sup>.

The Eurodiab Complications study investigated the dietary intakes of 2810 people with type 1 diabetes and found that those with the lowest HbA1c levels had the lowest dietary GI<sup>11</sup>.

Lower blood glucose excursions expected with a low GI diet has led researchers to explore the optimal pattern of insulin delivery for low-GI meals. A dual wave bolus (whereby the insulin dose for the meal is delivered in 2 parts over 2 hours) via insulin pump was found to achieve a greater reduction in postprandial glucose over a standard bolus<sup>12</sup>.

### GI in pre-diabetes

Lifestyle interventions that bring about weight loss will improve insulin resistance in overweight and obese people with pre-diabetes. Comparison of a 3-month low- and high-GI diet and exercise intervention in obese adults with pre-diabetes found that both induced weight loss and improved hepatic and peripheral insulin sensitivity<sup>13</sup>. However, only the low GI diet reduced postprandial insulin secretion whereas the high GI diet maintained hyperinsulinemia exacerbating  $\beta$ -cell dysfunction.

Observational studies suggest that following a low GI diet could delay or prevent the progression from pre-diabetes to diabetes<sup>14</sup>.

### GI in gestational diabetes (GDM)

To-date, few studies have looked at the effect of GI and the risk of developing GDM. However, of those that have, most support the benefit of a low GI diet in the treatment of GDM. On



a low GI diet the risk of a large-for-gestational-age infant was significantly lower<sup>15</sup> and the need for insulin to control hyperglycemia much lower<sup>16</sup> compared to a high GI diet. A recent RCT found similar foetal and maternal outcomes, however, with a low GI diet compared with a conventional high fibre diet<sup>17</sup>. Another study found an association between a high GI diet and risk of developing GDM<sup>18</sup>.

### Protection against type 2 diabetes

Epidemiological studies<sup>19</sup> and clinical trials<sup>20</sup> have shown that low GI and low GL diets protect against type 2 diabetes. Of note however, is that while low GI and low GL are associated with prevention, a low carbohydrate intake is not. In their prospective analysis of a cohort of ~36,000 adults followed for 4

years, Hodge et. al<sup>21</sup> found that higher-carbohydrate diets were associated with a lower risk of development of type 2 diabetes. However, the type of carbohydrate was extremely important: low-GI carbohydrates reduced the risk, while high-GI carbohydrates increased the risk.

#### Summary

Benefits of a low GI diet in diabetes\* include:

- improved glycaemic control
- improved insulin sensitivity
- reduction in insulin resistance
- reduced risk of vascular disease
- assistance with weight loss



\*For references cited go to [www.gisymbol.com/resources](http://www.gisymbol.com/resources).

For more information on low GI diets and diabetes visit [www.gisymbol.com](http://www.gisymbol.com)

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