

# The glycaemic index – scientific evidence on the practical use

The glycaemic index (GI) of a carbohydrate-containing food reflects its blood glucose raising potential, while the glycaemic load (GL) is defined as the mathematical product of the GI of a food and its carbohydrate content.<sup>1</sup> Evidence from prospective studies shows that low-GI diets are associated with reduced risk of diabetes,<sup>1-3</sup> cardiovascular disease,<sup>4</sup> cancer<sup>5-10</sup> and the metabolic syndrome.<sup>11</sup> Clinical trials have shown that low-GI diets improve glycaemic control in diabetes,<sup>12,13</sup> increase insulin sensitivity<sup>14</sup> and beta-cell function,<sup>15,16</sup> reduce food intake and body weight,<sup>17-19</sup> influence memory<sup>20,21</sup> and may improve blood lipids.<sup>22</sup> The GI is acknowledged by a number of major diabetes associations, including those in the UK,<sup>23</sup> Canada,<sup>24</sup> Australia,<sup>25</sup> Europe<sup>26</sup> and the USA,<sup>27</sup> as a useful tool for differentiating between carbohydrates.

It is therefore surprising that this area of nutrition science has been controversial for some time, more so in the USA than elsewhere, with little evidence of resolution.<sup>28</sup> The lively debate about what seems to be a simple, logical concept is not just due to the increasing commercial use that food companies have made of the GI. There is also significant scientific disagreement among academics and clinicians as to whether there is true physiological benefit in consuming a reduced-GI or GL diet.<sup>28,29</sup> As with all areas of science, a lack of data promotes controversy. The aim of this series of publications is to identify some areas of agreement and disagreement based on the available scientific data.

A group of 36 dietitians and nutritionists endorsed the use of the GI in choosing carbohydrate-containing foods during a Masters Class at the 2002 Nutrition Congress (5 - 9 November 2002, Potchefstroom). The consensus statements of the group, based on literature reviews, are included in this issue of the *SAJCN*,<sup>30</sup> the aim of which is to summarise scientific evidence on the practical use of the GI concept. The GI Masters Class 2002 Group expressed the need for (*inter alia*) 'more clarity on the health benefits of low- versus high-GI diets; standardised practices in measurement of the GI; the best way to express the GI on labels and the development of appropriate teaching aids', concepts presented in this issue of the *Journal*.

One should be aware, however, that any consensus is related to the knowledge at the moment that the consensus was obtained and defined. Any scientific consensus, once obtained, will need to be reviewed regularly and, if required, to be adapted to new standards. A recently published summary of a meeting in Washington, DC, of a group of experts from around the world who participated in a discussion on the role

of diet in blood glucose response and related health outcomes reflects the current areas of agreement and disagreement.<sup>28</sup> It was concluded that well-controlled research with healthy individuals is needed to resolve the current debate on this topic.

The consumer has the right to be informed about the impact that a food may have on metabolism and health. Labelling of the GI on foods has been proposed or is already occurring in a number of countries including Australia, South Africa, Scandinavia, the UK and Germany, and a number of laboratories are measuring the GI of foods. For regulatory purposes, an approved method for measuring the GI of foods is required and standards need to be developed to enable assessment of the performance of the laboratories using this method. The effect of many methodological variables on GI values is known and a recommended method is available.<sup>31</sup> However, the recommended method does not address all the variations in methods which are possible. The paper by Jerling and Pieters<sup>32</sup> critically evaluates many of the outstanding issues of the proposed methodology for GI testing, including the food portion size, and offers suggestions for resolving these issues. If consensus is obtained on these points, then there is a solid ground for establishing an industrial code of practice on measuring and labelling GI. Ideally, a recommendation should be made for regulation of GI labelling in food regulations across the world.

In their comments on the draft Food Labelling Regulations,<sup>33</sup> the Association for Dietetics in South Africa (ADSA) and the Nutrition Society of South Africa (NSSA) consider the practical application by health professionals and the complexity of consumer understanding of the GI concept as some of the major issues to be resolved (comment on draft food labelling regulations, letter to A Booyzen, 30 January 2003). Slabber<sup>34</sup> offers suggestions to incorporate high- and low-GI foods in the context of current dietary guidelines and client education.

Eventually, it will be randomised controlled trials (RCTs) on low-GI diets, with clinical endpoints and of reasonable numbers and duration (months and years rather than weeks or days), that will decide the role and value of the GI as a therapeutic modality. Although results of RCTs of low-GI diets in patients who already have diabetes or insulin resistance have generally had favourable outcomes,<sup>12</sup> long-term morbidity and mortality data are lacking. However, waiting for conclusive proof on the magnitude of efficacy of low-GI-carbohydrate foods on clinical endpoints may be unwise, given the projected burden of chronic diseases

(obesity, diabetes mellitus, stroke, heart disease) in relation to the suggested absence of risk from reduced postprandial glycaemia.<sup>35</sup>

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