Scientific Advisory Committee on Nutrition

## Paper for discussion

## Agenda item: 3

# Potential Carbohydrate and Disease Prevention Review

The issue of whether the current advice on carbohydrates is up to date or whether it warrants a review was initially raised at the October 2005 SACN meeting.

SACN members are asked to discuss:

(1) The need for a review on carbohydrate and disease.
(2) The scope, terms of reference and timing of the potential review on carbohydrate and disease.
(3) Which types of carbohydrate should be included in the review.
(4) Which diseases should be included in the review.
(5) Any other aspects the review should include.

1) This paper outlines aspects to consider including the types of carbohydrate, current advice on carbohydrate and disease based on reports from the Committee on Medical Aspects of Food Policy (COMA) and evidence from World Health Organisation (WHO)/ Food and Agriculture Organisation (FAO).

## Background

## Types of carbohydrate

2) There are three main types of carbohydrate; sugars, oligosaccharides and polysaccharides and each are divided into subgroups:

**1.1 Sugars**

**1.1.1 Monosaccharides**

Glucose
Galactose
Fructose

**1.1.2 Diassacharrides**

Sucrose
Lactose
Trehalose

**1.1.3 Polyols** (sugar alcohols)

Sorbitol
Mannitol

**1.2 Oligosaccharides**

**1.2.1 Malto-oligosaccharides**

Maltodextrin

**1.2.2 Other Oligosaccharides**

Raffininose
Stachyose
Fructo-oligosaccharides

**1.3 Polysaccharides**

**1.3.1 Starch**

Amylose
Amylopectin
Modified starch

**1.3.2 Non-starch polysaccharides (fibre)**

Cellulose
Hemicellulose
Pectins
Hydrocolloids

## Carbohydrates and disease

## Current evidence from COMA

3) The current advice to Government based on the Committee on Medical Aspects of Food Policy (COMA) reports is:

**Sugars**

- COMA in the report on dietary sugars and human health (1989) concluded that the available evidence was insufficient to establish a link between sugar intake and development of obesity (5).
- There was no direct causal role for dietary sugars in the development of diabetes (5).
- COMA (1989) reviewed the proposal that intake of sucrose is causally related to development of atherosclerotic cardiovascular disease but the evidence available did not support any direct link between sugar consumption and CHD risk (5).
- There was insufficient evidence for a role of sugar in cancers including colorectal cancer (4).
- The evidence relating dietary sugar to dental caries is extensive and has been obtained from human intervention studies, epidemiological studies and animal studies (5). The COMA panel recommended that consumption of non-milk extrinsic sugars (NMES) should be decreased to prevent dental caries (5).

**Non-starch polysaccharides**

- COMA (1994) reported that four prospective studies have shown an inverse relationship between dietary fibre and CHD (3).
- COMA (1998) reported that there is moderately consistent evidence that higher intakes of dietary fibre are associated with a lower risk of colon cancer. This was despite most epidemiological studies not demonstrating a significantly lowered risk (4). There are plausible mechanisms through colonic fermentation (e.g. butyrate) and increasing stool weight (4).
- There was insufficient evidence to draw conclusions between NSP and breast cancer (4).

**Evidence from other reports**

4) Evidence is also available from The Food and Agriculture Organisation (FAO 1998) Food and Nutrition Paper 66. Carbohydrates in Human Nutrition http://www.fao.org/docrep/W8079E/W8079E00.htm and the WHO/FAO Technical Report 916 on Diet, Nutrition and the Prevention of Chronic Diseases (2003).

**Sugar**

- The WHO/FAO expert panel concluded that there was probable evidence of an increased risk of obesity from a high intake of sugar sweetened soft drinks and fruit juices (9).
- WHO/FAO did not report on sugar and cancer risk
- WHO concluded that there was convincing evidence of an increased risk of dental caries related to the frequency and amount of free sugars (all monosaccharides and disaccharides added to foods plus sugars naturally present in honey, fruit juices and syrups) consumed, but insufficient evidence of an association of sucrose with increased risk of dental caries (9)

**Non-starch polysaccharides**

- The WHO/FAO expert panel concluded that there was convincing evidence that a high dietary intake of NSP decreased the risk of obesity (9).
- Foods rich in NSP and with low glycemic index appear to protect against non-insulin dependent diabetes (NIDDM), independently of BMI (1). WHO concluded that there was probable evidence that consumption of NSP decreased the risk of NIDDM (9).
- Some NSP (e.g beta-glucans) have been demonstrated to lower serum cholesterol (1).
- WHO concluded that there is probable evidence that NSP is protective against coronary heart disease and that adequate intake may be achieved through fruits, vegetables and wholegrain cereals (9).
- WHO noted that although case-control studies show a weak association between the risk of colorectal cancer and high consumption of fruit and vegetables and dietary fibre the results form recent prospective studies were inconsistent. The EPIC study group (6,7) observed a significant inverse association between fibre intake and colon cancer and the PLCO study demonstrated a decreased of colon cancer with dietary fibre from grains, cereal and fruits (8). The WHO/FAO report concluded that on balance the evidence suggests that fruit and vegetables probably reduce the risk of colorectal cancer (9).
- WHO (2003) noted that starch is of low risk to dental caries

**References**

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9. WHO/FAO (2003) Diet, Nutrition and the Prevention of Chronic Diseases. WHO Technical Report Series 916. Report of the Joint WHO/FAO Expert Consultation.