

CONCISE REVIEW

Clinical nutrition of diabetes

Mark L. Wahlqvist BMedSc, MD (ADELAIDE), MD (UPPSALA), FRACP, FAIFST, FAFPHM* and Richard O'Brien MBBS, PhD, FRACP†

*Department of Medicine; †Diabetes Unit; Monash University, Monash Medical Centre, Melbourne, Victoria, Australia.

The nutritional considerations in diabetes are:

- (1) To prevent its expression in those who are vulnerable for genetic, family reasons or because some other disease or treatment predisposes a person to it (eg disease of the pancreas which produces insulin; administration of steroids, such as cortisol or prednisolone, which antagonize the action of insulin)⁶.
- (2) To manage the elevated blood glucose (glycaemic) problem so as to reduce its damaging effects on tissues like the eye, kidneys, nervous system and arteries³.
- (3) To keep the blood fats (cholesterol, triglycerides, HDL or high density lipoprotein cholesterol) as normal as possible, because these also increase the risk of damaging the large and distributing arteries supplying heart, brain, lower limbs and kidneys, by way of the process of atherosclerosis^{7,13}.
- (4) To reduce damaging effects on tissues by any other mechanism, such as oxidation^{9,12}.
- (5) To improve the action of available insulin by:
 - (i) *minimizing abdominal fatness*
 - (ii) *improving the action of the insulin receptor* in cell membranes, possibly by altering its fatty acid composition in the direction of polyunsaturated fats¹⁴
 - (iii) *improving the action of insulin in the cell*, especially by reducing the amount of circulating free fatty acids (FFA) or increasing their utilization by ways that do not interfere with glucose metabolism – physical activity and reducing body fatness are important^{8,10,11}.
- (2) Have a wide variety of foods, especially of plant foods to provide different natural colours and dietary fibre types¹⁷.
- (3) Have fish regularly (2–3 times a week) since whatever the controversy about fish oil, blood glucose and lipids, arteries and life expectancy are not adversely affected and are likely to be improved^{2,16}.
- (4) Have alcohol in moderation and preferably with food to minimize its impact on blood levels and tissues like the pancreas.
- (5) Avoid having too much food at once and prefer low-fat snacks (eg apples, Scandinavian type hard rye breads).
- (6) Use foods with a 'low glycaemic index' (ie for a given amount of carbohydrate, less impact on blood glucose):
 - eg ● wholegrain rather than wholemeal (and wholemeal rather than white flour)
 - legumes/lentils
 - apples
- (7) minimize sodium (salt) intake in favour of potassium⁴, provided they are not associated with fat^{1,15}.

References

- 1 Brand JC, Colagiuri S, Crossman, S, Allen A, Roberts DCK and Truswell AS. Low glycaemic index foods improve long-term glycaemic control in NIDDM. *Diabetes Care* 1991; 14(2):95–101.
- 2 Burr ML et al. Effects of changes in fat, fish, and fibre intakes on death and myocardial reinfarction: Diet and Reinfarction Trial (DART). *Lancet* 1989; II:757–761.
- 3 DCCT Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *NEJM* 1993; 329:977–986.
- 4 DeFronzo RA. Insulin Resistance. A multifaceted syndrome responsible for NIDDM, obesity, hypertension, dyslipidemia, and atherosclerotic cardiovascular disease. *Diabetes Care*, 1991; 14(3):173–194.
- 5 Duncan JJ, Gordon NF and Scott CB. Women walking for health and fitness. How much is enough? *JAMA* 1991; 266(23):3295–3299.
- 6 Eriksson K-F and Lindgärde F. Prevention of Type 2 (non-insulin-dependent) diabetes mellitus by diet and physical exercise. *Diabetologia* 1991; 34:891–898.

By various mechanisms the following nutritional strategies are useful in prevention of non-insulin-dependent diabetes (NIDDM) and management of diabetes of both main types (insulin dependent, IDDM and non-insulin-dependent, NIDDM):

- (1) Avoid overfatness, especially around the abdomen by regular physical activity (eg walking at least 45' / day, 5 days a week) and having a low total fat intake (low-fat meats and dairy foods, avoid fried food, read food labels to avoid hidden fat in snack foods, biscuits, baked foods, etc.)⁵.

- 7 Ginsberg HN. Lipoprotein physiology in non-diabetic and diabetic states. Relationship to atherogenesis. *Diabetes Care* 1991; 14:839-855.
- 8 Depres JP. In: Wahlqvist M, Hills A, eds. *Exercise & Obesity*, Section 3, Chapter 8. Smith-Gordon & Co Ltd, London (in press).
- 9 Jones AF and Lunec J. *Br J Cancer* 1987; 55 Suppl VIII:60-65.
- 10 Krotkiewski M, Lonnroth P, Mandroukas K, Wroblewski Z, Rebuffe-Scrive M, Hol G, Smith U and Bjorntorp P. The effects of physical training on insulin secretion and effectiveness and on glucose metabolism in obesity and Type 2 (non-insulin-dependent) diabetes mellitus. *Diabetologia* 1985; 28(12):881-90.
- 11 Lassers BW, Wahlqvist ML, Kaijser L and Carlson LA. Relationship in man between plasma free fatty acids and myocardial metabolism of carbohydrate substrates. *Lancet* 1971; II:448-50.
- 12 Soulis-Liparota T, Cooper M, Papazoglou D, Clarke B and Jerums G. *Diabetes* 1991; 40:1328-1334.
- 13 Stern MP and Haffner SM. Dyslipidemia in Type II diabetes. Implications for therapeutic intervention. *Diabetes Care* 1992; 15:1068-1074.
- 14 Borkman M, Storlien LH, Pan DA, Jenkins AB, Chisholm DJ, Campbell LV. The relation between insulin sensitivity and the fatty-acid composition of skeletal-muscle phospholipids. *N Eng J Med* 1993; 328(4):238-244.
- 15 Truswell AS. Glycaemic index of foods. *EJCN* 1992; 46(S2):S91-S101.
- 16 Wahlqvist ML, Lo CS and Myers KA. Fish intake and arterial wall characteristics in healthy people and diabetic patients. *Lancet* II 1989; 944-946.
- 17 Wahlqvist ML, Lo CS and Myers KA. Food variety is associated with less macrovascular disease in those with Type II diabetes and their healthy controls. *Journal of American College of Nutrition* 1989; 8(6):515-523.