

Metabolic syndrome and Lipgene – 10 key facts for dietitians and nutritionists

1. The term metabolic syndrome describes a cluster of disorders (raised blood pressure, abdominal obesity, dyslipidaemia, insulin resistance and high blood glucose concentrations), which are associated with an increased risk of developing type 2 diabetes (2-3 fold) and cardiovascular disease (5-6 fold). It is estimated that between 10-35% of middle aged and elderly Europeans have metabolic syndrome. This figure is likely to rise as the prevalence of both obesity and type 2 diabetes increases across the continent, with a concurrent increase in life expectancy.
2. There is no universal definition of the metabolic syndrome which makes determining its true prevalence and ensuring a correct diagnosis of the disorder problematic. An appreciation of the true prevalence of the metabolic syndrome will also help define health policy, establish prevention programmes and steer future research.
3. Worryingly, the metabolic syndrome has now been reported in children. Although the prevalence is unknown, the numbers of children with metabolic syndrome is likely to be linked with the increasing prevalence of obesity and type 2 diabetes.
4. Obesity and insulin resistance both play key roles in the metabolic syndrome, but because of their close relationship it is difficult to disentangle their individual effects. Adipose tissue (body fat) was until recently simply considered to be an energy store, but it is now recognised that it actively secretes a number of bioactive compounds into the circulation (such as leptin, interleukin-6 and adiponectin), which have been implicated in the development of insulin resistance and, therefore, may play a role in the aetiology of the metabolic syndrome. Further research is required to determine the influence of both obesity and insulin resistance in the causality of the metabolic syndrome, and the impact of dietary change.
5. Research is underway to investigate what impact changes to the diet may have on the prevalence and management of the metabolic syndrome. Lipgene is an EU 6th Framework Programme Integrated Project (contract FOOD-CT-2003-505944) focusing on the metabolic syndrome. The project entitled "Diet, genomics and the metabolic syndrome: an integrated nutrition, agro-food, social and economic analysis" began in 2004 and will run until 2009. The Lipgene consortium comprises 25 centres across Europe. For more information visit www.nutrition.org.uk/lipgene or www.lipgene.tcd.ie
6. It has been suggested that diets rich in monounsaturated fatty acids may reduce the adverse effects of high intakes of saturated fatty acids on insulin sensitivity and, therefore, may impact on the prevalence of the metabolic syndrome. Monounsaturates also have a beneficial effect on blood lipids. It has also been reported that long-chain *n*-3

- fatty acids (EPA and DHA, which are found in oily fish and fish liver oils) may also help reduce risk of the metabolic syndrome. The Lipgene project will endeavour to determine the relationship between the amount and type of fat (i.e. saturates and unsaturates, including long-chain *n*-3 fatty acids) in the diet in those deemed at increased risk of the metabolic syndrome, taking into account genetic factors.
7. The Lipgene project is also investigating ways in which the fatty acid composition of animal products, such as meat and milks, can be altered through changes in the diets of livestock. It is hoped that modifying the fatty acid profile of these commonly consumed foods will make it easier for people to consume the right balance of fats in their diet.
 8. Research is also underway to develop a sustainable and economically viable plant source of the long-chain *n*-3 fatty acids (EPA and DHA), which are found in oily fish and fish oils. If such research is successful, it is hoped that foodstuffs with improved fatty acid profiles will be available in the future.
 9. It is estimated that, in 2002, obesity cost the EU €32.8 billion in terms of health costs and indirect costs, such as days off work sick. This is likely to be a conservative estimate and, as obesity is only one component of the metabolic syndrome, the costs associated with the metabolic syndrome are likely to be higher.
 10. Changing the fatty acid composition of the diet may help reduce the economic burden associated with the metabolic syndrome. However, foods with an improved fatty acid profile may attract a price premium and European consumers may be reluctant to spend additional money on something they perceive will have little benefit on their general health. The Lipgene project is considering various policy options to encourage selection of healthier foods, which will be explored at a workshop in Munich in December 2005 (for more information visit www.nutrition.org.uk/lipgeneconference). It is also exploring consumer and health professionals awareness of the metabolic syndrome and attitudes to the use new technologies to develop healthier products; the findings will be discussed at workshops during 2006.

For more information visit:

<http://www.lipgene.tcd.ie/>

www.nutrition.org.uk/lipgeneconference

www.nutrition.org.uk/lipgenepresspack

<http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-3010.2004.00403.x?prevSearch=allfield%3A%28metabolic+syndrome%29>