

## Metabolic syndrome and Lipgene - 10 key facts for small and medium enterprises

1. The term metabolic syndrome describes a cluster of disorders (raised blood pressure, abdominal obesity, abnormal blood lipids, 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).
2. 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, and as life expectancy increases concurrently.
3. It is believed that changing the amount and type of fat in the diet may reduce an individual's risk of developing the metabolic syndrome or help treat some of the related conditions. Research to investigate this is underway as part of the Lipgene project.
4. 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 see: [www.nutrition.org.uk/lipgene](http://www.nutrition.org.uk/lipgene) or [www.lipgene.tcd.ie](http://www.lipgene.tcd.ie)
5. Lipgene is looking at how changing the proportions of saturates, monounsaturates and n-3 (omega 3) polyunsaturated fatty acids consumed may reduce the risk of developing the metabolic syndrome. This may be of particular importance for some individuals because genetic differences are expected to influence future risk of developing the metabolic syndrome.
6. Meat and milk products form an important part of the European diet, but together they contribute much of the fat and saturated fatty acids in the diet. The Lipgene project will explore ways in which the saturated fatty acid content of milks can be reduced and the amount of unsaturated fatty acids (particularly n-3 fatty acids) increased, by manipulating the feed of cattle. The opportunity for changing the fatty acid composition of meats is limited; however, the Lipgene project will endeavour to increase the amount of n-3 fatty acid content of animal products, again through manipulating animal feed.
7. Plant biotechnology will be used to develop an economical and sustainable source of long-chain n-3 fatty acids in plant foods. It is hoped that genes present in marine algae, which are capable of synthesising EPA and DHA, can be re-constituted in oilseed crops, so that the oilseed itself can synthesis EPA and DHA. Such crops could be incorporated into animal feed to potentially modify the fatty acid profile of animal products. Alternatively

- plant oils providing long-chain *n*-3 fatty acids could be incorporated into foods such as fat-spreads, thereby helping to increase intakes of long-chain *n*-3 fatty acids.
8. Modified foods may attract increased costs related to: the costs of inputs (i.e. ingredients that are not used in the production of conventional foods); identity preservation costs associated with segregation of ingredients; and costs associated with reduced productivity (e.g. in terms of reduced egg output or reduced weight gain amongst livestock). Also there may be additional costs associated with production on a smaller scale (i.e. lower production efficiency and smaller volume of sales).
  9. It is hoped that the technology used and developed within the Lipgene project can be employed by the food industry to produce foods with an improved fatty acid profile on a larger scale, which will subsequently reduce the increased costs associated with production. Some of the opportunities and barriers to producing health benefiting foods are being explored with SMEs at a workshop in Munich in December 2005. See [www.nutrition.org.uk/lipgeneconference](http://www.nutrition.org.uk/lipgeneconference) for more information.
  10. The Lipgene project will also investigate whether the methodology employed to modify foods will influence the taste and other sensory properties of the final product. It is important that the foodstuffs developed within the Lipgene project have an acceptable taste, and do not have a compromised shelf life or oxidative stability. It will also explore consumer opinions with regards to the acceptability of new technologies being used, and these issues will be discussed at workshops during 2006.

**For more information visit**

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

[www.nutrition.org.uk/lipgeneconference](http://www.nutrition.org.uk/lipgeneconference)

[www.nutrition.org.uk/lipgenepresspack](http://www.nutrition.org.uk/lipgenepresspack)