Genotype foods still a decade from the shelves: experts

By Stephen Daniells in Paris
17/03/2008- **Personalised food tailored for people's genotypes are still 10 to 15 years away from the shelves, experts told the Nutrigenomics 2008 conference in Paris.**

The food industry is moving towards functionalised products for consumers, but *"there are still a lot of unknown unknowns,"* said Dr. Siân Astley, communications manager for the European Nutrigenomics Organisation (NuGO),

Nutrigenomics is defined as how food and ingested nutrients influence the genome (personalised nutrition). Nutrigenetics is defined as how a person's genetic make-up affects a response to diet (individual nutrition). The difference between the two is important, said Dr. Astley.

And currently, *"we can do the science, we can take a genetic snapshot of a person, but we're stuck on the long-term interpretation,"* Dr. Astley told NutraIngredients.com.

For the attendees, reported to be over 150 from 30 countries assembled at the Faculty of Medicine, Paris 5 for the two-day conference organised by the International Society of Antioxidants in Health and Nutrition (ISANH), a wide and varied programme brought people up to date on the state of play of the science, the industrial and academic focuses, and ethical, social, and legal considerations for the technology.

Dr. Martin Kussmann, group leader of functional genomics at the Nestlé Research Center told NutraIngredients.com: *"We see it as the future. Adding value through functionality is where the margin is."*

Three pipelines of research are being applied, often to address the same problem and compliment each other, including transcriptomics, proteomics, and metabonomics. In other words, changes to messenger RNA (transcriptomics) and the corresponding proteins (proteomics) control the transport of certain nutrients and metabolites (metabonomics) in the biochemical pathway.

But while work is progressing in laboratories around the world on these 'omics', Dr. Kussmann noted that the only 'ome' that is reasonably complete is the genome. By integrating the 'omics' and applying multiple platforms to the same question, significant advances can be made, he said. All the techniques are difficult and are used alongside established and existing methods, added Dr. Astley.

Industrial-academic team-ups

For Dr Kussmann and Nestlé, the key to prevention is detect early deviations from the natural trajectory of healthy ageing. "*Nutrition has become a molecular science,"* he said.

"We don't believe in 'give us your gene card and we'll print out your menu'," said Dr. Kussmann. Nutrigenomics is also not just about disease risk, he said, and could easily be applied to sports nutrition, for example.

Nestlé is taking the matter very seriously; with collaborations with universities, research institutes, and even some outsourcing to private companies. Such an approach has already yielded fruit: collaboration with Professor Jeremy Nicholson's group at Imperial College London applied the metabonomics approach to show that probiotic supplementation led to changes in a host's intestinal micorflora, which subsequently affect energy, lipid, and amino acid metabolism (*Molecular Systems Biology*, doi:10.1038/msb4100190).

Dr. James Kinross from Inmperial College London urged attendees to look at humans as having an 'extended genome' because of the microflora that exist symbiotically in our gut.

"Studies show that genetically identically animals have metabonomically different characteristics, based on their gut microflora," Kinross told a packed auditorium.

"Nutrigenomics and nutrigenetics are laying the foundation to understanding what is going on," said Dr. Kussmann.*"The nutrigenomics concept makes sense, but we are still far from personalised nutrition,"* he added.

Test issues

The overwhelming view from the international experts at the conference is that the science, while still in its infancy, is advancing rapidly. However, several companies are already offering genetic tests to physicians and consumers to help them plan personal nutrition based on their genetic profile, with prices reportedly ranging from $100 to $1000. Such products have aroused criticism and skepticism, including an article in the New Scientist in 2007 that stated that companies offering personalised nutrition testing are jumping the gun because the science behind nutrigenomics is not enough to support the claims.

Indeed, the US Government Accountability Office named named four personalised nutrition companies in July 2006 for having *"misled consumers by making predictions that are medically unproven and so ambiguous that they do not provide meaningful information."*

Dr. Astley told this website that the tests were not nutrigenomics, but nutrigenetics - an important distinction. The tests analyse for one specific gene, and do not analyse the entire genome, which contains about 26,000 genes. *"It is not currently possible to do nutrigenomics testing,"* she said. Indeed, more effective and valuable data can actually be obtained from accurately gathering information about lifestyle and family history, said Professor Ulf Gorman from the department of ethics at Lund University in Sweden.

Educating the public

Communicating to the public is key to the success and understanding of nutrigenomics, and science in general. *"I'm not sure that consumers recognise that the testing is about odds. Some of the odds being quoted about disease risk are lower than the odds of winning the lottery,"* she said. (The UK National Lottery has odds of approximately one in 14 million).

She also said that people should appraciate the difference between nutrigenomics and nutrigenetics, as well as the difference between adequate and optimal nutrition.

"Talking to the public about science is important," she said. "Sometimes they reject new technology - as is the case with GM in Europe, and sometimes they accept it but prematurely - and there is the risk that explanations can be too simplistic."

However, Dr. Kussmann said that it is possible to explain complicated things in simple terms, although it is difficult to do it well.

"Every party has a share in the education," he said, referring to industry and academia, as well as governments and other groups. *"Many public bodies must pay into the education, and this will lead to acceptance. Nutrigenomics is more than a gimmick."*