**NANOTECHNOLOGIES …**

**The big nano debate** *from the guardian website*

Can nanotechnology eradicate diseases and will the benefits of the technology outweigh any potential hazards? **Janet Murray** reports from a school in Glasgow where pupils, parents and experts discussed such vital questions

Smithycroft is one of just two UK schools to have been selected to host a nanotechnology event as part of the European Commission-funded Nanochannels project. Photograph: Martin Hunter

There is little doubt that, in decades to come, nanotechnology could play a revolutionary role in almost every aspect of our daily lives – from healthcare to heating our homes. Young people today will be the generation most affected by the technology as it becomes ever-more prevalent, and so it is vital they understand the implications of nanotechnology and are aware of its possible uses. But what are the potential dangers involved with these new technologies? Are they open to abuse or misuse? And do the benefits outweigh the risks?

These were just some of the questions asked in a debate held at Smithycroft secondary school in Glasgow earlier this month. The discussion brought together parents, pupils and experts from industry and academia to discuss the merits and potential hazards involved in nanotechnology.

Smithycroft is one of just two UK schools to have been selected to host such an event as part of the European Commission-funded Nanochannels project, which aims to encourage public discussion and debate that will feed into policy recommendations for an EU code of conduct on governance and best practice in nanotechnologies.

The event, which was attended by pupils, parents and members of the local community, opened with a presentation from 5th-year students Nicola Ballock and Melanie Haynes, who introduced the theme of the debate: the use of nanotechnology in food packaging.

The debate heard how scientists are currently exploring how electronic sensors could be used to detect when food has gone off and alert consumers, possibly through a colour change on its packaging. Experts argue this could be a much more accurate way of ensuring food freshness than the current method of printing "use by" dates on packaging and this could also result in a reduction in food waste.

But Donald Bruce, from the scientific research consultancy Edinethics, expressed concerns over the "unintended consequences" of using nanotechnology in food packaging. He said: "The big question is: do they [the nanoparticles] stay in the package or could they go on to the food. And if they did get on to the food, would they be toxic? Would we be running off to the loo every five minutes – or worse? The problem is, we just don't know."

And relying too heavily on nanotechnology could actually lead to more food waste, he argued. Instead of using our own judgment – and the look, feel and smell of food – we could become too reliant on food packaging. "The temptation might be to package more foods than we do already. So it could actually mean more food waste and more landfill."

**Need for more research**

Matt Hodgson, deputy headteacher at Smithycroft school, agreed saying he felt there was a need for more in-depth research across the board. He pointed to the example of so-called "nanotechnology socks", commonly coated (among other things) with a thin layer of silver nanoparticles to kill the bacteria associated with smelly feet. "What we don't really seem to know is what the impact of washing these kind of fabrics is and whether the silver could lead to a build up of toxic sludge in the sewage system."

Brendan Casey, of Kelvin Nanotechnology, which specialises in supplying nanofabrication to industry, pointed out that some areas were of more concern than others. "Show someone a phone, computer or other form of technology and they are OK with that," he said. "It's when you get to something like food or cosmetics that people get worried."

Professor Lee Cronin questioned the current hype around nanotechnology as an emerging field, saying that there is "nothing new about nano". In fact, its history can be traced as far back to the bronze age, he said, pointing out that Egyptians crushed up materials such as lead and oxidized copper to make eyeshadow and tiny nanocrystals that glow when stimulated by an external source of light.

Cronin argued that one of the most exciting developments in nanotechnology is personalised healthcare. Advances over the next 10 to 15 years could allow people to find out if they were predisposed to diseases such as cancer, Alzheimer's or heart trouble and have any faulty genes corrected, he said.

But Mark Morrison, from the Institute of Nanotechnology, was not convinced everyone would be comfortable with that idea. "We're still human beings and human beings need choice. There is a real moral issue around telling people they might develop certain illnesses in the future. Not everyone wants to know that."

At the end of the debate, the audience was asked to vote on the issue of whether nanotechnology should be used in food packaging. While the majority remained undecided, a science teacher at Smithycroft school, Linda McClusker, said the experience had been invaluable for pupils. "Young people should be discussing and debating nanotechnology because it is an issue that will affect them in the future. Learning to analyse and debate information is a life skill they can take into adulthood … one of our parents said it was the best school event she had ever attended."

**Food for thought**

**Nicola Ballock**



I've always been fascinated by science, says Smithycroft 5th-year Nicola Ballock. I love problem solving and finding out how things work. Nanotechnology really appeals to me because of its endless possibilities, from curing disease to prolonging life or even creating lighter, faster computers.

I'm fascinated by the idea that tiny particles have different properties from their bulk material that can make them look or behave differently.

But I do feel we need to know more. The idea of using nanomaterials in food packaging, to monitor food freshness is an exciting one, but my question would be: if the chemicals from the food can get out, there must be some way the nanoparticles can get into the food? I'm not sure we know enough yet to be sure that there isn't a risk of people becoming ill.

I'd also be concerned about how such food packaging would be disposed of. If it got into water supplies, could it be damaging to the environment, people and animals?

I decided to get involved with organising a debate at my school, because I think these are the kinds of things young people should be asking. They shouldn't just accept everything they read or hear about nanotechnology. They need to ask questions too.

**Demi Chapman**



I have lots of concerns about nanotechnology – mainly about the effect on the environment. I don't think animals or the environment should suffer for human's selfish needs. I found it a bit worrying to hear that nanoparticles used in clothing could be washed into the water. We drink this water and the nanoparticles could harm us. The scientists weren't at all what I was expecting. I thought they would all be wearing lab coats and glasses, but they all seemed like pretty normal people