

Atom by atom: thinking about the prospect of nanotechnology

March 2003

In March 2003 the Royal Institution hosted a meeting, in partnership with the Biotechnology and Biological Sciences Research Council, the Times Higher Education Supplement and the Institute of Nanotechnology, that brought together interested parties to discuss the science behind nanotechnology, possible ethical and wider social issues that might arise from the new technology and to identify ways in which effective public debate might be stimulated in the UK.

Around 200 people attended including scientists (academic and corporate), social scientists, science communicators and members of environmental and other special interest groups and members of the public. They heard presentations from: researchers from the Universities of Cambridge and Oxford; FirstStage Capital; Greenpeace; the Smithsonian Institution; and the Church of Scotland, Society, Religion and Technology Project. They then took part in an open discussion session chaired by journalist and broadcaster Vivienne Parry.

The meeting's sponsors consider the key points from this discussion to be:

- Nanotechnology is already here. Sales of carbon nanotubes, for example, total about \$2 billion per year while end products, such as stain-resistant 'nanotrousers', are already in the shops.
- Nanotechnology has immense promise – for example of less polluting industry, better medical diagnosis and treatments and the production of novel materials.
- There is little evidence that the science underpinning nanotechnology raises issues inherently different from those of other technologies. However, consideration should be paid to the extent to which developments are incremental advances on existing processes and those that are genuinely novel. Some applications, for example in the field of nano-surveillance devices may raise new issues about privacy, and those relating

to interactions between nano-devices and humans may raise specific issues.

- There was no consensus on whether existing good laboratory practice and regulatory processes to control (for example) research involving human tissues, release of novel organisms to the environment, potential pollutants, adequately covers all potential nanotechnology innovations. Specifically, the issue of further investigation into occupational health hazards and pollution potential of nanoparticles was raised.
- Some participants raised concerns about public accountability and democratic control over new technologies, including for example, issues of equity and ownership. IP issues and control of the technology will be key elements, as will public perception of the roles of Government, research funders and industry. The role of the media was also discussed.
- Specific concerns were also aired, e.g. the potential of nanotechnology involving DNA to produce new life forms. There was no consensus on the level of potential risk associated with hypothetical developments such as the self-replicating nanomachines invoked in the ‘grey goo’ scenarios so beloved of science fiction writers.
- There was generally a consensus on the need for an informed public discussion on all issues arising from the development of nanotechnology, (and some discussion about the optimal time) for this as many detractors use emotive terms and abstract concepts that create anxiety and fear in the public psyche, without referring in any way to the reality of the science. There are no data on public attitudes. Proposals were made to use deliberative approaches such as Citizen’s juries, and there were calls for additional social science research including public attitude surveys, and opportunities for dialogue between scientists and bioethicists, possibly through workshops or other meetings.

In the light of this discussion, the sponsors consider that the following topics offer foci for taking forward public debate in the UK:

- a discussion focused on existing ethical and regulatory frameworks to explore their adequacy for all nanotechnology, perhaps using nanoparticles as a case study
- an exploration of whether a consensus can be reached on realistic and ‘science fiction’ potential applications of nanotechnologies
- consideration of how relevant social science research can be commissioned, with what objectives and by whom – and how proposals for deliberative events and meetings might be taken forward

The sponsors consider that to these actions forward effectively a consortium of organisations working together was needed, and they are keen to work with all interested parties, including NGOs, the media, policymakers, learned societies and individual researchers to develop such a consortium.

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