Report

'Gene Technology: Benefits and Risks'

A Conference of the Royal Society of New Zealand, held at the National Library Auditorium, 21 August

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The programme presented a daunting challenge of seventeen 'quick-fire' papers; a discussion; a report on the day's proceedings between 9.00 am and 5.30 pm, followed by a public evening session which included another five short presentations; a summary of the highlights of the conference; a panel question and a discussion closing session. The day finished at 9.45 pm.

An impressive range of issues and differing perspectives relating to gene technology were presented, albeit in pretty abbreviated form because of the obvious time constraints placed on speakers.

The programme was divided into seven main segments with a number of people chairing. The categories were:

- Research on Gene Technology;
- Legal, Trade and Ethical Considerations;
- Health Benefits and Risks;
- Issues for Maori;
- Review of Community Perceptions (from the Conference on Talking Technologies);
- Discussion and a Report on the Day's Proceedings;
- Evening Session.

The opening address was given by Professor Grant Sutherland of the University of Adelaide. He is the President of the Human Genome Organisation and he discussed the HGP aims, progress and potential. Of interest were his estimates on the completion time for the project. He presented figures suggesting that it would be in the order of 5 years to complete the DNA sequence, 7 years to recognise the genes, 50 years to relate functions to all of the genes, and 100 years to recognise and quantify the contribution of genetic variation to disease. His message was that we are a long way off real progress from gene isolation to effective therapy. He strongly questioned current gene-testing programmes where no treatment was available. The other main points that he made related to the question of how we are to determine what is the 'normal' function of a disease gene, the revolutionary nature of DNA chips, and the links between the outcomes of the HGP and developments in animal breeding which will be greatly accelerated as a consequence.

Snow in Dunedin caused a reshuffle of the programme at this point as the next speaker was meant to be Professor George Peterson of the Department of Biochemistry of the University of Otago. Unfortunately he was stranded at Momona airport as the ground staff tried to de-ice the wings of his aircraft! He arrived later in the morning to present his paper.

The speaker promoted in the order was Dr Tony Connor of the NZ Institute for Crop and Food Research who argued that the risks ascribed by critics to the new technology already occur in nature, plant breeding and conventional agricultural practices. He saw the opportunities for the incorporation of new genes into crop plants allowing breeders to respond much more quickly to market needs as a real benefit of genetic engineering. Another main advantage he spoke about was the greater degree of control over desired outcomes offered by genetic engineering, compared to traditional plant breeding.

Dr Paul Reynolds of The Horticulture and Food Research Institute of NZ emphasised the key difference in the biotechnologies of the future would be the emerging ability to identify and characterise specific traits and the genes associated with them and then to transfer these specific genes to a target plant. He stressed that research should be based on a whole ecosystem approach and the belief that future trends will move away from those based on intervention.

The greater targeting of genetic engineering methods over traditional methods of gene management was also the message from Dr Mike Carson of The Forestry Research Institute. The first trial plantings of genetically modified *Pinus radiata* are expected later this year. While the emphasis in his paper was on the perceived 'huge benefits' of the biotechnology being pursued in the forestry industry, there was acknowledgment of the need to address such issues as intellectual property rights, the impact of gene flow on other natural communities, Maori ownership of land and their cultural values, public disclosure, consultation and education.

Professor Diana Hill of the Department of Biochemistry, University of Otago, spoke of the wide-ranging benefits from the new set of tools that genetic engineering had provided to extend the range of animals to meet the ever increasing human demands. She warned that there are risks and 'the challenge is to balance modern scientific practices with social, environmental and ethical considerations'.

By this time of the morning's session Professor Peterson had arrived from the snowy south and proceeded to present his 'out of sequence' address, the thrust of which was to follow the development of the 'Genetic Revolution'. Two points he made strongly were that he saw exciting progress in the near future when researchers were able to precisely insert genes into an exact location in the genome, and a caution concerning the sort of legislation which banned animal

experimentation. He said this would 'destroy NZ science'.

At this point the emphasis changed to the Legal, Trade and Ethical Considerations papers. The first speaker was Dr James Maryanski, Strategic Manager for Biotechnology, Center for Food and Safety and Applied Nutrition, U.S. Food and Drug Administration. From the Flavr Savr tomato developed by Calgene and available to consumers since 1994, there have been more than two dozen food safety consultations for additional genetically engineered plants with the U.S. They work from the concept that the new techniques are just a natural progression of the selection methods practised for the last 10,000 years. Their safety is the factor that the FDA must address. There are no special tests used and, in fact, tests are not generally carried out. Today's food is used as a standard based on the concept of substantial equivalence. The FDA acts largely as a consultative body to ensure that safety and regulatory issues are resolved before the products reach the consumer. The FDA does not require that the method of development of a particular food is included on the label. It must be labelled only if it differs significantly from the conventional varieties in composition, if it contains new allergens, or if it requires changes in processing, storage, or preparation.

At this point there was a welcome break, inevitably later than programmed, for lunch.

Professor Barry Scott of the Department of Microbiology and Genetics, Massey University, opened the afternoon's proceedings with an address on the assessment and approval of GMO development and release in NZ. At the present time, two committees administer this task. The Advisory Committee on Novel Genetic Techniques (ACNGT) oversees all small scale laboratory-based research. (In practice most approval is delegated to institutional committees which oversee the research and report annually to the ACNGT.) The Interim Assessment Group (IAG) assess approvals for large-scale fermentation of GMO's or field release. A new authority is soon to take over the work of both of these groups. The Environmental Risk Management Authority (ERMA) was set up following the passing of the Hazardous Substances and New Organisms Act in June of 1996. The HSNO Act will be triggered probably early in the New Year when the methodology being prepared by ERMA is approved. As with the current IAG practice, the new legislation places strong emphasis on public participation and public notification. A telling comment was that 'avoidance of hearings was a priority as they cost too much money'!

The aspect of trade was discussed by Mr Raj Rajesakar of the Ministry of Agriculture. He spoke of the large number of products from agricultural gene technology we could expect on the international market in the near future. This would mean that we must develop regulations governing trade on these products which would not disadvantage us. A number of international agreements are available as guidelines.

Up to this point I think it is fair to say that many of the presentations had a predictable, rather clinical, and narrow focus. It took our own Dr Barbara Nicholas to liven up the proceedings with her paper 'Ethical Considerations in Gene Technology'. This was the first time that the conference heard someone attempt to look at some of the issues from a wider perspective. She argued that 'the commercialisation and internationalisation of gene technology raises questions about the interfaces between business, science, medical ethics, patenting and ownership'. Decisions are more than looking at the risks and benefits and if this is the only approach autonomy can be compromised. Barbara's address attracted wide interest from conference delegates and the media.

Following on there was a slight change in direction again towards 'Health: Benefits and Risks'. Dr John Birkbeck, Medical and Scientific Director, NZ Nutrition Foundation, Auckland spoke on the large number of advantages inherent in the new technology. He was critical of the attempts (or lack of) by companies with respect to public relations and educational programmes before they introduced genetically modified food. He also perceived a degree of negativity from the media and argued that the organisations involved have a duty to ensure that the media is well informed. He made a strong case for taking the public into 'our' confidence. He argued that, while labelling must lean towards the 'right-to-know' reasoning, it is only meaningful where the product is very different from the unmodified product.

Dr Bruce Scoggins, Director of the Health Research Council of NZ, spoke of the role of NZ in the context of a global health research environment. He emphasised that, while international 'harmonisation' of guidelines and regulations is becoming common, it was important that small nations establish 'their own way of doing business'. We must be proactive with respect to policy development.

One of the speakers on 'Issues for Maori', Mr Andrew Sporle, Manager of Maori Health Research, Health Research Council, was unable to attend due to illness. Aroha Te Pareake Mead, of Ngati Awa and Ngati Porou, argued reasonably and persuasively for the strongly held traditional views of Maori and other indigenous peoples about the integrity of life, property and ownership. The perception was that scientists don't respect traditional views and therefore Maori feel intimidated by the scientific community. She showed concern at the question of who makes the decisions, at the risks involved in the pace of change, and that the ethical, cultural and environmental issues should not be overridden by the new technologies. I was taken by her example about the question of decision-making. Seasonal food availability is an important facet of Maori culture. If genetic manipulation makes some of these foods available all-year-round (for example farmed sea foods) what will this mean to age-old traditions?

The final session before the official 'stock-taking' of the day's proceedings was devoted to a presentation on the Talking Technologies conference. The Chair, Mr Ian Johnstone, told us about the roots of the conference and how it proceeded and then two of the sixteen participants gave us their views. The conference was organised along similar lines to those conducted in Denmark and the UK. The topic was plant biotechnology. The sixteen participants (chosen from the 232 who responded to newspaper advertisements) spent two weekends in June and July listening to and putting questions to a number of people with expertise in this field. They then formulated what they thought were

the seven most important questions from their deliberations. These were considered at the third weekend which was a conference open to the public with each question addressed by invited speakers and discussed in open session. A report was then prepared by the 16 members.

Both panel members, Ian Shields and Moira Scammell, spoke enthusiastically about the conference. Both talked about the need to educate and better inform the public. Both talked about the 'fear of the unknown' and the modification of this fear with accurate information. Both still expressed concerns.

The afternoon session concluded with the people who chaired each session giving a brief summary of the main points before the floor was opened to comment and debate. Maybe at this late stage of the day thoughts were turned to satisfying the inner man as the debated points were fewer than I had expected. However, the few were lively!

The evening public session attracted a solid number but could not be called 'standing room only' density. It was opened by Professor Sutherland who basically presented a précis version of his earlier address, emphasising the international perspectives in genome science. Dr James Maryanski addressed the USFDA policy for safety and labelling of foods developed using genetic engineering. Ian Johnstone chaired a group of three speakers: a representative of the Maruia Society asked 'Genetic Engineering – should the public accept it?'; Professor A Richard Bellamy, Director, School of Biological Sciences, University of Auckland addressed the statement 'DNA Technology: public benefit versus perceived risks'; and Ms Kay Weir, editor of *Pacific World* and executive member of the Pacific Institute of Resource Management discussed 'The risks inherent in genetic engineering technology'.

Professor Peterson then presented his 'Highlights from the Conference' followed by the final panel discussion which attracted a few passionate comments from some members of the audience. But, in general the late hour and a long day's proceedings seemed to preclude any lengthy debate. (On reflection a sympathetic chair contributed substantially!)

So concluded a day of wide-ranging discourse. The main benefit I think most in attendance would concur with was the clear message that the public must be the target of heightened awareness and efficient educational programmes. The gene technologies are here now and how we deal with them is a matter that, in an informed way, should concern us all.

My final observation is, perhaps, frivolous. To make these decisions I hope we don't all have to take to wearing corporate suits!

At the Centre

The big news at the Centre is the arrival of our new director, Professor Donald Evans. Donald started work at the beginning of October and the Centre has already benefited from his energy and experience. Donald will be giving his University of Otago Inaugural Professorial Lecture during the Centre's conference next February. The Lecture will be held on Friday 13 February 1998.

Although all the Centre staff are looking forward to the direction and leadership that Donald will bring to the Centre we are grateful for the presence of Professor Gareth Jones in the interim, between directors. We have been fortunate to have the skills and experience of Professor Gareth Jones as acting Director.

The medical curriculum at Otago Medical School continues to evolve. The first year of the new preclinical course (med two and three) is nearly over. Most of the Centre's ethics teaching in the preclinical course has been in the Doctor, Patient and Society module. We have also been involved in 'Systems Integration Days'. These are one of the most exciting components of the new curriculum. Essentially they involve input from relevant departments within the medical school to a specific illness. We do not have full student evaluations in from these sessions yet, however, from the perspective of those involved in the teaching of these sessions, integrating ethics teaching into the hard science areas of the medical curriculum was a fruitful way to teach medical ethics.

An exciting initiative that Barbara Nicholas and Lynley Anderson have developed, in conjunction with the Education Technology Support Services, is a video titled 'Living with Haemophilia'. The video is of members of the Haemophilia Society talking about the impact that haemophilia has made upon their lives and is being used to extend students' understanding of narrative ethics. Readers interested in finding out more about the video should contact Barbara Nicholas or Lynley Anderson at the Bioethics Centre, Dunedin School of Medicine, PO Box 913, Dunedin.

Nicola Collie has joined the team at the Centre. She comes to the Centre after recently completing a Master of Sciences degree in biochemistry at the University of Otago. Most of Nicola's work at the Centre involves assisting Barbara Nicholas in her research work. Nicola has also been handling requests for information on particular topics in Bioethics, so readers who write requesting material on particular topics will now have the benefit of utilising Nicola's research expertise.