



The Future

There stands the possibility of manipulation and manufacture of organs and cells. The identification of stem cells and their potential for growth of organs for human use is a reality, and offers the possibility of a healthy life for all, even in the most extreme circumstances. It raises the possibility for us to change our genetic heritage and shape the evolution of mankind.

Currently organ transplantation's major issue is rejection of donated organs. The time and cost of immune suppression, both through surgical techniques and the use of drugs to control rejection is great. In addition, the use of immune suppression drugs greatly increases the susceptibility to cancer in a transplant patient. It is possible to identify specific healthcare issue and the associated genetic make-up in a patient, isolate it and arrange to replace the damaged cells/organ. This is already been proven in USA, where re-engineered bladders (using patients own cells) were transplanted into patients with no rejection issues. The use of a replicated organs grown from the own cells of the patient, could all but eliminate the risk of rejection by the body, the pro-longed use of anti-rejection drugs and therefore the associated risk of cancer.

Whilst it is already possible to identify individual genes and their purposes, research continues to seek ways to be able to isolate and switch on/off these genes, and in particular rogue genes. Cancer contains many rogue genes all interacting with the environment, but while it maybe some way off until a Cancer Genome Atlas is available, daily advances in identification of the thousands of genome types, variations and sequences are being made.

Ethical Implications

What was acceptable yesterday, and what is acceptable today or even tomorrow is constantly shifting. There are differences in opinion with time, and specifically from one generation to the next. We have already seen biotechnology in the form of cross breeding of plants and animals to suit our own needs, whether it is for larger sweeter apples, or cows that produce more milk.

Currently, within human populations there is wide genetic diversity, and this has lead to the human race being the diverse collection we are today. The development of cloning, and biotechnological intervention, is likely to reduce this diversity. By the end of the century many scientists believe, we could engineer a new species, or sub species of Humans, without any health issues, living to a thousand years old - but would we do so, and should we do so?

If we have the ability map out the humans genomes, we can identify a person is more/less prone to cancer or heart attack at 50, from their genetic make up. However, would this lead to discrimination against them in the work place, through the ability to find and retain a job, their ability to get life insurance, or discrimination in other walks of life?

Do we want the situation where natural selection in babies is replaced by a catalogue baby where you have the ability to choose the physical attributes (sex, hair/eye colour, size, weight, etc)?

Finally, two key points made are made:

- 1) Ethical considerations transcend religious boundaries and beliefs, and that it is one area where all faiths come together as one.
- 2) Biotechnology presents tremendous opportunities, within the knowledge based economies for commercially orientated services, and also within the healthcare system for our expanded populations. Remembering of course George Bernard Shaw's comment that 'if economists were laid end to end they would not reach a conclusion'.

