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Title:
RISKS AND BENEFITS FROM BIOTECHNOLOGY FOR HEALTH

Abstract:
The revolution in DNA technology :

- has permitted the development of otherwise unavailable and novel biological medicines;
- has provided new and efficient methods for the large-scale production of existing substances;
- is the basis for novel, highly sensitive and specific diagnostic tests;
- has developed new techniques for defining and manipulating the genetic material of infectious agents and the so-called vectors;
- is the basis for the development of new and safer vaccines, which are more effective and can be produced in larger quantities than by any other means;
- is a major key to new fundamental understanding of normal and disease processes.

As far as risks are concerned, a few examples will be mentioned:

- biotechnology-derived products (biologics) hold a great deal of promise among the therapeutic interventions for a wide range of disorders, including cancer and inflammatory diseases. Biologics differ from traditional pharmaceutical drugs: all of these types of products have the potential to generate immune responses or immunogenicity through the production of anti-drug antibodies. Moreover, owing to the market expansion of new medications, the problem of disease mongering is attracting increasing attention, as it turns healthy people into patients, wastes precious resources, and causes iatrogenic harm.
- several somatic cell therapy products have been in clinical use for many years and have proven to be safe. Human embryonic stem cells are attractive new source-material for cell therapy but have their intrisic risks when used clinically. Translating their advantages into clinical benefits faces many challenges, including efficient differentiation into the desired cell type, maintaining genetic stability during long-term culture and ensuring the absence of tumorigenic cells from the final product.
- gene therapy encompasses a spectrum of therapeutic strategies, ranging from the concept of using wild type copies of genes to correct the root cause of genetic disorders through to using genes to mediate powerful and selective toxicity to cancer cells. The gene therapy failures involved leukemogenic events which, regrettable as they were, have made an important contribution to the understanding of the toxicities associated with gene therapy vectors.
- functional genomics is a field of molecular biology that explores the function and interaction of genes. The mapping of the human genome has made it possible to identify identical gene sequences in different species. Impressive advances make it feasible to fabricate animals predestined to, for example, heart muscle disfunction or osteoporosis, or produced to serve potentially as donors to human beings. The legitimacy of such affliction on no-humans, however, rests on an anthropocentric ethic, which is rarely disputed in public policy.
- as a final comment, the so-called precautionary principle raises a cluster of questions about how prudently to engage in risk-taking. For instance, if technological innovation is necessary in order rapidly to adapt humans to meet environmental threats that would otherwise be catastrophic on a large scale, then the development of biomedical technologies in many forms (including human germ-line genetic engineering) may be required by the precautionary principle, given the prospect of the obliteration of humans in the absence of such enhanced biotechnology.