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Focus: Some current debates in genetics and ecology

Introduction

The rapid development of molecular biology and genetics has created exciting new possibilities, but these are not without concerns. Some are ethical, relating to human life and behaviour, and some are ecological, potentially affecting the natural environment. The articles in this Focus are concerned with some of these matters.

Lovell-Badge discusses stem cells. These are cells found in nearly all tissues that have retained the ability to produce new cells – either of the mature kind present in the tissue from which they came, or possibly a whole new organism. Their potential usefulness is indisputable but they raise serious ethical concerns that have led to the banning of research in some countries and, at the very least, tough regulatory measures in others. Del Rio and his colleagues discuss the use of stem cells derived from the skin, one specific aspect of this strand of research. This is of interest not only in the treatment of burns and skin wounds, but also in the therapy of other hereditary and acquired skin diseases and possibly as a source of therapeutic proteins.

The availability of a stupendous amount of genetic information from DNA sequencing raises questions of how to find rapid and economical ways of using this information. Harshman and Martinez-A discuss the use of gene microarrays, derived in concept from microprocessor design, which allow the identification and quantification of huge numbers of genes simultaneously. These will provide a way of studying the very complex systems that govern bodily processes in health as well as in disease. It will also lead to a classification of individual responsiveness to therapy and a path for seeking new drugs.

Man has been interfering with agricultural crops since recorded history, through land clearance and selective breeding. He now has the ability to do this through genetics. Garcia-Olmedo considers how far do these new methods introduce new risks to the environment and to the population. Plant genetic manipulation also provides the prospect of new agricultural products, the result of introducing genes

that can produce pharmaceutical preparations, such as hormones and also new industrial materials.

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