

Year 12 Visual Text Study – Gattaca
Social, Political, and Historical Setting – Further Reading

New Scientist: Genetic engineering

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Following hard on the suggestion of Nobel laureate Dr Edward Tatum that "genetic engineering" might soon be possible in higher animals comes what seems to be the first definite news of changes evolved by deliberate genetic manipulation of any organism more complex than a bacterium. It comes from Dr A. S. Fox and Dr S. B. Yoon, of the University of Wisconsin, and relates to the much-studied fruit fly, *Drosophila* (*Genetics*, Vol. 53, p.897).

These workers took eggs containing *Drosophila* embryos in various stages of early development, and soaked them in a solution of DNA. This material (deoxyribonucleic acid) occurs in the genes of the chromosomes, and is now thought to contain, in the famous "genetic code", the basic hereditary recipe for the various characteristics manifesting themselves in mature animals and plants. In these experiments, the DNA was obtained from other flies differing in several ways from those providing the eggs. The differences involved ten or eleven genes at various places on the chromosomes, and affected such characteristics as the structure and colour of bristles, wing veins, wing structure, and eye colour.

The results may seem slight, but scientifically they are quite remarkable. What happened was that a significant proportion of the treated embryos developed into "mosaics", meaning that they had small patches on their bodies which were clearly of a genetic constitution different from the rest. Furthermore, the characteristics occurring in these patches corresponded to gene forms which were only present in the DNA used for treatment. Even more important however, is the evidence that this effect was hereditary, these flies transmitting it to their descendants for up to seven generations. Usually the descendants of a mosaic fly showed mosaicism for the same characteristics, but in a few cases they had mosaic patches of another feature. A particularly puzzling finding was that some of the embryos treated with the DNA did not produce mosaic flies, yet some of their descendants did.

Dr Fox and Dr Yoon cautiously point out that it is premature to say that they have succeeded in producing a "transformation" in *Drosophila* which is comparable with that achieved in bacteria. All they are prepared to claim is that their treatment induced an "unstable transformation" or "replicating instability". However, this is the first time that even this has been achieved in a higher animal, since the failure to replicate or confirm some famous experiments with ducks made some years ago rendered their significance doubtful.

Although technically premature, perhaps, it is not too soon to begin the debate on how such "genetic engineering" might be applied to man. As Dr Tatum has observed, the medical applications of gene transfer could range from modifying cells from defective organs such as the liver (for subsequent re-implantation) to modifying germinal cells. The latter raises possibilities for radical interference with human heredity, of profound consequences for the human species.

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