PROCEEDINGS OF THE BIOCHEMICAL SOCIETY

The 516th Meeting of the Society was held at the University of Oxford, on Thursday and Friday, 8 and 9 July 1971, when the following papers were presented:

COLLOQUIUM ON 'SOMATIC CELL GENETICS'

Genetic Analysis with Human-Mouse Hybrid Cells

By W. F. BODMER. (*Genetics Laboratory, Department of Biochemistry, University of Oxford, South Parks Road, Oxford OX1 3QU, U.K.*)

Chromosomal segregation after preferential loss of human chromosomes in human-mouse somatic-cell hybrids has provided the first systematic approach to the genetic analysis of somatic cells in culture. Using these techniques, Weiss & Green (1967) and others have shown that the human thymidine kinase gene is on an E group chromosome, probably no. 17. Peripheral-blood white cells (leucocytes), which can be used as the human component in such hybridizations, can provide a convenient cell source from any desired human donor. Any identifiable gene product that can be distinguished in mouse and man provides a potential genetic marker. So far, enzyme electrophoretic differences, antigens and also drug resistance have been the main marker sources. The X-linkage of the enzyme hypoxanthine/guanine phosphoribosyl-transferase, which is deficient in 8-azaguanine-resistant cells and in individuals with the X-linked Lesch-Nyhan syndrome, has been confirmed. Thus, in the products of hybridization between normal human cells and 8-azaguanine-resistant mouse cells, sensitivity to 8-azaguanine and presence of human glucose 6-phosphate dehydrogenase are uniformly associated (Nabholz, Miggiano & Bodmer, 1969). A search for consistent associations between pairs of unselected markers has shown that the human genes for peptidase B and lactate dehydrogenase B are most probably linked. Lack of consistent association indicates that most of the 11 other enzymes examined, and in particular lactate dehydrogenase A and lactate dehydrogenase B, are on different chromosomes (Santachiara, Nabholz, Miggiano, Darlington & Bodmer, 1970; Ruddle, Chapman, Chen & Klebe, 1970). Such association must, however, be evaluated in the light of probable strong selective pressures influencing the evolution of hybrid clones.

Nabholz, M., Miggiano, V. & Bodmer, W. (1969). *Nature, Lond.*, **223**, 358.

Ruddle, F. H., Chapman, V. M., Chen, T. R. & Klebe, R. J. (1970). *Nature, Lond.*, **227**, 251.

Santachiara, A. S., Nabholz, M., Miggiano, V., Darlington, A. J. & Bodmer, W. F. (1970). *Nature, Lond.*, **227**, 248.
Weiss, M. C. & Green, H. (1967). *Proc. natn. Acad. Sci. U.S.A.* **58**, 1104.

Insertion of Small Pieces of Foreign Genetic Material into Somatic Cells

By P. R. COOK. (*Sir William Dunn School of Pathology, University of Oxford, South Parks Road, Oxford OX1 3RE, U.K.*)

When a chick red-blood-cell (erythrocyte) nucleus is introduced into the cytoplasm of a tissue-culture cell of the same or of a different species, it resumes the synthesis of DNA and RNA (Harris, 1965, 1967; Johnson & Harris, 1969); and when the reactivated red-blood-cell nucleus develops a nucleolus it determines the synthesis of chick-specific proteins in the hybrid cell (Harris, Sidebottom, Grace & Bramwell, 1969; Harris & Cook, 1969; Cook, 1970). Within 3-4 days the heterokaryons formed by cell fusion enter mitosis and the red-blood-cell nuclei can no longer be distinguished as discrete entities. The fate of the red-blood-cell nuclei was initially obscure, but recent studies have shown that when such heterokaryons enter mitosis the red-blood-cell nuclei undergo fragmentation by a process that has been called 'chromosome pulverization' or 'premature chromosome condensation' (Johnson & Rao, 1970). On cultivation under special conditions mononucleate hybrid cells eventually emerge from such populations of heterokaryons. These hybrid cells, though retaining many of the characteristics of the tissue-culture parental cells, nevertheless contain small amounts of genetic material of the chick parent. By use of this special application of the cell-fusion technique it is possible to incorporate small amounts of foreign genetic material into somatic cells; further, the genes incorporated in this way are expressed and replicated in the foreign environment (Schwartz, Cook & Harris, 1971).

The tissue-culture cells used for these experiments were A 9 cells (Littlefield, 1964). These are a