apical leaves were ground with glass beads in a hypo-osmotic medium and centrifuged at 10000g for 10 min. The supernatant solution was assayed for NADP-specific triose phosphate dehydrogenase and ribulose diphosphate carboxylase. RNA polymerase was assayed in suspensions of washed pellets prepared by centrifuging extracts made in iso-osmotic medium at 1500g for 10 min. The synthesis of chlorophyll by the apices is inhibited 50% by 1 μ M-lincomycin. The specific activities of the dehydrogenase, carboxylase and polymerase increased about sixfold, tenfold and twofold respectively during illumination. The increases in dehydrogenase and polymerase activities are unaffected by 5 μ M-lincomycin, but the increase in carboxylase activity is almost totally prevented; 50% inhibition of the increase in carboxylase activity is produced by about 1 μ M-lincomycin. The activities of all three enzymes are unaffected by lincomycin *in vitro*. The increase in dehydrogenase activity is inhibited by D-threo-chloramphenicol, but a similar inhibition is produced by the L-threo isomer, indicating that the antibiotic is not acting solely at the ribosomal level (Ellis, 1969).

Analysis of RNA by polyacrylamide-gel electrophoresis showed that the chloroplast ribosomal RNA components increased in amount on illumination of the pea apices. This increase was prevented by 2.5 μ M-lincomycin. Incorporation of [32 P]phosphate into cytoplasmic ribosomal RNA was unaffected by 5 μ M-lincomycin.

Assuming that the increases in activity are due to net synthesis, these results suggest that the synthesis of the carboxylase and probably of chloroplast-ribosomal proteins requires the activity of plastid ribosomes, whereas that of the dehydrogenase and polymerase does not.

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Turnover of Deoxyribonucleic Acid in Seedlings of *Pisum sativum*

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Pelc (1968) has suggested that dividing and non-dividing cells of eukaryotic organisms contain a species of DNA ('metabolic DNA') that turns over much more rapidly than the chromosomal

DNA, and that consists of extra copies of active genes. In support of this suggestion Pelc (1968) cited observations made by several authors on a wide range of animal and plant tissues. Recently, however, the reliability of results obtained from experiments on plant tissue (Sampson & Davies, 1966) has been questioned (Bryant & Wildon, 1971). A series of experiments has therefore been undertaken to establish whether or not 'metabolic DNA' may be detected in plant tissue.

Pea (*Pisum sativum*) seedlings (five days old) were supplied with [6- 3 H]thymidine for 4 h; half the seedlings were then incubated in unlabelled thymidine (7000-fold excess) for a further 20 h. The roots were harvested and sectioned and the cells in the post-meristematic maturation zone were examined by radioautography. The results indicated that after a 4 h incubation in radioactive thymidine there was a high level of incorporation into the nuclei of the cells. Further, there was a marked decrease in the incorporation after 20 h in unlabelled thymidine. Treatment of the tissue sections with deoxyribonuclease I (EC 3.1.4.5) caused a loss of most of the radioactivity from the nuclei; treatment with ribonuclease (EC 2.7.7.16) or Pronase did not lead to a loss of radioactivity. These results led to the conclusion that radioactivity from [6- 3 H]thymidine may be incorporated into the nuclear DNA of cells in the maturation zone of the roots, and that part of the incorporated radioactivity may be 'chased' out by unlabelled thymidine. On their own these results cannot be taken to show that 'metabolic DNA' is present in plants. It is emphasized, however, that the results cannot be explained in terms of the kinetics of cell division reported for the maturation zone of the root (Clowes & Juniper, 1968).

Before any conclusions can be reached about the existence of 'metabolic DNA', it is important that these radioautographic experiments should be followed up by experiments involving more direct biochemical methods, including extraction of DNA and assay of radioactivity by scintillation counting. Such experiments are at present in progress.

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