The site-territory hypothesis gives a simple explanation for the segregation of two daughter chromosomes. New sites would be formed as far away as possible from the existing site and from each other. If cell division is triggered at the existing site⁷, the daughter chromosomes would be found segregated in the daughter cells. The model makes no predictions about more complicated problems of segregation^{2,5,7}.

Direct control of DNA replication by membrane structure would be relevant to discussion of contact inhibition.

The site-territory hypothesis differs slightly from previous models¹⁻³. It predicts that existing sites control initiation of DNA replication by repressing the formation of new sites until sufficient new membrane is made. The model is presented with the hope that it may stimulate the design of new types of experiments.

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AMP on an Insoluble Solid Support

WHILE investigating some fundamental interactions of amino-acids with nucleotides, we became interested in the possibility of attaching adenosine 5'-monophosphate (AMP) to an insoluble support. If AMP could be bound to a polymer frame by means of the phosphate function, the result would be a reactive site (template) which bears some resemblance to the amino-acid acceptor terminus of a transfer (soluble) ribonucleic acid (tRNA)¹. The similarity is represented schematically in Fig. 1.

The availability of Merrifield's chloromethylated polystyrene resin² (commercially available as 'Bio-Beads SX-2', Bio-Rad Laboratories, Richmond, California) suggested an attempt to apply the general scheme utilized in the field of peptide synthesis on a solid support (that is, the formation of a "benzyl" ester between the polymer and the acidic function). Subsequent experiments established that AMP could be attached to the resin by a bond which could be cleaved in non-destructive conditions, as shown in Fig. 2. The stability of the bond in neutral and

Fig. 1.

Fig. 2. AMP was bound to polystyrene as follows. Coupling: 10 g of resin (0.72 mequiv. of Cl/g) was mixed with 2 mM AMP and 100 ml. of pyridine, and washed with water, dioxane and finally methanol. Hydrolysis: 1 g of coupled and washed product was mixed with 20 ml. of 80 per cent aqueous glacial acetic acid.

mildly basic conditions, coupled with its facile rupture when treated with aqueous acetic acid, argues for its covalent nature and is consistent with the representation of a "benzyl" phosphodiester species. The use of AMP (8-¹⁴C) in this scheme made possible an analysis of the liberated material by a combination of paper chromatography and spectroscopic methods as outlined in Fig. 3. Several independent determinations of the bound nucleotide disclosed an average of 115 (± 5) μ moles of AMP/g of polymer.

Fig. 3. Analysis of bound AMP and polymer.

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