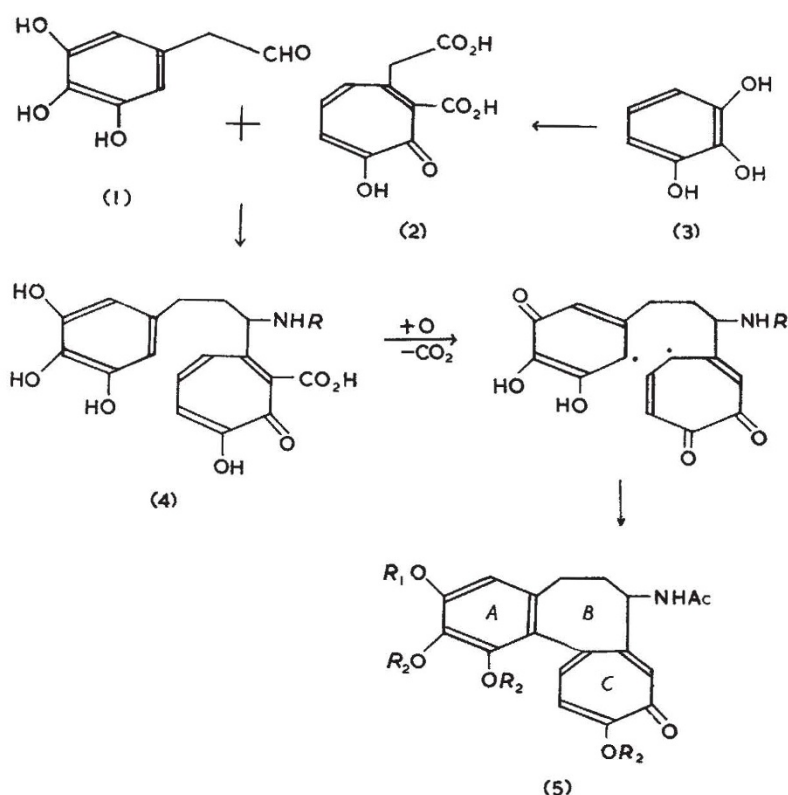


roitin sulphate isomer synthesized by the enzyme extract is demonstrated by the radioautographs and these zones correspond to the isomer added to, and isolated from, the incubation mixture as shown by the metachromatic zones. This is conclusive proof for the specificity of the enzyme-substrate relationship.

One consequence of these results is applicable to the study of the types of chondroitin sulphates being actively formed by particular tissues. Rather than attempting to isolate, fractionate and identify the chondroitin sulphates from the relatively large amount of tissue normally required by this procedure, it should be possible to prepare an enzyme extract from small amounts of such tissue, free it of its constituent acid mucopolysaccharides and determine which type or types of chondroitin sulphate are synthesized by observing the effects of addition of the three isomers. Alternatively, to determine whether isomer *A* and/or *C* is synthesized, a crude preparation of the constituent acid mucopolysaccharides can be isolated from the tissue in question and tested with the embryonic chick cartilage extract in the presence and absence of excess amounts of the *A* and *C* isomers. It is intended to apply this type of investigation to the study of stromal elements associated with certain tumours.



compound to the acid (2) takes place under biochemically acceptable conditions<sup>10</sup>. The biosynthesis of (4) has many possibilities of which only one is suggested herein. Experimental confirmation of this concept is being sought.

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### Biosynthesis of Colchicine

Of several proposals<sup>1-4</sup> concerning the biogenesis of the alkaloid colchicine (5;  $R_1 = R_2 = \text{Me}$ ), only that of Wenkert<sup>4</sup> involves the intervention of an intact tropolone ring prior to formation of ring *B*.

I now wish to suggest that a radical pairing reaction (4→5) involving one-electron oxidation of a tropolone ring might well represent the crucial stage in the elaboration of the tricyclic system. In support of this view I may mention that radical substitution has been observed in the case of diazotized 5-amino-tropolone<sup>5</sup>. Also, the occurrence of partially methylated alkaloids<sup>6,7</sup> in *Colchicum* species (for example, 5;  $R_1 = \text{H}$ ;  $R_2 = \text{Me}$ ) and the unlikely intervention of the  $\text{C}_6-\text{C}_1 \rightarrow \text{C}_7$  change at aromatic level<sup>4,8</sup> would seem to be in accord with the present proposal.

It may also be conceivable that the genesis of purpurogallin from pyrogallol<sup>9</sup> involves a radical-pairing reaction<sup>9</sup>. The conversion of the former

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### Swelling of Fresh and Aged Liver Mitochondria as affected by Succinate, Adenine Nucleotides and Thyroxine

It has been observed previously<sup>1</sup> that isolated mitochondria from primary and transplanted hepatocellular hepatomas, in contrast to their normal counterparts from liver, do not swell to any marked extent in the presence of thyroxine. The increasing evidence<sup>2-4</sup> that both the spontaneous and thyroxine-induced swelling of liver mitochondria is actually dependent upon respiration (that is, when no oxidizable substrate is added, upon endogenous substrate and co-enzymes) has led us to re-examine the