

produced 50 per cent inhibition of growth in the presence of up to 1,000 $\mu\text{gm./ml.}$ of vitamin B₁₂. These compounds generally possess chloroalkyl groups in the 1- and/or 2-positions and chlorine substituents in the 5- and/or 6-positions. It is of interest to note that compound No. 101—designated by Feitelson *et al.*⁶ in 1952 as “a novel type of nitrogen mustard”—was afterwards shown by Hirschberg, Gellhorn and Gump⁹ to be highly toxic to both human and mouse brain tumour cells in tissue cultures. The enhancement of toxicity associated with progressive chlorine substitution on the benzene ring is strikingly exemplified by a comparison of the activities of compounds Nos. 101, 33 and 103 (Table 1). Since in all probability substitution of this type would lead to increased fat solubility, these differences in biological reactivity may well be associated with differences in the ratios of relative solubilities of these compounds in lipids and water. Such a mechanism has been suggested by Timmis and Hudson¹⁰ in relation to the neutropenic effect of two homologous series of $\alpha\Omega$ dimethanesulphonylalkanes.

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Enzymatic Transformation of Dehydroascorbic Acid to Diketogulonic Acid

THE conversion of dehydroascorbic acid to diketogulonic acid has been studied in chemical systems¹; but, as Harris² has pointed out, definite evidence is not available for any enzymatically catalysed transformation.

A search by us has shown that cauliflower (*Brassica oleracea botrytis*) and bitter melon (*Momordica charantia*) possess an enzymatic mechanism for the conversion of dehydroascorbic acid to diketogulonic acid. The technique of investigation consisted in incubating homogenates with dehydroascorbic acid and following the course of reaction by estimating the amount of substrate disappearing and diketogulonic acid formed by the 2:4-dinitrophenylhydrazine method³. A system made up from heat-treated plant material was run simultaneously as control, and provided data for non-enzymic transformation. The homogenate was prepared by grinding the tissue with cold acetate buffer in a chilled Waring blender,

Table 1. ENZYMATIC TRANSFORMATION OF DEHYDROASCORBIC ACID TO DIKETOGULONIC ACID IN CAULIFLOWER AND BITTER MELON

		Diketogulonic acid formed (per cent)	Dehydroascorbic acid disappearing (per cent)
No. 1	Cauliflower Experimental	12.0	14.8
	Control	6.2	9.9
No. 2	Experimental, with added Mn ⁺⁺ , final concentration 0.001 M	12.4	13.0
	Control	5.7	5.7
No. 3	Bitter melon Experimental	8.9	10.1
	Control	2.9	2.9
No. 4	Experimental	17.9	17.9
	Control	9.5	8.8

straining through muslin and making up to 20 per cent (w/v). In a typical assay 10 ml. of the enzyme, or the heat-treated, preparation was incubated with 3,000 $\mu\text{gm.}$ of dehydroascorbic acid, the final volume being made to 30 ml. with buffer after adding any supplements. 5-ml. aliquots of the mixture were analysed at zero time and at the end of 60 min. of incubation at 37° C.

Results recorded in Table 1 show that whereas spontaneous transformation of dehydroascorbic acid to diketogulonic acid occurred in all experiments, enzymic conversion also occurred, as evidenced by the fact that the transformation in the untreated homogenates was significantly higher than in the heat-treated controls.

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Specific Protein of Legumes which reacts with Animal Proteins

INTERACTIONS of proteins among themselves, except immunological reactions, can be studied by various methods; but only in a few exceptional cases could they be demonstrated, as in the reactions of trypsin inhibitors and of agglutinins of legumes. Whether the isohaemagglutinins in man are the result of immunization or are a direct product of the participation of blood-group genes has not yet been fully settled. But the proteins which are contained in some plants and agglutinate erythrocytes cannot be a result of immunization; they are, so to speak, natural antibodies. An antibody, however, is defined as a substance produced in response to an antigen. In this regard an antibody produced not in response to an antigen is self-contradictory. To avoid such confusion, Boyd¹ proposed the term ‘lectin’ for such substance as is produced not in response to an antigen but reacts more or less specifically with certain proteins or antigens.

It is already well established that agglutination and the precipitation can be caused by one and the