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Influence of Ortho-Substitution on the Conjugation of Benzoic Acid.

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Substitution of benzoic acid in ortho position almost completely inhibits in the dog the conjugation with glycine. The effect appears to be independent of the nature of the group, for the methyl, chloro, bromo, iodo, nitro, and hydroxyl radicals impede the union with glycine. Substitution in meta and para position, on the other hand, exerts no steric hindrance.

The conjugation of benzoic acid with glycuronic acid is also affected by substitution in ortho position, but the nature of the substituting group is of fundamental importance. Taking the conjugation of benzoic acid as standard, it was found that a neutral group such as the methyl exerted no effect; an acid group like the chloro or the hydroxy caused a definite decrease in the excretion of the glycuronic acid compound; a strongly acid group such as the nitro suppressed the excretion almost completely; whereas a basic group like the amino produced a marked increased output of the glycuronic acid compound.

Excretion of uncombined acid was observed only when a strongly acidic group occupied the ortho position.

TABLE I.

Compound	Excretion of compound (in terms of benzoic acid) Free		Combined with Glycine			Combined with Glycuronic acid		
	6 hr.	12 hr.	6 hr.	12 hr.	24 hr.	6 hr.	12 hr.	24 hr.
Benzoic acid	—	—	0.60	0.55	0.21	0.96	0.54	
o-Toluic acid	0.02	—	0.14	0.12	0.13	1.06	0.89	0.41
o-Chloro-benzoic acid	0.36	0.27	0.12	0.11	0.30	0.54	0.50	0.64
o-Bromo-benzoic acid	0.36	0.05	0.09	0.09	0.20	0.58	0.53	0.57
o-Iodo-benzoic acid	0.01	0.02	0.12	0.04	0.09	0.47	0.41	0.40
o-Hydroxy-benzoic acid	0.09	0.06	0.08	0.07	0.17	0.48	0.50	0.80
o-Nitro-benzoic acid	1.32	0.77	0.11	0.08	0.08	0.24	0.18	0.21
o-Amino-benzoic acid						1.67	0.50	
Control			0.11	0.10	0.15	0.20	0.12	0.20

The various compounds were neutralized with sodium hydroxide and mixed with a glycine free diet. The equivalent of 3 gm. of benzoic acid was fed. In the case of o-iodo-benzoic acid only half that amount was given.

The importance of these considerations from the point of view of correlating pharmacological action with chemical structure is

illustrated by salicylic acid, a compound containing the acidic hydroxy radical in ortho position to the carboxyl group.

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A Protective Property of Serum in Irradiation of Amylase with Ultraviolet Light.

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The monomolecular character of the inactivation of pepsin by ultraviolet light has been demonstrated.[1] Recently, similar results[2] have been obtained with amylase, employing a viscosimetric method for estimations of concentration. As in the earlier work, infra-red radiation was absorbed in a filter of 5 mm. of water and it was demonstrated that the interposition of a No. 1 Crookes Glass filter prevented passage of the radiation responsible for the changes otherwise observable.

It seemed of interest to ascertain whether or not similar effects could be obtained with amylase in sera. A dilution of about 1 part of dog serum with 4 parts of 0.85% saline (containing 1.56 ± 0.02 units of amylase as estimated viscosimetrically) was irradiated for a period of 3 minutes at 10.0 ± 0.15°C. under conditions such that a simple 0.85% saline solution of pancreatin would have been about half inactivated, according to the findings of the previous work.[2] The estimated amylase concentration after irradiation was 1.52 ± 0.02 units—not significantly different from the previous value (the indicated dispersion measures being the A.D.). In a similar manner solutions containing serum from the same animal mixed in 0.85% saline with pancreatin solution (concentration of amylase, about 10 units) were irradiated with evidence of similar protection in the case of those containing 20% serum even when irradiated under the same conditions for 30 minutes. Finally, such a solution containing but 0.2% serum was about half inactivated in 6 minutes of such irradiation, about half the reaction speed of a similar solution without serum.

Other workers have observed protective effects upon enzymes in

[1] Hussey, R., and Thompson, W. R., *J. Gen. Physiol.*, 1925, **9**, 217.

[2] Thompson, W. R., and Hussey, R., *J. Gen. Physiol.*, 1931, **15**, 9.