LXXIV. THE WATER-SOLUBLE B-VITAMINS
XIV. NOTE ON THE YEAST ELUATE FACTOR OF THE VITAMIN B_2 COMPLEX

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BIOLOGICAL and chemical investigation of the yeast eluate factor [Edgar & Macrae, 1937] had indicated that this factor was probably identical with vitamin B_6 [György, 1935] and factor 1 [Lepkovsky *et al.* 1936], and very potent concentrates of yeast eluate factor had already been prepared when it was reported that factor 1 [Lepkovsky, 1938, 1] and vitamin B_6 [Keresztesy & Stevens, 1938, 1; György, 1938; Kuhn & Wendt, 1938, 1] had been obtained in a pure state.

Dr Lepkovsky very kindly presented us with a generous sample of his crystalline factor 1 and we found that this material completely replaced our yeast eluate factor in the diet of the rat. Since the biological identity of yeast eluate factor and factor 1 was thus established, we did not pursue further our independent experiments on the isolation of yeast eluate factor. However, by submitting our concentrates to the methods of fractionation found successful for factor 1 [Lepkovsky, 1938, 2] we obtained with some difficulty a small amount of a crystalline material which appeared to be identical with the hydrochloride prepared from factor 1. M.P. of our crystals, 201–203°; mixed M.P. with the hydrochloride of factor 1, 202–203°. Our crystals had the same crystalline form as that of the hydrochloride of factor 1 and also gave similar red colorations with $FeCl_3$ [cf. Kuhn & Wendt, 1938, 2; Keresztesy & Stevens, 1938, 2]. The identity of vitamin B_6, factor 1 and yeast eluate factor is therefore established.

The activity of factor 1 in our rat growth tests for eluate factor

Rats were prepared as previously described [Edgar *et al.* 1938, 1] and received yeast filtrate factor and riboflavin for a preliminary period of 2 weeks. Some of the animals then received an additional daily supplement of 5μg. factor 1, others 10μg. and others 20μg. In all cases increases in the growth-rate of the animals occurred (Table I). The extent by which the growth-rate of the animals was increased by administration of factor 1 was of the same order as that which has been repeatedly observed following administrations of our yeast eluate factor to rats receiving the same diet with the same supplements. Crystalline factor 1 also cured the florid type of rat dermatitis [Chick, unpublished experiments].

The growth-rate increase following administration of 20μg. daily of factor 1 (free base) was somewhat greater than that observed with 10μg. daily, which in turn was considerably greater than that observed with 5μg. daily. The optimal daily requirement of the rat for factor 1 in growth experiments appears therefore to lie between 10μg. and 20μg. daily and is probably nearer 10μg. Lepkovsky [1938, 1] observed optimal growth when he administered 10μg. of factor 1

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Table I. *Growth-promoting action of factor 1 for rats receiving a "vitamin B-free" basal diet with supplements of 10–15 μg. aneurin, 50 μg. riboflavin and yeast filtrate fraction equivalent to 1–2 g. dry yeast*

No. of rats	Av. weekly wt. increase of the group in each of 2 preliminary weeks g.	Av. weekly increase during 2 weeks g.	Factor 1 μg. daily	Av. weekly wt. increase of the group in each of 2 weeks subsequent to dosing with factor 1 g.	Av. weekly increase during 2 weeks g.
4	17, 12·5	14·7	5	20, 19·8	19·9
5	19·6, 13·6	16·6	10	26·2, 22·8	24·5
4	16·5, 14·5	15·5	20	28, 24·8	26·4
6*	18, 12	15	Yeast eluate fraction = 2 g. dry yeast	24, 25	24·5

* Taken from a previous paper [Edgar *et al.* 1938, 2 (Table II)].

(free base) daily and Dimick & Schreffler [1939] found that 10 μg. daily produced nearly optimal growth; Kuhn & Wendt [1938, 3] stated that the rate of weight increase observed following administration of 2·5–10 μg. daily of vitamin B_6 hydrochloride increased with the dose of the vitamin given.

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