XCVI. STUDIES ON THE VITAMIN B COMPLEX

II. EXPERIMENTS ON THE EFFECT OF Isoleucine ON THE "PELLAGRA-LIKE" DERMATITIS IN RATS

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SJOLLEMA [1937] reported that rats placed on a dermatitis-producing diet could be cured by daily doses of 60–90 mg. *isoleucine*. If this is true the "pellagra-like" dermatitis in rats would seem to be caused by deficiency of an amino-acid and not by avitaminosis. The diet used by Sjollema was very similar to that used in our experiments [Lunde & Kringstad, 1938]. It consisted of: glaxo casein 18.5 %, rice-starch 64 %, butterfat 8.3 %, cod liver oil 2 %, agar 2 % and salt mixture 5.2 %.

In addition to this diet the animals received each day 10 γ vitamin B₁ and in some groups the same amount of lactoflavin. On this diet the rats developed dermatitis in 8–10 weeks, i.e. much later than our rats. This is probably due to the fact that the glaxo casein used in Sjollema's experiments was not further purified and contained small amounts of the antidermatitis factor.

EXPERIMENTAL

Young rats weighing 40–60 g. and about 4 weeks old were placed on the dermatitis-producing diet previously described [Lunde & Kringstad, 1938]. The first sign of the "pellagra-like" dermatitis occurred after 3–6 weeks. In all animals growth ceased after 2 weeks and the weights remained constant or decreased. When the dermatitis was pronounced 7 rats were given 50 mg. *d-isoleucine* (Hoffmann-La Roche) in addition to the diet. No improvement occurred. In 2 rats the amount of *d-isoleucine* was raised after 1 week to 70 mg. Four of the rats, including those receiving 70 mg., died after 2–5 weeks. In two of the remaining rats the symptoms of dermatitis increased rapidly. After 3 weeks the administration of *d-isoleucine* was stopped and the 2 rats received 150 mg. rice polish concentrate (Labco) in addition to the basal diet. Improvement could be observed after 1 week; the weights increased rapidly and the rats were completely cured in 3 weeks. The average gain in weight was 52 g. in 3 weeks.

Three other rats with dermatitis received 100 mg. *dl-isoleucine* a day for 4–5 weeks without any sign of recovery or gain in weight. The *isoleucine* was dissolved in water and given by means of a stomach tube.

DISCUSSION

Our experiments do not confirm the finding by Sjollema that the "pellagra-like" dermatitis in rats can be cured by *isoleucine*. Sjollema does not mention which optical isomeride of *isoleucine* was used in his experiments. We used both *d-isoleucine* and a mixture of the two optical isomerides.

If *isoleucine* should be the active principle of "vitamin B₆" it must be contained in Peters' eluate, 0.2 ml. of which cures the dermatitis rapidly. Peters' eluate is prepared by a method involving the use of lead acetate which precipitates all proteins. The nitrogen content of Peters' eluate was determined. It contained 5.5 mg. per ml. calculated as *isoleucine*. This result also indicates that the "pellagra-like" dermatitis in rats cannot be due to lack of *isoleucine* in the diet.

SUMMARY

The "pellagra-like" dermatitis in rats is not due to a lack of *isoleucine* in the diet. The dermatitis was not cured by daily doses of 50–70 mg. *d-isoleucine* or 100 mg. *dl-isoleucine*.

REFERENCES

- Lunde & Kringstad (1938). *Biochem. J.* **32**, 708.
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