

the later work of Steenbock and his associates, of Fairhall, and of Sherman and MacLeod, which shows clearly that vitamin D can not take the place of the calcium needed for optimal bone development. Vitamin D appears to have influence upon the rate of normal calcification, even at levels well above those associated with rickets; but the supplying of vitamin D in abundance does not justify any lack of care in providing the growing organism with the liberal calcium intake which has also been shown to be essential to the optimal development of bone.

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Some Differences in Action Between Irradiated Ergosterol and Cod Liver Oil.

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In a recent communication¹ it was reported that chickens require a much greater amount of irradiated ergosterol than its cod liver oil equivalent in order to protect them against leg-weakness. The potency of the irradiated ergosterol preparation used in these experiments has been standardized on rats on the basis of cod liver oil, as is the custom in the United States. In another communication² from this laboratory, it was shown that irradiated ergosterol, when given to rats in inadequate amounts, acted differently from cod liver oil, in that it raised the inorganic phosphorus of the blood to its normal concentration without healing the rachitic lesion.

The action of these two specific antirachitic agents is likewise not identical in relation to infantile rickets. This winter, in the course of an extended series of observations, it was found that 20 drops of a standard preparation of irradiated ergosterol (viosterol) in some instances failed to fully protect infants from rickets, although the inorganic phosphorus concentration of the blood was maintained. According to the standard biological test, 20 drops of this preparation is equivalent to 10 teaspoonfuls of cod liver oil. In one in-

¹ Hess, A. F., and Supplee, G. C., *PROC. SOC. EXP. BIOL. AND MED.*, 1930, xxvii, 609.

² Hess, A. F., Lewis, J. M., and Rivkin, H., *PROC. SOC. EXP. BIOL. AND MED.*, 1930, xxvii, 611.

stance in which mild rickets developed although this amount of irradiated ergosterol had been given daily, 6 teaspoonfuls of cod liver oil subsequently brought about healing in a few weeks as demonstrated by radiographs. In other words, 6 teaspoonfuls of cod liver oil brought about cure where 20 drops of irradiated ergosterol (supposed to be the equivalent of 10 teaspoonfuls of cod liver oil) failed to afford complete protection. Such a result does not mean that the antirachitic action of irradiated ergosterol is weak or unreliable, for undoubtedly complete protection or cure would have been brought about by a larger dosage. Cod liver oil not infrequently fails to fully protect when given to infants in the customary dose of 3 teaspoonfuls a day. An observation of this kind indicates rather that we have a faulty conception of the relative potencies and dosages of the two specifics.

These inconsistencies may be due to the fact that irradiated ergosterol contains a phosphate-raising factor in addition to its well recognized antirachitic fraction. However this may be, it would seem evident that the present method of standardizing irradiated ergosterol is unsound from a clinical point of view, as it is based on the assumption that the relative antirachitic potency of cod liver oil and of irradiated ergosterol is the same in the rat and the infant, and that the units are interchangeable. Instead of an indirect method which computes activity on the basis of "cod liver oil units", it would be better to determine the number of protective or curative "rat units" and to use this direct determination as the basis of standardization.

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Inorganic Constituents of Blood and Urine in Dogs with Pancreatic Fistula.

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Several studies on the effects of drainage of pancreatic juice have appeared during the last few years, verifying and extending Pawlow's original observations. Elman and McCaughan¹ demonstrated that drainage of the pancreatic juice through a fistula will cause

¹ Elman and McCaughan, *J. Exp. Med.*, 1927, xlv, 569.