BIBLIOGRAPHY

Of

VITAMIN D

By

FREDERICK WOODROW NEVEU

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Vitamin D

The term "Vitamin" was coined by Funk[1] to designate the principle found in rice polishings that relieved the disease (beriberi) produced by the use of polished rice as an almost exclusive diet.

The discovery of the antirachitic vitamin is credited to the English physiologist Mellanby[2] who performed over four hundred experiments with puppies and published the accounts in 1918 and 1919. His accounts note how he induced real rickets in the puppies by means of limited diets, how they developed soft bones, bow-legs, and other deformities much like those of rachitic children.

Some of the rachitic puppies he succeeded in curing with cod-liver oil. Less effective was a diet of butter fat or suet. Attempts to cure them with diets of lard, cotton-seed, olive or linseed oil failed. He placed rickets among the diseases due to a deficient diet. His accounts indicated the substance necessary to prevent rickets was found in some fats and oils and not in others. He concluded that "vitamin A", was the antirachitic accessory factor, because the fats which he had found the richest in antirachitic power, cod-liver oil and butter, were also those which five years earlier had been shown to be richest in "vitamin-A."[3]

1. Funk, C. The Vitamins of Yeast and Their Role in Animal Nutrition, Soc. Exp. Biol. Med. v. 19, p. 15, 1921.
2. Mellanby, E. The Part Played by an Accessory Factor in the Production of Experimental Rickets (Proceedings of the Physiological Society, January 26, 1918), Journal of Physiology, LII (1918), XI.
3. Mellanby, E. An Experimental Investigation on Rickets, Lancet, I (1919), 407.

McCollum[4] and his co-workers, in 1922, at John Hopkins University proved that the antirachitic factor in cod-liver oil is distinct from vitamin A. Knowing that vitamin A oxidizes fairly easy, they heated some cod-liver oil and passed through it a stream of oxygen. This oil was then fed to rats infected with xerophthalmia. The disease continued thus proving the vitamin A to be oxidized, and no longer of value. A set of rats on a rickets-producing diet were fed this same oil and yet were cured of rickets. This proved that the antirachitic factor was still in the oil.

Thus a new vitamin, of great significance to mankind was found. Because of its curative power for slight or severe rickets it was very important. This vitamin which is now known as vitamin D or the antirachitic was for a while merely called "X".

A scientific basis was established for cod liver oil, as a specific against rickets. Vitamin D is also of great influence in the normal activities of calcium and phosphorus in the body, and also in the normal formation of bone.

Cod liver oil as a remedy was used long ago by people that lived on the coast of England, Holland and France. Its usefulness was even known to the physicians of the past. The rediscovery of the action of cod liver oil in "irreproachably scientific terms" was necessary for its intelligent use.

4. McCollum, E. V. Studies on Experimental Rickets: XXI, An Experimental Demonstration of the Existence of a Vitamin which Promotes Calcium Deposition, Journal of Biological Chemistry, LIII (1922), 292.
Chemistry in Medicine, p. 145. New York: The Chemical Foundation, Inc., 1928.

It was the recognition of the fact that rickets are not caused by the lack of vitamin D alone, but also by an unbalanced ratio ratio of calcium and phosphorus that led to a series of researches. The experiments were carried on at Columbia and at Johns Hopkins in 1921 and resulted in the control of rickets and all the associated abnormalities of calcium and phosphorus metabolism by Vitamin D and ultra-violet light.

The German Scientest Huldschinsky[5] found a large number of rachitic children after the war. Working on patients in a crippled childrens' home, on children from three to five years of age, he had the children subjected to radiations from the quartz mercury lamp and sunlight. Although he had a certain amount of success in healing the rachitic bones, he discovered that curing the children over deformities was not possible. Hence he became interested in the prevention of rickets rather than its cure. Because of the tendency of rickets to appear in children kept in the crowded, dark rooms of the city tenements, it was often ascribed to "bad air" or "noxious gases." A few physicians up to this time had used sunlight for a cure but not with definite proofs and results. In 1921 Hess[6] and Unger[6] in New York City showed that sunlight alone could quickly and effectively cure infantile rickets. Rats that developed rickets on a diet adequate in

5. Huldschinsky, K. Heilung von Rachitis durch Kunstliche Hohensonne, Deutsche Medizinische Wochenschrift, XLV (1919), 712.
6. Hess, A. F. and Unger, L. J. The Clinical Role of the Fat-Soluble Vitamin: Its Relation to Rickets, Journal of the American Medical Association, LXXIV (1920), 217.

calcium but low in phosphorus were cured as effectively by short exposure to sunlight as by addition of a definite small amount of phosphorus to their diet.

Two lines of research were well under way. The control of calcium and phosphorus metabolism in general and rickets in particular, on the one hand by Vitamin D, and on the other by sunlight and artificial sources of ultraviolet light.

In 1924 the first interrelation of Vitamin D and light were realized. Hess[7] in New York irradiated cottonseed and linseed oils and found them as potent to cure rickets in his rats as cod liver oil. At the University of Wisconsin Steenback[8] irradiated the whole mixed diet of the rats with equal success. Thus Vitamin D was apparently produced by ultraviolet light.

Due to these investigations many foods have since been irradiated. The potent part of the active fat is contained in the non-fatty part of the "unsaponifiable fraction," and it was also found that the unsaponifiable fraction of a technically inert fat may be activated by irradiation. It is the sterols (solid alcohols) in the food that can take on this potency, in particular one called ergosterol. Biochemistry is credited with the proof that from ergosterol, by a chemical action induced by ultraviolet light, Vitamin D is

7. Hess, A. F. Experiments on the Action of Light in Relation to Rickets, American Journal of Diseases of Children, XXVIII (1924), 517.
8. Steenbock, H. Fat Soluble Vitamins: XVII, the Induction of Growth-Promoting and Calcifying Properties in a Ration by Exposure to Ultra-Violet Light, Journal of Biological Chemistry, LXI (1924), 405.

formed. The antirachitic action of ultraviolet light in man is very likely the formation of Vitamin D from the ergosterol in the skin.

Vitamin D is now recognized by the United States Pharmocopeia as: "Liquor Ergosterolis Irradiati" (Solution of Irradiated Ergosterol). The U.S.P. definition: A solution of ergosterol in an edible vegetable oil, activated by irradiation with ultra-violet rays. Solution of Irradiated Ergosterol contains in each Gm. not less than 10,000 U.S.P. Units of Vitamin D.

Mellanby, E. 1918

The Part Played by an "Accessory Factor" in the Production of Experimental Rickets.

Jour. Physiology, v. 52, p. XI.

The author states that rickets is a condition primarily due to the lack of an accessory factor in the diet.

Mellanby, E. 1919

An Experimental Investigation on Rickets.

Lancet, v. 97, p. 407.

The author states the serious results of rickets, the determination of rachitic diet, and the importance of dietetic factor.

Hess, A. & Unger, L. J. 1920

The Clinical Role of the Fat-Soluble Vitamin: Its Relation to Rickets.

Jour. A.M. A. v. 74, p. 217.

The authors conclude that there is a prenatal factor involved, and that the fat-soluble vitamin is not the controlling influence. Finally that the danger to infants of a diet deficient in fat-soluble vitamin is slight.

Funk, C. & Dubin, H. E. 1921

The Vitamins of Yeast and Their Role in Animal Nutrition.

Soc. Exp. Biol. Med. v. 19, p. 15.

The authors conclude that rats require besides the vitamin A, at least two vitamins of the B type, namely the B and D vitamins, for their well-being and growth.

Hess, A. F. & Unger, L. J. 1921

The Cure of Infantile Rickets by Sunlight.

Jour. A. M. A., v. 77, p. 39.

The authors state that the sun's rays play a big part in the cure of infantile rickets.

Grieves, C. J. 1922

The Effect of Defective Diets on Teeth.

Jour. A. M. A., v. 79, p. 1567.

The author discusses his experiments on rate, and the results of defective diets.

Heaton, T. B. 1922

LXXXIV. On the Vitamin D.

Biochem. Jour., v. 16, p. 800.

The author found the deprivation of water-soluble vitamins from rats is held to involve a double deficiency; a deficiency of vitamin B in the first place, and of the yeast-activating substance in the second.

McCollum, E. V. & 3 others. 1922

Studies on Experimental Rickets: XXI. An Experimental Demonstration of the Existence of a Vitamin which Promotes Calcium Deposition.

Jour. Biol. Chem., v. 53, p. 292.

These experiments demonstrate the existence of a fourth vitamin whose specific property is to regulate the metabolism of the bones.

Dubin, H. E. & Funk, C. 1923

Studies on the Chemistry of Cod Liver Oil.

Jour. of Metabolic Research, v. 4, p. 467.

The authors were unable to establish the clinical composition of the concentrate, but they demonstrated the presence of C, H and O.

Fischer, L. 1923

A Study of Clinical Rickets.

Jour. of Metabolic Research, v. 4, p. 481.

The author found the best results were obtained under a treatment combining proper food, cod liver oil and exposure to sunlight.

Funk, C. & Levy, A. 1923

Mineral Metabolism in Rats Under the Influence of B and D Vitamines.

Jour. of Metabolic Research, v. 4, p. 453.

Vitamin D has little influence on the food intake, it improves the mineral balance markedly, while vitamin B exhibits both actions.

Steenbock, H. & 3 others. 1923

Fat-Soluble Vitamins: XIV, The Inorganic Phosphorus and Calcium of the Blood Used as Critiria in the Demonstration of the Existence of a Specific Antirachitic Vitamin.

Jour. Biol. Chem., v. 58, p. 59.

The experiments reported indicate that the antirachitic vitamin is distinct from vitamin A.

Hess, A. F. 1924

Experiments on the Action of Light in Relation to Rickets.

Amer. Jour. Dis. Child., v. 28, p. 517.

The experiments are in regard to the action of light rays, and the mechanism by which they produce their remarkable effect.

Hess, A. F. & Wienstock, M. 1924

Antirachitic Properties Imparted to Inert Fluids and to Green Vegetables by Ultra-Violet Irradiation.

Jour. Biol. Chem., v. 62, p. 301.

In these experiments an antirachitic factor was produced both in vitro and in growing plants.

Steenbock, H. & Black, A. 1924

Fat-Soluble Vitamins: XVII, The Introduction of Growth-Promoting and Calcifying Properties in a Ration by Exposure to Ultra-Violet Light.

Jour. Biol. Chem., V. 61, p. 405.

The authors show the results of irradiation on lung and liver tissue, on hog millet, on salt, casein, yeast, agar, and dextrin ration.

Eddy, W. H. 1925

The Vitamin Content of Foodstuffs.

Amer. Jour. Pub. Health, v. 16, p. 109.

The author gives the vitamin content of several foods and he also brings out the extremely experimental character of the methods of vitamin testing.

Eliot, M. M. 1925

The Control of Rickets.

Jour. A. M. A., v. 85, p. 656-63.

The author states that almost all infants who are thriving show slight degrees of rickets, and indicates her plan of study to prevent rickets in infants in a community.

Hess, A. F. & 2 others. 1925

The Antirachitic Value of Irradiated Cholesterol and Phytosterol: V Chemical and Biological Changes.

Jour. of Biol. Chem., v. 67, p. 413.

The authors state that the activation of the cholesterol is not due to impurities but to the action of the rays on sterol itself.

Hughes, J. S. & 3 others. 1925

The Relation Between the Amount of Ultraviolet Light Received by Hens and the Amount of Antirachitic Vitamin in the Eggs Produced.

Jour. Biol. Chem., v. 66, p. 595.

The amount of ultraviolet irradiation which a hen receives is an important factor in determining the antirachitic vitamin content of the eggs which she produces when her feed is low in the antirachitic vitamin.

Zajdel, R. & Funk, C. 1925

The Use of Colloidal Ferric Hydroxide Solution for Absorbing Vitamin B and D.

Biochem. Jour., v. 20, p. 26.

The authors found that the absorption of vitamin B and D gave negative results.

Boyd, J. D. 1926

The Use of Standard Diet Formulas in the Control of Juvenile Diabetes Mellitus.

Jour. A. M. A., v. 87, p. 1020.

The author discusses the diets for diabetic children.

Chick, H. & Roscoe, M. H. 1926

LXXXIV. Influence of Diet and Sunlight upon the Amount of Vitamin A and Vitamin D in the Milk Afforded by a Cow.

Biochem. Jour., v. 20, p. 632.

The milk contained the maximum amount of both fat-soluble vitamins, A and D, when the cow was out in the pasture. Vitamin A was found to be dependent on the diet while vitamin D was found to be dependent on the degree of isolation of the cow.

Drummond, J. C. 1926

Fat-Soluble Vitamins.

Lancet, v. 104, p. 272.

The author discusses the nature of vitamin A and B.

Golding, J. & 2 others. 1926

CLXIV. The Influence of the Cow's Diet on the Fat-Soluble Vitamins of Winter Milk.

Biochem. Jour., v. 20, p. 1306.

The authors found that the inclusion of kail in winter rations of the cow raised the vitamin A content but not the vitamin D content; the inclusion of cod-liver oil raises both the vitamin A and D content of the milk.

Heilbron, I. M. & 2 others. 1926

XII. The Absorption Spectrum of Cholesterol and its Biological Significance with Reference to Vitamin D. Part I Preliminary Observations.

Biochem. Jour., V. 21, p. 78.

The authors conclude that purified cholesterol contains another compound and believe that the substance is closely connected with the vitamin D precursor.

Jephcott, H. & Bacharach, A. L. 1926

CLXX. A Rapid and Reliable Test for Vitamin D.

Biochem. Jour., v. 20, p. 1351.

The authors state that albino rats on certain high calcium-low phosphorus diets develop marked faecal alkalinity in 10 to 15 days.

McCollum, E. V. & 3 others. 1926

Studies on Experimental Rickets: XXVII. Variation of Vitamin D Content of Butter Fat as a Factor in the Development of Rickets Induced by Diets Suitable for Preparing Rats for the Line Test.

Jour. of Biol. Chem., v. 70, p. 437.

The authors point out the necessity of keeping the butter fat content of the diet as low as possible as this is in certain cases a disturbing factor.

Rosenheim, O. & Webster, T. A. 1926

XIX. The Relation of Cholesterol to Vitamin D.

Biochem. Jour., V. 21, p. 127.

The authors state that the precursor of vitamin D is not cholesterol itself, but a substance which is associated with and follows cholesterol in all its stages of purification by the usual methods (esterification, soponification recrystallization).

Bills, C. E. 1927

Antirichitic Substances: VI The Distribution of Vitamin D, with Some Notes on its Possible Origin.

Jour. Biol. Chem., v. 72, p. 751.

This report summarizes an extensive study its distribution in various oils and fats the assays of which are also compared.

Cruickshank, E. M. & 2 others. 1927

The Vitamin A and Vitamin D content of Cod Liver Meal.

Poultry Science, v. 7, p. 9.

The sample of cod liver meal used contained sufficient vitamin D to promote good calcification in chickens when fed at levels of 1 and 3 per cent.

Dutcher, A. & 2 others. 1927

Assimilation of Vitamins A and D in Presence of Mineral Oil.

Soc. Exp. Biol. Med., v. 24, p. 953.

The authors stated that mineral oil may act as a solvent for vitamin A but they have obtained no evidence to show that the calcifying potency of cod liver oil is affected.

Hume, E. M. & 2 others. 1927

LII. On the Absorption of Vitamin D from the Skin.

Biochem. Jour., v. 21, p. 362.

The authors state that vitamin D in irradicated cholesterol can be absorbed from a small area of undamaged skin in sufficient amount to supply the needs of the animal.

Jephcott, H. & Bacharach, A. L. 1927

X. The Quantitative Estimation of Vitamin D.

Biochem. Jour., v. 22, p. 60.

Evidence is submitted that the extent of the lowering of faecal P H by the administration of vitamin D to rats on a rachitogenic diet is a function of the amount of vitamin D administered.

Leigh-Clare, J. L. 1927

LIII. A Search for Vitamin D in the Deaton Nitzschia Closterium.

Biochem. Jour., v. 21, p. 368.

The author concludes that unicellular marine organisms are not the ultimate source of vitamin D in Cod liver oil.

Leigh-Clare, J. L. 1927

XCVI. A Note on the Vitamin D Content of the Stomach Oil of the Australasian Petrel (Aestralata Lessoni).

Biochem. Jour., v. 21, p. 725.

The author states the presence of vitamin D in amount equal to about 1/5 of that present in a good cod liver oil, has been demonstrated in the stomach oil of the Australasian mutton bird (Aestralata lessoni).

McCollum, E. V. & 3 others. 1927

Studies on Experimental Rickets: XXVII. Does Vitamin D Pass into the Milk?

Amer. Jour. Dis. Child., v. 33, p. 230.

The authors experiments demonstrate that the vitamin D of Cod liver oil does pass into the mother's milk.

Paulsson, E. & Lovenskiold, H. 1927

XIX. The Quantitative Determination of Vitamin D.

Biochem. Jour., v. 22, p. 135.

The authors describe a quantitative method for determining vitamin D and its chief features such as the preparatory period and the test period.

Rosenheim, O. & Webster, T. A. 1927

LVI. The Parent Substance of Vitamin D.

Biochem. Jour. v. 21, p. 369.

It is concluded that the natural parent substance of vitamin D is ergosterol, or a highly unsaturated sterol of similar constitution, which is converted into vitamin D by irradiation.

Rosenheim, O. & Webster, T. A. 1927

The Photochemical Production of Vitamin D from Ergosterol.

Lancet, v. 105, p. 622.

It was found that ergosterol is activated by the radiations of sunlight, as well as by the long wave-length radiations of the mercury-vapour lamp.

Sherman, H. C. & Hessler, M. C. 1927

Quantitative Differentiation of Vitamins A and D.

Jour. Biol. Chem., v. 73, p. 113.

The authors discussed their experiments in making quantitative differentiation of vitamins A and D.

Willimott, S. G. & Wakes, F. 1927

CXXI. Vitamins A and D of Spinach.

Biochem. Jour., v. 21, p. 887.

The authors state that spinach extract, when fed at a level supplying adequate amounts of vitamin A does not contain significant amounts of vitamin D.

Adams, G. & McCollum, E. V. 1928

A Method for the Biological Assay of Cod Liver Oil.

Jour. Biol. Chem., v. 78, p. 495.

The method used indicates only relative potency of oils.

Baldwin, F. M. & 2 others. 1928

The Influence of Vitamin D Deficiency on Gaseous Exchange in cheeks.

Amer. Jour. Physiol., v. 85, p. 482.

The authors found the temperature of experimental cheeks fell previously to the appearance of the characteristic symptoms of rachitic, and it continued slightly lower than normal during the period over which these symptoms were apparent.

Bills, C. E. & Honeywell, E. M. 1928

Antirichitic Substances: Studies on Highly Purified Ergosterol and its Esters.

Jour. Biol. Chem., v. 80, p. 15.

The authors discuss ergosterol and the three new esters, ergosteryl, isobutyrate, isolvalerate, and cinnamate, which have been prepared and purified.

Bills, C. E. & 2 others. 1928

Antirichitic Substances: Quantitative Biophysical Studies on the Activation of Ergosterol.

Jour. Biol. Chem., v. 80, p. 557.

The authors made a series of parallel spectroscopic and biological measurements on an irradiated alcoholic solution of exceptionally pure ergosterol. They found that the photochemical reaction product which exhibits an absorption maximum at 248 Mu. is not vitamin D.

Boyd, J. D. & Drain, C. L. 1928

The Arrest of Dental Caries in Childhood.

Jour. A. M. A., v. 90, p. 1867-9.

The authors indicate that a diet rich in mineral salts, and vitamins will arrest dental caries in diabetic children.

Clare, J. L. L. & Soames, K. M. 1928

Vitamins A and D in Cod Liver Oil.

Lancet, v. 106, p. 150.

The authors state that the content of vitamin A in cod liver oil bears no necessary relationship to that of vitamin D.

Coward, K. H. 1928

CLI. The Minimum Amount of Vitamin D Required for a Positive Antirachitic Effect in the "Line" Test.

Biochem. Jour., v. 22, p. 1221.

The actual amount of vitamin D required to give a positive reaction in the "line" test would prove to be 2×10^{-8} g.

Golding, J. & Zilva, S. S. 1928

XXV. The Influence of the Cow's Diet on the Fat-Soluble Vitamins of Winter Milk.

Biochem. Jour., v. 22, p. 173.

This experiment deals with the influence of doses of cod liver oil, which are not high enough to depress the fat content of the milk, on the vitamin D potency of butter.

Harvard, R. E. & Hoyle, J. C. 1928

LXXXVII. Vitamin D in Adults: Its Effect on the Calcium and Inorganic Phosphate of the Blood.

Biochem. Jour., v. 22, p. 713.

The experiments cast doubt, in the case of adults, upon the accuracy of the conception that the higher value of the blood inorganic phosphate during summer is due to the increased incidence of ultraviolet light.

Hume, E. M. & 3 others. 1928

V. The Examination of yeast-fat for the Presence of Vitamins A and D before Irradiation and of Vitamin D after Irradiation.

Biochem. Jour., v. 22, p. 27.

The authors found that vitamin D was absent in the yeast-fat before irradiation.

Hume, E. M. & 3 others. 1928

CXXII. The Examination of Irradiated Zymosterol for the Presence of Vitamin D.

Biochem. Jour., v. 22, p. 980.

Zymosterol can not be activated by ultraviolet irradiation.

Knudson, A. & Moore, C. N. 1928

Comparison of the Antirachitic Potency of Ergosterol Irradiated by Ultra Violet Light and by Exposure to Cathode Rays.

Jour. Biol. Chem., v. 78, p. XIX.

The authors conclude that under the influence of ultraviolet light or cathode ray, vitamin D is being destroyed at the same time that it is being produced and that the destruction is more rapid under the influence of the cathode ray.

Knudson, A. & Moore, C. 1928

Comparison of the Antirachitic Potency of Ergosterol Irradiated by Ultraviolet Light and by Exposure to Cathode Rays.

Jour. Biol. Chem., v. 81, p. 49.

The authors found that ergosterol exposed to cathode rays with the tube operating at 180,000 to 200,000 volts is not rendered as potent as when irradiated with ultraviolet rays from a mercury vapor quartz lamp.

Larimore, J. W. 1928

Chronic Ulcerative Colitis.

Jour. A. M. A., v. 90, p. 844.

The author found that the condition of ulcerative colitis improves with the addition to the diet, food rich in vitamins.

Marcus, J. K. 1928

A New Process for the Separation of the Vitamin Fraction from Cod Liver Oil.

Jour. Biol. Chem., v. 80, p. 9.

The author discusses the new methods, namely cold soponification, and soponification in homogeneous solution.

Morrison, R. R. & 2 others. 1928

CXLI. The Action of X-Radiation upon Vitamin D in Activated Ergosterol.

Biochem. Jour., v. 22, p. 1138.

The authors state that X-rays when applied to a dry sample of activated ergosterol exposed to air exert a destructive effect upon vitamin D.

Outhouse, J. & 2 others. 1928

Human Milk Studies: A Quantitative Comparison of the Antirachitic Factor in Human Milk and Cow's Milk.

Jour. Biol. Chem., v. 78, p. 129.

The authors found that for rats human milk contains no demonstrable antirachitic factor, whereas cow's milk does possess a ricket-healing substance.

Rosenheim, O. & Webstor, T. A. 1928

XCV. The Specificity of Ergosterol as Parent Substance of Vitamin D.

Biochem. Jour., v. 22, p. 762.

Evidence is presented which strengthens the assumption that only a molecular structure such as that possessed by ergosterol enables a sterol to be photochemically converted into vitamin D, and confirms the evidence that ergosterol is the specific parent substance of vitamin D.

Selkerk, T. K. & 2 others 1928

Studies in Rickets.

Jour. A. M. A., v. 91, p. 2057.

The authors conclude that a small amount of ultra-violet irradiation from an efficient artificial source is a practicable method of preventing rickets in the human infant if it is started early and given regularly.

Sexton, W. A. 1928

CXXXIX. The Colour Reactions of Substances containing Vitamin D.

Biochem. Jour., v. 22, p. 1133.

The author states that colour produced by oils must be due to some constituent other than vitamin D, as irradiated ergosterol gave no colour at all.

Shabl, A. T. & 2 others. 1928

Rickets in Rats: Metabolism of Calcium and Phosphorus of Rats Fed upon Non-Ricketogenic Diets.

Jour. Biol. Chem., v. 79, p. 257.

The authors experimented by means of a diet which has been progressively improved from a rickets producing diet toward normal by alteration in the salt composition and by the addition of vitamins. The best results insure when the diet is supplemented with cod liver oil and by irradiation.

Soames, K. M. & Leigh-Clare, J. C. 1928

LXVI. The Assay of the Antirachitic Vitamin D.

Biochem. Jour., v. 22, p. 522.

The conclusion of Steenbock and his colleagues (1923), that the growth curve of the animal on an otherwise adequate diet can be employed for assay of vitamin D, is substantiated.

Sure, B. 1928

Vitamin Requirements of Nursing Young.

Jour. Nutr., v. 1, p. 155.

The author states that nursing young need approximately 100 times as much vitamin B as vitamin A and B.

Webster, T. A. & Bourdillon, R. B. 1928

CLII. Notes on the Irradiation of Ergosterol.

Biochem. Jour., v. 22, p. 1223.

The authors state that the irradiation of ergosterol produces two substances in succession, of which the first has an absorption of maximum at about 280 or 290 u u, and the second a maximum at about 230 u u and that the former is vitamin D.

Bacharch, A. L. & Jephcott, H. 1929

Vitamin D and Fecal Reaction.

Jour. Biol. Chem., v. 82, p. 751.

The authors discuss the useful application of the assay of vitamin D, based upon examination of the fecal P H of rats on a rachitogenic diet.

Bills, C. E. & Cox, M. M. 1929

Studies on the Isomerization of Ergosterol.

Jour. Biol. Chem., v. 84, p. 455.

The authors tell of the preparation of the three forms of intertransformable isoergosterol, and all of which have the same double bond which is "activated" in vitamin D.

Bills, C. E. & 2 others. 1929

The Heat of Combustion of Ergosterol Isoergosterol, and Cholesterol.

Jour. Biol. Chem., v. 84, p. 655.

The authors concluded that the molecular structure responsible for the phenomenal activatability of ergosterol is not associated with an anomalous heat of combustion.

Blunt, K. & Cowan, R. 1929

Do Adults Need Vitamin D.

Jour. A. M. A., v. 93, p. 1141.

The authors claims that adults do need vitamin D, but not so much as the growing organism.

Blunt, K. & Cowan, R. 1929

Distribution of Vitamin D.

Jour. A. M. A., v. 93, p. 1219.

The authors state that vitamin D is the most limited in distribution of all known vitamins, cod liver oil, other fish oils, egg yolk, and butter fat being practically the only naturally occuring sources so far discovered.

Blunt, K. & Cowan, R. 1929

Irradiated Foods and Irradiated Ergosterol.

Jour. A. M. A., v. 93, p. 1301.

The authors conclude that ergosterol is the parent substance of vitamin D.

Harris, L. J. & Moore, T. 1929

XXXV. Hypervitaminosis and Vitamin Balance. Part II. The Specificity of Vitamin D in Irradiated Ergosterol Poisoning.

Biochem. Jour., v. 3, p. 261.

Evidence presented supports the belief that excessive vitamin D induces a condition of specific hypervitaminosis. Non-irradiated ergosterol is not toxic.

Harris, L. J. & Moore, T. 1929

XXXV. Hypervitaminosis and Vitamin Balance. Part III. The Pathology of Hypervitaminosis D.

Biochem. Jour., v. 23, p. 267.

Post mortem after death from hypervitaminosis D showed enormous deposits of calcium in the heart musculature, kidneys and other organs, also found presence of urinary calculi.

Heller, V. G. & Caskey, C. 1929

An Application of Some of the More Recent Methods of Estimating Vitamin D.

Jour. Nutr., v. 2, p. 59.

The authors used a combination of the Jepchott and Bacharach method, which is the changing hydrogen ion concentration of the feces, and the Paulsson method which is the use of the X-ray picture in following the rate of decalcification or recalcification.

Heuser, G. F. & Norris, L. C. 1929

Rickets in Chicks: IV. The Effect of Heat and Exposure to Air on the Stability of Vitamin D.

Amer. Jour. Diseases of Children, v. 38, p. 486.

The results indicate that vitamin D is not a stable vitamin when heated and exposed to air.

Honeywell, H. E. & 2 others. 1929

Vitamin Studies XVII: Ossifying Potency of Raw and Evaporated Milk.

Jour. Nutr., v. 2, p. 251.

The data obtained that the milks described are not rich in vitamin D.

Humphrey, G. C. & 3 others. 1929

Dietary Factors Influencing Calcium Assimilation: The Influence of Cod Liver Oil Upon Calcium Metabolism of Milking Cows.

Jour. Biol. Chem., v. 84, p. 359.

The authors conclude that at the level fed there had been very poor absorption of vitamin D from the tract.

King, H. & 2 others. 1929

XXI. Vitamin D from Sterols of Mummified Egyptian Brain.

Biochem. Jour., v. 23, p. 166.

It is evident from the experiments that the ergosterol content of cholesterol, isolated from brain after 1400 years, is still of the same order as that of cholesterol prepared from fresh brain.

Koch, F. C. & 2 others 1929

Fractionation Studies on Provitamin D.

Jour. Biol. Chem., v. 85, p. 141.

The authors conclude that provitamin D activity is not limited to ergosterol, but that it may be a general property in varying degrees of various sterols or certain forms of those sterols.

Kramer, B. & 2 others. 1929

Composition of Bone: Effect of Massive Doses of Irradiated Ergosterol.

Jour. Biol. Chem., v. 82, p. 555.

The authors found the ratios obtained for the bones of the rats which had been fed irradiated ergosterol were the same as those obtained for the bones of control rats which had been fed cod liver oil.

Light, R. F. & 2 others. 1929

Studies on the Effects of Overdosage of Vitamin D.

Jour. Biol. Chem., v. 84, p. 487.

The authors found that in rats the dosages of 100,000 times the daily curative dose produced anorexia, emaciation, greasy hair, labored breathing, and eventually death. If it were possible to apply relative figures of the toxic dose of vitamin D for white rats to the infant, the harmfulddose would be 1.5 liters per day of a solution of irradiated ergosterol in oil 100 times as potent as cod liver oil.

Mayer, E. & Kugelmoss, N. 1929

Basic (Vitamin) Feeding in Tuberculosis.

Jour. A. M. A., v. 93, p. 1856.

The authors found that the vitamin provision in the food offered constitutes a specific advance in the form of dietary treatment of tuberculosis.

Mellanby, E. & 2 others. 1929

LXXX. Vitamin D in Ergot of Rye.

Biochem. Jour., v. 23, p. 710.

The authors found that all samples tested, whether Russian or Spanish origin, are definitely antirachitic and that some samples contain one-eighth to one-quarter the calcifying activity of cod liver oil.

Moore, T. 1929

CXL. Vitamin A and Carotin. III. The Absence of Vitamin D from Carotin.

Biochem. Jour., v. 23, p. 1267.

The author found that carotin obtained from carrots was inactive as a source of vitamin D to rats in doses greatly in excess of the minimal dose for vitamin A.

Morgan, A. F. & Garrison, E. A. 1929

The Effect of Vitamin D and of Reaction of Diet upon Response to Parathyroid Extract.

Jour. Biol. Chem., v. 85, p. 687.

The authors state that vitamin D and the diet influence the response to parathyroid treatment.

Moritz, A. R. & Krenz, C. 1929

The Relation of the Fat-Soluble Vitamins (A and D) to the Development of Experimental Rickets in Rabbits.

Jour. Nutr., v. 2, p. 257.

The authors found that rickets occurred due to a diet deficient in fat-soluble vitamins.

Reerink, E. H. & Wijk, A. V. 1929

CXLIII. The Vitamin D Problem. I. The Photochemical Reactions of Ergosterol.

Biochem. Jour., v. 23, p. 1294.

The authors found that short-wave irradiation of ergosterol gives rise to a series of reaction-products different from that caused by long-wave irradiation, and that the long-wave product is vitamin D.

Russell, W. C. 1929

The Effect of the Curing Process upon Vitamin A and D content of Alfalfa.

Jour. Biol. Chem., v. 85, p. 289.

The authors state that there was an increase in vitamin D potency, obtained by drying in the sun, but was accompanied by a decrease in vitamin A.

Schultz, F. W. & Ziegler, M. R. 1929

Is Irradiated Farina as Bought in the Market Enriched with Vitamin D?

Jour. A. M. A., v. 93, p. 1466.

The authors found that irradiated farina, as purchased in the open market and incorporated as 10% of a rachitic diet, does not cure rickets in rats.

Sherman, H. C. & Stiebeling, H. K. 1929

Quantitative Studies of Responses to Different Intakes of Vitamin D.

Jour. Biol. Chem., v. 83, p. 497.

The author shows through his experiments that cow's milk as ordinarily produced in this country contain important amounts of vitamin D.

Steenbock, H. & 2 others. 1929

Cereals and Rickets: The comparative Rickets - Producing Properties of Corn, Wheat, and Oats, and the Effect of Irradiated and Mineral Supplements.

Jour. Biol. Chem., v. 85, p. 585.

The authors found that the cereals ranked in antirachitic potency in the descending order of wheat, rolled oats and corn. Irradiationmade cereals alike in antirachitic potency. Calcium supplements increased percentage of ash.

Steenbock, H. & 3 others. 1929

Dietary Factors Influencing Calcium Assimilation: A Study of the Influence of Hogs Cured with Varying Exposure to Sunlight on the Calcium Metabolism of Milking Cows.

Jour. Biol. Chem., v. 84, p. 367.

The authors conclude that while hogs may vary considerably in their antirachitic potency due to conditions of curing and sunlight exposure, it is possible that there are factors other than the antirachitic vitamin operating in the absorption of lime from the tract of the cow.

Steenbock, H. & 3 others. 1929

Cereals and Rickets.

Jour. A. M. A., v. 93, p. 1868.

The authors prevented rickets in dogs and rats by feeding them commercially irradiated rolled oats.

Boynton, L. C. & Bradford, W. L. 1930

Effect of Vitamin A and D on Resistance to Infection.

Jour. Nutr., v. 4, p. 323.

The authors found that a vitamin A free diet brought on a decreased resistance, while no such susceptibility to similar inoculations was found in young rats on a diet deficient in vitamin D.

Bills, C. E. & 3 others. 1930

A Critique of the Line Test for Vitamin D.

Jour. Biol. Chem., v. 90, p. 619.

A critical study has been made of the line test, with special reference to technique, graphic calculation of the cod liver oil coefficient, factors influencing calcification, the dosage-time-healing relation, and the probably error.

Bills, C. E. & 2 others. 1930

Factors Determining the Ergosterol Content of Yeast.

Jour. Biol. Chem., v. 87, p. 259.

The authors found that the ergosterol content depended on the cultural conditions of the yeasts.

Bills, C. E. & 2 others. 1930

The Isoergosterols and Vitamin D.

Jour. Biol. Chem., v. 87, p. LIII.

The authors regard vitamin D as isomeric with ergosterol.

Cox, W. M. & Bills, C. E. 1930

Antirachitic Substances on the Relation of the Isoergosterols to Vitamin D.

Jour. Biol. Chem., v. 88, p. 709.

The authors found in an irradiated alcoholic solution of ergosterol a substance which exhibited an absorption spectrum characteristic of the isoergosterols but differs in the fact that it, like vitamin D, does not form a precipitate with digitonin.

Crawford, M. C.. F. & 3 others. 1930

LXXVIII. The Fat-Soluble Vitamins of Milk.

Biochem. Jour., v. 24, p. 682.

The results suggest definitely that the entire vitamin A and vitamin D content of milk is associated with the milk-fat.

Duguid, J. B. 1930

The Toxicity of Vitamin D.

Lancet, v. 108, p. 983.

The author states that there is a wide range of dosage available in vitamin D therapy without approaching the danger line.

Hansman, F. S. 1930

Vitamin D Administration in Parathyroid Deficiency Following Thyroidectomy.

Med. Jour. of Australia, v. 2, p. 809.

The author states that on the administration of irradiated ergosterol all symptoms due to thyroid imbolence disappeared.

Harris, L. J. & Innes, J. R. M. 1930

XLV. The Mode of Action of Vitamin D. Studies on Hypervitaminosis D. The Influence of the Calcium-Phosphate Intake.

Biochem. Jour., v. 25, p. 367.

These results show that excess vitamin D gives rise to a raised blood-calcium or phosphate or both, with a tendency to deposition of calcium in certain sites.

Heller, V. G. & St. Julian, R. R. 1930

Further Observation of the Effect of Light on the Synthesis of Vitamins.

Jour. Nutr., v. 4, p. 227.

The data indicates that green leaves are not good sources of vitamin D, that seedlings grown in the open sunlight do synthesize vitamin D to a certain extent, and that no appreciable increase is noted in the absence of brilliant sunlight.

Hess, A. F. & 2 others. 1930

Newer Aspects of the Therapeutics of Viosterol (Irradiated Ergosterol).

Jour. A. M. A., v. 94, p. 1885.

The authors state that viosterol is an absolutely reliable curative agent for rickets, and that the dose of viosterol should be increased from two and a half to three times.

Hess, J. H. & 3 others. 1930

Viosterol (Irradiated Ergosterol).

Jour. A. M. A., v. 95, p. 316.

The authors discussed the prophylactic dose, the therapeutic dose, the effect of massive doses, and the advantage of feeding vitamins A and D together.

Holmes, A. D. & 2 others. 1930

The Vitamin Value of Cod Liver Meal.

Jour. Nutr., v. 4, p. 193.

The authors found that the vitamin content of cod liver meal is extremely variable and the meal may be of little if any value as a source of vitamin D.

Jephcott, H. & Bacharach, A. L. 1930

Toxicity of Vitamin D.

Lancet, v. 108, p. 1044.

The authors tell of the great variation in vitamin D content of cod liver oils, and of the necessity for checking up of existing units and standards against the official preparations.

Marriott, W. M. 1930

The Use of Proprietary and Medicinal Foods in the Hospital.

Jour. A. M. A., v. 94, p. 1281.

The author discussed the medicinal property of foods containing vitamins.

McFarlane, W. D. & 2 others. 1930

XLIV. The Fat-Soluble Vitamin Requirements of the Chick. I. The Vitamin A and Vitamin D Content of Fish Meal and Meat Meal.

Biochem. Jour., v. 25, p. 358.

A sample of meat meal was found to contain little or no vitamin A or vitamin D when compared with fish meal.

Sherman, H. C. & Stiebeling, H. K. 1930

Quantitative Differentiation of Vitamins A and D.

Jour. Biol. Chem., v. 88, p. 683.

The authors find gain in weight under suitably controlled conditions the best measure for vitamin A intake, and the degree of calcification the most practical measurement of vitamin D intake.

Steenbock, H. & 3 others. 1930

Fat Soluble Vitamins: The Antirachitic Value of Cow's Milk as Modified by the Feeding of Irradiated Yeast.

Jour. Biol. Chem., v. 88, p. 197.

The authors state that irradiated yeast can be used as a satisfactory source of vitamin D for the enrichment of milk in this dietary essential.

Steenbock, H. & 3 others. 1930

Dietary Factors Influencing Calcium Assimilation: The Influence of Irradiated Yeast on the Calcium and Phosphorus Metabolism of Milking Cows.

Jour. Biol. Chem., v. 87, p. 145.

The authors found that irradiated yeast, potent in vitamin D, showed no positive influence in improving the lime assimilation of liberally milking cows.

Steenbock, H. 1930

Fat Soluble Vitamins: The Antirachitic Value of Cow's Milk as Modified by Exposure of the Cow to Sunlight and to Radiations from a Quartz Mercury Vapor Lamp.

Jour. Biol. Chem., v. 87, p. 103.

The authors prove that daily exposure of cows to sunlight or artifically generated ultraviolet radiations has little if any effect on the antirachitic potency of milk.

Steenbock, H. & 4 others. 1930

Fat Soluble Vitamins: Is Antirachitic Activation Induced by Ultraviolet Radiations a Panacea for Negative Calcium Balances?

Jour. Biol. Chem., v. 87, p. 127.

The authors conclude that antirachitic activation cannot be considered a panacea for a disturbed calcium metabolism.

Steenbock, H. & Schrader, I. M. 1930

The Distribution of Vitamin A in Tomato and the Stability of Added Vitamin D.

Jour. Nutr., v. 4, p. 267.

Red tomatoes showed that freed from skin and seeds the pulp contains approximately 32 times as much vitamin A as the clear yellow serum. Vitamin D added in the form of irradiated ergosterol was found to have maintained its activity after sterilization, followed by 13 months storage at 3-o/o C.

St. Julian, R. R. & Heller, V. G. 1930

The Effects of Vitamin Deficiency Upon the Coefficients of Digestibility of Protein, Fat, and Carbohydrate.

Jour. Biol. Chem., v. 90, p. 99.

The authors conclude that the digestive process is not affected by vitamins A, B_1, B_2, C, and D.

Sure, B. & Kik, M. C. 1930

Hematopoietic Function in Avitaminosis. V. Vitamin D Deficiency.

Soc. Exp. Biol. Med., v. 28, p. 496.

The authors conclude that vitamin D deficiency has no influence on hematopoietic function.

Sure, B. & Smith, M. E. 1930

Vitamin D Deficiency on Concentration of Sugar, alkaline Reserve, and Glycogen Content of the Liver.

Soc. Exp. Biol. Med., v. 28, p. 440.

The authors conclude that vitamin D deficiency has no influence on food and water intake.

Tu-Tunji, D. F. 1930

The Toxicidity of Vitamin D.

Lancet, v. 109, p. 53.

The author shows the variation of dosage in vitamin D therapy.

Weinshank, O. 1930

Minerals and Vitamins in the Treatment of Tuberculosis.

Med. Jour. and Record, v. 131, p. 610.

The author discusses the importance of minerals and vitamin D in the treatment of tuberculosis.

Ane, J. N.& 2 others. 1931

Motility of Gastro-Intestinal Tract of Rats on Vitamin D Deficient Diet with Minerals.

Soc. Exp. Biol. Med., v. 29, p. 329.

The authors conclude that the cause of the hypomotility of the gastro-intestinal tract of rachitic rats is due to a lack of vitamin D and not to the unbalanced minerals of the diet.

Browning, E. 1931

Vitamins in Commerce.

Med. Jour. and Record, v. 133, p. 585.

The author discussed the importance of vitamins and how their importance has forced them into the very forefront of commercial attention.

Callow, R. K. & Fischmann, C. F. 1931

CLVIII. The Occurrence of Vitamin D in Lamprays (Petromyzontidoe).

Biochem. Jour., v. 25, p. 1464.

The oils extracted from the eviscerated body, liver and ovary of the lampern (Petromyzon fluviotilis) and the sea lamprey (P. marinus) have been found to contain vitamin D in moderate amount.

Drummond, J. C. 1931

Note on the Subcutaneous Administration of Vitamin D.

Lancet, v. 109, p. 904.

The author found that the subcutaneous administration of vitamin D is of little value when compared with the oral.

Eddy, W. H. 1931

Vitamins.

Med. Jour. and Record, v. 133, p. 521.

The author reviews the practical phases of vitamins and the science underlying them.

Gordon, B. & Roberts, I. 1931

The Question of Depletion and Saturation of Vitamin A and D in Malnutrition.

Med. Jour. and Record, v. 134, p. 157.

The authors conclude that nutrition depends on the level of vitamins A and D saturation.

Grauer, R. C. 1931

Production of Osteitis Fibrosa with Overdoses of Vitamin D.

Soc. Exp. Biol. Med., v. 29, p. 466.

The authors observations further strengthened the similarity of vitamin D and of the harmone of the parathyroid gland in the production of Osteitis fibrosa.

Holmes, A. D. 1931

Are Vitamin D and Irradiated Ergosterol Identical?

New Eng. Jour. Med., v. 204, p. 211.

The author states that we should not refer to vitamin D and irradiated ergosterol as though they were identical substances.

Jorstad, L. 1931

The Relationship of Type of Radiant Energy to its Activation of Vitamins in Yeast.

Jour. Lab. and Clinical Med., v. 16, p. 1169.

The experiments tend to establish that Vitamin D is closely allied with vitamin A and that the liberation of these vitamins from brewer's yeast depends upon the amount of "ray" energy given.

Key, K. M. & Morgan, B. G. E. 1931

XXIV. The Determination of Vitamin D.

Biochem. Jour., v. 26, p. 196.

The authors state that the curative test is more generally useful than the prophylactic test since the difference in degree of healing could be evaluated by reference to the curves.

Kletzien, W. F. & 3 others. 1931

Vitamin D and Calcium Conservation in the Adult Rat.

Jour. Biol. Chem., v. 92, p. IX.

The authors discuss their experiments conducted to determine the effect of vitamin D in the adult rat, with male for control, and maintenance, and females for control, maintenance, reproduction, and lactation.

Kon, S. A. 1931

The Antirachitic Value of Irradiated Yeast.

Lancet, v. 109, p. 579.

Yeast irradiated under specific conditions was found to contain one rat unit (Steenbock) in one Mg.

Kramer, B. & Howland, J. 1931

Factors which Determine the Concentration of Calcium and of Inorganic Phosphorus in the Blood Serum of Rats.

Jour. Nutr., v. 5, p. 39.

The concentration of calcium and phosphate in the diet, its content of Vitamin D, as well as the concentration of other salts, the amounts of organic factors such as fat, carbohydrates and protein, and the reaction which the diet yields ultimately in the body, all play a part in determining the absorption of bone forming salts.

Kramer, B. & 2 others. 1931

Composition of Bone: XII. Effect of Inadequate Amounts of Viosterol on the Healing of Rickets.

Jour. Biol. Chem., v. 91, p. 723.

The authors found that when inadequate amounts of viosterol were added to the diet, healing was not obtained.

Krauss, W. E. & Bethke, R. M. 1931

Effect on the Vitamin D content of Milk of Feeding Irradiated Ergosterol to Cows.

Jour. Biol. Chem., v. 92, p. X.

The authors found that the vitamin D content of the butter fat increased as the number of rat units of vitamin D fed increased.

Krauss, W. E. & 2 others. 1931

The Effect of Feeding Irradiated Ergosterol to cows on the Vitamin D Content of Milk.

Jour. Nutr., v. 5, p. 467.

The authors discussed the practicability of feeding cows irradiated ergosterol so as to produce milk rich in vitamin D.

Light, R. F. & 2 others. 1931

Studies on the Effects of Overdosage of Vitamin D.

Jour. Biol. Chem., v. 92, p. 47.

The authors found that large overdosage given for a long period of time, produces striking pathological changes in the third and fourth generations.

Lilly, C. A. 1931

Failures to Produce Experimental Dental Caries in the White Rat with High Carbohydrate Diet and Bacillus acidophilus or with Vitamin D Deficiency.

Jour. Nutr., v. 5, p. 175.

The author in his experiments was unable to produce any dental caries.

McGowan, J. P. & 2 others. 1931

CXLII. On the Fundamental Nature of Vitamin D Action.

Biochem. Jour., v. 25, p. 1295.

The mode of action of vitamin D in the cure and prevention of rickets is by the setting free from the lipins of the body of inorganic phosphate, the relative deficiency of which is regarded as the essential cause of rickets.

Reerink, E. H. & Wijk, A. V. 1931

CXI. The Vitamin D Problem. II. Optical Rotation of Vitamin D.

Biochem. Jour., v. 25, p. 1001.

Experiments are described in which the change of the rotation of ergosterol solutions on irradiation with long-wave ultraviolet rays is measured.

Rose, S. F. & Mackay, H. M. M. 1931

Vitamin D Deficiency, Dental Caries, and Tonsillar Enlargement.

Lancet, v. 109, p. 1230.

The authors found that vitamin D deficiency is not an important factor in determining the development of caries in early childhood. Nor does D deficiency in early childhood appear to have influenced materially the tendency to the development of enlarged tonsils or of enlarged curvical glands.

Schultzer, P. 1931

CLXXXIX. Investigations on the Determination of Vitamin D. Comparison Between the Preventive and the Curative Methods.

Biochem. Jour., v. 25, p. 1745.

The author gives a precise description of the technique employed in the preventive and the curative methods for estimation of vitamin D. The results are judged by bone analysis, x-ray examination and autopsy.

Shelling, D. H. 1931

Calcium and Phosphorus Studies: II. The Effect of Diet and of Viosterol on the Tetang and on the Serum of Parathyroidectomized Rats.

Jour. Biol. Chem., v. 96, p. 215.

The author discussed the relation of the parathyroids to the activity of therapeutic doses of viosterol.

Shelling, D. H. 1931

Calcium and Phosphorus Studies: III. The Source of Excess Serum Calcium in Viosterol Hypercalcemia.

Jour. Biol. Chem., v. 96, p. 229.

The author discusses the effects of large doses of viosterol on the levels of serum calcium of rats fed diets free of either calcium or of both calcium and phosphorus and the effects of such a regime on the excretion of calcium and phosphorus.

Supplee, G. C. & 3 others. 1931

The Comparative Antirachitic and Calcifying Properties of Irradiated Milk and Milk Derivatives.

Jour. Biol. Chem., v. 91, p. 773.

The authors found that negative antirachitic and calcifying properties were obtained from the irradiated non-saponifiable fraction of milk fat. The milk irradiated in fluid form and subsequently dried showed marked antirachitic properties.

Taylor, N. B. & 3 others. 1931

A Study of the Action of Irradiated Ergosterol and of its Relationship to Parathyroid Function.

Canadian Med. Ass. Jour., v. 24, p. 763.
v. 25, p. 20

The experiments show that, upon increasing the dosage of irradiated ergosterol from small to very large amounts, its effect upon calcium metabolism becomes riversid, a parathormone-like action becoming manifest.

Tisdall, F. F. & 2 others. 1931

The Incorporation of Vitamins in Bread.

Canad. Med. Ass. Jour., v. 24, p. 211.

The authors state that bread is a particularly suitable carrier for vitamins because of its universal distribution and large consumption; and that vitamin D does not change in any way the appearance or taste of the bread.

Vanderveer, H. L. 1931

Hypervitaminosis D and Arteriosclerosis.

Arch. Path., v. 12, p. 941.

Arteriosclerosis was produced in rabbits by means of large doses of irradiated ergosterol, and the sequence of events in the pathologic processes in the affected vessels was studied.

Warren, S. & Nissen, H. A. 1931

The Preparation of a Vitamin-Containing Vegetable Extract.

New Eng. Jour. Med., v. 205, p. 135.

The authors discuss the use of the vegetable diffusion extract process.

Abeloff, A. J. & Sobel, I. P. 1932

Viosterol in Experimental Fibrous Osteitis.

Arch. Path., v. 14, p. 471.

The authors found that viosterol did not prevent the bone lesions of generalized fibrous osteitis in guinea-pigs formed by repeated injections of parathormone.

Askew, F. A. & 2 others. 1932

XCVIII. The Production of Vitamin D in a Glow Discharge.

Biochem. Jour., v. 26, p. 814.

The authors state that it is practicable to produce vitamin D in quantity in a glow discharge.

Barnes, D. J. 1932

Relative Value of Various Forms of Vitamin D Milk in Prevention of Infantile Rickets.

Soc. Exp. Biol. Med., v. 31, p. 1221.

The author believed that if satisfactory clinical comparisons are to be made between various antirachitic substances it would be necessary to set up and follow a standardized procedure for the various studies made.

Bills, C. E. & McDonald, F. G. 1932

Crystalline Vitamin D.

Jour. Biol. Chem., v. 96, p. 189.

The authors conclude that crystalline preparations of vitamin D reveal wide variation in antirachitic value, and that the best preparations are probably isomorphous mixtures containing a large percentage of inert material.

Bourdillon, R. B. & Bruce, H. M. 1932

LXI. The Determination of Vitamin D: II. A comparison of Radiography and Bone Analysis in the Estimation of Vitamin D.

Biochem. Jour., v. 26, p. 506.

The authors state that the prophylactic radiographic scale is less satisfactory than the curative scale.

Bourdillon, R. B. & 2 others. 1932

LXII. The Determination of Vitamin D. III. The Stability of Preparations of Vitamin D.

Biochem. Jour., v. 26, p. 522.

The results indicate that most of the inorganic or organic impurities likely to be present in small quantities in solutions of irradiated ergosterol cause no great reduction in stability, with the exception of sulphur.

Branion, H. D. & Smith, J. B. 1932

The Influence of Vitamin D on Hatchability and Egg Production.

Poultry Science, v. 11, p. 261.

The authors found that egg production is increased by an increase in vitamin D potency of the ration within certain limits. Viosterol was found to be less efficient than cod liver oil in promoting egg production.

Clouse, R. C. 1932

Vitamin D.

Jour. A. M. A., v. 99, p. 215.

The author discusses the importance of Vitamin D, distinction between vitamins A and D, the relation of vitamin D to ultraviolet rays, the influence of vitamin D on calcium and phosphorus metabolism, the bodily storage of vitamin D, the quantitative determination of vitamin D, the standardization of irradiated ergosterol and cod liver oil, and the formation of vitamin D by ultraviolet radiation.

Clouse, R. C. 1932

Vitamin D.

Jour. A. M. A., v. 99, p. 301.

The author discusses the chemistry, toxicity, stability, distributing of vitamin D, cereals as anti-calcifying substances, and irradiated foods.

Cody, C. C. 1932

Relation of Vitamins A, D, B, and G to Otolaryngology.

Arch. Otholaryngology, v. 16, p. 661.

The author states that a diet deficient in vitamin D has no effect on the nasal, aural and tracheal mucosa.

Coward, K. H. & 2 others. 1932

CLXXXVIII. The Quantitative Determination of Vitamin D by Means of its Growth-Promoting Property.

Biochem. Jour., v. 26, p. 1585.

The authors have worked out a method for the estimation of vitamin D by means of its growth-promoting power on similar lines to that proposed for vitamin A.

Dann, W. J. 1932

XIX. The Vitamin D Content of Red Palm Oil.

Biochem. Jour., v. 26, p. 151.

The author states that four different samples of red palm oil have been shown to contain very little vitamin D.

De Vaney, G. M. & 2 others. 1932

Effect of Sources of Vitamin D on Storage of the Antirachitic Factor in the Egg.

Poultry Science, v. 12, p. 215.

The results show that for storage of the antirachitic factor in egg yolk viosterol is less efficient than cod liver oil.

Ham, A. W. 1932

Mechanism of Calcification in the Heart and Aorta in Hypervitaminosis D.

Arch. Path., v. 14, p. 613.

The author states that enormous single doses of irradiated ergosterol will produce massive calcifications in the aorta, coronary vessels and cardiac musculature of the rat as soon as forty-eight hours after administration.

Harris, L. J. 1932

The Mode of Action of Vitamin D.

Lancet, v. 110, p. 1037.

The mode of action is to permit an increased net absorption of calcium and phosphate, tending to raise the level of the blood calcium and phosphate.

Hess, A. F. & 3 others. 1932

A Study of the Milk, Blood, and Excreta of Cows Fed Moderate and Excessive Amounts of Irradiated Yeast or Ergosterol.

Jour. Biol. Chem., v. 97, p. 369.

The milk of cows fed 300 gm. of irradiated yeast daily is highly antirachitic. When excessive quantities of irradiated yeast were fed, the blood contained 1 unit of vitamin D per 1.5 gram. Cows receiving 300 gm. of irradiated yeast daily showed that about 25 per cent of vitamin D ingested was eliminated by way of the intestine.

Hume, E. M., & 2 others. 1932

LX. The Determination of Vitamin D: I. The Relationship between Graded Doses of a Standard Solution of Vitamin D, Administered to Young Rats on a Rachitogenic Diet, and the Ash Content of their Bones.

Biochem. Jour., v. 26, p. 488.

The construction is described of a scale correlating doses of a standard solution of irradiated ergosterol, administered prophylactically, with the percentage ash in the bones of young rats on a rachitogenic diet.

Kletzien, S. W. F. & 3 others. 1932

Vitamin D and the Conservation of Calcium in the Adult.

Jour. Biol. Chem., v. 97, p. 265.

Adult rats kept on a rachitogenic diet, lost mineral elements from their skeletons. This loss was reduced but not prevented by the addition of vitamin D.

Langhorst, H. F. 1932

Vitamins: Their Role in the Prevention and Treatment of Disease.

Med. Jour. and Records, v. 135-136, p. 238.

The author treats the source, the action, the prevention of degenerative diseases, and the influence of vitamins on fracture healing.

Lucas, N. S. 1932

XIX. The Production of Vitamin D by Irradiation of Ergosterol through the Epidermis of a Rat.

Biochem. Jour., v. 27, p. 132.

The author states that ergosterol, in alcoholic solution with exclusion of oxygen, was irradiated with ultraviolet radiation through the epidermis of a day-old rat, by means of a specially devised apparatus.

McClung, L. S. & Winters, J. C. 1932

Effect of Dietary Deficiency of Vitamin D in Relation to Infection by Salmonella Enteritidis.

Jour. Infectious Diseases, v. 51, p. 475.

The authors experiments showed that vitamin D was a factor in the resistance of the white rat to infection by Salmonella enteritidis.

Mitchell, J. M. & 3 others. 1932

Protective Value for Infants of Various Types of Vitamin D Fortified Milk.

Amer. Jour. Publ. Health, v. 22, p. 1220.

Three types of vitamin D fortified milk were studied; namely (a) irradiated pasteurized milk (b) yeast milk, and (c) milk from irradiated cows. The first two types were found to be equivalent in the protection afforded infants against rickets. The last deserves further consideration and study.

Morgan, R. S. 1932

CXXXV. The Determination of Vitamin D in the Line Test by Measurement.

Biochem. Jour., v. 26, p. 1144.

The author states that the healing measured in the line test is found to be proportional to the logarithm of the dose of vitamin D.

Nicholas, H. O. & Kuhn, E. M. 1932

The Role of Calcium, Phosphorus and Vitamin D in Pregnancy.

Jour. of Clinical Investigation, v. 11, p. 1313.

The authors found that viosterol causes better assimilation of the calcium and phosphorus in the diet by the maternal organism, and it also has a prenatal effect of allowing better transmission of calcium and phosphorus from the mother to the fetus.

Robertson, E. C. & Ross, J. R. 1932

The Effect of Vitamin D in Increasing Resistance to Infection.

Jour. of Pediatrics, v. 1, p. 69.

The addition of vitamin D, in the form of vitamin D bread, to a rachitogenic diet, which already contained considerable amounts of the other vitamins raised the resistance of rats to a "rat typhoid" infection which was fed per os.

Schultz, F. W. 1932

The Clinical Significance of Vitamin D in Infancy and Childhood.

Jour. A. M. A., v. 99, p. 384.

The author discusses the importance of vitamin D, the calcium and Phosphorus Metabolism, distribution of Vitamin D, activation of irradiation, dosage, and the desirability of caution.

Steenbock, H. & Kletzien, S. W. F. 1932

The Reaction of the Chicken to Irradiated Ergosterol and Irradiated Yeast as Contrasted with the Natural Vitamin D of Fish Liver Oils.

Jour. Biol. Chem., v. 97, p. 249.

The authors found that ergosterol and yeast when irradiated are inefficient sources of vitamin D for the chickens; whereas 1 per cent. of cod liver oil of average potency results in normal bone production.

St. John, J. L. & 2 others. 1932

Observations on the Bone Ash Method of Determining Effectiveness of Vitamin D Supplements.

Poultry Science, v. 12, p. 35.

The authors emphasized the need for the standardization of the method of determining ash in bone, when the ash method is used as a measure of the effectiveness of vitamin D supplements.

Supplee, G. C. & Hanford, Z. M. 1932

Irradiated Milk: The Amounts of Vitamin D and its Rate of Formation.

Jour. Biol. Chem., v. 95, p. 687.

The authors state that the degree of antirachitic potency of milk bears a direct relationship to the amount of energy applied; beyond these limits additional energy does not increase the vitamin D content proportionately. The rate of vitamin D formation is greatest during the very early stages of the process.

Sure, B. & 2 others. 1932

Effect of Vitamin D Deficiency on Concentration of Lipids of Blood of Albina Rat.

Soc. Exp. Biol. Med., v. 30, p. 621.

Vitamin D deficient animals showed the same range of concentration of blood lipids as the controls.

Tibbettes, D. M. & 2 others. 1932

Studies of Calcium and Phosphorus Metabolism. XX. The High Calcium Excretion in Exophthalmic Goiter is not due to Vitamin D Deficiency.

Jour. of Clinical Investigation, v. II, p. 1273.

The authors state that it is clear that the high calcium excretion found in hyperthyroidism is not due to a deficiency of vitamin D.

Zucker, T. F. 1932

The Addition of Vitamin D Concentrate to Milk.

Amer. Jour. Pub. Health, v. 23, p. 11.

The author discusses the characteristics of vitamin D milk made by the addition of a concentrate.

Bakwin, H. & Bakwin, R. M. 1933

Vitamin D Deficiency.

Jour. of Pediatrics, v. 3, p. 880.

The authors showed that a form of tetany in infants is dependent on sunlight or vitamin D deficiency.

Brown, A. 1933

The Role of Minerals and Vitamins in Growth and Resistance to Infection.

Brit. Med. Jour., V. 1, p. 55.

The author states that sixty cities in the United States produce bread containing the vitamin D equivalent of 3 drachms of cod liver oil to each 24 ounce loaf.

Bunker, J. W. M. & 2 others. 1933

The Antirachitic Potency of the Milk of Human Mothers Fed Previously on "Vitamin D Milk" of the Cow.

New Eng. Jour. Med., v. 208, p. 313.

The authors state that the antirachitic potency of human breast milk can be augmented by including vitamin D milk in the diet of the mother, during lactation.

Bunker, J. W. M. & 2 others. 1933

Antirachitic Potency of Milk of Human Mothers Fed Previously on "Vitamin D Milk" of the Cow.

New Eng. Jour. Med., v. 208, p. 317.

The authors discuss the antirachitic value of human breast milk augmented by including vitamin D milk in the diet of the mother.

Burr, G. O. 1933

The Role of Vitamins in Nutrition.

Minn. Med., v. XVI, p. 668.

The author discusses the effects of vitamin deficiencies and their relation to all metabolism.

Burr, G. O. 1933

Effects of Vitamin Deficiencies.

Minn. Med. v. XVI, p. 669.

The author presents a chart summarizing some information about the well established vitamins.

Coward, H. H. & Key, K. M. 1933

LXVI. The Degree of Accuracy Obtainable by the Line Test in Estimations of Vitamin D.

Biochem. Jour., v. 27, p. 451.

The authors found an error of 12-o/o when the doses of vitamin D given range from 0.2 to 1.5 unit.

Crimm, P. D. & Strayer, J. W. 1933

Vitamin Therapy in Pulmonary Tuberculosis.

Jour. Lab. and Clinical Med. v. 19, p. 966.

The authors discussed the effect of viosterol in the therapy of pulmonary tuberculosis.

Daly, C. 1933

A Note on the Mode of Action and Administration of Vitamin D.

Soc. Exp. Biol. Med., v. 31, p. 368.

The author states that vitamin D increased formating acid in the gastrointestinal tract. Vitamin D may be administered either oral or subcutaneous.

Goldberg, B. 1933

Vitamin "D" and Calcium Metabolism in Tuberculosis.

Archives of Physical Therapy, X-Ray, Radium, v. 14, p. 655.

The author discusses the importance of vitamin D and calcium in the prevention and in the treatment of tuberculosis.

Ham, A. & Portuondo, B. C. 1933

Relation of Serum Calcium to Pathologic Calcifications of Hypervitaminosis D.

Arch. Path., v. 16, p. 1.

The authors' contribution is concerned with a study and interpretation of the evidence obtained by correlating the changes in the tissues with the serum calcium curves of animals during the time immediately following the administration of one single massive dose of activated ergosterol.

Jackson, R. W. 1933

The Effect of Mineral Oil Administration Upon the Nutritional Economy of Fat-Soluble Vitamins.

Jour. Nutr., v. 7, p. 617.

Mineral oil administered separately from irradiated ergosterol was not found to interfere with the utilization of vitamin D.

Jeans, P. C. & Stearns, G. 1933

Effectiveness of Vitamin D in Infancy in Relation to the Vitamin Source.

Soc. Exp. Biol. Med., v. 31, p. 1159.

The authors found that the amount of calcium retained from a given intake of milk will be determined in part by the quantity of vitamin D ingested and that the rat unitage of the sources studied is equivalent to each other.

Kon, S. K. & Booth, R. G. 1933

CLXXVII. The Vitamin D Activity of Butter: 1. A Chemical Differentiation of the Antirachitic Factor of Autumn and Winter Butter from Irradiated Ergosterol and the Vitamin D of Cod Liver Oil.

Biochem. Jour., v. 27, p. 1302.

The authors found that saponified autumn and winter butters lose over 80-o/o of their antirachitic potency, while irradiated ergosterol or cod liver oil could be subjected to saponification either alone or mixed with butter without loss of potency.

Levine, V. E. & Seaman, C. L. 1933

CCLXXIX. Critical Study of Shear's Aniline-Hydrochloric Acid Reaction Associated with Vitamin D. 1. Furan and Derivatives.

Biochem. Jour., v. 27, p. 2047.

The authors tabulated the characteristic colour reactions with the anilin-hydrochloric acid reagent.

Levine, V. E. & Shaughnessy, E. J. 1933

CCLXXIX. Critical Study of Shear's Aniline-Hydrochloric Acid Reaction Associated with Vitamin D: II. Terpenes.

Biochem. Jour., v. 27, p. 2048.

The authors tabulate the reactions of terpenes with anilene-hydrochloric acid reagent.

Light, R. F. & 2 others. 1933

Vitamin D in the Blood and Milk of Cows Fed Irradiated Yeast.

Jour. Nutr., v. 8, p. 105.

The authors conclude that the concentration of vitamin D in the blood plasma governs the concentration of this factor in the milk.

McBeath, E. C. 1933

Vitamin D Studies.

Amer. Jour. Pub. Health, v. 24, p. 1028.

The author states that vitamin D is an important factor in the nutritional control of dental caries.

McGowan, J. P. 1933

CXXII. Further Investigations into the Fundamental Nature of Vitamin D Action.

Biochem. Jour., v. 27, p. 943.

The author states that vitamin D produces its action by setting free inorganic phosphate endogenously and in all probability from the lipins of the body.

Morgan, A. F. 1933

Effect of Diet on Response to Parathyroid Extract and Vitamin D.

Amer. Jour. of Phys., v. 105, p. 621-634.

The author determines the effect of diets of normal calcium and phosphorus content in dogs.

Morgan, A. F. & Field, J. G. 1933

The Effect of Diet on Response to Parathyroid Extract and Vitamin D.

Amer. Jour., of Phys., v. 105, p. 585.

The authors discuss the relation of calcium and phosphorus of the diet to response to parathyroid extract in rats.

Morgan, A. F. & Garrison, E. A. 1933

The Effect of Diet on Response to Parathyroid Extract and Vitamin D.

Amer. Jour. of Phys., v. 105, p. 596.

The authors discuss the effect of high calcium low phosphorus diets in dogs.

Morgan, A. F. & 2 others. 1933

The Effect of Diet on Response to Parathyroid Extract and Vitamin D.

Amer. Jour. of Phys., v. 105, p. 608.

The authors discuss the effect of low calcium-high phosphorus diets in dogs.

Morgan, A. F. & 3 others. 1933

The Effect of Moderate Doses of Viosterol and of Parathyroid Extract upon Bone Composition.

Jour. Biol. Chem., v. 100, p. LXXI.

The authors state that the increased loses in balances and metaphysis ash seen in animals which received both substances appear to indicate that the effects of the vitamin and of the harmone are similar and cumulative.

Schultzer, P. 1933

LIV. Investigations on the Determination of Vitamin D by the Preventive Method. The Preventive Dose Established as Curative.

Biochem. Jour., v. 27, p. 376.

The author states that with increasing doses of vitamin D the rachitic changes at the beginning of the experimental period are more and more inconspicuous; and with the real preventive dose there is no sign of rickets whatever.

Shelling, D. H. & Tidwell, H. C. 1933

A Simple Method for Production of Vitamin D Milk of Known and Controllable Potency.

Soc. Exp. Biol. Med., v. 31, p. 605.

The method consists simply of homogenizing, in water, a concentrated oily solution of viosterol of known potency, with the aid of an emulsifying agent known as lecithin. The necessary amount of the emulsion may be added to the milk before pasteurization.

Sobel, A. E. & 2 others. 1933

Studies of Incurable Rickets: I. Respective Role of the Local Factor and Vitamin D in Healing.

Soc. Exp. Biol. Med., v. 31, p. 869.

The authors found that vitamin D caused an increase of CAXP even when healing did not take place in strontium fed rats.

Spencer, J. C. & Durh, M. D. 1933

Clinical Tests of the Antirachitic Activity of Calciferol.

Lancet, v. 111, p. 911.

Calciferol was found to have an active curative effect on rickets and that it produced healing, acting as quickly and as effectively as the usual therapeutic doses of cod liver oil or irradiated ergosterol.

Templin, V. M. & Steenbock, H. 1933

Vitamin D and the Conservation of Calcium in the Adult: II. The Effect of Vitamin D on Calcium Conservation in Adult Rats Maintained on Low Calcium Diets.

Jour. Biol. Chem., v. 100, p. 209.

The authors found that the sole addition of vitamin D resulted in almost complete protection against mineral losses in the adult rat.

Templin, V. M. & Steenbock, H. 1933

Vitamin D and the Conservation of Calcium in the Adult: III. The Effect of Vitamin D on the Teeth of Rats.

Jour. Biol. Chem., v. 100, p. 217.

The addition of vitamin D resulted in almost complete protection against mineral losses of the teeth.

Tisdall, F. F. 1933

Vitamin D.

Amer. Jour. Diseases of Children, v. 45, p. 619.

The author discussed the role of vitamin D which is the promotion of optimal utilization of calcium and phosphorus, particularly to form the skeletal and dental structures.

Wyman, E. T. 1933

Vitamin D Milk.

New Eng. Jour. of Med., v. 209, p. 889.

The author concludes that vitamin D milk prevents as well as cures rickets.

Barnes, D. J. & 3 others. 1934

Vitamin D Potency as Influenced by Supplementing the Diet of the Mother During Pregnancy and Lactation with Cow's Milk Fortified with a Concentration of Cod Liver Oil.

Jour. Nutr., v. 8, p. 647.

The breast milk was not sufficiently enriched with vitamin D to heal rickets.

Bells, C. E. & 2 others. 1934

Potency of Vitamin A and Vitamin D of Halibut Liver Oil Correlated with Seasonal Variations in the Oil Content of Halibut Liver.

Jour. Biol. Chem., v. 105, p. X.

The authors found that from January to June the oil content moves slightly upward; then it suddenly increases until in August it has doubled; thereafter it declines. The potency of the oil in both vitamin A and D moves inversely with the oil content of the liver.

Bruce, H. M. & Callow, R. K. 1934

LXXIV. Interaction of Vitamin D and Dietary Factors in the Healing of Rickets in Rats.

Biochem. Jour., v. 28, p. 512.

The authors state that the combined antirachitic effect of changes in the mineral composition of a diet and of simultaneous administration of vitamin D is found to be greater than the effect of the sum of the two acting separately.

Cooping, A. M. 1934

CCI. Origin of Vitamin D in Cod Liver Oil: Vitamin D Content of Zooplankton.

Biochem. Jour., v. 28, p. 1516.

The author states that dried capepod contains sufficient vitamin D to make this constituent of the zooplankton a good source of vitamin D in the food of the cod.

Coward, K. H. & Key, K. M. 1934

CXXIII. Simplification of Vitamin Tests. The Effect of Giving Doses Half-Weekly for vitamin A tests, and once only for Vitamin D Tests, Instead of Giving Doses Daily.

Biochem. Jour., v. 28, p. 870.

The authors conclude that in changing from daily doses to half-weekly doses for vitamin A tests and of giving the whole dose of vitamin D at the beginning of the 10 days' curative period gives a result which is not less accurate than that obtained by the method of giving doses daily.

Davidson, L. T. & Merritt, K. K. 1934

Viosterol in the Prophylaxis of Rickets in Premature Infants.

Amer. Jour. Diseases of Children, v. 48, p. 281.

The authors state that viosterol 250 D in a maximal dosage of 20 drops a day has been inadequate for the complete protection of the premature infant.

Dodds, E. C. & 2 others. 1934

The Solar Irradiation of Children with Special Reference to Hypervitaminosis D.

Archives Disease Childhood, v. 9, p. 91.

The authors conclude that no excess production of vitamin D occurred as a result of solar irradiation.

Greaves, J. D. & Schmidt, L. A. 1934

Further Experiments on the Role Played by Bile in the Absorption of Vitamin D in the Rat.

Univ. of Calif. Publications in Physiology, v. 8, p. 43-48.

The authors conclude that the bile plays an important role in the transport of Vitamin D across the intestinal tract of the rat.

Ham, A. W. & Lewis, M. D. 1934

The Action of Vitamin D.

Brit. Jour. Exp. Path., v. 15, p. 228.

The authors discuss the results of their experiments in comparison to the theory that vitamin D acts through the intermediary of the parathyroid mechanism to control a fraction of the serum calcium.

Kaupe, W. 1934

Die Vitamine A and D in der Kinderheilkunde.

Munchener Medizinische Wochenschrift, v. 81, p. 1885.

The author used vitamins A and D with good results, in the treatment of infants with anorexia and an unsatisfactory gain in weight.

Kay, J. R. W. 1934

The Practical Treatment of Rickets in Children.

Lancet, v. 12, p. 1390.

The author discusses the treatment of rickets with vitamin D.

Kon, S. K. & Booth, R. G. 1934

XVII. The Vitamin D Activity of Butter: II. The Complex Nature of the Antirachitic Action of Butter.

Biochem. Jour., v. 28, p. 111.

The authors conclude that at least two factors antirachitic for the rat are present in butter; a factor which is not recoverable in the non-saponificable residue, and the usual vitamin D, which is resistant to saponification.

Kon, S. K. & Booth, R. G. 1934

XVIII. The Vitamin D Activity of Butter: III. An Attempt to Elucidate the Nature of the Labile Factor in Butter Antirachitic for the Rat. The Antirachitic Potency of Lard, Olive Oil, Egg Oil and the Fatty Acids of Butter and Lard.

Biochem. Jour., v. 28, p. 121.

The authors conclude that the antirachitic value of the labile factor is still in question and the only safe course for ascertaining the vitamin D activity of butter is to submit it to saponification and feed to rats the non-saponificable residue only.

McBeath, B. D. 1934

Vitamin D Studies.

Amer. Jour. Public Health, v. 24, p. 1028.

The author states that clinical observations point to a probable correlation of the degree of control of dental caries with the quantitative dosage of vitamin D.

Schour, I. & Ham, A. W. 1934

Action of Vitamin D and of the Parathyroid Hormone on the Calcium Metabolism as Interpreted by Studying the Effect of Single Doses on the Calcification of Dentin.

Arch. Path., v. 17, p. 22.

The experiments show that vitamin D acts through the parathyroid mechanism, and that parathyroid hormone act on the blood rather than on the bones.

Shelling, D. H. & Hopper, K. B. 1934

Calcium and Phosphorus Studies. VI. Observations on the Treatment of Late Rickets with Viosterol Based on the Study of Twenty-Three Cases.

Amer. Jour. Diseases of Children, v. 47, p. 61.

The authors state that twenty-two of 23 patients with late rickets treated with viosterol were cured completely.

Sutherland, R. 1934

Vitamins A and D: Their Relation to Growth and Resistance to Disease.

Brit. Med. Jour., v. 1, p. 791.

The author states that vitamins A and D are necessary along with a balanced diet in promoting growth and in the resistance of disease.

Venor, Y. & Todd, T. W. 1934

The Efficacy of Vitamin D Administration in Aqueous Preparation.

Jour. Nutr., v. 8, p. 553.

The authors used an aqueous preparation of vitamin D in their experiment on invitro calcification of bone. They found the aqueous solution very satisfactory.

Whipple, D. V. 1934

Vitamins A, D, and B in Oysters.

Jour. Nutr., v. 9, p. 163.

The author states that oysters were found to be an excellent food source of vitamin B (B), a relatively good one of vitamin A, and a very modest source of vitamin D.

White, C. 1934

Onychia Due to Chronic Hypovitaminosis.

Jour. A. M. A., v. 102, p. 2178.

The author tells of the cure of this disease by the use of vitamins B_2 and D.

Astrowe, P. S. & Morgan, R. A. 1935

Dermal Absorption of Vitamin D.

Amer. Jour. Diseases of Children, v. 49, p. 913.

The authors found that viosterol is absorbed through the skin in sufficient quantities to prevent and cure rickets.

Bethke, R. M. & 2 others. 1935

Further Studies Pertaining to Provitamin D of Plant and Animal Sources.

Jour. Biol. Chem., v. 112, p. 231.

The results show that the provitamin D of animal products and that of plant products are not identical and suggest that no taxonomic differences exists between vitamin D efficiency of irradiated products from higher plants and irradiated plants of the lower botanical order.

Bethke, R. M. & 3 others. 1935

The Comparative Antirachitic Efficiency of Vitamin D in Irradiated Milk, Metabolized (Yeast) Milk, and Cod Liver Oil.

Jour. Nutr., v. 11, p. 21.

The authors found that it required ten times the rat equivalent amount of Vitamin D metabolized (yeast) milk than in irradiated milk to produce the same antirachitic effect in chicks. Equivalent rat units of vitamin D from cod liver oil and irradiated milk were equally efficient.

Bills, C. E. & 6 others. 1935

A Toxonomic Study of the Distribution of Vitamin A and D in one Hundred Species of Fish.

Jour. Biol. Chem., v. 109, p. VII.

The taxonomic study revealed that the highest concentration of both vitamins were in species of the order Percomorphi, and numerous percomorph oils were 100 to 400 times more potent than cod liver oil in either or both vitamins.

Branion, H. D. 1935

The Vitamin D Content of Egg Yolk.

Jour. Canad. Med. Assoc., v. 32, p. 9.

The author states that the average number of Steenbach vitamin D units per average market egg yolk (fresh extras) is 8.6.

Crimm, P. D. & Strayer, J. W. 1935

Phosphatase Content of Blood Serum and Tissues in the Rat Following Administration of Vitamins D and A.

Jour. Biol. Chem., v. 112, p. 511.

Rats made toxic with viosterol showed a marked reduction of phosphatase in blood and kidney, the phosphate content of small intestine was increased, no effect on liver and spleen.

Dryer, I. & Reed, C. I. 1935

The Treatment of Arthritis with Massive Doses of Vitamin D.

Arch. Physical Therapy, X-Ray, Radium, v. 16, p. 537.

The authors state that the results of their experiments may prove an efficient form of therapy.

Goldberg, S. 1935

Vitamins in Relation to Normal Growth and Dentition in Children.

Med. Jour. and Record, v. 114-142, p. 19.

The author tells of the great need of vitamins for normal growth and development.

Greaves, J. E. 1935

Can Azotobacter Chroococcum Synthesize Vitamin D?

Jour. Bact., v. 30, p. 143.

The author states that he synthesized the precursor of vitamin D, which is readily transformed into vitamin D by irradiation.

Guerrant, N. B. & 3 others. 1935

The Relationship of the Vitamin D intake of the Hen to the Antirachitic Potency of the Eggs Produced.

Jour. Nutr., v. 10, p. 177,

The antirachitic potency of egg yolk depends on the antirachitic intake of the hen producing it. It also depends on the ability to transfer the antirachitic factor from her direct to the egg.

Haman, R. W. & Steenback, H. 1935

The Differential Antirachitic Activity of Vitamin D Milks.

Jour. Nutr., v. 10, p. 653.

The authors found that yeast milk is approximately one-tenth as effective as irradiated milk.

Hathaway, M. L. & Lobb, D. E. 1935

The Provitamin D of Heat-Treated Cholesterol.

Jour. Biol. Chem., v. 113, p. 105.

The authors state that a new form of vitamin D has been formed by the heat treatment of cholesterol, which corresponds, rat unit for rat unit, to the vitamin D of cod liver oil for chicks.

Hunter, D. 1935

New Aspects of Deficiencies in Nutrition.

Lancet, v. 113, p. 1025.

The author concludes that nutrition of the skin depends on B_2 and A_1 of nerve tissues on B_1 and A_1 and teeth on D, C, and A.

Jones, J. H. 1935

Further Observations on the Possible Interrelationship in the Physiological Action of the Parathyroid Glands and Vitamin D.

Jour. Biol. Chem., v. 109, p. XLVI.

The author does not believe that there is much interrelationship between the parathyroid glands and vitamin D.

Jones, J. H. 1935

Further Observations on the Possible Interrelationship between the Physiological Actions of the Parathyroid Blands and Vitamin D.

Jour. Biol. Chem., v. III, p. 155.

The author states that the toxicity of irradiated ergosterol is not due to a stimulation of the parathyroid glands, and also that the failure of rachitic animals to respond to parathyroid extract is not directly due to a lack of vitamin D.

Jones, J. H. & Cohn, B. N. E. 1935

The Healing of Rickets in Rats on a Diet containing Negligible Amounts of Calcium and Vitamin D.

Jour. Nutr., v. 11, p. 293.

The authors showed that irradiated ergosterol vitamin D is not essential for the transferring of the bone salts from calcified portions of the skeleton to the more rachitic parts of the effected rat.

Kon, S. K. & Henry, K. M. 1935

CCXLI. The Effect of Feedings Cacao shell to Cows on the Vitamin D Content of Butter (Milk).

Biochem. Jour., v. 29, p. 2051.

The authors found that feeding cacao shell to cows has resulted in increasing the vitamin D content of their butter fat from the winter to the summer level.

Knapp, A. W. & Coward, K. H. 1935

CCCXXV. The Vitamin D Activity of Cacao Shell: I. The Effect of the Fermenting and Drying of Cacao on the Vitamin D Potency of Cacao Shell.

Biochem. Jour., v. 29, p. 2728.

The authors found that the vitamin D potency of the shell of the cacao bean is: (artificially dried absent; (2) not deliberately fermented but slightly fermented during sun-drying- fairly high, approaching the potency of dairy butter; (3) fermented and sun-dried-very high, twenty or thirty times the potency of dairy butter.

Lebowich, J. 1935

Deficiency Osteoporosis.

Arch. Path., v. 20, p. 742.

The author gives clinical evidence that deficiency osteoporosis is due to lack of vitamin D and hence may be an adult form of rickets.

Lewis, J. 1935

Clinical Experience with Crystalline Vitamin D: The Influence of the Menstrum on the Effectiveness of the Anti-rachitis Factor.

Jour. of Pediatrics, v. 6, p. 362.

The author found that the medium of milk allows for better utilization of the antirachitic vitamin than does the medium of corn oil.

Natelson, S. & Sobel, A. E. 1935

A New Method for the Separation of Sterols from Vitamin D containing Materials.

Jour. Biol. Chem., v. 109, p. 687.

The authors found that sterols may be separated efficiently from vitamin D containing material such as Cod Liver Oil, irradiated cholesterol, and irradiated ergosterol by converting them to potassium salts of their sulphuric acid esters.

Rapoport, M. & 2 others. 1935

The Antirachitic Value of Irradiated Evaporated Milk in Infants.

Jour. of Pediatrics, v. 6, p. 799.

The milk appeared to be an adequate agent for the prevention of rickets but an unreliable agent for the cure of rickets.

Reed, C. D. & 2 others. 1935

A Study of Mineral Metabolism in Arthritis under Treatment with Vitamin D.

Amer. Jour. Physiol., v. 113, p. 108.

The authors state that seven arthritic patients showed marked retention of calcium and phosphorus, but in treatment of vitamin D, tended to restore a balance which was coincidence with clinical improvement.

Remington, R. E. & Levine, H. 1935

Studies on the Relation of Diet to Goiter.

Jour. Nutr., v. 11, p. 343.

The authors state that the ratio and the presence or absence of vitamin D do not significantly affect the degree of goiter produced.

Rosebury, T. & Karshan, M. 1935

Susceptibility to Dental Caries in the Rat. V. Influence of Calcium, Phosphorus, Vitamin D and Corn Oil.

Arch. Path., v. 20, p. 697.

This report deals with the results obtained with 286 animals, intended to test the influence of the production of caries of calcifying agents and corn oil and the relative importance of the size of particles of rice and the two kinds of dietary calcifying defect.

Russell, W. C. & Taylor, M. W. 1935

The Relation Between the Vitamin A and D Intake by the Hen and the Output in Eggs.

Jour. Nutr., v. 10, p. 613.

The output of Vitamin A in eggs, calculated as the percentage of that consumed, varied from 11 to 32 per cent, and was determined by the number of units of the factor consumed, the number of the eggs produced and the potency of the yolk.

In the case of vitamin D the amount of the factor which appeared in the eggs was 10 per cent. of that consumed.

Strong, R. A. & 2 others. 1935

The Antirachitic Properties of Irradiated Evaporated Milk Fed to Normal Babies under Home Conditions.

Jour. of Pediatrics, v. 7, p. 21.

The authors conclude that in irradiated evaporated milk containing 3.8 Steenback units to the ounce, we have an inexpensive, pleasant-tasting, convenient source of vitamin D.

Swanson, W. W. & Iob, L. V. 1935

Calcium and Phosphorus Content of the Offspring after Feeding Vitamin D to the Mother Rat.

Amer. Jour. Diseases of Children, v. 49, p. 43.

The authors found that the ash of rat pups from the groups in which the mother rat received 0.12 cc. of viosterol 250 D had the calcium content 9 per cent. greater and a phosphorus content 11 per cent. greater than the ash of the pups in the control group.

Tourtellotte, D. & Bacon, W. E. 1935

Variability of Vitamin D Response with Temperature of Environment.

Jour. Nutr., v. 10, p. 683.

The authors found that to a certain extent the variation in the sensitivity of the rachitic test animals is due to fluctuating laboratory temperatures during the rachitogenic and test periods.

Bacharach, A. L. & 2 others. 1936

CCLXXX. Technique of the Line Test Assay for Vitamin D.

Biochem. Jour., v. 30, p. 2004.

The single dose method of feeding vitamin D supplements in the line test, was found not to be applicable to a different stock of rats receiving a more severely rachitogenic diet and gave significantly less good healing than the divided dose method.

Bechtel, H. E. & Hoppert, C. A. 1936

A Study of the Seasonal Variation of Vitamin D in Normal Cow's Milk.

Jour. Nutr., v. 11, p. 537.

The authors results obtained demonstrate that milk produced by cows managed under practical farming conditions varied as much as 900 per cent. in antirachitic potency, reaching a maximum from June to September and beginning with October declining rapidly to a minimum which usually occurred in February.

Cowdy, E. V. & Rector, L. E. 1936

Effect of Viosterol on the Parathyroids and Kidneys of Rats.

Soc. Exp. Biol. Med., v. 34, p. 795.

The authors found that the viosterol had no reaction on the parathyroids and that it did not excite nuclear inclusion formation in the kidneys.

Deutsch, H. & 2 others. 1936

The Role of the Thyroid in the Calorigenic Action of Vitamin D.

Amer. Jour. Physiol., v. 117, p. 1.

The authors state that the effect of vitamin D is not due to an action on the parathyroids.

Drake, T. G. H. & 2 others. 1936

Irradiated Evaporated Milk in the Prevention of Rickets.

Jour. of Pediatrics, v. 8, p. 155.

The authors found that infants receiving irradiated evaporated milk in whom x-ray evidence of "mild rickets" was found, there was always evidence of healing as shown by lime salt deposits.

Eliot, M. M. & 4 others. 1936

A Study of the Comparative Value of Cod Liver Oil, Viosterol, and Vitamin D Milks in the Prevention of Rickets and of Certain Basic Factors Influencing their Efficacy.

Jour. of Pediatrics, v. 9, p. 355.

The authors found that the milk containing viosterol to be the most efficient. The basic factors considered were color, sex, rate of growth in length and the period of observation.

Ely, R. C. & 2 others. 1936

The Prophylactic Value of Vitamin D Irradiated and Vitamin D Yeast-Fed Milk.

New Eng. Jour. of Med., v. 215, p. 110.

The authors found that both the irradiated vitamin D milk and the yeast-fed vitamin D milk were adequate as prophylactic measures.

Gellam, A. E. & Heilbron, I. M. 1936

CLXXIX. The Absorption Spectra of Sterols from Various Natural Sources with Particular Reference to Ergosterol and Other Vitamin D Precursors.

Biochem. Jour., v. 30, p. 1253.

The authors found that certain marine animal sterols, notably those of the lugworms (Arenicola marina) sea anemones and oysters, exhibit absorption bands identical with those of ergosterol and, calculated as such, indicate the presence of 5-12% of the absorbing substance.

Gowen, J. W. 1936

Inheritance as it Affects Survival of Rats Fed a Diet Deficient in Vitamin D.

Genetics, v. 21, p. 1.

The author produces evidence for the effects of inheritance on resistance to vitamin D deficiencies.

Haman, R. W. & Steenback, H. 1936

The Antirachitic Effectiveness of Vitamin D from Various Sources.

Jour. Biol. Chem., v. 114, p. 505.

The comparative antirachitic effectiveness of the fish oils was approximately the same.

Heymann, W. 1936

Studies on the Mode of Action and the Metabolism of Vitamin D.

Jour. of Pediatrics, v. 8, p. 480.

The author explains how vitamin D brings about the regulation of inorganic phosphates and calcium in the blood.

Hoffmann, R. M. & Daniels, F. 1936

The Formation of Vitamin D by Cathod Rays.

Jour. Biol. Chem., v. 115, p. 119.

The authors discuss certain factors important in the formation of vitamin D by cathod rays.

Howe, P. R. 1936

The Relation of Avitaminosis to Oral Pathology.

New Eng. Jour. of Med., v. 215, p. 1163.

The author states that the vitamins play an important role in oral pathology.

Irwin, M. H. & 2 others. 1936

The Influence of Vitamins A, B or D, Anemia or Fosting upon the Rate of Fat Absorption in the Rat.

Jour. Nutr., v. 12, p. 357.

The authors experiments on anemia and semi-starvation showed that the rate of fat absorption was influenced by the nutritional state of the animal, it cannot be concluded that the vitamin deficiency experiments revealed any specific effects of vitamins on fat absorption.

Koch, E. M. & Koch, F. C. 1936

Provitamin D Potency of Some Sterol Derivatives.

Jour. Biol. Chem., v. 116, p. 757.

The authors found the antirachitic potency of other derivatives negative on rats.

Kon, S. K. & Henry, K. M. 1936

CXIII. A Comparison of the Vitamin D Contents of Guernsey and Shorthorn Butter (Milk).

Biochem. Jour., v. 30, p. 776.

The Guernsey butter fat was found to contain 0.35, the Shorthorn 0.28 I.U. of vitamin D per g.

Lewis 1936

Further observations on the Comparative Antirachitic Value of Crystalline Vitamin D Administered in Milk, Corn Oil, or in Prophyline Glycol.

Jour. of Pediatrics, v. 8, p. 308.

The author found in this investigation that in infants receiving crystalline vitamin D in the daily ration of milk, rickets developed less frequently than in those receiving a comparable number of units of this antirachitic agent in 7 drops of corn oil or of propyline glycol.

Massengale, O. N. & Bills, C. E. 1936

A Quantitative Method for the Assay of Vitamin D with Chickens.

Jour. Nutr., v. 12, p. 429.

The authors describe a quantitative method for the assay of Vitamin D with chickens. It is based on the determination of femur ash, and the interpretation of the ash percentage by means of either of two response curves, one for cod liver oil and the other for irradiated ergosterol.

McDonald, F. G. 1936

The Multiple Nature of Vitamin D. III. Irradiated 22 - Dihydroergosterol.

Jour. Biol. Chem., v. 114, p. LXV.

Rat unit for rat unit, irradiated 22 - dihydroergosterol was found to be intermediate between irradiated ergosterol and cod liver oil in effectiveness for chickens.

Nicolaysen, R. 1936

CXC. Studies Upon the Mode of Action of Vitamin D: I. Investigations upon the Phosphorus Compounds in Muscles, Liver and Kidneys as Influenced by Different Levels of Vitamin D and Phosphorus in the Diet.

Biochem. Jour., v. 30, p. 1329.

The author concludes that the action of vitamin D in P metabolism is to increase the supply of P from the intestinal contents to the blood stream, and thence to the tissue.

Rapoport, M. & Stokes, J. 1936

The Antirachitic Value of Irradiated Evaporated Milk and Irradiated Whole Fluid Milk in Infants.

Jour. of Pediatrics, v. 8, p. 155.

The author found that the irradiated evaporated and whole fluid milks appeared to be equally efficacious in preventing the development of rickets.

Sontag, L. W. & 2 others. 1936

Effects on the Fetus of Hypervitaminosis D and Calcium and Phosphorus Deficiency During Pregnancy.

Amer. Jour. Diseases of Children, v. 51, p. 302.

The authors found that fetal mineralization is not independent of the mineral metabolism of the rat mother.

Stearns, G. & Jeans, P. C. 1936

The Effect of the Quantity of Vitamin D Intake upon Calcium Retention in Infancy.

Jour. Biol. Chem., v. 114, p. 2.

The authors state that as the intake of vitamin D increased, the average retention of calcium increased for any given per pelo intake, and the range of observed retentions narrowed.

Stearns, G. & 2 others. 1936

The Effect of Vitamin D on Linear Growth in Infancy.

Jour. of Pediatrics, v. 9, p. 1.

Standards reported in 1929 and 1933 show rate of growth definitely increased over those of older standards. This increased rate of linear growth is ascribed chiefly to the increased intake of vitamin D and its resultant effect on skeletal growth.

Supplee, G. C. & 3 others. 1936

The Influence of Milk Constituents on the Effectiveness of Vitamin D.

Jour. Biol. Chem., v. 114, p. 95.

The experiments show the increased effectiveness of unit amounts of pure vitamin D caused by lactalbumin solutions and milk.

Tabor, F. S. & 2 others. 1936

The Effect of the Vitamin A (Carotin) Intake on the Vitamin D Requirement of Rats in the Production and Cure of Rickets.

Jour. Nutr., v. 12, p. 39.

The authors demonstrated the effect of Vitamin A on the Vitamin D utilization.

Thatcher, L. 1936

Hypervitaminosis D.

Lancet, v. 114, p. 20.

The author tells of a case where a child died due to hypervitaminosis D. Liesons characteristic of hypervitaminosis D were found in the kidneys.

Tonney, F. O. 1936

Vitamin D in Child Health.

Amer. Jour. Pub. Health, v. 26, p. 665.

The author discusses the influence of vitamin D upon the child's physical development from the standpoint of: growth, bone development, tooth development, posture, and resistance to the infections.

Warkang, J. 1936

Estimation of Vitamin D in Blood Serum.

Amer. Jour., Diseases of Children, v. 52, p. 831.

Changes of vitamin D level of the blood serum after oral ingestion of viosterol have been demonstrated.

Wild, C. E. 1936

A Capillary Resistance Test and its Relation to Vitamins C and D.

Jour. of Pediatrics, v. 9, p. 226.

The author found that vitamin D is a more effective agent than vitamin C in increasing the capillary resistance.

Yoder, L. 1936

The Effect of Vitamin D on Intestinal Atony of Rickets.

Amer. Jour. of Digestive Diseases and Nutrition, v. 3, p. 828.

The author states that vitamin D deficient rations cause hypomotility in all parts of the gastro-intestinal tracts of rats and the supplements of the vitamin brought about greater motility.

Yoder, L. 1936

The Effect of Vitamin D on Intestinal Iron Reduction.

Amer. Jour. of Digestive Diseases and Nutrition, v. 3, p. 829.

The author found that ingested vitamin D caused a distinct decrease in a high intestinal reduction.

Aldrich, C. A. 1937

The Use of Vitamins in Children's Diets.

Med. Clinics of North Amer., v. 21, p. 63.

The author outlines known facts about the functions of the vitamin.

Wilbur, D. L. 1937

Vitamin Deficiency Diseases: Their Diagnosis and Treatment.

Med. Clinics of North Amer., v. 21, p. 737.

The author discussed the result of each vitamin deficiency, its prevention, and the treatment of deficiency.

List of Journals Consulted

American Journal of Digestive Diseases, v. 3, 1936.

American Journal Diseases of Children, v. 28-52, 1924-1936.

American Journal of Public Health, v. 16-26, 1925-1936.

American Medical Association, v. 74-102, 1920-1934.

Archives Otholaryngology, v. 16, 1932.

Archives Pathology, v. 12-17, 1931-1934.

Archives of Physical Therapy, X-ray, Radium, v. 14-16, 1933-1935

Bacteriology, v. 30, 1935.

Biological Chemistry, v. 53-114, 1922-1936.

British Journal of Experimental Pathology, v, 15, 1934.

British Medical Journal, v. 1, 1933.

Clinical Investigation, v. 11, 1932.

Canadian Medical Association Journal, v. 24-32, 1931-1935.

Genetics, v. 21, 1936.

Infectious Diseases, v. 51, 1932.

Laboratory & Clinical Medicine, v. 16-19, 1931-1933.

Lancet, v. 97-114, 1919-1935.

Medical Clinics of North America, v. 21, 1937.

Medical Journal & Records, v. 131-142, 1930-1935.

Medical Journal of Australia, v. 2, 1930.

Metabolic Research, v. 4, 1923.

Minnesota Medicine, v. 26, 1933.

New England Journal of Medicine, v. 204-215, 1931-1936.

Nutrition, v. 1-12, 1928-1936.

Pediatrics, v. 1-9, 1932-1936.

Poultry Science, v. 7-12, 1927-1932.

Physiology, v. 52-117, 1918-1936.

Society for Experimental Biology & Medicine, v. 19-31, 1921-1933

University of California Publications in Physiology, v. 8, 1934

Approved A. H. Uhl

Asst. Prof. Pharm. Chem.

Date Jan. 27, 1938.