Dr. George Fahr, University of Minnesota Medical School, investigation of the effect of strophanthosid K upon the heart failure produced by chloroform, potassium ion and chloral hydrate; and investigation of the effect of narrowing the circumflex branch and the descending branch of the left coronary artery upon cardiac hypertrophy.

Dr. Allan L. Grafflin, Harvard Medical School, analysis of functions of living organs *in situ*, study of frozen sections, tissue spreads, blood smears, etc., with and without the addition of fluorescent compounds.

Dr. David E. Green, Harvard Medical School, work on the isolation of enzymes.

Dr. F. B. Gordon, University of Chicago, search for an etiological agent in rheumatic fever by means of inoculation of fetal animals and by culture.

Dr. Irvin M. Korr, New York University, research on the relation between tissue metabolism and physiological activity.

Dr. Fritz Lipman, Cornell University Medical College, New York, continuation of work on pyruvic acid oxidation.

Dr. Romano H. de Meio, Rosario, Argentina, South America, work on the action of sympathomimetric drugs on tissue respiration.

Dr. Ernst P. Pick, New York, investigation of brain tissue *in vitro*.

Dr. J. P. Quigley, Western Reserve University School of Medicine, Cleveland, study of the process of gastric evacuation.

Dr. George J. Scheff, New Haven, study of fluorescence.

Dr. A. K. Solomon, Harvard University, biological studies making use of artificial radioactive tracers.

Professor Barnett Sure, University of Arkansas College of Agriculture, Fayetteville, continuation of research on the vitamin C phase of the hyperthyroid problem.

Thorndike Memorial Laboratory, Boston City Hospital (Professor George R. Minot, Director), in recognition of Dr. Francis W. Peabody's services to the foundation.

Professor Charles W. Turner, University of Missouri College of Agriculture, Columbia, research on the endocrinology of lactation.

Dr. Earl Walker, University of Chicago, investigation of the eye movements elicitable from electrical stimulation on the striate, para- and peristriate cortex of the macaque monkey.

In their first statement regarding the purposes for which the Fund would be used, the trustees expressed themselves as follows:

For the present, researches will be favored that are directed towards the solution of problems in medicine and surgery or in the branches of science bearing on medicine and surgery.

As a rule, preference will be given to researches on a single problem or on closely allied problems; it is hoped that investigators in this and in other countries may be found, whose work on similar or related problems may be assisted so that more rapid progress may be made possible.

Grants may be used for the purchase of apparatus and supplies that are needed for special investigations and for the payment of unusual expenses incident to such investigations, including technical assistance, but not for providing apparatus or materials which are ordinarily a part of laboratory equipment. Stipends for the support of investigators will be granted only under exceptional circumstances.

In the past few years the policy outlined in paragraph 2 has been neglected. During the present great need for funds, grants will be given in the sciences closely related to medicine without reference to special fields. The maximum size of grants will usually be less than $500.

Members of the executive committee are: Drs. George B. Wislocki, *chairman;* A. Baird Hastings, Harry Plotz, Bernard Sachs, Paul J. Sachs, Soma Weiss, Joseph C. Aub, Secretary.

Applications for grants must state definitely the qualifications of the investigator, an accurate description of the research, the size of the grant requested and the specific use of the money to be expended. In their requests for aid, applicants should state whether or not they have approached other foundations for financial assistance. It is highly desirable to include letters of recommendation from the directors of the departments in which the work is to be done. Only applications complying with the above conditions will be considered.

Applications should be sent to Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695 Huntington Avenue, Boston, Massachusetts, U. S. A.

SPECIAL ARTICLES

THE PREVENTION BY ALPHA-TOCOPHEROL OF "COD LIVER OIL MUSCULAR DYSTROPHY" IN THE RABBIT[1]

THE injurious effect of cod liver oil in the herbivora has been demonstrated by the extensive investigations of Madsen, McCay and Maynard,[2] and Davis, Maynard and McCay.[3] Lesions of the skeletal muscles were observed in rabbits, guinea pigs, goats and sheep fed cod liver oil. The possible role of vitamin E was discussed, but no definite conclusion was reached.

[1] Supported by grants from the Research Corporation of New York and the Carnegie Institution of Washington.

[2] L. L. Madsen, C. M. McCay and L. A. Maynard, Memoir 178 of the Cornell University Agricultural Experiment Station, 1935.

[3] G. Davis, L. A. Maynard and C. M. McCay, Memoir 217 of the Cornell University Agricultural Experiment Station, 1938.

We have demonstrated[4] the antidystrophic action of d,l-alpha-tocopherol (synthetic vitamin E) in rabbits fed a diet containing lard and cod liver oil, and have emphasized the fact that the absence of physical symptoms does not exclude extensive microscopic muscle lesions.[5] Recently we have reported[6] that acute muscular dystrophy could be produced in the absence of cod liver oil or other animal fats in rabbits reared on a synthetic diet. The oral administration of 3 mg of alpha-tocopherol 6 days a week to rabbits on this diet afforded complete protection against muscle lesions. The preventive action of the vitamin E was counteracted by the oral administration of 1 cc of cod liver oil soon after the vitamin E.

In more recent experiments employing the same synthetic diet, we attempted to prevent the action of cod liver oil by administering 6 mg of alpha-tocopherol[7] orally on Mondays, Wednesdays and Fridays, and 2 cc of cod liver oil on Tuesdays, Thursdays and Saturdays. This procedure was employed by Shimotori, Emerson and Evans[8] in preventing dystrophy in guinea pigs on a synthetic diet. The rabbits supplemented in this manner developed lesions of the skeletal muscles equaling in severity those produced when the same levels of alpha-tocopherol and cod liver oil were administered within a few minutes of each other, three times a week. In both cases the lesions were frequently not accompanied by overt symptoms.

However, when the dosage of alpha-tocopherol was increased to 40 mg every other day, the administration of 2 cc of cod liver oil on alternate days was without effect. No microscopic lesions were detected in the skeletal muscles. Thus it is clear that alpha-tocopherol when administered in sufficient amounts and under the conditions described protects the rabbit against muscular dystrophy produced by the administration of cod liver oil.

The following propositions have now been demonstrated on rabbits receiving *the same basal ration:* (1) severe dystrophy develops in rabbits on a vitamin E deficient diet in the absence of cod liver oil; (2) alpha-tocopherol prevents this dystrophy; (3) cod liver oil counteracts the antidystrophic action of alpha-tocopherol and produces muscle lesions, (4) increasing the alpha-tocopherol sufficiently prevents the dystrophic action of cod liver oil. It seems probable that this quantitative relationship also applies to other species in which cod liver oil produces lesions of the skeletal muscles. A detailed report of these experiments will be published elsewhere.

C. G. MACKENZIE
JULIA B. MACKENZIE
E. V. MCCOLLUM
SCHOOL OF HYGIENE AND PUBLIC HEALTH,
THE JOHNS HOPKINS UNIVERSITY

THE APPARENT EFFECT OF TYROTHRYCIN ON STREPTOCOCCUS HEMOLYTICUS IN THE RHINOPHARYNX OF CARRIERS

As yet no satisfactory method of eliminating pathogenic bacteria from the rhinopharynx of carriers has been devised. To this end a large number of chemical and physical agents have been unsuccessfully employed. Under the present conditions of shifting industrial populations and mobilization of troops, the problem again becomes urgent.

Dubos's recent isolation of a bactericidal substance from a soil bacillus ("tyrothrycin")[1, 2, 3] suggested that this agent might be effective in clearing the rhinopharynx of certain bacteria such as hemolytic streptococcus, meningococcus, pneumococcus and the diphtheria bacillus.

From cultures of *B. brevis* kindly furnished by Dr. Dubos, "tyrothrycin" was prepared according to the procedure which he has described.[3] The material was found to exert *in vitro* a lethal action on 18-hour broth cultures of hemolytic streptococcus, *staphylococcus aureus* and diphtheria bacillus (gravis strain) in a final dilution of 1:1,000,000, and on recently isolated strains of meningococcus (Type I) in a dilution of 1:100,000. The alcohol soluble fraction diluted 1:100 in normal saline containing 2.5 per cent. glycerine was introduced as a spray into the nose and throat of monkeys (*M. mulatta*) and of man. By means of copious spraying an attempt was made to cover as completely as possible the entire nasopharynx. This was often preceded by preliminary cleaning and shrinking of the mucous membranes. The active agent being insoluble in aqueous solution, vigorous shaking of the suspension was required immediately before use.

Separate nose and throat cultures from human beings were carried out for the demonstration of hemolytic streptococcus according to the method of Mueller.[4]

[4] C. G. Mackenzie and E. V. McCollum, *Jour. Nutrition,* 19: 345, 1940.
[5] C. G. Mackenzie, M. D. Levine and E. V. McCollum, *Jour. Nutrition,* 20: 399, 1940.
[6] C. G. Mackenzie, J. B. Mackenzie and E. V. McCollum, *Jour. Nutrition,* 21: 225, 1941.
[7] We are indebted to Merck and Company, Inc., for the supply of alpha-tocopherol.
[8] N. Shimotori, G. A. Emerson and H. M. Evans, *Jour. Nutrition,* 19: 547, 1940.

[1] R. J. Dubos, *Jour. Exp. Med.,* 70: 1, 1939.
[2] R. J. Dubos and R. Hotchkiss, *Jour. Biol. Chem.,* 136: 803, 1940.
[3] R. J. Dubos and R. Hotchkiss, *Jour. Exp. Med.,* 73: 629, 1941.
[4] J. H. Mueller and L. Whitman, *Jour. Bact.,* 21: 219, 1931.