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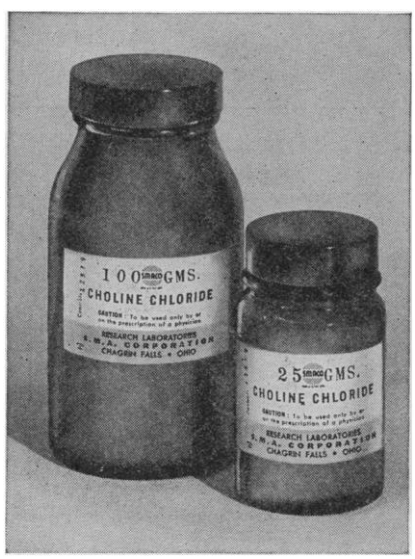
CHOLINE CHLORIDE

SMACO

THE IMPORTANCE of choline in nutrition is now more widely recognized as a result of new investigations showing its relationship to liver cirrhosis[1] and renal damage.[2] Under specific dietary conditions a deficiency of choline results in fatty infiltration of the liver in rats[3] and perosis in chicks.[4] Choline is definitely involved in the metabolism of the sulphur containing amino acids.[5, 6]

It has been suggested that choline is a factor in the B-complex[7] and because of this there is increasing use of choline chloride as a routine supplement in nutritional research especially where highly purified diets are employed.

Choline Chloride synthesized in our laboratories, is available conveniently packaged for research purposes and in bulk quantities.



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THE METAMORPHOSIS OF DRUG RESEARCH[1]

By Dr. THEODORE G. KLUMPP

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THE topic which has been assigned to me for discussion is a broad one, and I am going to consider it from its broadest aspects. It is only a small exaggeration to say that any one who takes as much as an aspirin tablet for himself engages in drug research. I can speak then as one of 130,000,000 drug researchers in this country, but even at that I can only speak with the deepest humility. A short time ago our colored maid developed a cold and with it a cough. I was called upon to do something about it, and I gave her what I considered to be the best medicines available for a cough due to a cold. But the maid had more faith in a medicine of her own selection which I noticed she took to the exclusion of mine. Her faith in her medicine was its own reward and in due course of time her cough fortunately disappeared. I would have exposed myself to polite but silent scorn if I had tried to tell her that neither my prescription nor hers cured the cough—that it would have disappeared anyway, or, as some one put it, "Nature cures the disease while the remedy amuses the patient." I might have tried to show her that man has been subject to colds and coughs since the dawn of civilization and that they have come and disappeared for countless generations before her medicine or mine had been discovered. But it would have been useless. If colds and their coughs hadn't made a habit of coming and going in precisely the same way regardless of what we did for them, man would long since have coughed himself off the face of the earth.

The element of faith has for centuries been one of the most important active ingredients in every medi-

[1] An address delivered before the American Drug Manufacturers Association, May 7, 1941.

confirmation media. It should be understood that since the success of this method depends upon the formation of certain minimum amounts of gas those samples having very few organisms, or predominatingly slow lactose fermenters, must necessarily take a longer period of time for completion of the test. Speed is enhanced by using larger samples for only slightly contaminated waters.

The governing factors are: (1) concentration of organisms in inoculum; (2) size of fermentation vial which regulates the amount of liquid which will overflow into conductor tube; (3) height of limiting level mark; (4) diameter and shape of conductor tube; (5) length of time inoculum is enriched before passing into conductor tube, 4 hours found to be optimum time. All these factors are controllable.

With this method, mobile laboratories are enabled to collect a flock of samples on one day and are ready to move again the next morning when the tests are completed. Positive tests on ships' supplies may be accomplished overnight as compared with 48 to 96 hours. In a large distribution system, water leaving the reservoirs may be tested with ensuing results obtained sufficiently early to regulate the supply before it reaches the end of the distribution system.

HAROLD LEON FRUITMAN
SAN FRANCISCO WATER DEPARTMENT

PERMANENT MOUNTS OF VIRUS-INFECTED CHORIOALLANTOIC MEMBRANES

THE chorioallantoic membrane of chick embryos has become an important tissue for the cultivation of viruses. The lesions produced are in many cases characteristic of the infecting virus. There is a need for an easy method of permanently mounting such membranes. A method is here described which has proven itself to be satisfactory.

The mounting material is prepared by slowly pouring, with constant stirring, 50 gm of powdered isobutyl methacrylate polymer[1] into 100 cc of xylol. The mixture is placed in the incubator and stirred at intervals until it becomes clear. This takes about an hour. A higher concentration of the plastic is less good, as air bubbles do not rise well to the surface.

The membranes are harvested in the usual manner and rinsed in physiological saline or Tyrode's solution. They are then passed through a series of dilutions of ethyl alcohol, 5, 10, 15, 20, 25, 30, 40, 50, 65, 85, 95 per cent. and, finally, absolute alcohol. They are spread out and left in each dilution for 15 minutes or longer, except for the absolute alcohol in which they are left for at least half an hour. Just before mounting they are transferred from the latter to xylol, where they are left for five minutes. About 5 cc of the solution of plastic is poured into the bottom of a Petri dish. The membranes are drained slightly and spread out in this. A paper label may be embedded beside them. This may be typewritten or marked with pencil, ink or india ink. The Petri dish is set aside to dry in a dust-free place. A second layer of plastic is added to cover all irregularities. When this has hardened, the cover of the Petri dish is put on to protect the surface from dust and injury.

When the membranes are passed through fewer dilutions of alcohol or more rapidly, the normal parts do not remain as clear and the lesions do not show as well. Other solvents were tried, but none gave better results than xylol.

No difficulty is experienced from curling of the membranes. In membranes with considerable edema there is a shrinkage of 10 to 15 per cent., but in normal ones or in those with little edema there is no shrinkage.

This method produces a solid mount which can be easily handled and examined. The areas of hyperplasia due to virus infection stand out in sharp contrast to the surrounding tissue.[2]

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[1] Manufactured by E. I. du Pont de Nemours and Company, Wilmington, Del.

[2] I wish to express my appreciation for the valuable suggestions of Dr. Maurice N. Richter. This work was conducted under a grant for virus research from the Lambert Pharmacal Company, St. Louis, Mo.

CORRECTION

IN Table 2 of the article "Prevention of Tumor Growth (Carcinoma 2163) by Intravenous Injections of Yeast and Vitamins" (SCIENCE, July 18, 1941) the per cent. figures for non-takes should read: Yeast + Riboflavin 62%, Yeast 21%, Riboflavin 14%, Yeast + Thiamin 18%, Thiamin 3%.

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National Research Council. *Report of Committee on Drug Addiction, 1929–1941, and Collected Reprints.* Pp. xxx + 1581. The Council, Washington, D. C.