Rhizopus infection in experimental animals and may be of value in human cases.[13]

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FAT CONTENT OF THE DIABETIC DIET

What is the optimum fat content of the diet for the patient with diabetes mellitus?

In order to answer this question, it becomes important to review periodically the new information and to assess more fully the necessity for a change in opinion with the progress of time. Much of the discussion that one hears in this area is speculative. The hope for diminishing the area of speculation lies in further research to develop factual knowledge.

The basic component of any diet is its caloric content. An individual may consume optimum amounts of the micronutrients, the minerals and other ancillary food factors, but unless his caloric demands are satisfied, he will starve. To achieve adequate caloric intake for any individual, the diet prescription must contain sufficient amounts of carbohydrates, proteins and fats. In the case of the patient with diabetes the amount of carbohydrate prescribed has definite limitations. When the carbohydrate content of the diabetic diet exceeds approximately 250 gm. in a day, the control of the glycosuria and the glycemia is in most cases made more difficult with the insulins currently available. For those who are not concerned with the control of the glycosuria as part of their therapeutic regimens for the patient, the loss of glucose in the urine becomes an important factor. In an attempt to assess the total caloric metabolic mixture, it is not the amount of carbohydrate that is taken by mouth that is important, but the actual amount of carbohydrate which is metabolized in the body, i.e., the difference between the amount consumed and the amount excreted in the urine. If one assumes that approximately 250 gm. of carbohydrate are metabolized, this will account for 1,000 calories. The average consumption of protein in the current diet for the diabetic patient varies from 70 to 100 gm. each day. This will account for another 400 calories, a total of 1,400 calories. The difference between the total caloric requirements and the 1,400 calories supplied by the carbohydrates and protein must be derived from fat. Thus the total fat content of the diet will vary considerably with caloric requirements of different individuals and cannot be limited to any fixed percentage of the total calories supplied by any specific diet prescription. One hundred grams of protein, as consumed by the average American, carries with it an inherent 40 to 50 gm. of animal fat. These fats are usually the more saturated type and supply about 360 calories. The remainder of the needed calories must be supplied by the visible or table fats and

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oils. These, generally speaking, are employed as spread for bread, in cooking and other food preparation, in salad dressing, and the fat component of the dairy products which are consumed daily.

Increasing attention has been paid to the place of the polyunsaturated fatty acids in the diet by virtue of their ability to reduce the concentration of the circulating cholesterol, and possibly to affect the beta lipoprotein fractions in the blood. While the total cholesterol concentration of the serum is found frequently to be elevated in those patients suffering coronary occlusions, it must be re-emphasized that up to the present writing there is no conclusive evidence that lowering the concentration of cholesterol in the circulating blood influences the atherogenesis. No one can deny that the concentration of cholesterol in the circulating blood is a most important suspect as a cause for atherogenesis. Many physicians are concerned now with the importance or necessity of incorporating the vegetable oils, with their high linoleic acid content, into the daily dietary of their patients. This must be done by substitution for the other types of fats or oils, rather than as an additional source of calories.

There are numerous reports of ways of reducing blood cholesterol concentrations: the administration of glycine, of neomycin, nicotinic acid, thyroxin, low-fat diets, polyunsaturated fatty acids, sitosterol, and undoubtedly others. The mechanisms of their actions are not definitely known, and may vary considerably. The substitution by the polyunsaturated fatty acids in the diet for the more saturated fats and oils offers the possibility of controlling the levels of circulating blood cholesterol without having to resort to supplementary medication or unusual dietary practices. In greatly hypercholesterolemic patients, these latter measures may be of extreme importance. For the individual whose problem is mainly prophylactic, the dietary methods of control are important because of their basic simplicity.

There are many means of introducing the polyunsaturated fatty acids into the diet in addition to the use of the vegetable oils. These include the use of nuts, the preference for chicken and fish over some of the other protein sources.

Studies in weight reduction of obese, middle-aged persons have led to the conclusion that the reduction of the weight itself may not be of prime importance in lowering serum cholesterol. When the patient comes into caloric balance at a new and lower level, this effect may be lost.

The fact that one can obtain so much better control of the glycosuria and glycemia with diets relatively high in fat content than with diets whose carbohydrate content is high, leads one to consider the use of the comparatively fat-rich diet for the diabetic patient. This can be acceptable to many physicians if it includes adequate quantities of the vegetable oils, such as cottonseed or corn oils, which have a high content of polyunsaturated fatty acids.

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BOOK REVIEWS

THIRST. *By A. V. Wolf. $12.50, pp. 536, Charles C Thomas, Springfield, Illinois, 1958.*

This manuscript deals with all aspects of thirst. In the preface the author states that he is attempting to assemble current knowledge of thirst in one review, and the purpose is accomplished in admirable fashion. The book is divided into two parts; one dealing with physiology, and the other with actual accounts of persons suffering from thirst.

Chapter I concerns basic subjects, such as the water content of the body, and how much water different species imbibe daily. It is of some interest to know that the cow drinks forty-five liters daily, the elephant 149 liters daily, and the rat only 35 cc. per day. The maximum gulp of a man is 30 cc., while an elephant can quaff 6.6 L. at one swallow. However, man can make up for his deficiency by carrying out sixty gulps a minute, in contrast to only twelve for the elephant. The remainder of the chapter contains a discussion of osmotic pressure, as viewed by the biologist. This section is worth reading by anyone interested in theories of tonicity.

In chapter II are given and discussed the many stimuli and processes thought to initiate thirst. All possible causes of thirst are presented, even the pleasures of love. Several older case reports are given wherein the subjects were observed *never* to drink any water! Of course they drank wine and other similar beverages, but this was for effect only. These unusual subjects are called "oligopotes." There is an interesting case report of a woman who never drank anything at all and is called an "apote." Thence the author goes into a discussion of the physiology of thirst. The theories of the dry mouth, cellular dehydration, and central stimulus are discussed at length. There are descriptions of the thirst brought on by dipsogens such as alcohol, states of sodium and potassium deficiency, and trauma and battle stress. The reader can only conclude that the sensation of thirst may arise from a multitude of causes, with mechanisms anything but clear.

In chapter III there is an account of satiety. The author finds difficulty in defining satiety, and states that one could follow Darwin in his remarks on definition, when he said