

THE IMPORTANCE OF A VITAL, HIGH PROTEIN DIET IN THE TREATMENT OF TUBERCULOSIS AND ALLIED CONDITIONS*

F. M. POTTENGER, JR., M.D.
Monrovia, California

THE FACT that a high protein diet is to be recommended for persons suffering from pulmonary tuberculosis is known to every student and hospital attendant, as well as to the graduate medical and nursing staffs. When a physician in a hospital wishes to prescribe a high protein intake, he therefore frequently calls for the "tuberculosis diet." An analysis of the protein content of many of these, however, will show a surprisingly low content of this food element. Even the Sauerbruch-Hermansdorfer-Gerson diet¹ was one of a relatively low protein but higher total caloric intake than the average served in hospitals today.

In recent years certain forces have been operating to supplant the high protein by a high carbohydrate diet, as will be noted by those who are particularly watching food trends. This shift is due to many factors, among which are the relatively high cost of proteins, the erroneous fear promoted by dietetic faddists that a high protein intake is injurious, and further, the fact that carbohydrates increase body weight, which is often mistaken as a mark of superiority.

The usual hotel dinner in the 90's was a high protein meal consisting of a meat stock soup; fish, fowl, or roast; a side dish or two of vegetables; some sort of dessert, frequently followed by cheese; and sometimes a little wine. Steaks, chops, fish, eggs, ham, sausage, and other such foods almost always constituted part of the breakfast, and were frequently re-

enforced by flapjacks and potatoes. Today a bowl of cereal, a cup of coffee, and a glass of fruit juice constitute a common breakfast, while our dinner meal is a far cry from the high protein meal mentioned above. We have learned from our physiologists that the proper intake of protein should be not less than 120 grams a day², although the fasting equilibrium is recognized as 71.5 gms. per day³. When we study our League of Nations Diet C⁴ we find that only 69 grams of protein are called for.

The content of the typical American meal has been restricted by the present erroneous belief on the part of many people that vitamins are the chief factors in our diet, and that if these are supplied in goodly portions other food elements are not so essential. That a high caloric intake is likewise essential for maintaining body equilibrium has not been emphasized, but the fact that sugars and starches give energy has received undue consideration. The fasting requirement of an individual at rest is 2,000 calories⁵. From the standpoint of energy there are no elements of our diet that have a greater specific dynamic action than proteins, and, gram for gram, fats furnish two and one-fourth times as much energy as carbohydrates.

The manner in which foods are prepared for the market and table can determine to a great extent their digestibility and ease of assimilation⁶. At the present time many of our valuable food products are being subjected to high temperatures in order to kill bacteria, and the general public is demanding that its meat be tenderized and well cooked rather

*Presented before the Sixth Annual Meeting of the American Academy of Tuberculosis Physicians, June 2, 1941, Cleveland, Ohio.

than rare and flavorsome. The individual who enjoys his tasty cannibal sandwich, his salami, or other uncooked meat is looked upon with suspicion. Morgan and her co-workers^{7,8} have shown that the biological value of cereal and meat protein is materially altered and diminished by the application of the temperatures used in cooking.

In the "special" diet used for the last eight years at the Pottenger Sanatorium there are four essential principles. First, we attempt to obtain most of the vitamin content from foods naturally rich in these factors. Second, we alter our food elements as little as possible by applying low temperatures in their cooking. Third, we supply an adequate amount of minerals by using relatively crude foodstuffs, and by the addition of actual raw bone to the diet itself. Fourth, we make extensive use of the hydrophilic colloidal properties of gelatin⁹.

A sample day's diet is as follows:
Breakfast: A cooked whole grain cereal composed of about one ounce of the raw material (whole grain rye, oats, barley, wheat or corn) to which is added about one-half ounce of raw wheat middlings, one drachm of raw sesame seed, and one drachm of raw bone meal. The patient receives two pats of butter, three ounces of 20 per cent raw cream, eight ounces of raw milk, a citrus fruit equivalent to one-half grapefruit or an orange, four prunes (30-40 size), either two eggs and four slices of bacon or a slice of ham (occasionally sausage), a slice of whole grain toast, a cup of coffee substitute and, a glass of gelatine drink containing one-half ounce of gelatin with a suitable flavoring material.

Luncheon consists of a meat stock soup, a meat (frequently one of the viscera such as heart, brain, tripe, kidney, sweetbreads, liver), raw liver

three times a week, and a raw meat patty served as an hors d'oeuvre two or three times a week, a raw green salad (once daily the raw Chinese bean sprout is used), two vegetables, a dessert such as custard, ice cream, junket or jello, a slice of whole grain bread with two pats of butter, one-half pint of raw milk, the gelatin drink, and a drachm of rice molasses or one-half ounce of malt extract.

The evening meal is similar to the luncheon, with the exception that a roast is usually served in the evening in place of stews and other cuts.

With such a diet we find it superfluous to give feedings between meals, and it is rarely necessary to vary the foods eaten even for cases of tuberculous enteritis. As we use it, roughly 4,000 calories are consumed each day, including about 225 grams of protein, 250 of fat, and 235 of carbohydrate, in addition to a highly sufficient supply of minerals. This diet will vary plus or minus 15 per cent. Of the 250 grams of fat, all but approximately 15 grams are of animal origin.

Whole grains are used in cereals and in breads in order to insure the proper distribution of minerals, and all baking is done at a low temperature in order to destroy as few vitamins as possible. The bread which we serve is made from sprouted wheat and rye and is very rich in the Vitamin B Complex inasmuch as it is baked at a temperature of about 160 degrees Fahrenheit for a period of approximately eight hours. The raw bone meal is used because we have found that the heat treated bone meal is not readily assimilable. Finely ground bone meal is easily chewed into a gelatinous-like substance and it affords an excellent source of calcium. The femur of the steer ground at low temperatures is used as a source of bone marrow. The sesame seeds and prunes act as a laxative.

RECOMMENDED DAILY FOOD INTAKE

	Average Weight gm.	Protein		Carbohydrate		Fat		Total Calories	
		%	gm.	Cal.	%	gm.	Cal.		
BREAKFAST									
Breakfast Cereal									
Wheat	32	11	3.5	14	75	24	96	2 1 9	119
Wheat Middlings	16	15	2.4	10	46	7.3	29	4 1 .9	48
Bone meal	4	64	2.5	10				10 0.4 4	14
Sesame seed	4	9	0.4	2	70	2.8	11	3 0.1 1	14
Butter	8	1	0.8	3				82 7.4 67	70
Whole grain toast.....	32	10	3.2	13	50	16	64	1 0.3 3	80
Cream	96	3	2.8	11	5	4.8	19	20 19 171	201
Milk	240	3	7	29	5	12	48	4 9.6 86	163
Grapefruit	120	1	1.2	5	12	14	56		61
Prunes	40	2	0.8	3	73	2.9	12	7 2.8 25	40
Eggs (2)	128	13	16.6	66				11 14 126	192
Bacon (4 slices).....	64	11	7	28				65 41 369	397
Gelatin	16	91	14.5	58					58
	800		62.7	252		83.8	335		96.6 870 1457
LUNCH OR DINNER									
Meat stock soup, 4 oz.....	128	3	3.8	15	5	6.4	25	11 13 117	157
Meat, 6 oz.....	192	19	36.5	146				19 36.5 324	470
Liver or raw meat.....	15	20	6	24	3	0.5	2	6 0.9 9	35
Salad	8	35	2.8	11	27	2.1	8	15 1.2 12	31
Vegetable, 10-20%	64	4	2.5	10	15	9.6	38		48
Vegetable, 5%	64	1	0.6	2	5	3.2	13		15
Custard (dessert)	128	4	2.5	10	20	25	100	14 8.9 80	190
Whole grain bread.....	32	10	3.2	13	50	16	64	1 0.3 3	80
Butter	8	1	0.8	3				82 7.4 67	70
Milk	240	3	7	29	5	12	48	4 9.6 86	163
Gelatin	16	91	14.5	58					58
	895		80.2	321		74.8	298		77.8 698 1317
TOTAL FOR 3 MEALS.....	2590		223.1	894		233.4	931		252.2 2266 4091

The raw wheat middlings are an excellent source of Vitamin B Complex as well as Vitamin E.

We use fertile eggs of hatching grade because of their protein and fat in preference to the ordinary unfertilized eggs which are devoid of estrogenic substances¹⁰. We serve raw milk of high quality in order that the important enzymes necessary in calcium metabolism shall not be destroyed. Experimentally we have shown that cooked meat when served to cats interferes with proper calcification of bones and enhances susceptibility to bacterial infection^{11,12}. Our patients eat raw liver, which again is an excellent source of Vitamins B Complex and A. The raw bean sprouts are rich in Vitamin B₁ and C, and they have a small amount of A; they contain diastase, prochlorophyll and many minerals.

The visceral meats constitute roughly one-third of the meat ration, in order to assure the individual of an adequate intake of the nuclear proteins. Gelatin is used not for its energy giving properties alone, as is so widely heralded in the advertisements, but for the purpose of providing a hydrophilic colloidal substance which materially aids in the digestion of food as a whole¹³.

In this dietary regime we attempt to avoid extensive use of vegetable fats. The more readily assimilated animal fats with their saturated fatty acids are used both in cooking and in the diet itself. We stress the value of the fats of meat in particular. The Vitamin B intake is also enhanced by the addition of malt and rice molasses to the noon and supper meals when the raw bean sprout salad is not used.

RESULTS

This dietary is well tolerated by nearly all patients with the exception of those who may be sensitive to certain of the specific foods used in it. These can be eliminated when proved to be offensive. Even the patients with an extensive ulcerative enteritis can eat these foods in spite of the roughage, for we find that the improved nutrition aids in the healing of intestinal lesions. Apparently the addition of the gelatin is an important factor in making possible the consumption of the rough foods prescribed.

Persons on this diet usually adjust their bowel habits even when they have suffered from long-standing constipation. When it is used for patients with tuberculosis of the bowel, we usually find a regulative effect on controlling the frequency of their evacuations, the average number of bowel movements being approximately two each day. Most people gain weight on the diet for a period of at least three months; but in contradistinction to the usual procedure, these individuals often actually shrink in physical measurements, giving the effect of smaller size, although greater weight will be shown by the scales. Patients suffering from extensive tuberculosis and living a practically inactive existence maintain a relatively excellent degree of muscular tone in spite of lack of exercise. Muscular fatigue noted in many tuberculous men and women upon resuming physical activity after long periods of bed rest is commonly avoided by those on the diet.

Although about one-half of the patients in the institution are definitely on this dietary regime, it has an effect upon the others in their selection of foods. The large majority state at first that it is too much food, but they soon become accustomed to it. Most of the patients

have gone upon this special diet at their personal request and usually once they are on it, although they get tired and wish for their own selection, they usually do not remain off it for a long period of time.

To evaluate the usefulness of our diet in aiding the cure of tuberculosis we do not wish to make any specific claims as to therapeutic value except to state that the improved nutrition which results from the use of these foods has definitely reduced the frequency and severity of gastrointestinal complications and that we find that it materially increases resistance. In other conditions such as malnourishment of asthmatic adults and children, it has proven of inestimable value, especially as indicated in increased muscular strength, lessened fatigue, improved muscular tone, and a smaller number of acute respiratory infections.

SUMMARY

The food habits of the population have undergone a marked change in the last few decades. The amount of carbohydrate consumed has been increasing steadily with subsequent decrease in the consumption of fat and protein, particularly the latter. People have become "vitamin conscious" and in trying to obtain the necessary amounts of these compounds have neglected other food elements which are essential.

Present methods of production and processing have lowered the nutritional value of our foods. The heating, milling, filtering, etc., that are so commonly used in present methods of manufacture destroy or alter the usability of many essential food elements.

The diet used at the Pottenger Sanatorium, which is essentially a high protein, high fat, and low carbohydrate diet, is given in detail. The following principles are observed: (a) the vitamins are ob-

tained from foods naturally rich in these factors; (b) the food is altered as little as possible by the use of minimal temperatures in the cooking process; (c) the minerals are supplied by using relatively crude foodstuffs; and (d) the extensive use of gelatin because of its properties as a hydrophilic colloid.

BIBLIOGRAPHY

- ¹Sauerbruch, F.; Hermansdorfer, A.; and Gerson, M.: Muench. med. Wchnschr. 73: No. 8, 1926.
- ²Voit: Zeit. f. Biol. 41:167, 1901.
- ³Wright, Samson: Applied Physiology, p. 360. 1926. Oxford University Press.
- ⁴League of Nations Annual Report of Committee on Nutrition, Diet C. 1939.
- ⁵Pfeiffer, Ehr.: Bio-Dynamic Farming and Gardening. Rudolf Steiner Pub. Co., London.
- ⁶Pottenger, F. M., Jr.; and D. G. Simonsen: Jour. Lab. and Clin. Medicine. 25:238, 1939.
- ⁷Morgan, A. F.; and Kern, G. E.: J. Nutrition. 7:367-379, 1934.
- ⁸Morgan, A. F.: Jour. Biol. Chem. Vol. 90, No. 3, March, 1931.
- ⁹Pottenger, F. M., Jr.: Am. Jour. Digestive Diseases. Vol. 5, No. 2 (April), p. 96-99.
- ¹⁰Riboulleau, J.: Compt. rend. soc. biol. 129:914-16, 1938.
- ¹¹Pottenger, F. M., Jr.; and Simonsen, D. G.: Transactions of the Am. Therapeutic Society, 1939.
- ¹²Pottenger, F. M., Jr.; and Simonsen, D. G.: Journal So. Cal. State Dental Assn. November, 1939.
- ¹³Fischer, Martin H.: Oedema and Nephritis, 1914, John Wiley & Sons.