Fasting, Food Composition, Health and Belief

Yitshal N. Berner

Department of Geriatrics, Meir Hospital, Kfar Saba [affiliated to Sackler Faculty of Medicine, Tel Aviv University], Israel

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Fasting is a physiological, psychological as well as spiritual experience, and is common practice in various religions. In Judaism the *Yom Kippur* fast is the most well known and most widely practiced; three other fast days to commemorate historical tragic events are followed by observant Jews, and some ultra-orthodox Jews also fast every Monday and Thursday. In Islam the fast during the month of Ramadan is one of the essential tenets of the religion, although the fast is conducted only during the daytime. Strict religious observance in Christianity, Islam and Buddhism also demands additional daily fasts. The principle common to these various religions is that the self-discipline in abstaining from food is a means of reaching inner purification, that receives God's blessing. During the twentieth century, vast progress was made in understanding physiological function and the influence of dietary intake on the development of certain ailments. It is also generally accepted that a reward for the self-discipline of fasting is better health and a more attractive body shape [1].

Certain studies have attempted to correlate religious fasting and possible health benefits [2,3]. In this issue of *IMAJ*, the article by Blondheim et al. [4] touches upon physiology, psychology and religion. Against the background of religious fasting the authors conducted a study with the aim of acquiring information on the effect of different diet compositions on the ability of the subjects to abstain from food and water for 24 hours. The authors used subjective as well as objective physiological measurements to evaluate the consequences of different compositions of the pre-fast meals. In their small study they examined the effect of the major energy sources that constituted the main components of the pre-fast meal. The high carbohydrate meal consisted of 86% calories, in the high fat meal 69% of the energy came from fat, and in the high protein meal 49% of the energy derived from proteins. The meals were equal in total energy (about 950 Kcal), sodium, potassium and water (about 0.66 L) content. The meal mass of the fat meal was lower because of the difference in the energy density of fat. The protein meal was superior to the others in subjective evaluation; it had no effect on heart rate, but an increase in blood urea nitrogen and decrease in red blood cell volume were noted. All other measurements, including blood pressure, weight, complete blood count, urinalysis and blood chemistry, were similar after the different meals. Despite these benefits, the high protein meal was found to have more side effects and the subjects' thirst was greater. The thirst may be explained by higher urine osmolarity and increase in blood urea nitrogen; interestingly it was not accompanied by higher urine excretion. The high fat pre-fast meal had a somewhat lesser effect on blood pressure and plasma glucose concentration.

The effects of the different dietary compositions can be explained by the initiation of different metabolic consequences. Dietary composition affects the thyroid's hormone profile. Complete fasting is well known to decrease triiodothyronine concentrations and activity and to increase reverse T_3. Caloric restriction without carbohydrates lowers T_3 while maintaining rT_3 levels. A caloric restriction diet containing 50 g carbohydrates keeps both T_3 and rT_3 within normal limits [5]. In diabetics a high carbohydrate diet decreases dehydroepiandrosterone sulfate levels that accompany changes in body fat distribution [6]. The main known endocrine effect of high protein content during energy-restricted diets is the maintenance of insulin growth factor levels, as compared to either high fat or high carbohydrate content [7]. These metabolic changes in different dietary compositions may explain some of the different effects of the meals. The effect of different dietary compositions on epinephrine and norepinephrine as well as other hormonal reactions requires further evaluation. The dietary composition effect on motility as well as on gastrointestinal hormone excretion has been documented [8]. Many of the gut hormones have certain effects on the brain as well. The effect of dietary composition on different cytokine activities is the subject of many studies. The combined effect on different systems of dietary composition may explain the findings of Blondheim et al. [4].

In conclusion, the authors reveal new correlations between the different combinations of dietary compositions, physiologi-

T_3 = triiodothyronine
rT_3 = reverse T_3

cal parameters and subjective feelings in the determined condition of 24 hours fasting. Their use of different subjective measurements in addition to certain biochemical and physiological measurements is the main benefit of this study. According to their findings, besides the objective shortcomings of the high protein meal, the study participants reported the protein-rich fast to be the most difficult. However, this last point raises the question: does an "easier" fast not contradict the spiritual aim of religious fasting?

This study is another step in the comprehensive research of nutrition, dealing with all the diverse components of nutrition: composition of food, physiological and biological activities following food consumption, and psychological effects of the food components as well as the food consumption. Certainly, the subject is food for thought.

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Correspondence: Dr. Y.N. Berner, Dept. of Geriatrics, Meir Medical Center, Kfar Saba 44281, Israel. Phone: (972-9) 747-1003, Fax: (972-9) 740-8610, email: ynberner@clalit.org.il