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Perspective

Mean pre-prandial BG (MBG)

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Abbreviations

BG: Blood Glucose, an index of energy availability in blood for the whole body; IH: Initial Hunger consists of gastric pangs, or mind or physical weakness. In sedentary adults and in children, IH corresponds to 76.6 ± 3.7 mg/dL BG. In infancy corresponds to demand before sight of food; IHMP: Initial Hunger Meal Pattern: Energy intake is adjusted to three arousals of IH per day; GTT: Glucose Tolerance Test; AUC: Area Under Curve of GTT; RMR: Resting Metabolic Rate; TEE: Daily Total Energy Expenditure; OW: Overweight, BMI > 25; NW: Normal Body Weight, BMI under 25; BMI: Body Mass Index = Body Weight in Kg Divided by Squared Height in Meters; MBG: The mean of 21 BG measurements before the three main daily meals reported by a week diary. MBG reproducibly measures the compliance with IHMP, the changes after training and is negatively correlated to insulin sensitivity. Below 81.8 mg/dL (Low BG) MBG indicates a healthy meal pattern in sedentary people. Over 81.8 mg/dL MBG is associated with fattening/insulin resistance; NSV: Non-starchy Vegetables, food with lower content than 30 kcal/100 grams.

Mean pre-prandial BG (MBG) is the mean of 21 pre-prandial BG measurements reported in week diaries. This value is basic in alimentary pathology. The habitual availability and the habitual balance are responsible for (unwanted) feedback reflexes. Figures 1 and 2 [1-5] show experimental animals and humans in a warm environment in comparison with a cold environment. The two opposite environments provoke opposite energy availabilities. Warm environment is associated with a decrease in resting metabolic rate. Available energy is spared and the surplus of energy causes a decrease in nutrient absorption, xylose in this experiment. This current high energy availability and not the increase in body weight is effective. Balance is positive when it is associated with body energy accumulation and the accumulation may reveal by body weight increase. Meal by meal balance is thus positive when BG is high, even if it is constant before meals (insulin resistance). The constancy at high levels reveals a progressive increase in fat tissues.

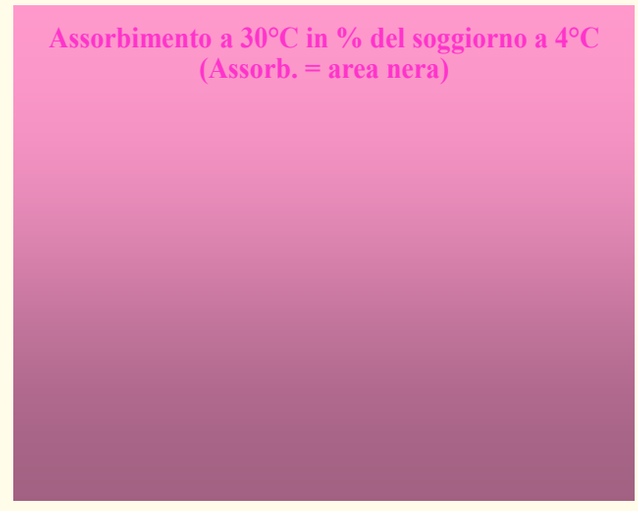

Figure 1: Xylose absorption by rats kept at the environmental temperature of 30 °C in percentage of the absorption at 4 °C.

Figure 2: Urinary xylose absorption tests in humans that were kept at different environmental temperature.

Meal by meal balance is negative when meal energy plus influx from adipose tissue, is lower than expenditure and preprandial BG is very low. BG approximation to these low levels before meals (76.6 ± 3.7 mg/dL) is associated to an even energy balance in blood and to insulin sensitivity. We took the BG of 76.6 ± 3.7 mg/dL as a normal reference for meal start from the "low BG" group of adults who maintained both the recruitment body weight and the recruitment MBG after training [6]. This BG is similar to the "low MBG" of infants at recruitment and to the MBG acquired by those adults and infants who significantly decreased their MBG after training IHMP. The figure 3 reports 89 adult subjects with their MBG at recruitment and their MBG decrease after training: 40 out of 55 adults with high MBG at recruitment significantly decreased MBG and 15 out of 55 were poorly compliant and their MBG did not significantly decrease. However, 34 adult subjects who were lean, maintained after training the body weight and the MBG that they had at recruitment. The identity in values between recruitment and after training in this part of population suggests that training IHMP is a return to a safe, normal eating pattern that was developed in the phylogenies rather than a technological artifact. Phylogenies may have developed a number of sensations that we called as Initial Hunger (IH). Reliance on these IH sensations maintains an even energy balance in blood that consists in a stable and low BG before meals (76.6 ± 3.7 mg/dL). This even blood energy balance three times a day is more precise than a stable weight that is measured after a week or a month. After longer time intervals, meal by meal null balance coincides with a stable body weight. An increase in resting metabolic rate and in total energy expenditure may correct occasional intake excesses up to 15% at least in infants [7]. Higher excesses increase MBG, resting metabolic rate [6,7], insulin resistance, body fat and associated risks. Both increases in MBG as well as in body weight document this positive balance. Part of the recruited adults (34 out of 89) showed low MBG values before any training [6]. Yet, low MBG was the expected result as an effect of IHMP at the end of the study. In a consistent part of population, low MBG at recruitment shows that only part of population, those 55 with high MBG, maintains risky eating customs that are associated with insulin resistance. A study on infants confirmed low MBG values in 21 out of 70 trained infant-mother pairs from recruitment throughout the study (from 76.4 ± 4.5 to 75.2 ± 6.6) [8]. MBG from diaries that was high at recruitment, decreased significantly in the other 49 out of 70 through training (from 91.3 ± 7.2 to 76.9 ± 6.7; $P < 0.001$ on longitudinal differences). During adolescence (18 years old), 19 boys and girls out of 29 showed a MBG of 75.5 ± 7.4 mg/dL at recruitment whereas only 10 showed significantly higher values [9]. In absence of training, this was the safest meal pattern at recruitment for any age! Under pressure of conditioning unfortunately, the exhaustion of nutrient in blood is accomplished by lower and lower number of ageing people.

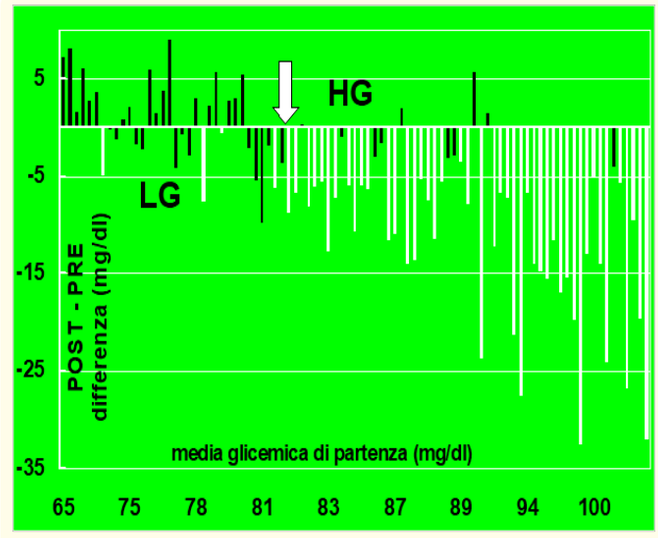

Figure 3: Difference after training versus value in mean blood glucose for each trained subject at recruitment.

Notes: Column height shows 5-month post- less pre-mean blood glucose difference from 7-day diary in each trained subject. Significant increases in blue, significant decreases in red, and no significant changes in black. Mean blood glucose reported in sequentially increasing order at recruitment, not in linear correlation, with segment length on the x-axis scale. The dashed division indicates the most significant division between subjects who showed no mean blood glucose decrease after training (LBG group, n = 34 subjects) and those who showed significant decrease of mean blood glucose (HBG group, n = 55 subjects; $\chi 2$ analysis: $P = 0.00001$). This threshold blood glucose at recruitment (demarcation point) is 81.8 mg/dL (4.5 mmol/L) at recruitment.

Abbreviations: HBG, high blood glucose; LBG, low blood glucose

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Conflict of Interest

No conflicts of interest

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