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A subjective, reproducible limit of intake in the child and the adult

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I prefer to use we instead of I although I often complained my loneliness. This search for an objective outlook cannot be performed by a scientist rigidly concerned on the only own objective. I always felt the mothers' participation to the search for why. Why the child suffered. What was his future, what handicap would remain, what was the difference from well children. Only once the mother and I had the conviction that our failure would mean the child's death, but all other mothers (as I) ignored how far we were from this misfortune and also ignored when we would be freed from this concern. Food intake and absorption and infant growth are under the attention of all parents as well the focus of the present book. The tension became acute during training: we suggested to stop meals and to work or play until hunger spontaneously aroused. The searched limit for daily intake, subjective though reproducible, consisted in Initial Hunger. This sensation was defined by the arousal after meal suspension and by the synchronous BG measurement.

The decision of measuring blood glucose (BG) before meals responded to a widespread fear on medical studies on hunger. At the very beginning of our research we had to treat malnourished, diarrheic infants [1-6]. We had to prevent any hypoglycemic episode. This prevention was a stronger argument than the fact that the (initial) hunger was more recognizable than postprandial satiety. We investigated pre-prandial events in blood by 7-day week diaries that reported BG measurements with a portable device before the three main meals. This new parameter was more consistent in repeated measurements than a single measurement of fasting BG.

(We measured BG by a portable potentiometer for whole BG measurement with the hexokinase method: Glucocard Memory; Menarini diagnostics; Florence, Italy). The adult subject had to personally measure BG with the portable instrument against the auto analyzer in the lab as he/she did at home. At blood sampling, we supervised the performance of the comparison. The auto analyzer was checked every morning in comparison with the other 50 laboratories in Tuscany. A difference in BG from the mean had to remain within 1% every day. The heparinized blood sample for the auto analyzer was immediately centrifuged and measured with the hexokinase method. The meantime, the patient performed his/her measurements on the same blood sample by glucometer. The auto analyzer obtained a mean ± SD of 89.9 ± 11.3 mg/dL (N = 85). Subjects measured 89.0 ± 12.5 mg/dL. The mean difference (0.9 ± 7.1) was not significant. On absolute values, the mean difference was: 5.7 ± 4.3 mg/dL with no bias. This error is low compared to the spontaneous BG wavering of 10% every 12 minute. However I employed portables for measuring pre-prandial BG only for personal assessments, increase in reliance on sensations and for adjustments in meal enegy. In scientific demonstrations [1-6], I used Mean BG, the mean of 21 pre-prandial measurements reported by 7 d food diaries. This mean is quite reliable for no bias in the comparison with the autoanalyzer and for the small confidence interval around the mean pre-prandial BG (3.8 mg/dL) [1].

The energy availability refers to the energy from glucose, fatty acids, amino-acids and alcohol that is the aim and the consequence of meal intake. Available nutrients are in mutual correlation and blood glucose (BG) can substitute others or can be substituted. BG disappears from blood before other nutrients, the utilization decreases with abundance of nutrients in all tissues, but BG reserves are exhaustible. Thus we used BG as representative of other nutrients in blood [7-9]. Nutrients (energy) availability, i.e. BG rise, is the aim for any meal. Availability depends on instant balance between entry and efflux of nutrients in blood. This balance is dynamic like a flux in a small tank with a tap that provides the input at intervals and with a permanently open exit. Blood contains about 6 - 7 grams of glucose, thus the meal is mostly stored in a transient container; insulin release enlarge storage and fatty tissues during meal and after meal. Fatty cell may rapidly increase their size, although the increase by a meal decreases in proportion to the number of fat cells and remains unmeasurable.

Instant balance and instant energy availability are shown by BG value. Meal by meal dynamic balance of energy is much more important and consists of BG right before further energy addition (the following meal). At this precise time, BG acquires a cumulative meaning for the interval period between subsequent meals. The level of nutrients and glucose in blood results from balance in blood between entry (previous meal intake and fatty acids release in blood from adipose tissues) and exit (expenditure plus nutrients deposition in fatty tissues and muscle) in previous inter-meal interval, according to our findings [1-17]. Previous meal intake includes liver glycogen. Mean pre-prandial BG is the mean of 21 pre-prandial BG measurements reported in weekly diaries. This mean measured habitual meal by meal BG balance in blood, a basilar information in pathology that provokes unwanted feedback reflexes. Body weight measured body energy balance cumulated in a period [18]. Somebody might suggest that inter-meal balance is positive when the second pre-prandial value in a day (before lunch) is higher than the first (before breakfast). Yet, balance is positive all the times it is associated with body energy accumulation. Meal by meal balance is thus positive when BG is high, even if it is constant before meals. The constancy at high level reveals a progressive increase in fat tissues [1-5]. Meal by meal balance is negative when meal energy

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plus influx from adipose tissues is lower than expenditure and pre-prandial BG is very low. BG approximation to these low levels before meals (76.6 ± 3.7 mg/dL) are associated to an even energy balance in blood and to insulin sensitivity, the healthy goals in eating [1-5]. We took the BG of 76.6 ± 3.7 mg/dL as a normal reference for meal onset from the "low BG" group of adults who maintained the recruitment Mean BG after training [1,18]. This BG is similar to the "low Mean BG" of infants at recruitment and to the Mean BG acquired by those adults and infants who significantly decreased their Mean BG after training IHMP (Figure). In the figure, 40 out of 55 adults with high Mean pre-prandial BG at recruitment significantly decreased Mean BG. The identity in values between recruitment and after training suggests that training IHMP is a reacquisition of 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 termed 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 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% [5]. Higher excesses produce fattening/insulin resistance and associated risks. Both increases in Mean BG as well as in body weight document this positive balance.

Following the words of Dante Alighieri (Fatti non foste a viver come bruti ma a seguir virtute e conoscenza) a National Health Care requires to contrast current disastrous trends [19,20]. Health Care might add an educational effort to teach awareness on energy availability, energy content per meal, energy expenditure between meals. An increase in the maintenance of low pre-prandial BG and high insulin sensitivity would be expected.

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