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ORIGINAL RESEARCH

The effects of fats and proteins on glycemic responses in people without diabetes vary with waist circumference, fasting plasma insulin, and fiber intake - Evidence review

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1. ABSTRACT

The analyzed study evaluated how different amounts of protein and fat, added to a drink containing 50 g of glucose, modified blood glucose levels after consumption in 20 people without diabetes. Both macronutrients reduced the glycemic response progressively as the dose increased, while the effect attributed to protein was greater than that attributed to fat. The magnitude of the protein effect was associated with waist circumference and habitual fiber intake; the effect of fat was associated with fasting plasma insulin.In section 2.3 of "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi, the publication contributes primarily to the narrative that proteins and fats can attenuate the glycemic spike when consumed with carbohydrates, with a more marked effect from proteins for the same quantity. Independent studies confirm that proteins can acutely reduce postprandial glycemia and that fats can delay gastric emptying and the glycemic peak. However, the effects change based on the type of food, the dose, the sequence of intake, and the person's metabolic characteristics. The observed association with fiber, waist circumference, and baseline insulin requires more robust confirmation.

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MISSION

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Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The research question was whether adding protein and fat to a fixed amount of glucose could reduce the rise in glycemia after consumption, and whether this response varied in relation to the metabolic and dietary characteristics of the participants. In simple terms, the authors verified whether the body reacted to the same glucose load differently when protein or fat was also present in the drink.The hypothesis was that the two macronutrients would reduce the glycemic response according to a dose-response relationship, meaning with an increasing effect as the amount consumed increased. The authors also explored whether fasting plasma insulin, waist circumference, and habitual diet could explain some of the individual differences.The reason for its relevance to section 2.3 of "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi is specific: the study documents that protein and fat, when added to glucose, reduce the acute glycemic response and that, in the experimental model used, the effect of protein was greater than that of fat. However, it does not directly measure insulin secretion after each combination of nutrients, gastric emptying, gut hormones, or long-term clinical outcomes. Therefore, it can support the segment regarding the reduction of postprandial glycemia, but it does not, on its own, prove the entire physiological chain described in the book.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The available material is only the abstract; therefore, information not included in the abstract is not present in the available material. The study included 20 people without diabetes. Ten participants had fasting plasma insulin levels equal to or less than 40 pmol/L, and ten had levels greater than 40 pmol/L. Fasting plasma insulin is the concentration of insulin in the blood after an overnight Fasting; it does not, by itself, equate to a diagnosis of insulin resistance.Participants consumed 50 g of glucose dissolved in 250 mL of water, with the addition of 0, 5, 10, or 30 g of fat and/or protein. Each fat level was tested with each protein level. The abstract reports that the individuals were studied on 18 occasions after 10-14 hour overnight fasts, but it does not fully clarify the distribution of individual visits or the order of the trials.Habitual diet was assessed using a three-day food diary. The primary variable was the glycemic response induced by glucose, i.e., the increase in blood glucose concentration after intake. The authors analyzed the relationship between the effects of protein and fat and waist circumference, fasting plasma insulin, and habitually consumed nutrients. The available material does not report complete inclusion or exclusion criteria, sex, age, body mass index, analytical technique for glucose, randomization methods, intervals between trials, or full details of the statistical analyses.

4. RESULTS

In the experimental model, both proteins and fats reduced the glycemic response to glucose in a linear and dose-dependent manner within the range of 0 to 30 g. This means that as the added amount increased, the rise in glycemia after the drink tended to decrease. The effects of the two macronutrients were described as independent: no statistically significant interaction between fats and proteins was observed, although the value reported for the interaction was close to the conventional threshold of statistical significance, $P = 0.051$.According to the reported analysis, gram for gram, proteins reduced the glycemic response approximately twice as much as fats, with $P < 0.001$. In the conclusion of the abstract, the authors described the effect of proteins as approximately triple that of fats. Since the available text does not include tables, complete statistical models, or absolute glycemia values, it is not possible to determine precisely from which analysis the difference between the "approximately twice" and "approximately three times" phrasing derives. However, the observed direction remains clear: the addition of proteins produced a greater glycemic reduction compared to the addition of the same amount of fats.The effect of proteins was greater in people with a larger waist circumference, with an inverse correlation between waist circumference and the glycemic effect of the protein: $r = -0.56$; $P = 0.011$. It was also greater in participants with a higher habitual intake of dietary fiber: $r = -0.60$; $P = 0.005$. An inverse correlation here indicates that as those characteristics increased, the reduction in the glycemic response attributed to proteins also increased. The effect of fats, on the other hand, was

positively associated with fasting plasma insulin; P = 0.029, and was not associated with waist circumference or habitual diet. The abstract does not report the absolute quantities of the glycemic reductions in the different subgroups.The authors explicitly warned that the conclusions might not be applicable to solid meals. This limitation is important: a glucose drink with added nutrients does not fully replicate the digestion, physical structure, and absorption rate of an ordinary meal.

5. INTERPRETATION

The main takeaway is that blood glucose levels following a glucose load do not depend solely on the grams of glucose ingested. In the specific model studied, proteins and fats attenuated the glycemic peak, with proteins having a greater average effect per gram added. This is the passage that corresponds to the statement in the book that proteins and fats act as modulators of the glycemic response.From a physiological perspective, a possible explanation is that proteins influence both insulin secretion and gut hormones, as well as the rate at which the stomach transfers its contents into the intestine. Fats can slow down gastric emptying—the passage of food from the stomach to the intestine—thereby spreading the arrival of glucose into the bloodstream over a longer period. The study analyzed, however, did not measure these mechanisms. Their attribution therefore remains a biologically plausible interpretation, not a result directly observed in this publication.Individual associations should also be interpreted with caution. The fact that the glycemic reduction linked to proteins was greater in people with a larger waist circumference or higher dietary fiber intake does not prove that abdominal adiposity or fiber causes that effect. The sample size was small, dietary habits were estimated using a three-day food diary, and the analyses were exploratory. In particular, the study does not demonstrate that fiber acts through the gut microbiota or incretin hormones, nor that the effect of fats necessarily decreases in people with hyperinsulinemia.

6. INDEPENDENT CONFIRMATORY EVIDENCE

Direct confirmation of the protein-related segment comes from a randomized crossover study conducted on nine healthy men. On different days, participants received glucose, protein in the form of gelatin, or glucose plus gelatin. The addition of 30 g of protein to 50 g of glucose reduced the glycemic response compared to glucose alone, with $P < 0.005$, and increased the half-emptying time of the stomach, with $P < 0.05$. The study therefore supports the passage in the book stating that protein added to carbohydrates can attenuate the glycemic spike. Since the sample was very small, male, and healthy, it primarily confirms an acute effect under experimental conditions, not a long-term clinical consequence [1].Regarding the fat-related segment, a randomized crossover study evaluated six men with type 2 diabetes who consumed mashed potatoes after water, olive oil taken before the meal, or oil incorporated into the meal. Oil taken before the meal markedly slowed gastric emptying compared to the other conditions, $P < 0.0001$, and delayed the postprandial rise in glycemia, $P = 0.03$. It also reduced the responses of insulin and GIP, an intestinal hormone involved in the response to nutrients, while increasing GLP-1, a hormone that helps regulate glycemia and gastric emptying. This mechanistically confirms that fat can spread the glycemic rise over time; however, it does not prove that all types, doses, and methods of fat consumption have the same effect [2].A meta-analysis of acute controlled studies examined 154 experimental comparisons between meals containing carbohydrates with or without added protein, in adults without diabetes and in people with type 1 or type 2 diabetes. In adults without diabetes, the addition of milk or plant-based proteins reduced the area under the glucose curve—that is, the overall exposure to glycemia after the meal—and increased the area under the insulin curve. This independent synthesis reinforces the general direction observed in the original study: protein added to a carbohydrate-rich meal tends to reduce the acute glycemic response. However, the authors noted high heterogeneity among the studies and differences based on the type of protein and metabolic status [3].

7. CONFLICTING EVIDENCE

The same meta-analysis that confirms the average effect of proteins also shows why it is incorrect to turn it into a universal rule. In people with type 2 diabetes, the reduction in glycemic area associated with proteins was smaller and less uniform compared to adults without diabetes. In the few comparisons available for type 1 diabetes, the addition of proteins was associated with a 40% increase in the glycemic area. These results do not contradict the experimental data from the study analyzed in people without diabetes, but they indicate that the clinical context substantially modifies the response [3].No directly conflicting evidence sufficiently relevant to demonstrate the opposite of the main result in people without diabetes subjected to a comparable glucose load has been identified. This does not prove the absence of contrary results. In particular, the associations in the original study with waist circumference, habitual fiber intake, and fasting insulin do not have equally specific independent confirmations and should not be considered established causal mechanisms.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the study that is the subject of the review from the independent publications used to confirm or contextualize the specific narrative of the book's paragraph.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Dose-response experimental study	20 adults without diabetes	Protein and fat added to 50 g of glucose reduced the glycemic response; the protein effect was greater.	direct confirmation	moderate
[1]	Randomized crossover	9 healthy men	Adding gelatin to glucose reduced postprandial glycemia and slowed gastric emptying.	direct confirmation	moderate
[2]	Randomized crossover	6 men with type 2 diabetes	Oil before the meal slowed gastric emptying and delayed the glycemic spike.	biologically consistent evidence	moderate
[3]	Systematic review and meta-analysis of acute crossover studies	Adults without diabetes and with type 1 or type 2 diabetes; 154 comparisons	Protein added to carbohydrates generally reduced glycemic exposure in adults without diabetes, but the effect varied according to context and type of diabetes.	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed pertinently supports the idea that the glycemic response to a glucose load can be attenuated by the addition of protein and fat. In its experimental model, the effect of protein was greater. Independent evidence confirms that protein can acutely reduce glycemia after a carbohydrate-rich meal and that fats can delay the rise by slowing gastric emptying.The narrative is moderately supported but requires precision. The data do not allow us to conclude that every protein- or fat-rich meal produces the same effect, nor that the associations with fiber, abdominal adiposity, and fasting insulin are causal. Responses depend on the meal matrix, the dose, the type of macronutrient, and the individual's metabolic state.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

11. RIFERIMENTI BIBLIOGRAFICI

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