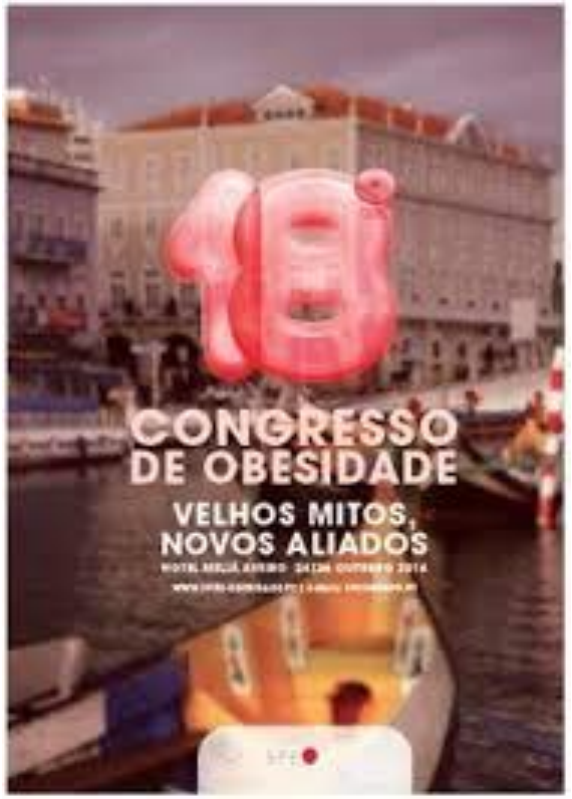
As hipoglicemias estão associadas a ganho ponderal.

Mito ou facto?



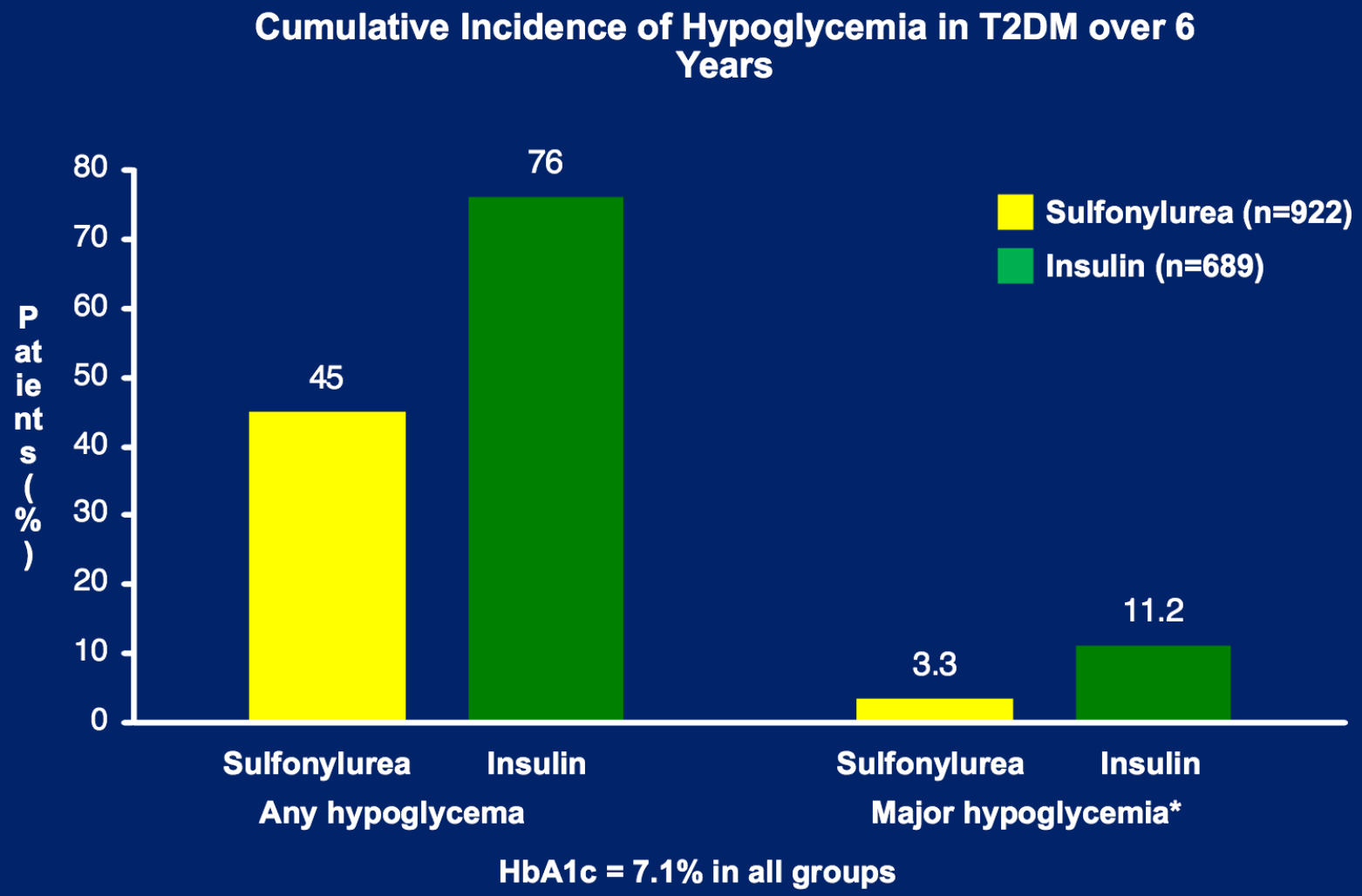
JOANA GUIMARÃES

SERVIÇO DE ENDOCRINOLOGIA, DIABETES E NUTRIÇÃO CENTRO HOSPITALAR DO BAIXO VOUGA - AVEIRO

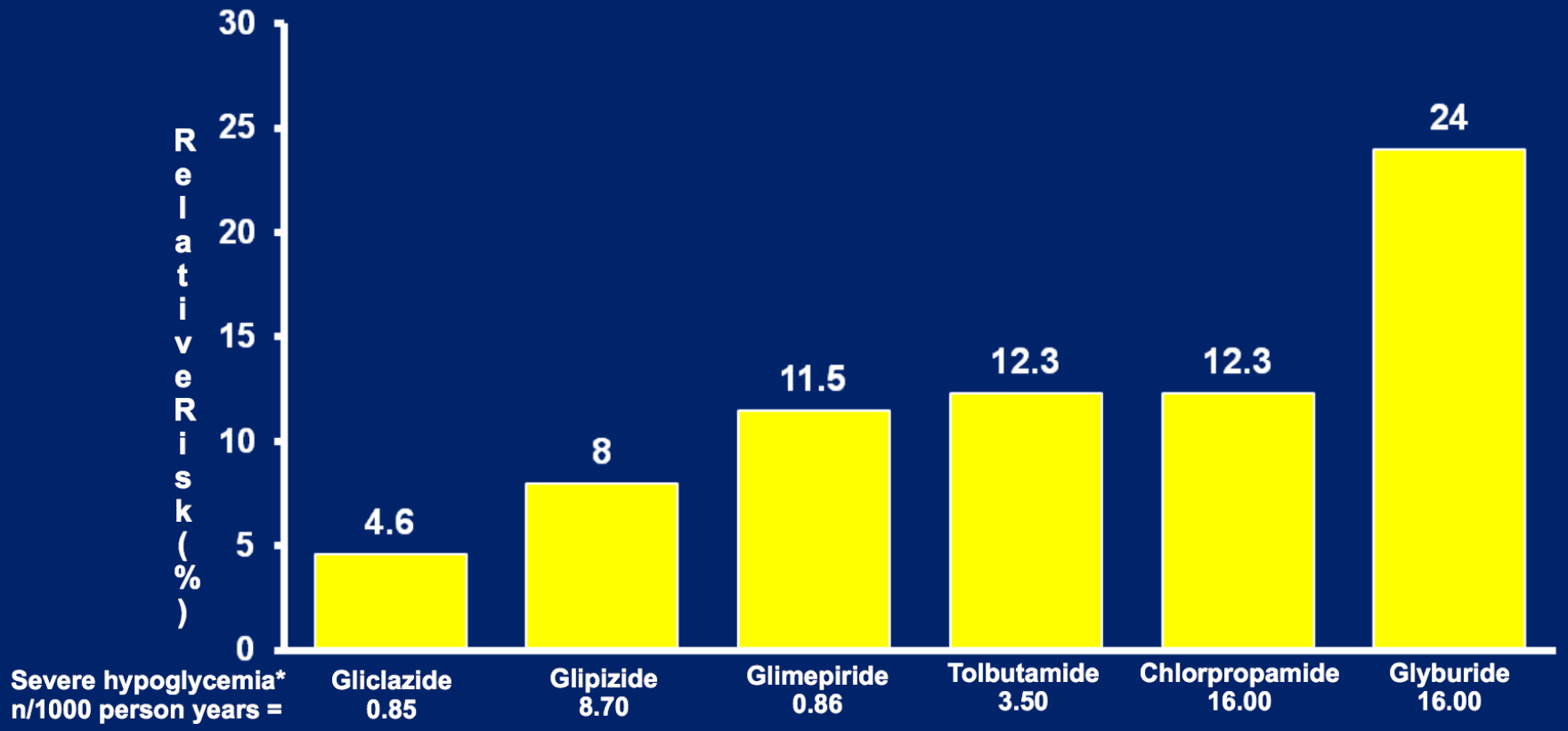
Causas e fatores de risco

- Excesso relativo ou absoluto de insulina ou secretagogos
- Intervalo entre insulina/secretagogos e absorção alimentos
- Contrarregulação
- Fármacos
- Erros na administração da medicação
- Tumores associados a hipoglicemia
- Hipoglicemia autoimne

UKPDS – Treating to Targets Elevates the Risk of Hypoglycemia and Incidence can be High with SUs



Risk of Hypoglycemia with Different Sulfonylureas



Complicação *amarga*

- Controlo metabólico
- Redução qualidade de vida
- Risco cardiovascular
- Aumento da mortalidade
- Aumento dos custos
- Aumento de peso

Aumento de peso

Fig. 1. Weight gain over time in type 2 diabetes patients undergoing intensive or conventional treatment with insulin or sulfonylureas. Reprinted with permission from Elsevier (*The Lancet*, vol. 352, 1998, pp. 837–853).

- UKPDS

✓ Aumento de peso foi > no grupo tratado de forma intensiva (média 2.9Kg)

✓ Doentes tratados com insulina aumentaram 4Kg e os doentes tratados com clorpropamida 2.6 Kg e com glibenclamida 1.7 Kg

Diab Research and Clinical Pract, 2004 65S, The Lancet 352, 1998

Hipoglicemia e aumento ponderal

Mito ou facto?

Tratamento

- Doente consciente

✓ 15-20 gramas de HC de absorção rápida

✓ Repetir se mantiver hipoglicemia 15-20 minutos

✓ Quando glicemia normal, ingerir refeição/snack

Alternativas:

✓ 1 tubo glucose em gel
✓ 4 cp de Glucotabs
✓ 3 gomas
✓ 5 Halls
✓ 1 fatia fina de marmelada
✓ 1 colher sopa de compota
✓ 135 ml néctar fruta
✓ 150 ml refrigerante com gás

Valor calórico

20 gramas de açúcar	80 Kcal
5 Halls	75 Kcal
1 fatia fina marmelada	54 Kcal
150 ml Refrigerante com gás	51 Kcal

Hipoglicemia e aumento de peso

Mito ou facto?

O porquê do aumento de peso com insulina?

- **Efeito anabólico de elevadas doses de insulina**

  - Aumento de 9 Kg em doentes com Diabetes tipo 2 tratados de forma intensiva com > 100U

(Diabetes Care 1993, 16)

- **Redução da glicosúria**

(Diab Res and Clin Prac, 2004)

O porquê do aumento de peso com insulina?

- **Aumento do apetite**

(Metabolism 1985, 34)

- **Liberdade na ingestão, com menor risco de hiperglicemia**

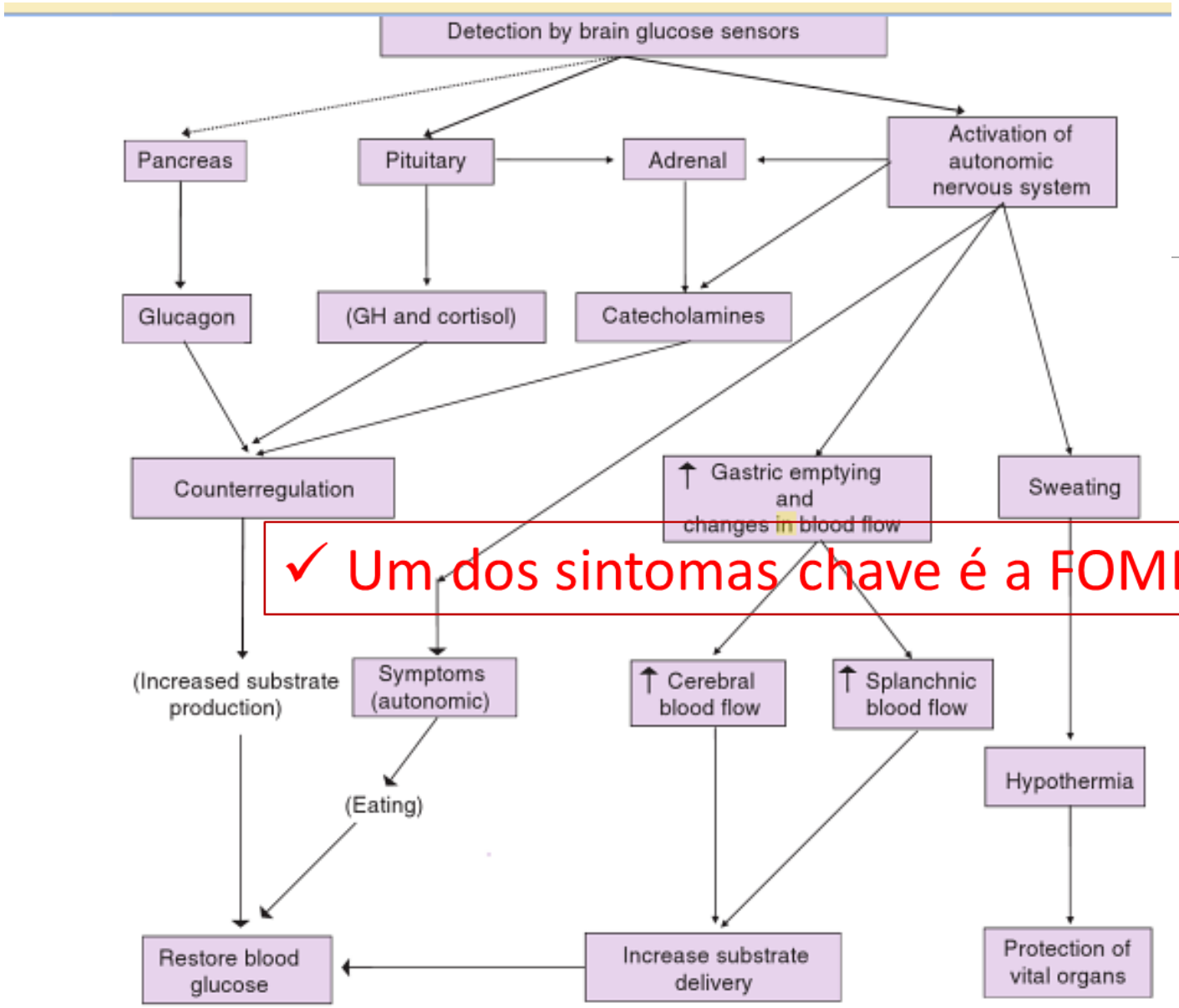
- **Hipoglicemia ligeira, aumenta o apetite: episódios repetidos de hipoglicemia ligeira podem aumentar consideravelmente a ingestão alimentar**

  - (Diab Res and Clin Prac, 2004)

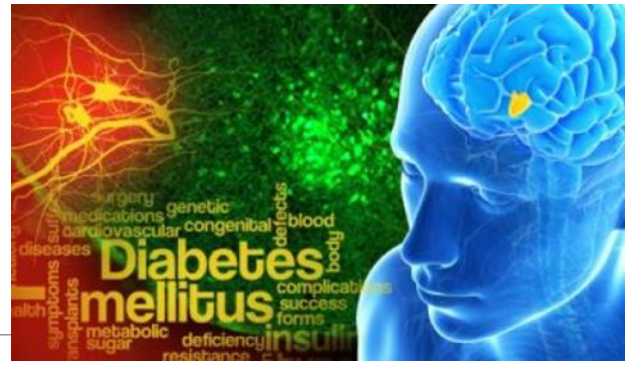
O porquê do aumento de peso com SU?

- **Aumento do apetite induzido por hipoglicemia**

(Annals of Pharmacotherapy, 2005)



✓ Um dos sintomas chave é a FOME!!!



Box 1.3 Neuroendocrine activation

Hypothalamus
↑ CRH
↑ GHRH
Ant Pituitary
↑ ACTH
↑ β endorphin
↑ GH
↑ Prolactin
↔ TSH
↔ Gonadotrophins
Post Pituitary
↑ Vasopressin
↑ Oxytocin
Pancreas
↑ Glucagon
↑ Somatostatin-28
↑ Pancreatic polypeptide
↓ Insulin
Adrenal
↑ Cortisol
↑ Adrenaline (epinephrine)
↑ Aldosterone
Others
↑ PTH
↑ Gastrin

Hipoglicemias ligeiras

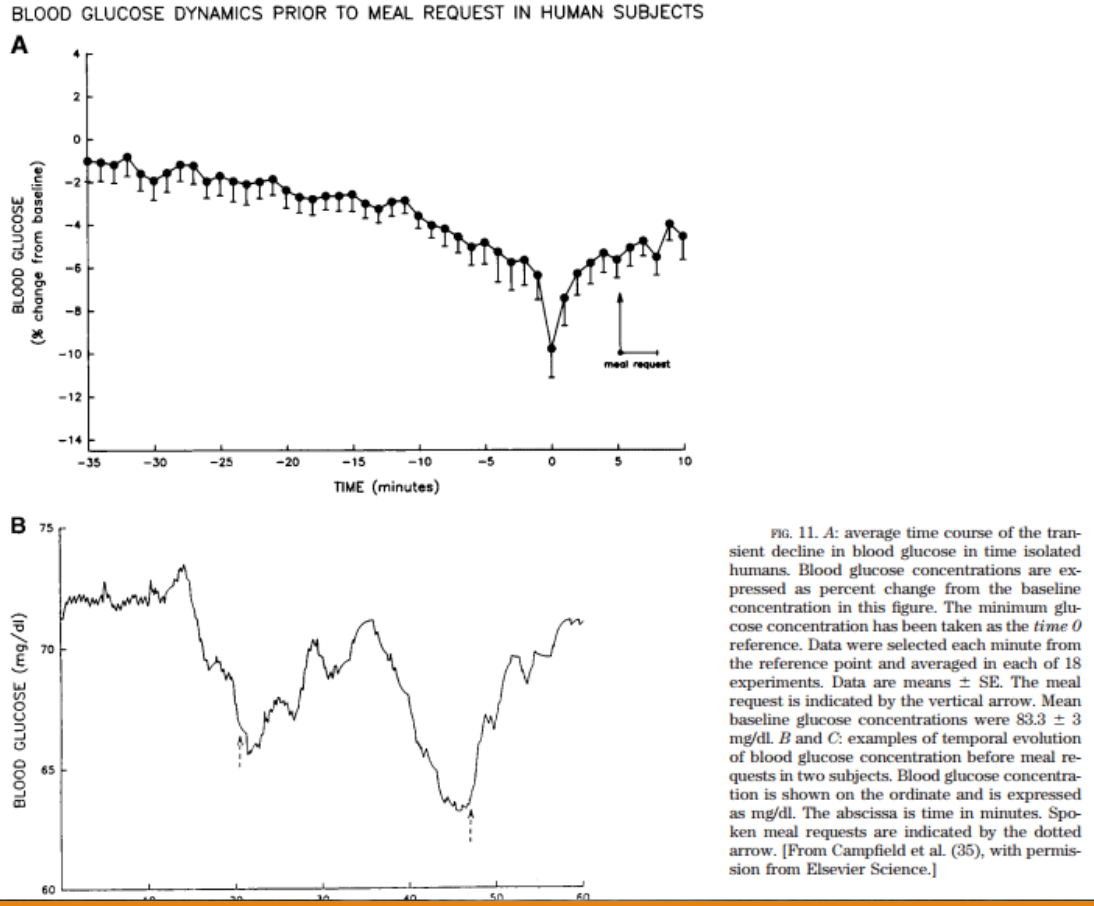


FIG. 11. *A*: average time course of the transient decline in blood glucose in time isolated humans. Blood glucose concentrations are expressed as percent change from the baseline concentration in this figure. The minimum glucose concentration has been taken as the *time 0* reference. Data were selected each minute from the reference point and averaged in each of 18 experiments. Data are means ± SE. The meal request is indicated by the vertical arrow. Mean baseline glucose concentrations were 83.3 ± 3 mg/dl. *B* and *C*: examples of temporal evolution of blood glucose concentration before meal requests in two subjects. Blood glucose concentration is shown on the ordinate and is expressed as mg/dl. The abscissa is time in minutes. Spoken meal requests are indicated by the dotted arrow. [From Campfield et al. (35), with permission from Elsevier Science.]

Physiol Rev 2003, 83

Food cravings during acute hypoglycaemia in adults with Type 1 diabetes

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Abstract

Background: Food craving is defined as an intense desire to eat a specific foodstuff. It may be distinguished from the sensation of hunger, which is relieved by *nonspecific* foodstuffs. No controlled studies have examined the effects of hypoglycaemia on food cravings. Thus, the aim of this study was to examine change in cravings for eight specified food types during euglycaemia and insulin-induced hypoglycaemia. *Methods*: Thirteen adults with Type 1 diabetes attended two experimental sessions where acute hypoglycaemia was induced with either insulin aspart or human soluble insulin. Food cravings were assessed, using a questionnaire, at baseline and at the onset of the autonomic reaction to hypoglycaemia ("R"). *Results*: The mean arterialised blood glucose concentration at baseline was 6.0 ± 0.3 mmol l^{-1} and at R was 1.9 ± 0.4 mmol l^{-1} ($P < .01$). Fifteen percent of subjects reported having a craving for food during euglycaemia. The prevalence increased to 65% during hypoglycaemia ($P < .01$). Cravings for seven of the eight food types increased during hypoglycaemia, but the greatest effect sizes (>1.0 standard deviations) were observed for three food types that had a high carbohydrate content. *Conclusions*: In people with Type 1 diabetes, acute hypoglycaemia produces a highly reliable generalised increase in cravings for food, particularly foodstuffs with a high content of carbohydrate. The mechanisms behind this response remain to be elicited.

“Food cravings”

- “Teoria homeostática”

- Peptídeo opióide endógeno

  - A hipoglicemia estimula a libertação de β-endorfina
  - Libertação de hormonas que provocam ansiedade e stress (cortisol, adrenalina e GH)

Pharmacol Biochem Behav 2000, 66; Appetite 1997, 29; Diabet Med 2002, 19

Research article

Circulating glucose levels modulate neural control of desire for high-calorie foods in humans

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- RM funcional em 14 indivíduos
- Glicemia 88±2 mg/dl vs 67±1 mg/dl

- Euglicémico

- Ativação córtex prefrontal – comportamento inibitório
- Esta resposta está ausente nos obesos

- "Hipoglicemia"

- Ativação das regiões límbica-estriado – desejo por alimentos calóricos, perante presença de alimentos elevado/baixo valor calórico
- > Índices de fome
- Efeitos ocorridos na ausência de alteração de valores circulantes de insulina, leptina ou grelina, mas com níveis elevados de cortisol

➢ Reduções modestas e transitórias da glicemia, reduzem o controlo inibitório do córtex prefrontal, particularmente em ambientes com alimentos altamente calóricos

The Journal of Clinical Investigation, 2011

Valor calórico

1 Donuts	200 Kcal
Croissant	416 Kcal
Chocapic (6 colheres de sopa)	109 Kcal
Queque	309 Kcal
4 Bolachas “Oreo”	212 Kcal
Kit Kat	234 Kcal

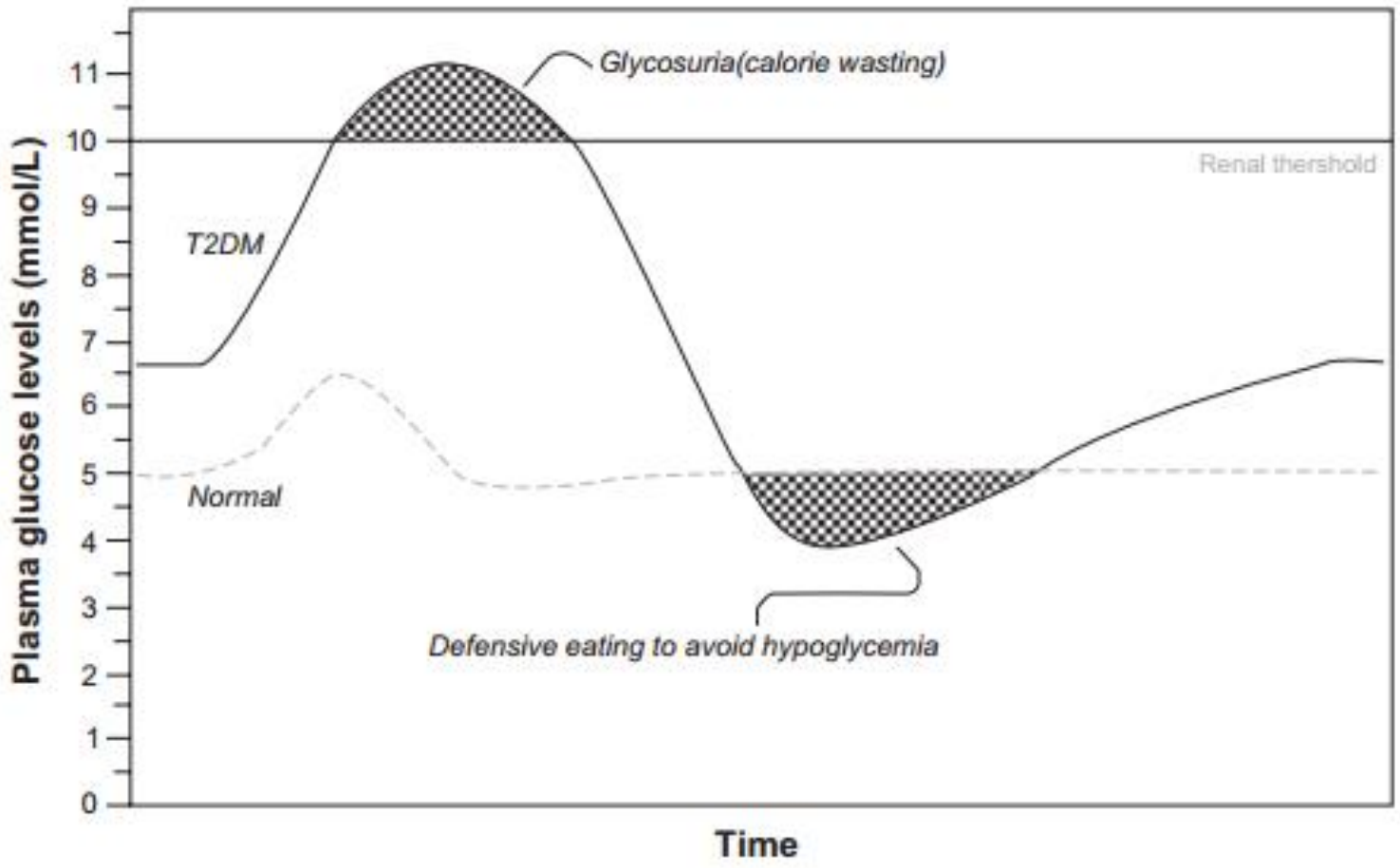

Figure 1 Calorie wasting and defensive eating are possible results of fluctuating plasma glucose levels in type 2 diabetes, confounding weight management.
Abbreviation: T2DM, type 2 diabetes.

Hipoglicemia e aumento de peso?

Mito ou facto?