Escola Superior de Tecnologia da Saúde
Politécnico de Coimbra

Poster 115

GLUCAGON AND APETITTE: CORRELATION WITH OBESITY, DIABETES AND KETOGENIC DIET

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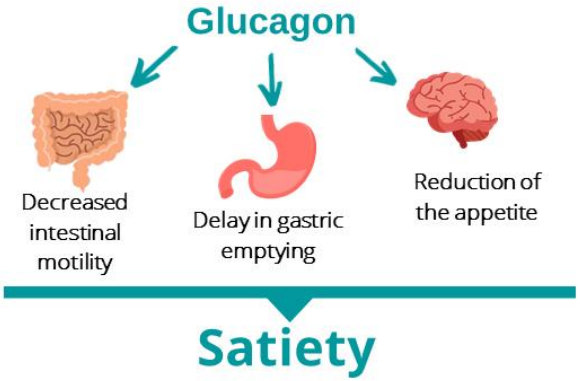
Background: Glucagon is a pancreatic peptide and has been recognized as counter-regulating the insulin hormone preventing hypoglycemia, although it has shown effects on the appetite regulation.

Aim: Verify the correlation between glucagon and appetite reduction and its consequences on weight loss and diabetes.

Methods: A literature review with articles from the last 10 years was conducted in PubMed and ScienceDirect resulting in 268 articles from which 32 were chosen initially by the title, then by the reading of the abstract. After all, 20 were selected both in Portuguese and English.

Results



Obesity

Glucagon
↓
+ Body consumption of oxygen
↓
+ Thermogenesis
↓
+ Energy consumption to regulate body's temperature

T2D

Type 2 diabetes relates to high levels of glucagon
↓
Treatment with antagonist: GLP-1
↓
Inhibition of glucagon
↓
Normal glycemic levels

Ketogenic Diet

High Protein Diet
↓
+ GLP-1 + **Ketogenesis**
↓
+ Satiety
↓
- Food Intake
↓
Weight loss

Fat=F
Protein=P
Carbohydrates=C

Conclusion: With this study, we verified a correlation between glucagon and satiety, resulting in a potential diabetes and obesity treatment.

References:
(1)Camilleri M. (2019). Gastrointestinal hormones and regulation of gastric emptying. Current opinion in endocrinology, diabetes, and obesity, 26(1), 8–10. https://doi.org/10.1097/MED.0000000000000448; (2) Dailey, Megan J., Moran, Timothy H. (2013). Glucagon like peptide 1 and appetite Trends Endocrinol Metab. 24(2): 85–91. https://www.sciencedirect.com/science/article/pii/S1043276012002184; (3) Calzada León, Raúl, Altamirano Bustamante, Nelly, & Ruiz Reyes, María de la Luz. (2008). Reguladores neuroendocrinos y gastrointestinales del apetito y la saciedad. Boletín médico del Hospital Infantil de México, 65(6), 468-487. Recuperado en 14 de mayo de 2021, de http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-11462008000600007&lng=es&tlng=es. (4) Al Massadi, O., Fernø, J., Diéguez, C., Nogueiras, R., & Quiñones, M. (2019). Glucagon control on food intake and energy balance. International Journal of Molecular Sciences, 20(16), 1–12. https://doi.org/10.3390/ijms20163905; (5) Chia, C. W., & Egan, J. M. (2020). Incretins in obesity and diabetes. Annals of the New York Academy of Sciences, 1461(1), 104–126. https://doi.org/10.1111/nyas.14211; (6) Doulton, J. E., Norgren, R., & Grigson, P. S. (2021). Effects of a glucagon like peptide-1 analog on appetitive and consummatory behavior for rewarding and aversive gustatory stimuli in rats. Physiology and Behavior, 229(July 2020), 113279. https://doi.org/10.1016/j.physbeh.2020.113279; (7) Gonz, I., Milbank, E., Di, C., Miguel, L., & Contreras, C. (2019). Glucagon , GLP-1 and Thermogenesis I, 1–16.; (8) Heppner, Kristy M. et al (2010). Glucagon regulation of energy metabolism. Physiology & Behavior, Vol. 100, Issue 5, 14 July 2010, Pg. 545-548. https://doi.org/10.1016/j.physbeh.2010.03.019 (9) Hædersdal, S., Lund, A., Knop, F. K., & Vilsbøll, T. (2018). The Role of Glucagon in the Pathophysiology and Treatment of Type 2 Diabetes. Mayo Clinic Proceedings, 93(2), 217–239. https://doi.org/10.1016/j.mayocp.2017.12.003; (10) Kleinert, M., Sachs, S., Habegger, K. M., Hofmann, S. M., & Müller, T. D. (2019). Glucagon regulation of energy expenditure. International Journal of Molecular Sciences, 20(21), 1–12. https://doi.org/10.3390/ijms20215407; (11) Brown, E., Cuthbertson, D. J., & Wilding, J. P. (2018). Newer GLP-1 receptor agonists and obesity-diabetes. Peptides, 100(December 2017), 61–67. https://doi.org/10.1016/j.peptides.2017.12.009; (12) Chia, C. W., & Egan, J. M. (2020). Incretins in obesity and diabetes. Annals of the New York Academy of Sciences, 1461(1), 104–126. https://doi.org/10.1111/nyas.14211; (13) Al Massadi, O., Fernø, J., Diéguez, C., Nogueiras, R., & Quiñones, M. (2019). Glucagon control on food intake and energy balance. International Journal of Molecular Sciences, 20(16), 1–12. https://doi.org/10.3390/ijms20163905; (14) Finan, B., Capozzi, M. E., & Campbell, J. E. (2020). Repositioning glucagon action in the physiology and pharmacology of diabetes. Diabetes, 69(4), 552–561. https://doi.org/10.2337/dbi19-0004; (15) Müller, T. D., Finan, B., Clemmensen, C., DiMarchi, R. D., & Tschöp, M. H. (2017). The new biology and pharmacology of glucagon. In Physiological Reviews (Vol. 97, Issue 2). https://doi.org/10.1152/physrev.00025.2016; (16) Chambers, E., Viardot, A., Psichas, A., Morrison, D., Murphy, K., Zac Varghese, S., Macdougall, K., Preston, T., Tedford, C., Finlayson, G., Blundell, J., Bell, J.D., Thomas, E.L., Mt-Isa, S., Ashby, D., Gibson, G., Kolida, S., Dhillo, W., Bloom, S., Morley, W., Clegg, S., & Frost, G. (2014). Effects of targeted delivery of propionate to the human colon on appetite regulation, body weight maintenance and adiposity in overweight adults. Gut, 64, 1744–1754. (16) Zanchi, Davide et al. (2017). The impact of gut hormones on the neural circuit of appetite and satiety: A systematic review. Neuroscience & Biobehavioral Reviews Vol. 80, September 2017, Pages 457-475Volume 80, September 2017, Pages 457-475 https://doi.org/10.1016/j.neubiorev.2017.06.013; (17) Moon, J., & Koh, G. (2020). Clinical Evidence and Mechanisms of High-Protein Diet-Induced Weight Loss. Journal of obesity & metabolic syndrome, 29(3), 166–173. https://doi.org/10.7570/jomes20028

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