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Why does Michael sleep for hours after consuming a family-size chicken pot pie?

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Abstract

The classic US sitcom "The Office" follows the day-to-day working life of a Dunder Mifflin paper office in Scranton, with Michael Scott being the incredibly erratic yet surprisingly successful boss. Michael decides to ingest a whole family-size pot pie for lunch, resulting in him falling into a deep sleep for hours. Whilst doing so, everyone else in the office changes the clocks and tricks him into leaving work early. This paper will investigate the relationship between digestion, hormones, and neurotransmitters to explain the mechanisms by which Michael fell into his deep slumber.

Keywords: TV programme; Biology; Neurophysiology, Nutrition; The Office; Michael Scott

Introduction

In a cold open of season 5 episode 28, Michael decides to consume a whole family-size chicken pot pie (figure 1) and ends up falling into a 'food coma' [1], a more scientifically accurate term for this is a 'postprandial dip' [2]. A postprandial dip is believed to be a possible evolutionary feature due to our ancestors being alert when hungry and sleeping when food was obtained [3]. The paper will delve into the science behind why he fell asleep, particularly through a neurophysiological lens.



Figure 1 – Micheal Scott with the family-size chicken pot pie [1].

Caloric content from the chicken pie

Assuming the chicken pie to be the "Banquet family-size chicken pot pie" from Kroger [4] we can

break down its nutritional contents (Figure 2), as by ingesting 5 servings in a brief period Michael has ingested 2,150 calories, Including 190 g of total carbohydrates and 135 g of total fat. At around 40 years of age, Michael's recommended caloric intake is 2200 calories [5] assuming he follows a sedentary lifestyle, therefore by ingesting 98 % of his daily calories in the space of approximately 40 minutes, he has overconsumed quite greatly.

Nutrition Facts

| servings per container Serving size | 0.2pie (215 g) |
|--|----------------|
| Amount per serving Calories | 430 |
| | % Daily value* |
| Total Fat 27g | 34.62% |
| Saturated Fat 10g | 50% |
| Trans Fat 0g | |
| Cholesterol 30mg | 10% |
| Sodium 760mg | 33.04% |
| Total Carbohydrate 38g | 13.82% |
| Dietary Fiber 3g | 10.71% |
| Sugar 3g | |
| Added Sugar 0g | 0% |
| Protein 10g | |
| Calcium 30mg | 2% |
| Iron 2.4mg | 15% |
| Potassium 240mg | 6% |
| Vitamin D 0mcg | 0% |
| *The % Daily Value (DV) tells you how much a nutrient in a | |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Figure 2 – Nutritional content of a Kroger Family-size chicken pot pie [4].

The Digestive system and the Nervous system

Energy needed to fuel Michael's metabolism is gained through the ingestion of food [6], with the enteric nervous system overseeing the digestion process. Endocrine cells in the small intestine will release peptide proteins (e.g. Cholecystokinin (CCK)) in response to nutrients, resulting in the activation of the vagal fibres present. The brain then receives information about the nutrient content and volume of food consumed through the vagus nerve, with the activated vagal fibres in the stomach detecting volume, whereas those in the intestine detecting nutritional content [7]. This shows a direct link between the two systems (Figure 3) as seen through cross talk between the vagal afferent signals and other digestive signals present in the hindbrain.



Figure 3 – Feedback received by the brain from the gastrointestinal tract [6].

What causes the deep sleep after consumption of the pie?

The entire process of digestion can take anywhere between 10 to 73 hours [8], in which we can assume the large quantity of the pie causes blood to be directed towards the digestive system for a long period of time [9]. This results in other functions receiving reduced blood flow i.e. hindering their activity, for example, skeletal muscles receiving less blood flow can result in muscle weakness [10]. However, recent research has determined this explanation is not the root cause of the fatigue experienced after consumption, instead activation of sleep centres and hormonal changes lead to this 'daytime sleepiness' [2] with a well-known sleep centre being the pineal gland which produces melatonin.

So how do these hormonal changes result in sleep?

After consumption of this highly caloric meal, Michael will have a significant spike in his blood sugar levels [11] resulting in insulin secretion. A study shows highcalorie meals to have a 40 % increase in insulin concentration in individuals compared to a 15 % increase detected after low-calorie consumption [12]. The elevated insulin levels emphasise the presence of the amino acid tryptophan in the brain, through mechanisms of reducing levels of other large neutral amino acids present in the blood, thus reducing competition for the transport carriers into the brain [13]. By increasing the likelihood of tryptophan entering the brain, insulin secretion results in greater secretion of serotonin as tryptophan is a precursor for the serotonin neurotransmitter [14] and subsequently, the melatonin hormone [15, 16], both of which are known to modulate the sleep-wake cycle.

By falling into this 'postprandial dip', It has been shown that cognitive skills are reduced, and overall alertness is impacted, with large meals and high-fat content resulting in greater dips in cognitive ability post-lunch [2]. Alternative factors can also lead to fatigue such as quality of sleep at night, stress levels and physical activity. As a manager of a Dunder Mifflin branch during economic crisis, we can assume Michael to be incredibly stressed from his role.

Conclusion

We can see that sleep inducement after digestion is due to the activity of serotonin neurotransmitters and melatonin hormone secretion as a result of insulin-increasing tryptophan uptake in the brain. With the elevated insulin secretion of ~40 % [10] after the chicken pot pie is consumed. Highlighting the relationship between the enteric and central nervous system through vagal fibre activation. The paper highlights the role of serotonin and insulin in the slumber that the chicken pie induces and for an efficient day, Michael should avoid high-calorie meals during office hours.

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