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I'll take a potato chip... And cause a heart attack!

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Abstract

In the anime and manga series *Death Note*, protagonist Light Yagami inflicts his version of justice on criminals. His modus operandi is a supernatural notebook, the Death Note, that allows him to kill off criminals with heart attacks. This paper, inspired by one of Light's most memorable quotes, explores how potato chips could be used as the modus operandi instead. Due to the themes of the anime and manga series, readers should be aware of the themes relating to murder, serial killers, and nutritional information that could trigger eating disorders.

Keywords: TV programme; Comic; Biology; Nutrition; Energy Consumption; Heart Attack; Death Note

In episode eight, *Glare*, of *Death Note* [1], and the seventeenth chapter, *Trash* [2], main character Light Yagami is placed under surveillance by the detective L as he is a suspect in the Kira investigation to find the notorious serial killer who kills their victims with heart attacks. While under surveillance, Light circumvents L's cameras and continues to kill criminals by writing their names on pieces of paper torn from the supernatural Death Note, where writing the full name of a person while thinking of their face will kill them and, if the cause of death is not specified, will kill them via a heart attack. To prevent the cameras from seeing him, Light hides the slips of the notebook in a bag of potato chips along with a mini TV. To mask him writing down the names of the criminals, Light monologues that "[he'll] take a potato chip, and eat it!" [1, 2] to throw L off the scent. But what if Light had to use potato chips to kill the criminals? Would it be possible to induce a heart attack from eating potato chips alone? This article is going to consider potato chips that have spontaneously appeared in the person's stomach.

Which potato chips are we talking about?

Light mentions that his family only eat plain or sour cream and onion flavoured chips, and so he makes sure to hide the TV in a barbecue bag, as he is the only one who would touch them [2], as shown in the panel from the manga in figure 1. Reddit user Miss_Junior, in response to Reddit user rx7ghost, identified that the brand is Calbee chips [3]. From Calbee's

nutritional information [4], per 100g, the barbecue chips have:

- 531 kcal
- 6.7g of protein
- 30.1g of fat with 13.3g saturated
- 58.3g carbohydrates
- 3.7g fibre
- 361 mg sodium



Figure 1 – Light Yagami, protagonist of *Death Note*, mentions that no one else in his family will eat the barbecue chips, and hides a mini TV in the barbecue bags that he can use to trick L and the investigation later [2].

This paper will investigate the calories, fat, and sodium of the chips, and how many would lead to a heart attack.

Calories

100g of barbecue chips contains 531 kcal, so 1g of chips is equivalent to 5.31 kcal. The NHS recommends a daily calorie intake of 2,000 for women, and 2,500 for men [5]. Overconsumption of calories can lead to weight gain and coronary problems, which can then result in heart attacks, as a large meal can enhance markers associated with acute coronary syndromes, and predispose a person to a cardiac event [6]. An example of this is at the Las Vegas "Heart Attack Grill", where several people have had heart attacks while consuming their "bypass" burgers and some have died [7]. However, as the restaurant also had promotions like "Over 350 pounds? Eat for free!" [7], it is likely that several of the clientele had pre-existing conditions like obesity that increased their risk of heart attacks. Instead of looking at the calories that increase the longer-term risk of a heart attack, fats will be investigated next to see if they can induce an acute heart attack in a short time.

Fats, particularly saturated fats

One of the factors known to influence the development of atherosclerosis, hardening of the arteries, is the cholesterol content of the blood. Higher cholesterol and fatty content in the diet results in fat deposits within the walls of the arteries, which can cause atherosclerosis, which then are the primary cause of heart attacks [8]. Saturated fats in particular, where the carbon atoms in the fatty acids have no double bonds, give rise to the levels of blood cholesterol [9], and the chips Light prefers have 13.3g of saturated fat for every 100g of chips.

However, there are both "good" and "bad" saturated fats. The majority of blood cholesterol is packaged into low-density lipoproteins (LDL) and so different saturated fats containing different specific fatty acids have different impacts. Palmitate raises the level of LDL, but stearate does not, and both are saturated fatty acids [9]. As the nutrition report [4] does not specify whether the saturated fats are "good" or "bad", it is difficult to determine how the consumption of the potato chips will lead to a build-up of fatty deposits on the walls of arteries. Furthermore, like with an overconsumption of calories, consuming excessive "bad" fat will lead to

arterial deposits, but the process will not be rapid. In Death Note, deaths from heart attacks occur after 40 seconds of writing the name, unless a time of death is specified [1, 2] and so the rate of death through atherosclerosis induced heart attacks would likely be too slow for Light. If he's waiting for someone to die of a heart attack after feeding them many chips, he may as well leave them in prison to serve their sentence with how long it would take.

Sodium consumption

Sodium, while essential for cellular processes and normal bodily functions, needs to be tightly regulated as excessive sodium intake is associated with increasing blood pressure. Hypertension, increased blood pressure, is a risk factor for cardiovascular diseases generally, and can be associated with heart attacks [10]. This again, would take a long time and would be too slow for Light.

However, with sodium, there is a lethal dose when ingested. A systematic review [11] found that the lethal dose of sodium in adults is estimated to be less than 25g so 25g will be considered the lethal dose. 1g of chips contains 3.61mg of sodium, so the following equation shows how many grams of chips the criminal would need to consume.

$$25g \text{ of sodium} = 25000 \text{ mg} \quad (1)$$

$$\frac{25000}{3.61} = 6925.21g \text{ of chips} \quad (2)$$

Unfortunately for Light, consuming 7kg of chips is not feasible. Additionally, this would induce death not via a heart attack but likely through neurological damage instead [11].

Conclusion

Light, unless he has access to several kilograms of potato chips or is willing to wait for several years, should stick to using his supernatural notebook to induce heart attacks. Inducing a heart attack in a short amount of time is very difficult. Consuming a large dose of sodium would likely be the easiest method for Light to kill someone using potato chips, but this would not kill them through a heart attack but rather through neurological damage instead. If Light really wants to punish criminals, writing in his Death Note is a more efficient method, and would be much less suspicious than buying several kilograms of potato chips per criminal!

References

- [1] Tsugumi Oba, Takeshi Obata & Inoue Toshiki (2006) *Glare*, Death Note, Season 1, Episode 8 [TV episode]. Madhouse. First broadcast: 21st November 2006 [Japan]
- [2] Tsugumi Oba, Takeshi Obata. (2004) *Death Note Volume 3: Hard Run*, Shonen Jump, volume chapter 9.
- [3] Miss_Junior (2022) 18 April. Reddit. Available at: https://www.reddit.com/r/deathnote/comments/u64b2j/comment/i56ikuf/?utm_source=share&utm_medium=web3x&utm_name=web3xcss&utm_term=1&utm_content=share_button [Accessed: 18th January 2024]
- [4] Calbee (no date) *Barbecue*, Available at: <https://calbeemohseng.com.sg/Product-Details/3/Calbee-Potato-Chips-Barbecue> [Accessed: 18th January 2024]
- [5] NHS (2023) *What should my daily intake of calories be?* Available at: <https://www.nhs.uk/common-health-questions/food-and-diet/what-should-my-daily-intake-of-calories-be/#:~:text=Generally%2C%20the%20recommended%20daily%20calorie,women%20and%20%2C500%20for%20men.> [Accessed: 18th January 2024].
- [6] Sergey, M.C., Rapoport, S.I., Agarwal, R.K., Singh, R.B., De Meester, F., Wilkzynska, A., Vargova, V., Pella, D. & Otsuka, K. (2010) *Potential chonobiological triggering factors of acute heart attack*, The Open Nutraceuticals Journal, vol. 3, pp 166 – 173. DOI: 10.2174/18763960010030300166
- [7] Chappell, B. (2012) *Man Has Heart Attack While Eating At The Heart Attack Grill*, NPR. Available at: <https://www.npr.org/sections/thetwo-way/2012/02/16/146992505/man-has-heart-attack-while-eating-at-the-heart-attack-grill> [Accessed: 18th January 2024]
- [8] Page, I.H., Allen, E.V., Chamberlain, F.L., Keys, A., Stamler, J. & Stare, F.J. (1961) *Dietary fat and its relation to heart attacks and strokes*, Circulation, vol. 23, pp.133-136. DOI: 10.1161/01.CIR.23.1.133
- [9] DiNicolantonio, J.J., Lucan, S.C. & O'Keefe, J.H. (2016) *The evidence for saturated fat and for sugar related to coronary heart disease*, Progress in cardiovascular diseases, vol. 58, pp.464-472. DOI: 10.1016/j.pcad.2015.11.006
- [10] O'Donnell, M., Mente, A. & Yusuf, S. (2015) *Sodium intake and cardiovascular health*, Circulation research, vol. 116, pp.1046-1057. DOI: 10.1161/CIRCRESAHA.116.303771
- [11] Campbell, N.R.C. & Train, E.J. (2017) *A Systematic Review of Fatalities Related to Acute Ingestion of Salt. A Need for Warning Labels?*, Nutrients, vol. 9, pp. 648. DOI: 10.3390/nu9070648