Student number.....

# UE BODY MIND INTERACTION (M Darnaudéry, A Nadjar)

You can answer in French or English at your convenience. Be concise in your answers

1. Briefly explain why sickness behaviour can be considered as an adaptative response (5 points).

In this article, the authors explore how gut bacteria influence brain function and metabolism. Peptidoglycan (PG), is a major component of the bacteria cell wall. Fragments of Peptidoglycan named muropeptides can be release from the gut. Because they are present in almost all bacteria and are constantly released, muropeptides may serve as important gut-derived signals to the brain. In mammals, cytosolic Nod-like receptor 2 (Nod2) recognizes muropeptides found in every bacterial PG.

2- Briefly explain the protocol used in Fig1. What is the purpose of this experiment? (2 points)

3- Fig2. Explain why the authors examined mice VgatΔNod2? (1 point)

4. Describe the results of Fig 2 and conclude. (1 point)

5. Fig3. What are the dependent and independent variables? (1 point)

6. Describe the results in Fig 3 and conclude. (1 point)

7. Why did the authors test the effects of muropeptides on the activity of GABAergic neurons in the arcuate nucleus? (1 point)

8. Describe the results in Fig 4 and conclude. (1 point)

9. Propose a graph (as in Figure 4F) showing the expected results of the administration of muropeptides on the activity of GABAergic neurons in the hypothalamic arcuate nucleus in Vgat D Nod2 mice. (2 points)

10. On the basis of all these data, propose a graphical abstract summarizing the possible mechanisms by which gut bacteria modulate food intake. (5 points)

*Adapted from* : Gabanyi I, et al Science. 2022 Apr 15;376(6590):eabj3986.

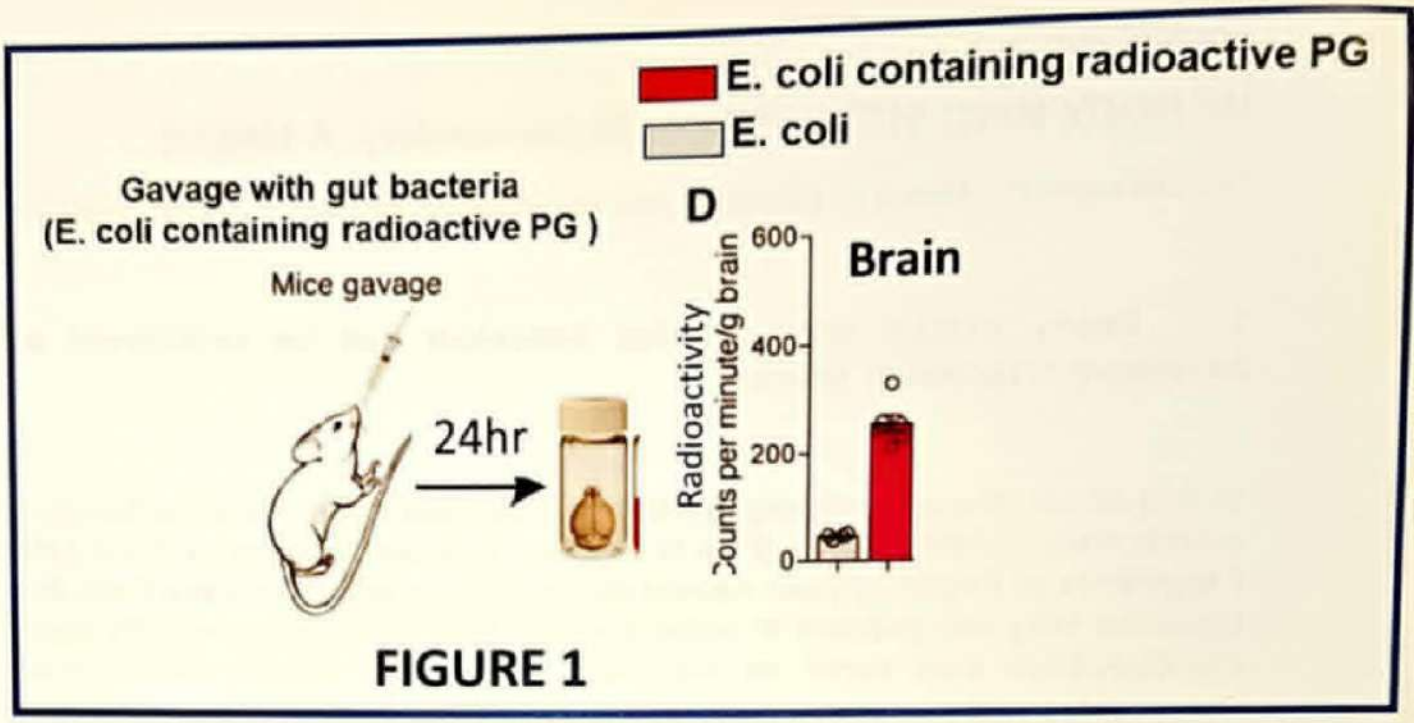
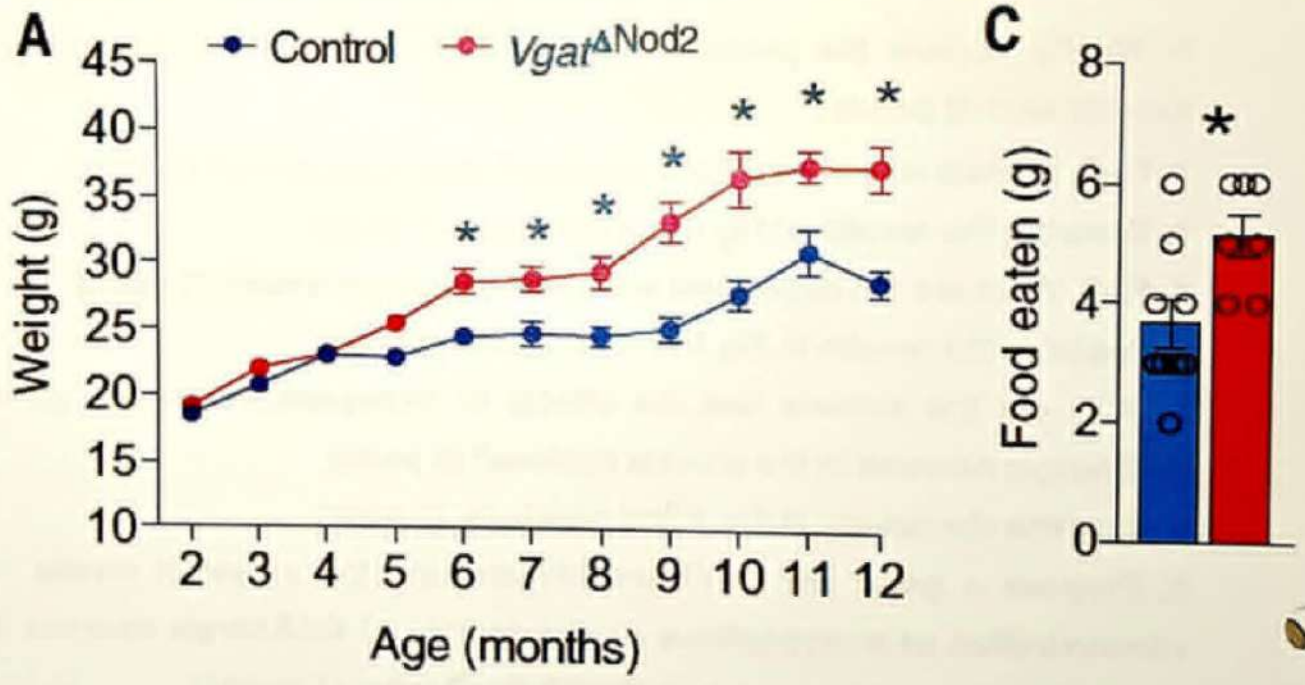



**FIGURE 1**




**Vgat Δ Nod2= mice that lack expression of NOD2 receptor in Gabaergic neurons in the whole brain**

**FIGURE 2**

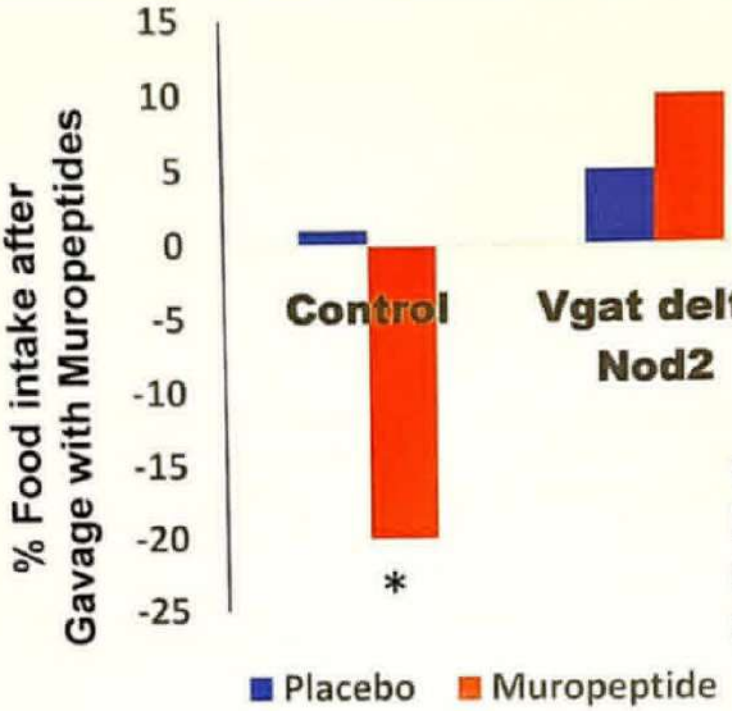



**FIGURE 3**

Vgat delta Nod2= mice that lack expression of NOD2 receptor in Gabaergic neurons in the whole brain

## Activity of GABAergic neurons in the arcuate nucleus of the hypothalamus

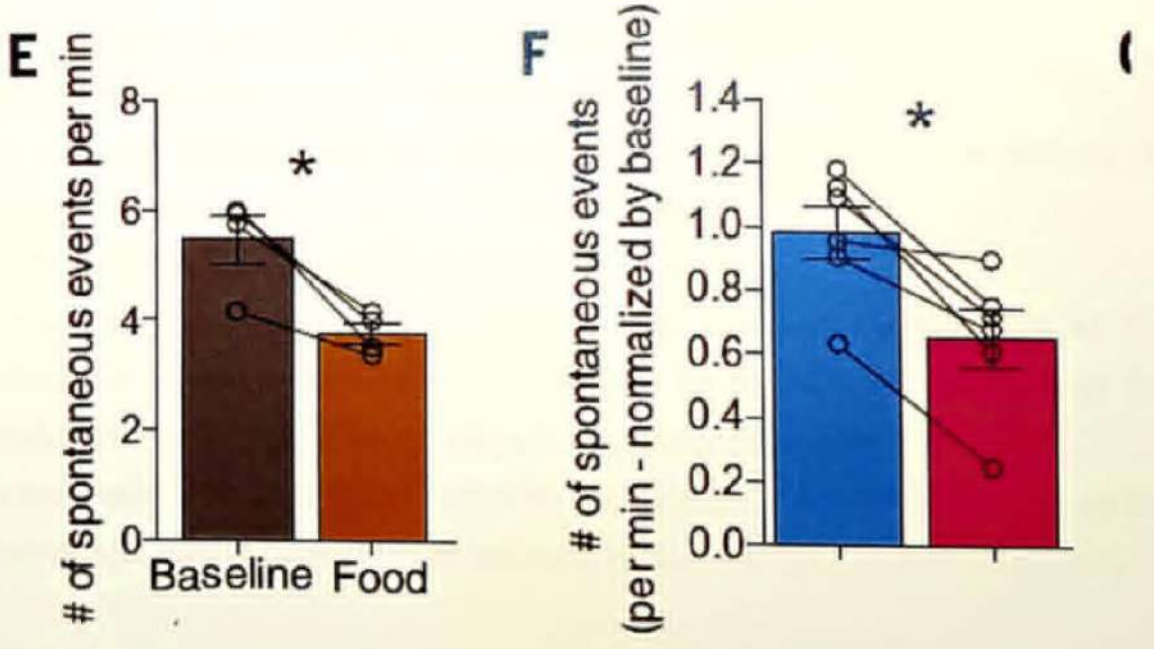



**FIGURE 4**

Gavage: placebo

Gavage: Muropeptides