

Paper 1<sup>st</sup>

# ARTICLE

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## Acetate mediates a microbiome–brain– $\beta$ –cell axis to promote metabolic syndrome

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# Background and Scientific question

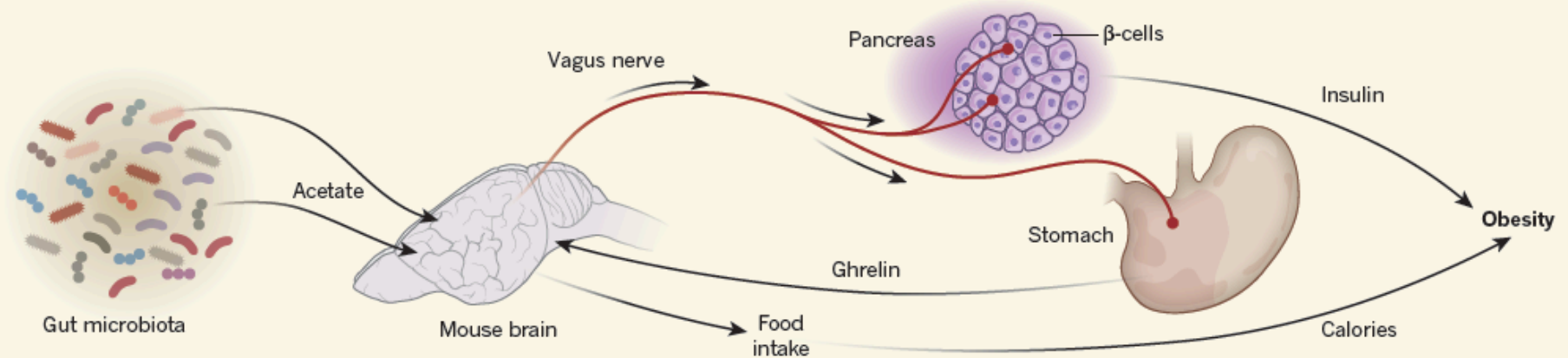
- Obesity, insulin resistance and metabolic syndrome have been shown to be associated with changes to the gut microbiota.
- The relation between decrease and increase of plasma and faecal SCFA and overfeeding and obesity has been discovered in both rodents and human.



## **Scientific question:**

Do gut microbial derived alterations of SCFAs play a casual role in the development of obesity?

# Summary and highlights



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- A method to measure the whole-body turn-over of short chain fatty acid (SCFA) by MS.
- A microbiota-derived increased acetate production leads to activation of the parasympathetic nervous system and results in increased ghrelin secretion and glucose-related insulin secretion.
- This causes a positive feedback loop which leads to hyperphagia, liver and muscle insulin resistance and etc. relating to obesity.
- Chronic increase of acetate drive obesity.

# References

## **Nature commentary on this paper**

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## **The relationship of SCFAs and obesity**

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# High-affinity monoclonal IgA regulates gut microbiota and prevents colitis in mice

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# Background and Scientific question

- Palm effect: IgAs preferentially coat colitogenic bacteria in IBD.
- Lacking of whole IgA (AID-/-) or only high affinity IgA (AIDg23s) both can lead to dysbiosis and immune hyperactivation.



## **Scientific question:**

Can a monoclonal high-affinity IgA restores symbiosis and prevents colitis.

# Summary and highlights

- The authors isolated monoclonal IgA antibodies and identified their target bacterial epitopes.
- A large proportion of IgAs derived from the small intestine of mice recognized an epitope that represented four amino acids (EEHI) expressed in a bacterial enzyme, serine hydroxymethyltransferase (SHMT).
- A high-affinity polyreactive W27 IgA as the best candidate for an efficient gut microbiota modulator and showed that W27 oral treatment modulated gut microbiota composition and had a therapeutic effect on both lymphoproliferative disease and colitis models in mice.

# References

## **Palm effect**

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