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Longitudinal exposure to antiseizure medications shapes gut-derived microbiome composition, resistome, and metabolome

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Longitudinal exposure to antiseizure medications shapes gut-derived microbiome composition, resistome, and metabolome.

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INRAE

ISME

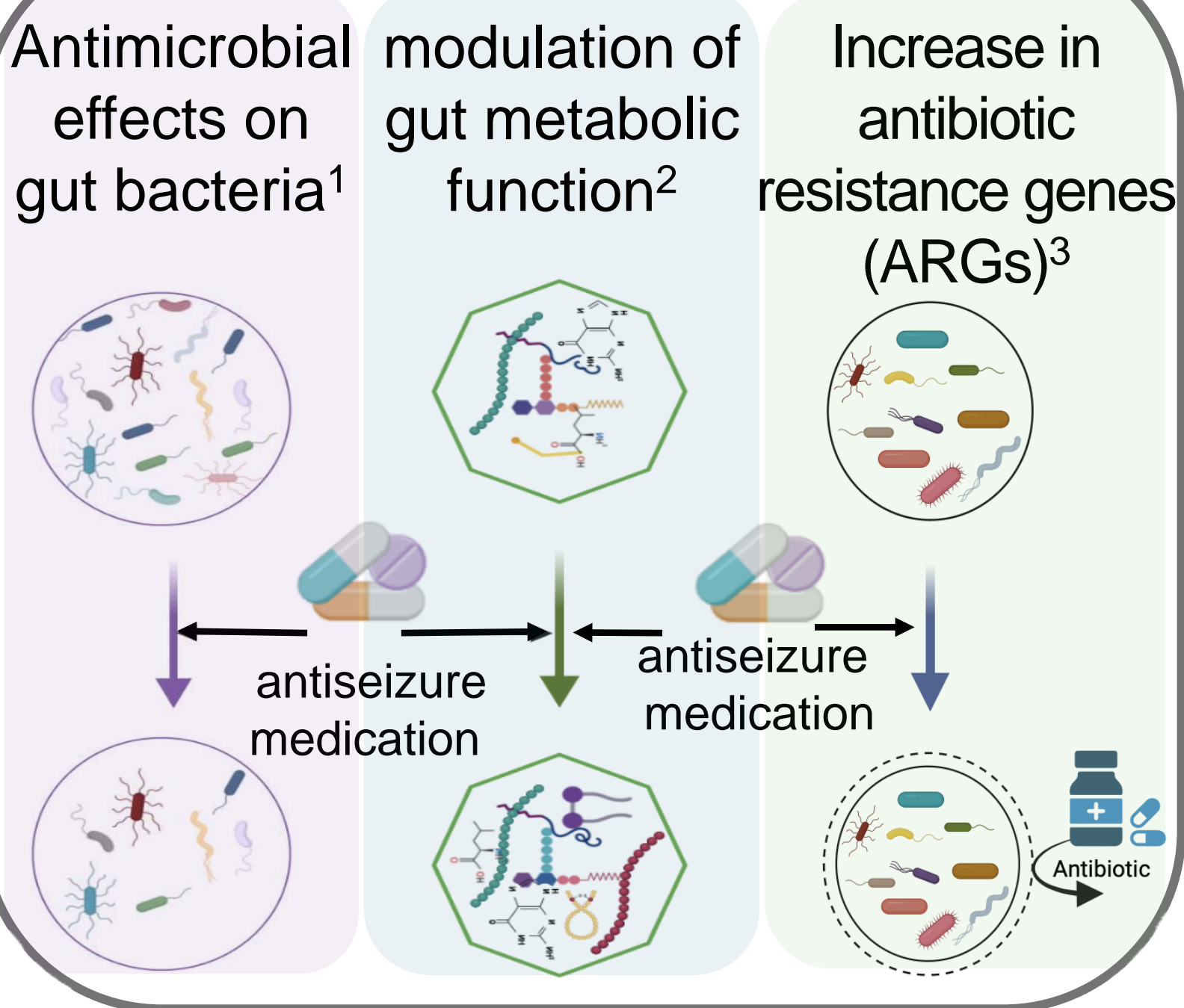
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ÉCOLE DOCTORALE Innovation Thérapeutique DU FONDAMENTAL À L'APPLIQUÉ

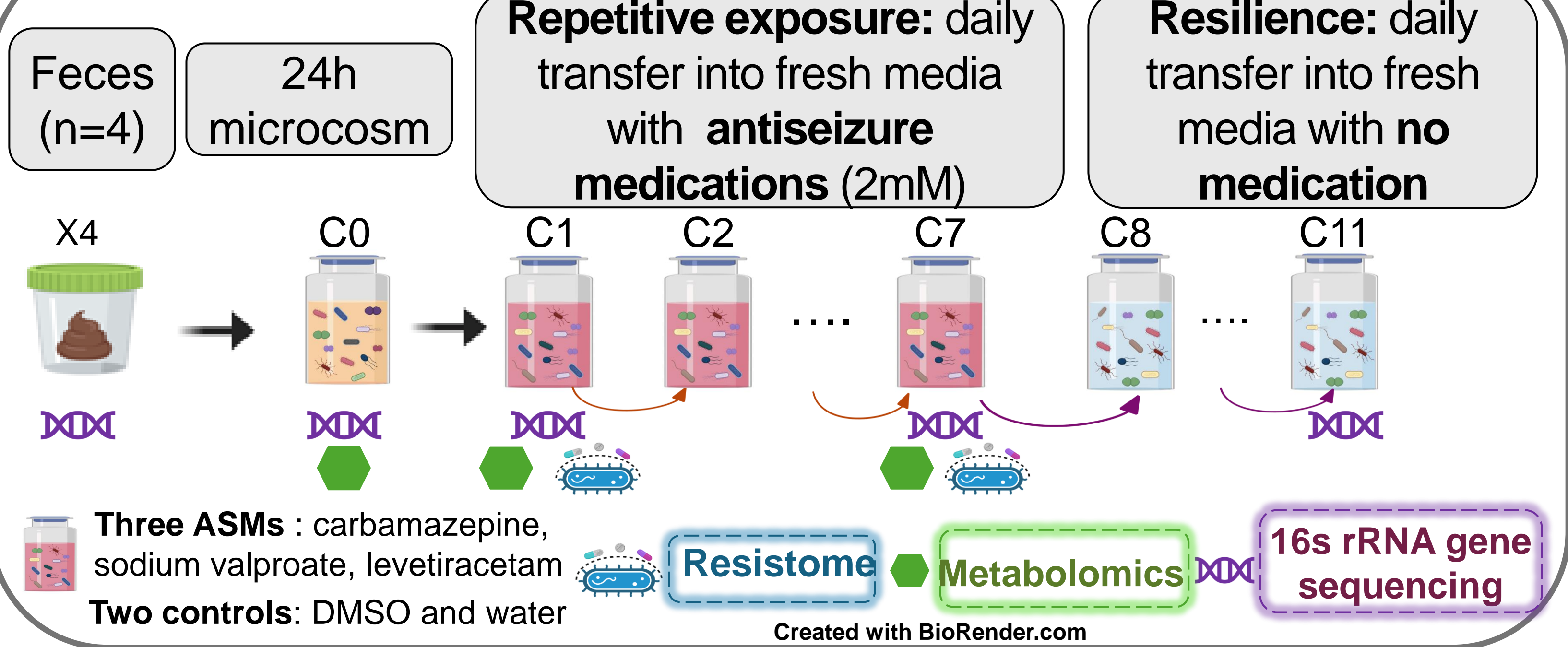
BACKGROUND



SCIENTIFIC QUESTION

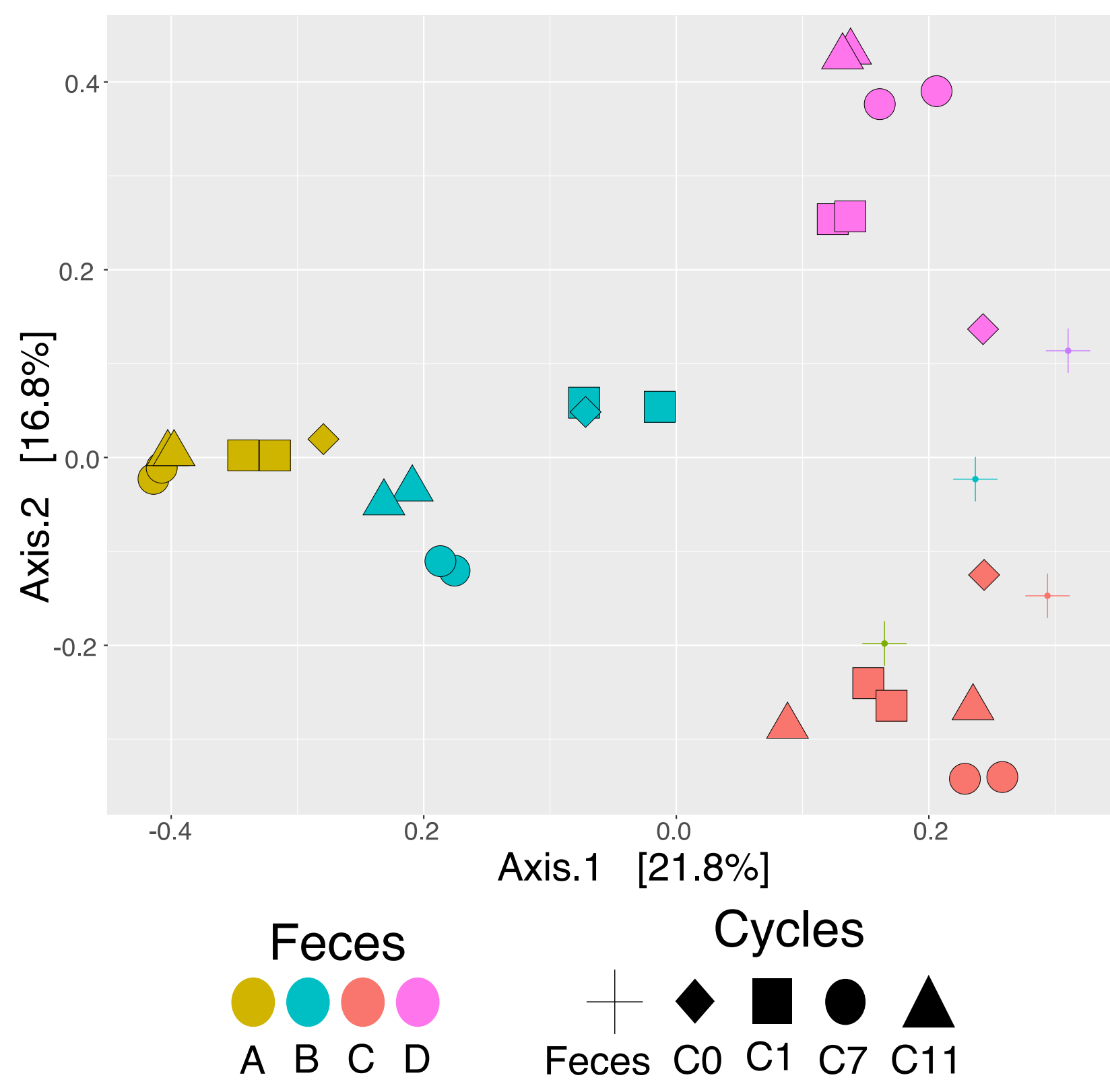
How does chronic exposure to an antiseizure medications (ASMs) impact gut composition, metabolism, and antibiotic resistance?

EXPERIMENTAL DESIGN



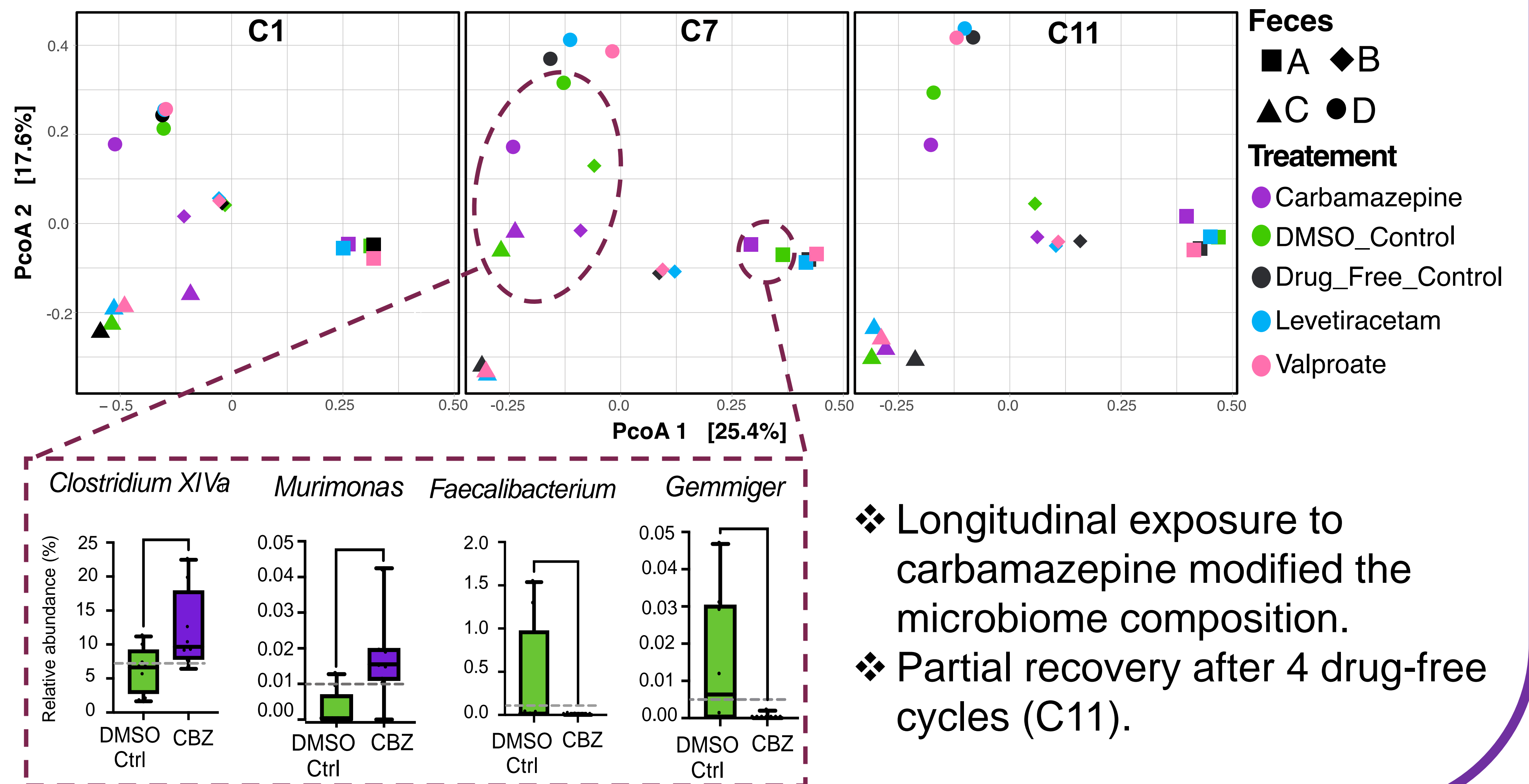
Shifts in the gut microbiome due to longitudinal exposure to carbamazepine

Semi-continuous cultivation preserved the inter-individual variation



❖ cultivation strategies generate compositionally different microcosms.

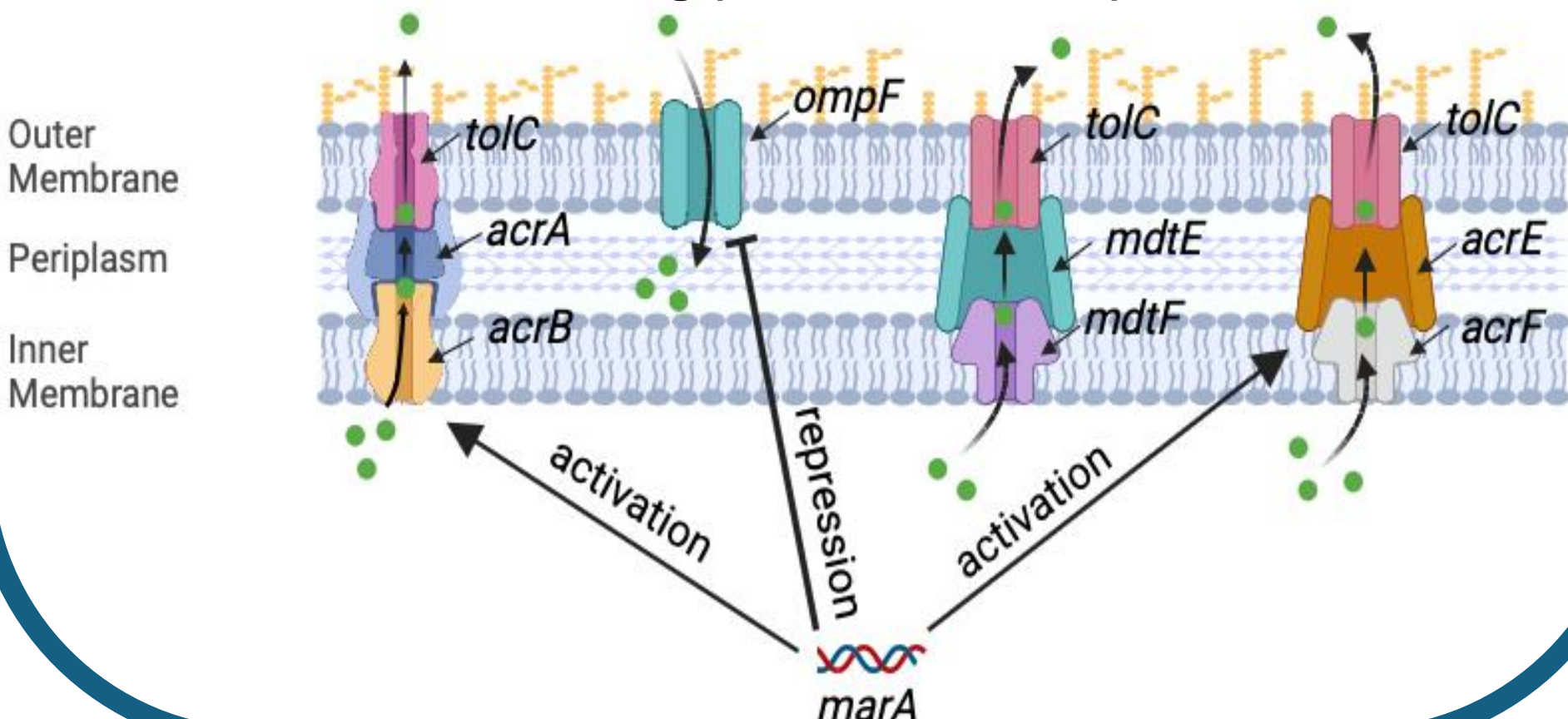
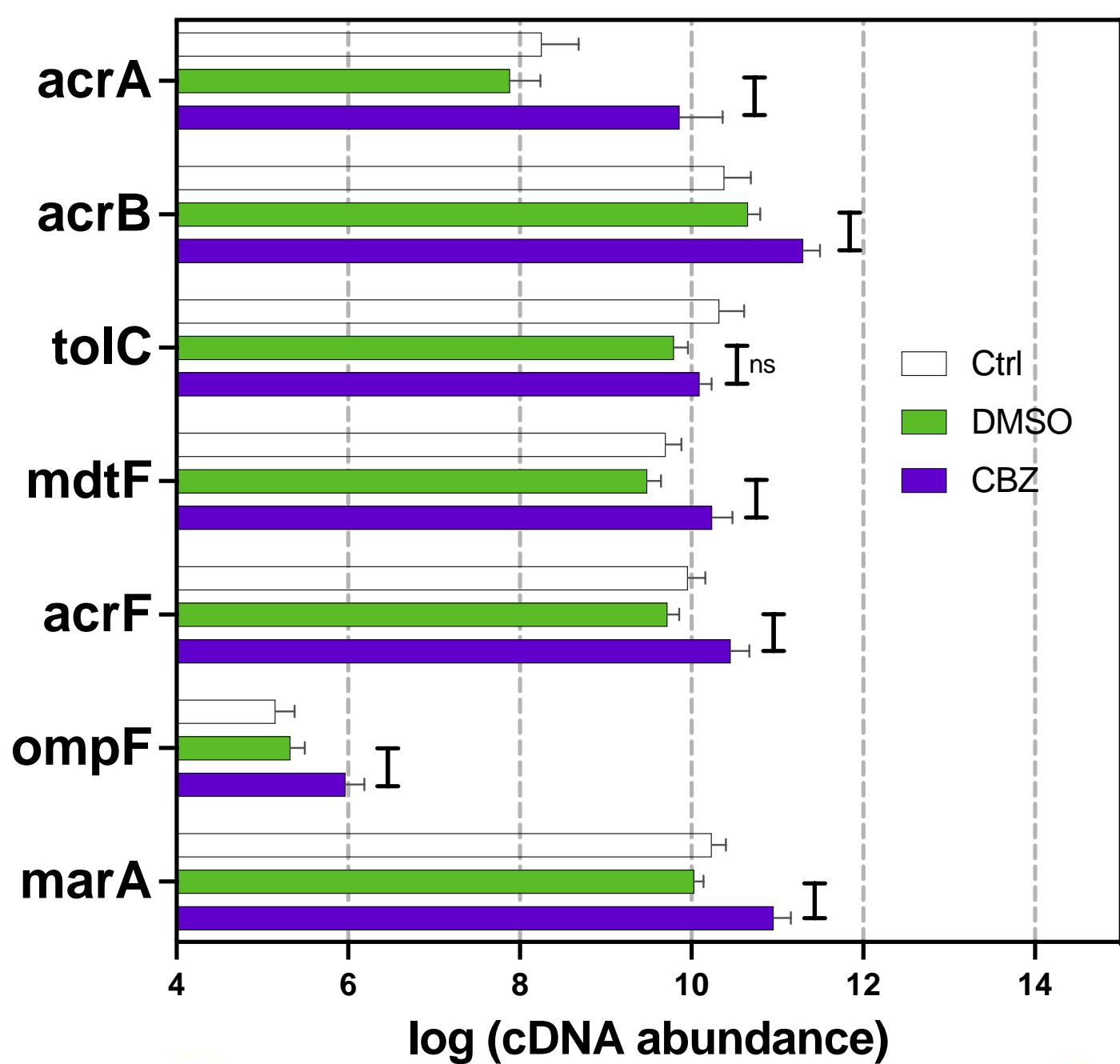
Repetitive exposure to carbamazepine impact the community composition



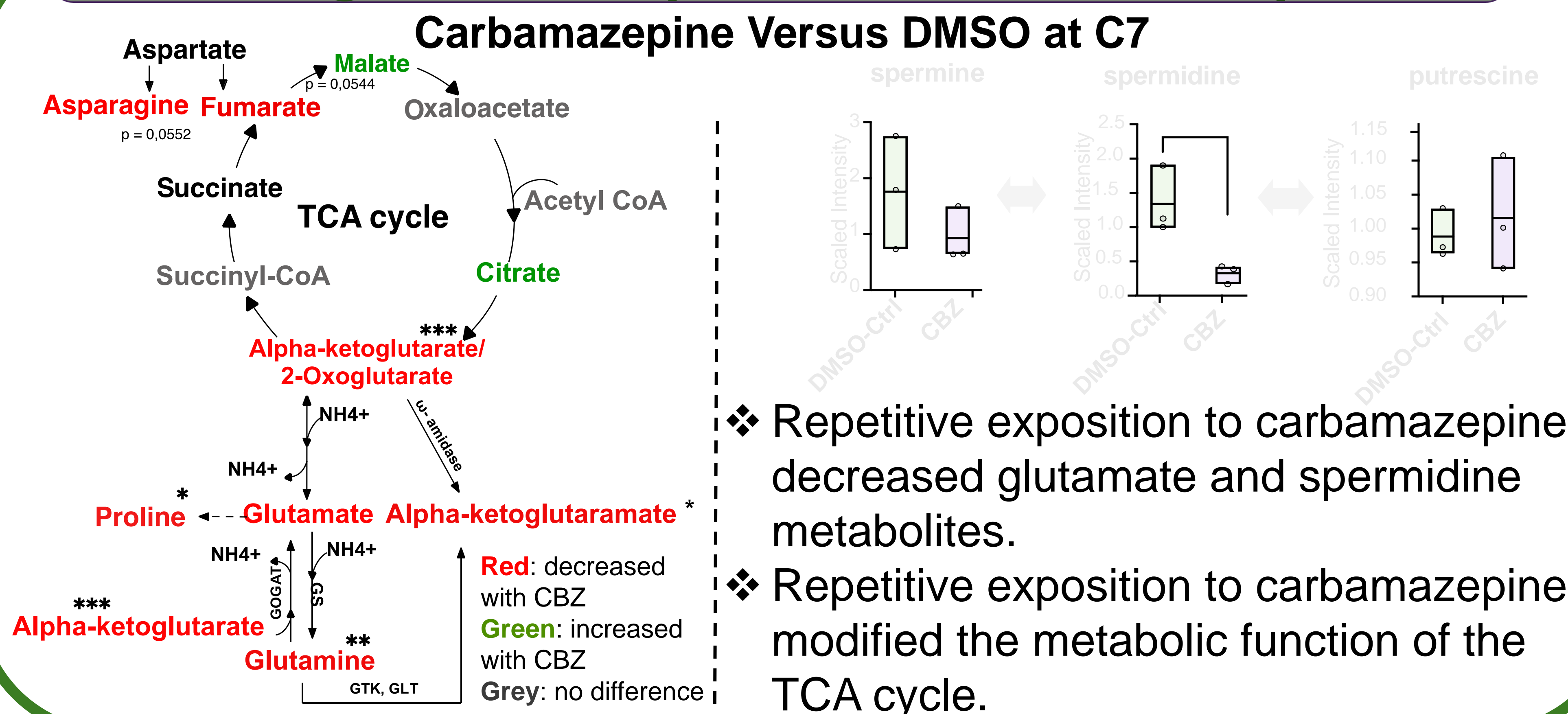
❖ Longitudinal exposure to carbamazepine modified the microbiome composition.
❖ Partial recovery after 4 drug-free cycles (C11).

Increased in ARGs expression

Repetitive exposure to carbamazepine increased the expression of ARGs



Shift in the microbiome metabolic function due to longitudinal exposure to carbamazepine

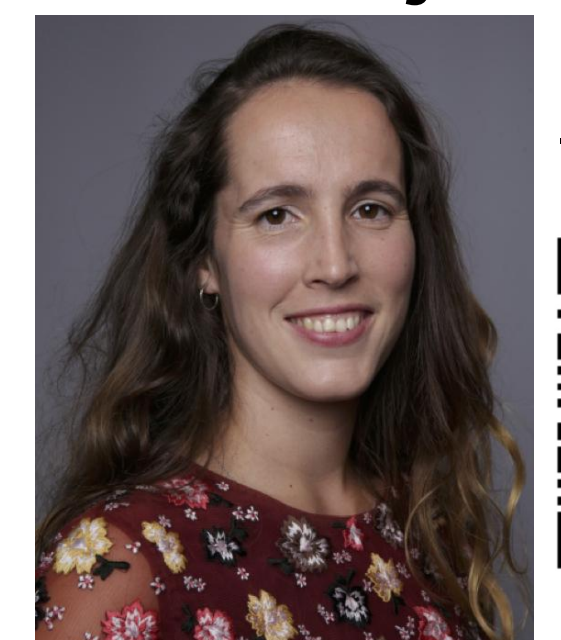


❖ Repetitive exposition to carbamazepine decreased glutamate and spermidine metabolites.
❖ Repetitive exposition to carbamazepine modified the metabolic function of the TCA cycle.

Conclusion

- ❖ Microcosms longitudinally developed based on inoculum feces composition.
- ❖ Repetitive carbamazepine exposure modified gut microbiome composition and increased ARGs expression.
- ❖ Carbamazepine exposure altered vital metabolic functions involving TCA cycles and polyamines of the gut microbial communities.

Where to join me!



LinkedIn link:



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¹Maier et al., PMID : 29666994, ²Cossotto et al., PMID : 30155748,

³Wang et al., PMID : 30291330,