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Parabens impact interactions among key bacterial members of the early-life gut microbiome

Zehra Esra Ilhan, Marie Aerts, Patricia Lepage

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Parabens impact interactions among key bacterial members of the early-life gut

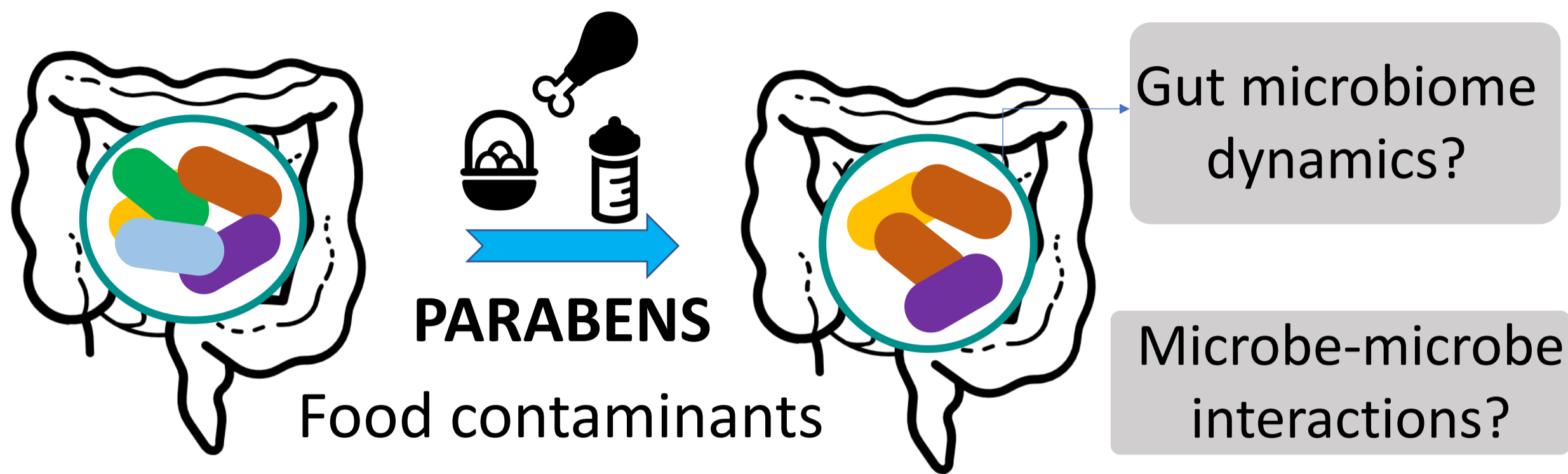
Zehra Esra ILHAN¹ (zehra-esra.ilhan@inrae.fr) ; Marie AERTS¹ ; Patricia LEPAGE¹

¹Université Paris-Saclay, INRAE, AgroParisTech, Micalis Institute, Jouy-en-Josas, 78350, France



BACKGROUND

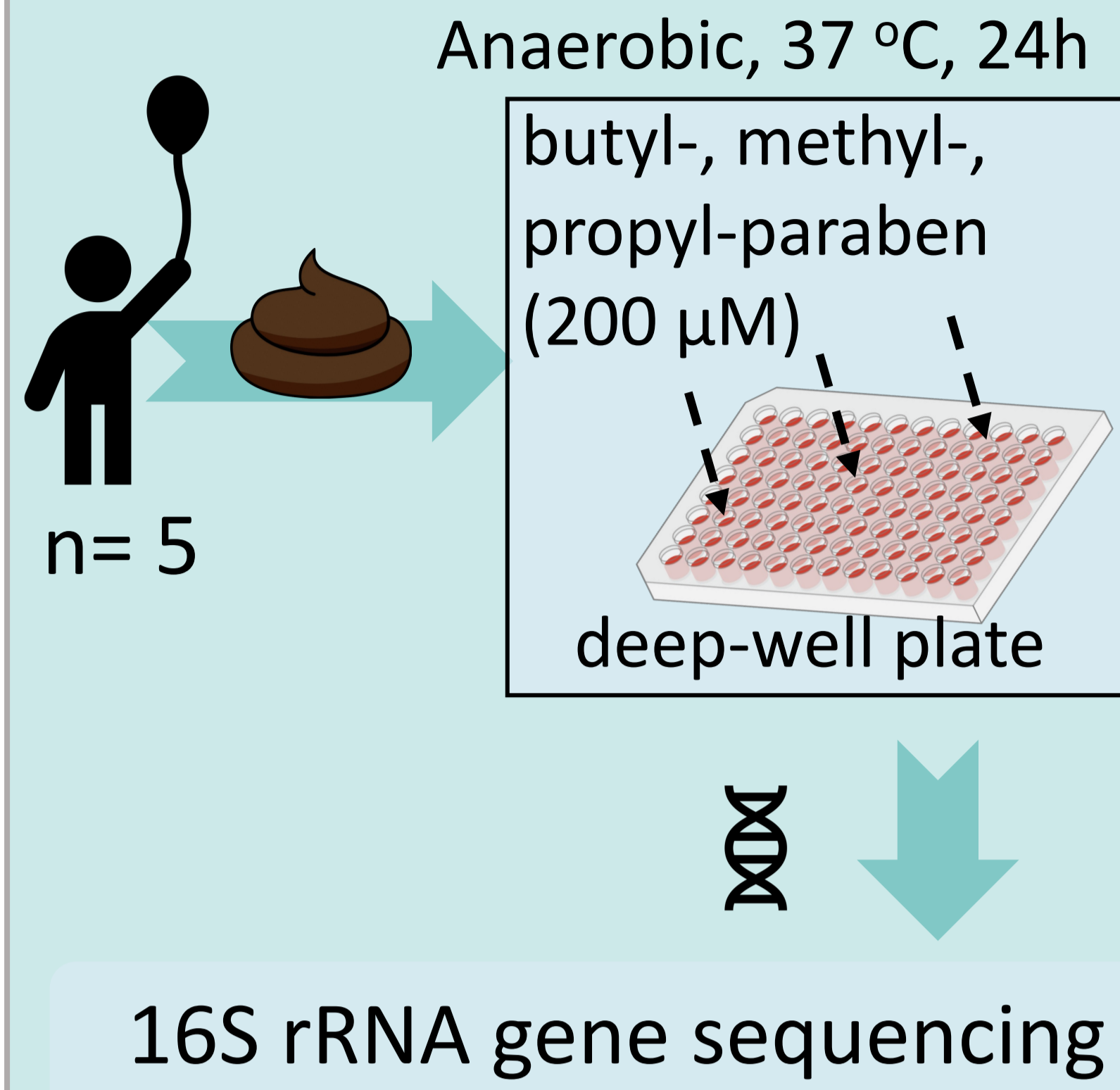
Early life microbiome plays a critical role in development and is vulnerable to xenobiotics.



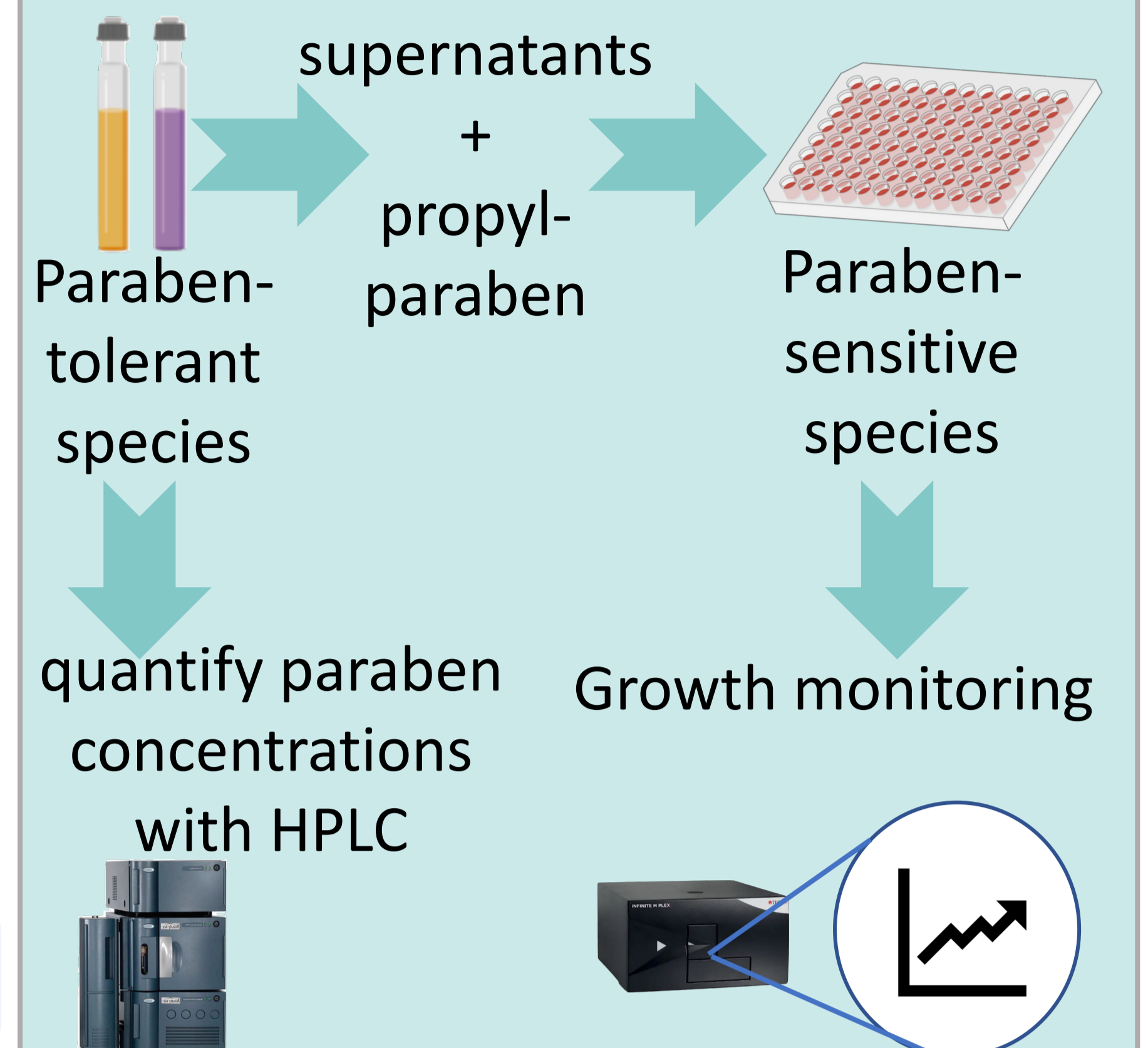
Parabens adversely impact the infant development, and reproductive function. Parabens may disturb gut microbiome dynamics.

EXPERIMENTAL DESIGN

Community Response



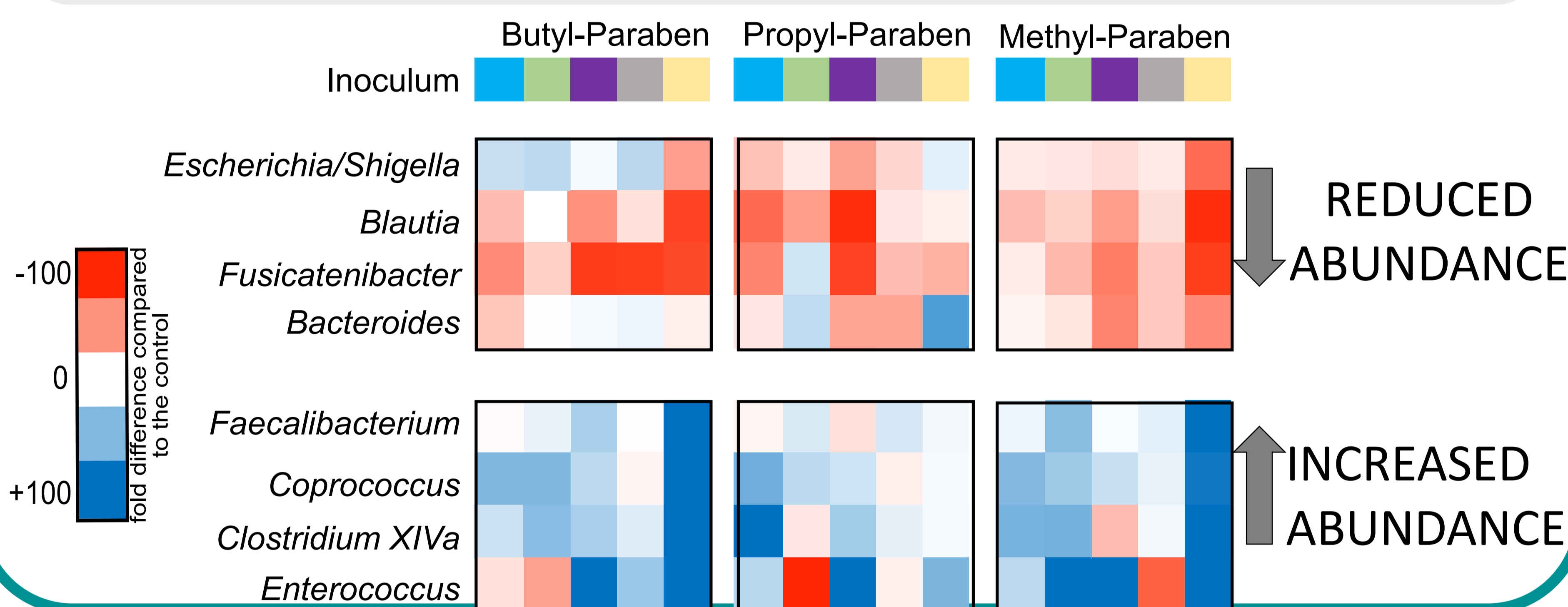
Microbe-paraben interactions



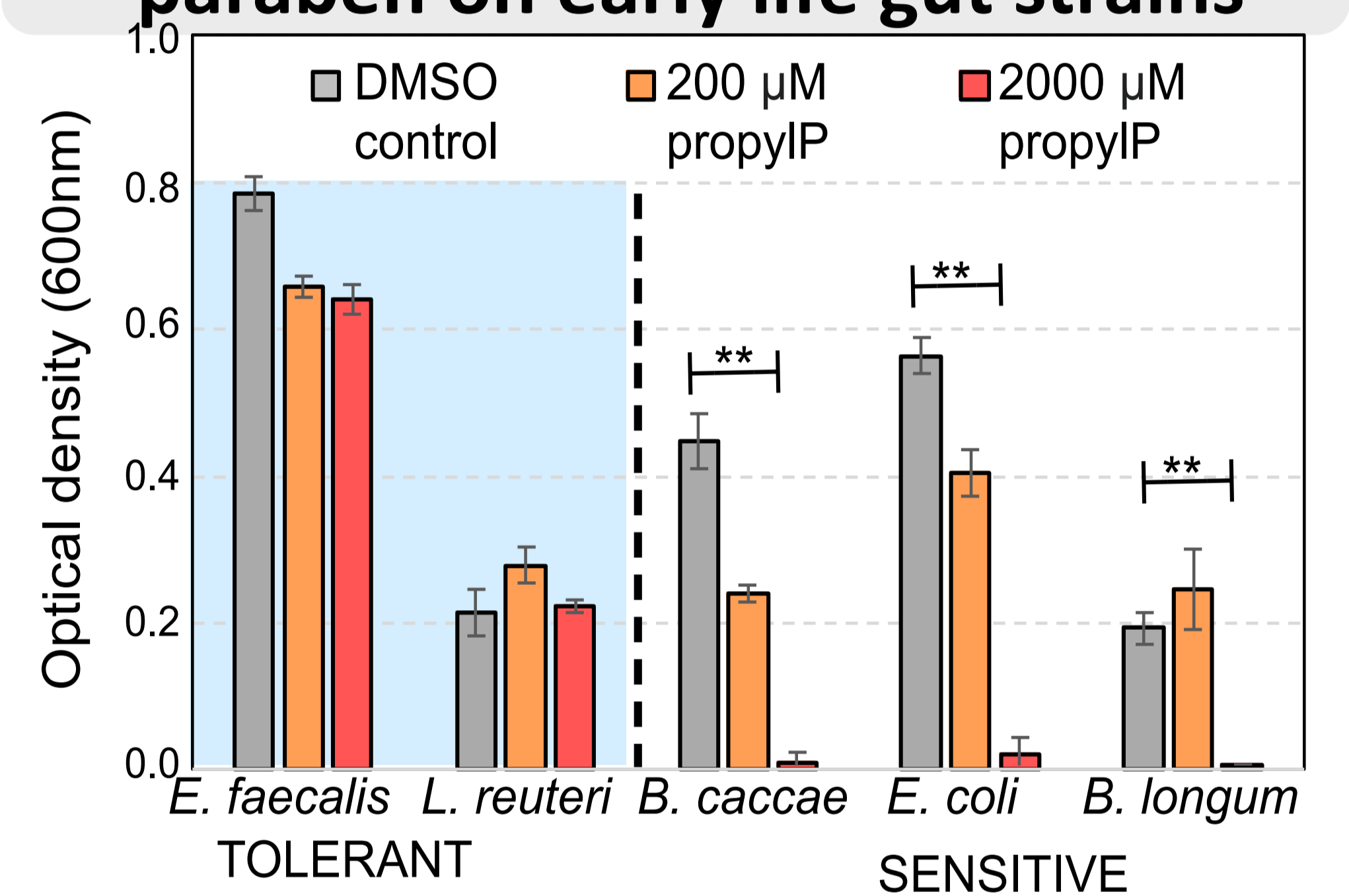
OBJECTIVE: Identify the effects of parabens on gut communities and dissect microbe-microbe interactions as a response to paraben toxicity.

RESULTS

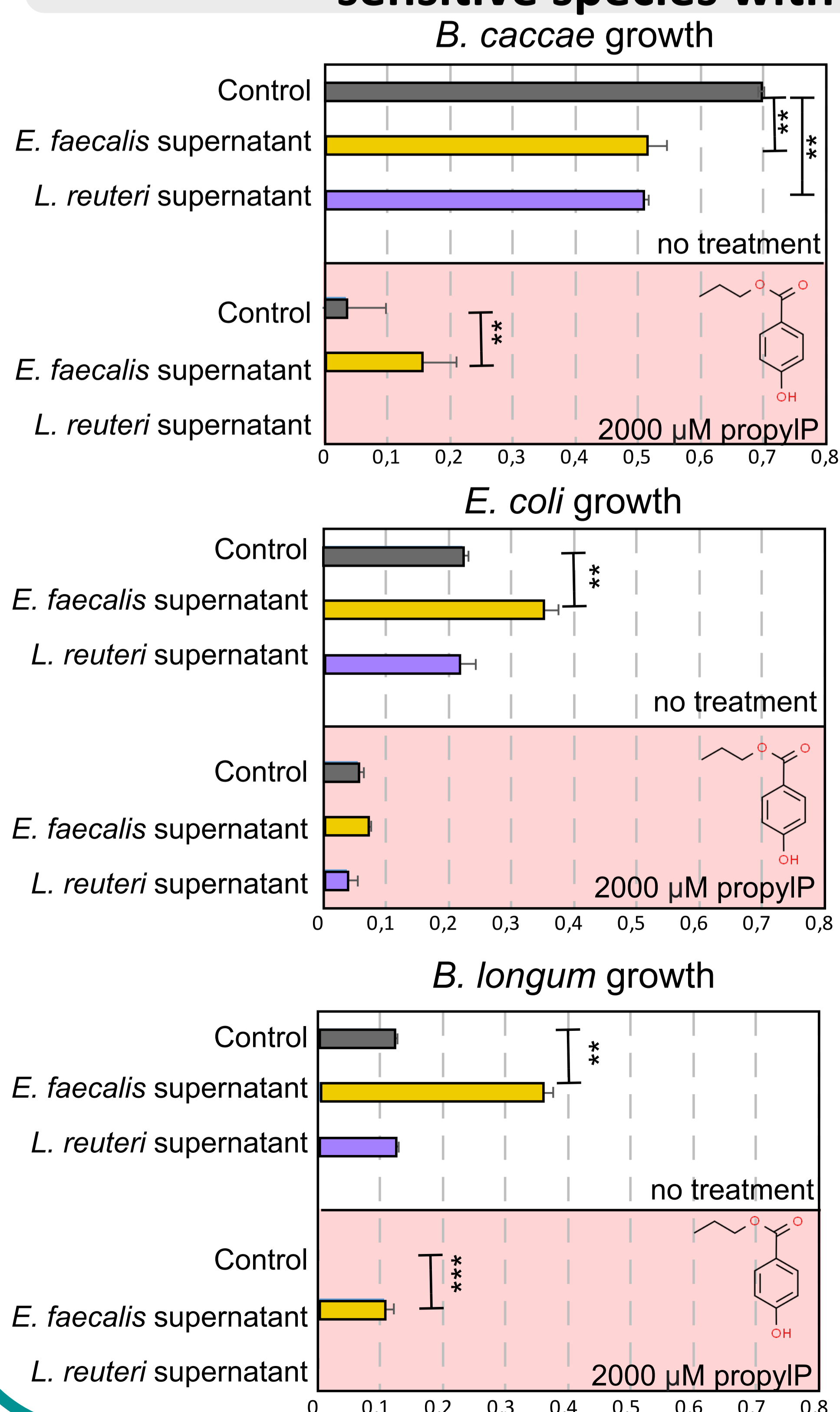
Parabens altered the mixed microbial community dynamics



Strain-specific ecotoxicity of propyl-paraben on early life gut strains

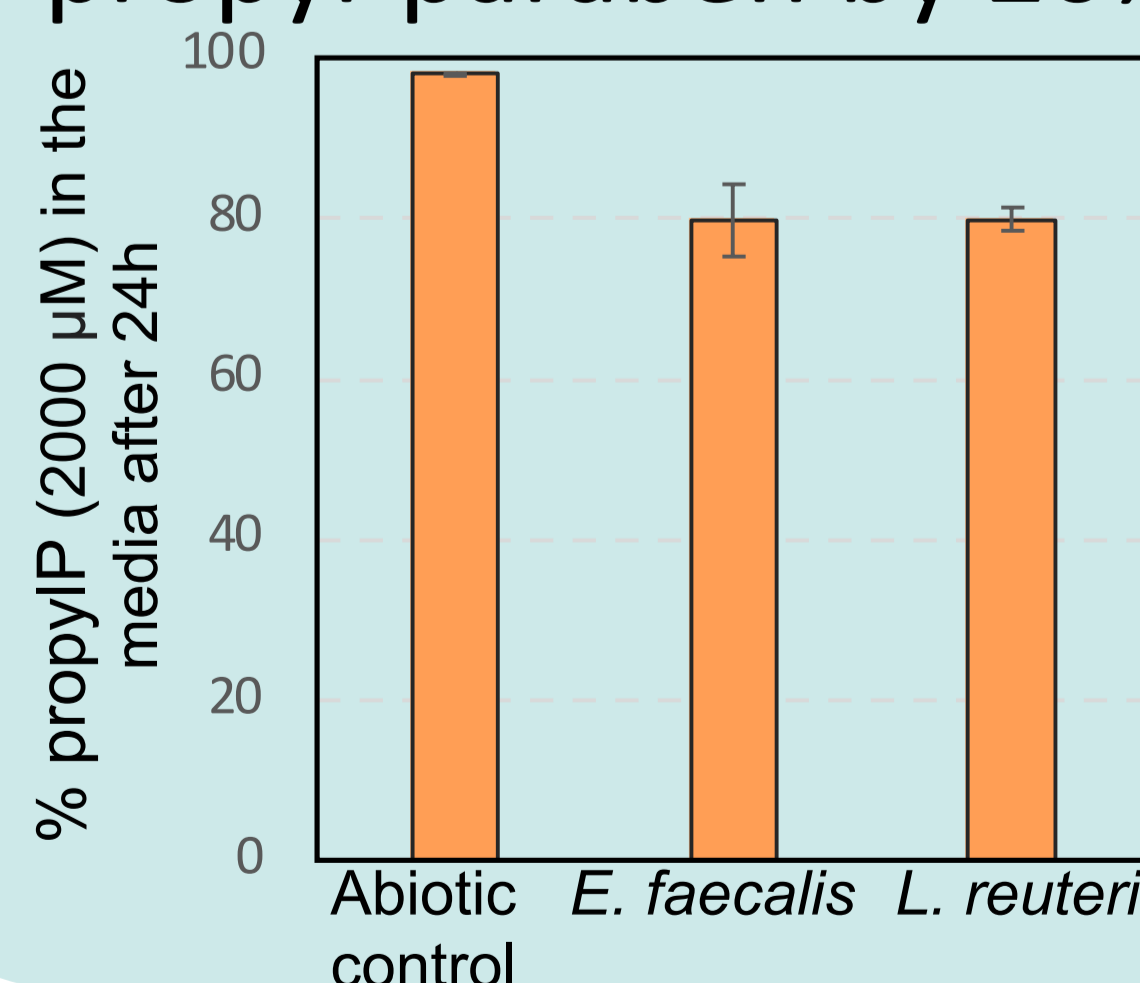


Cell-free supernatants of the tolerant species impact growth of sensitive species with propyl-paraben



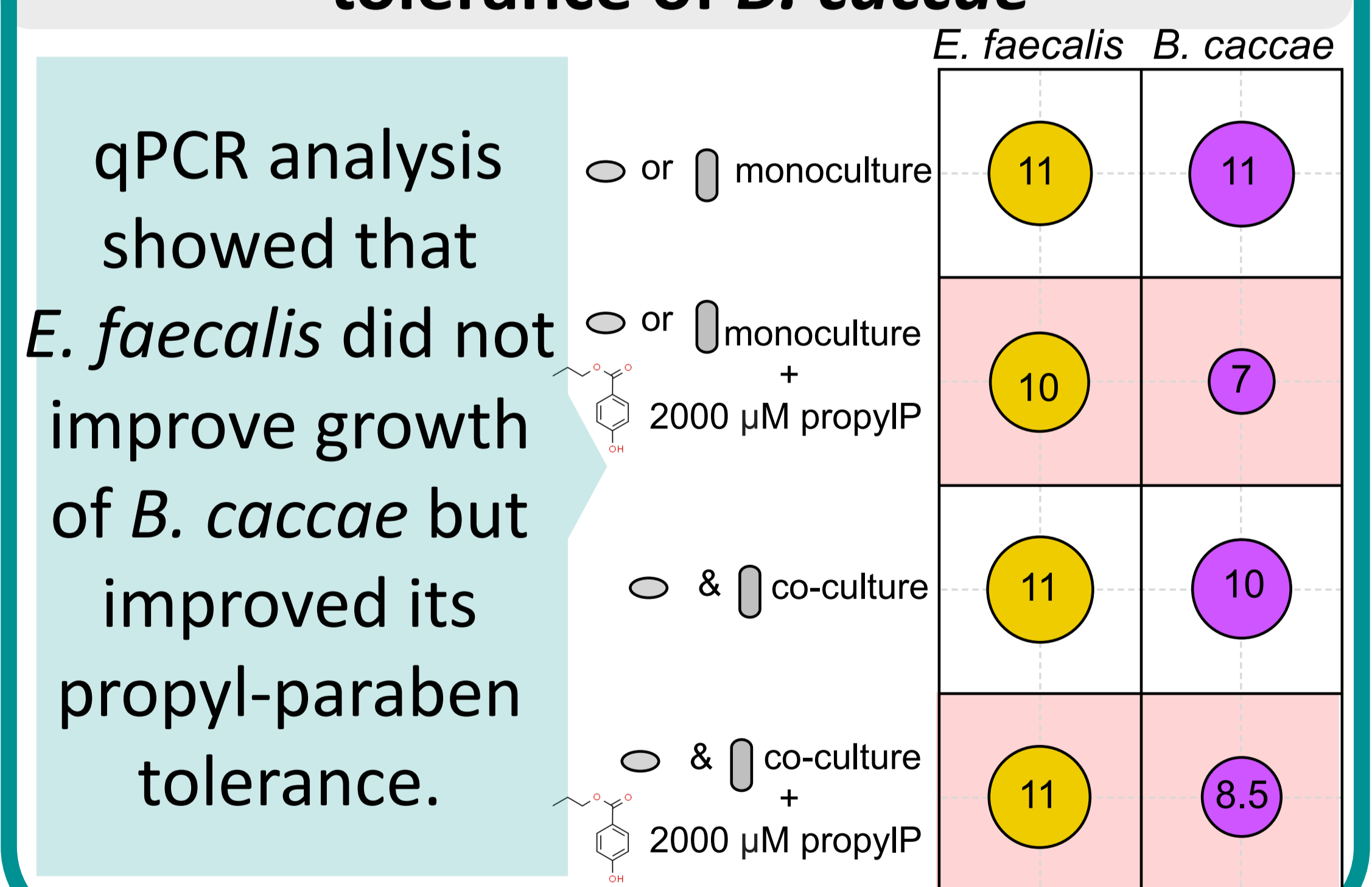
E. faecalis but not *L. reuteri* supernatants improved the growth of *E. coli* and *B. longum*

L. reuteri and *E. faecalis* reduced bioavailability of propyl-paraben by 20%



E. faecalis supernatant reduced toxicity of propyl-paraben for *B. caccae* and *B. longum*.

Co-cultivation improved propyl-paraben tolerance of *B. caccae*



SUMMARY

- Parabens influence gut microbiome composition at low concentrations.
- Metabolites produced by *E. faecalis* improved growth of sensitive species in the presence of propyl-paraben.
- Bi-directional interactions between gut species may strengthen xenobiotic tolerance in the gut.