

Deciphering the dynamics of antibiotic resistance transfer through natural transformation in bacterial communities

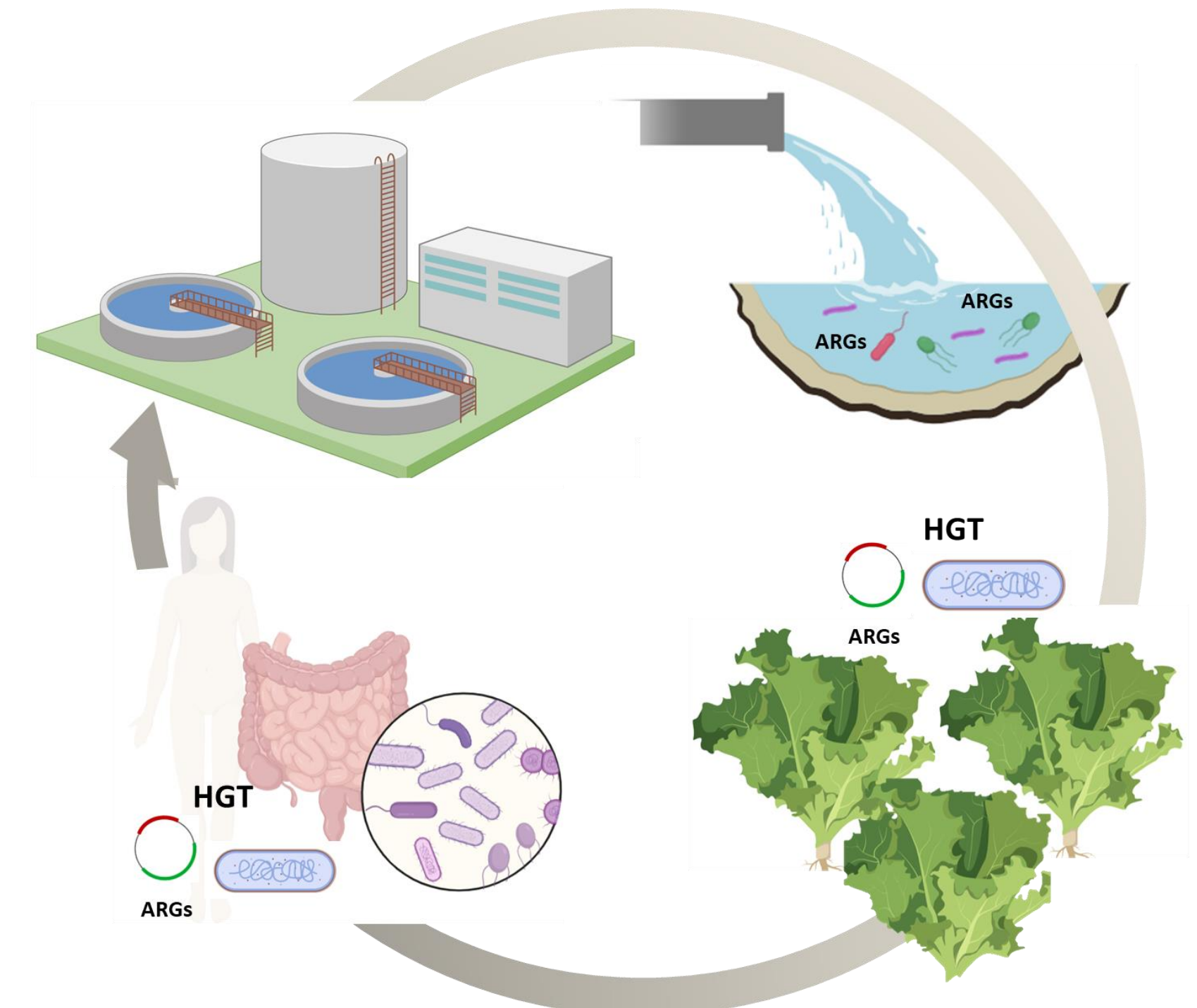
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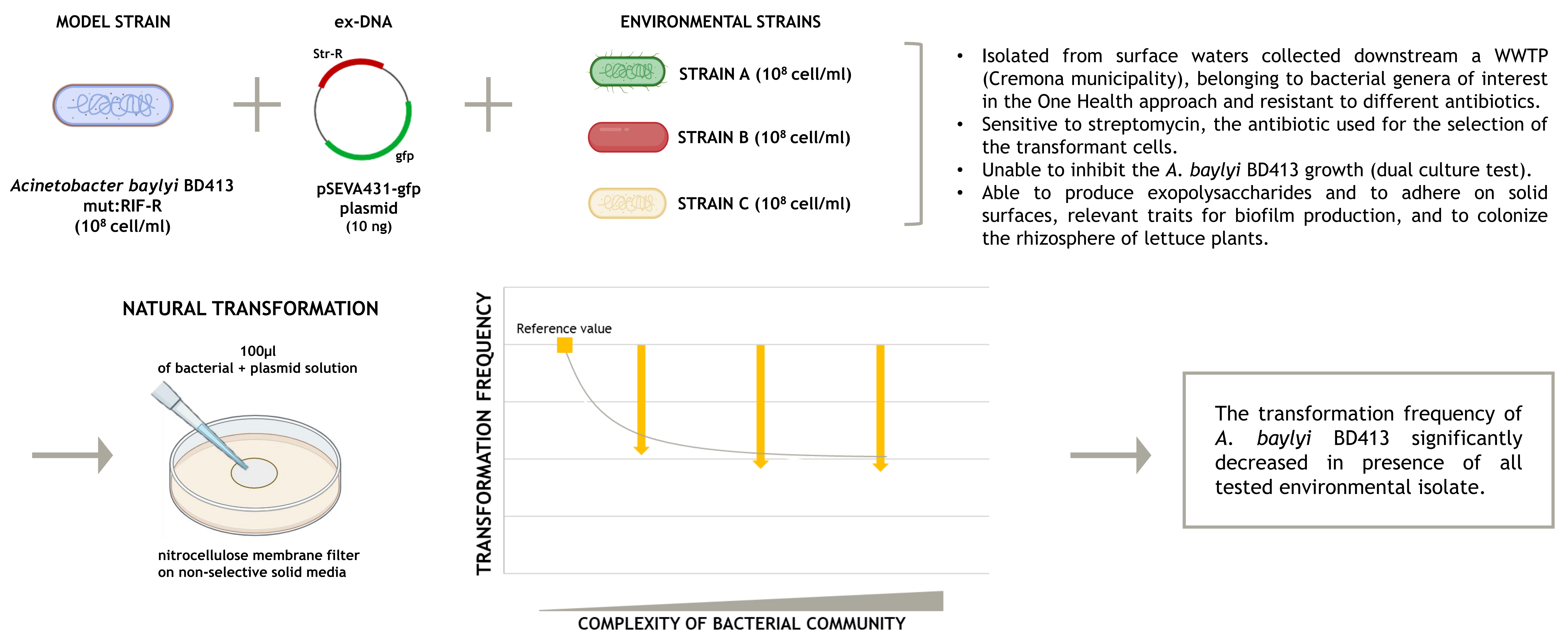
AGRI-FOOD SYSTEMS ARE CRUCIAL HOTSPOTS FOR ANTIBIOTIC RESISTANCE DIFFUSION UNDER THE ONE HEALTH PERSPECTIVE

- Environmental studies showed Wastewaters Treatment Plants (WWTP) as one of the most relevant release points of Antibiotic Resistance Genes (ARGs) and Antibiotic resistance Bacteria (ARB) (Castiglioni et al., 2006)
- Acquisition of ARGs via Horizontal Gene Transfer (HGT) can occur in aquatic environment (Riva F. et al 2020) and on edible lettuce leaves (Riva V. 2022). Moreover, exogenous DNA (ex-DNA) and transformants of the recipient bacterium (*Acinetobacter baylyi* BD413) applied on lettuce leaf surface were also found in the internal tissue of the leaves after 24 hours.
- Maeusli et al., 2020 demonstrated that *Acinetobacter baylyi* BD413 can transfer plasmid DNA carrying ARGs to *E. coli* clinical isolates on leaf discs and that the *E. coli* transformant cells can subsequently colonize the mice gut and transfer the antibiotic resistance determinants to mice gut microbiome *in vivo*.

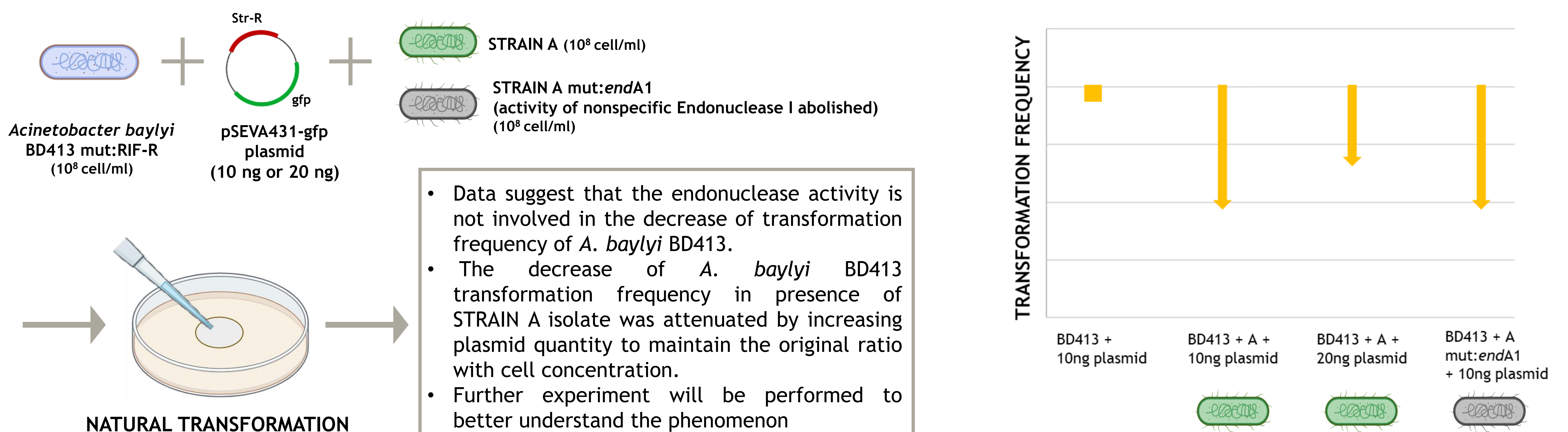


HGT events are mostly verified in simplified systems:

WHAT IF CONSIDERING A BACTERIAL COMMUNITY AND THE OCCURRING ECOLOGICAL INTERACTIONS?



Clarifying the mechanisms behind the observed phenomenon



Overall, our data suggests that is pivotal to integrate the effects of ecological interactions occurring in bacterial communities to better estimate HGT occurrence into the environment.

References

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- Riva, F. et al. 2020. *AFrontiers in microbiology*, 11, 574301
- Maeusli, M. et al. 2020. *MSphere*, 5(3), 10-1128