Resistome flow in global landfill systems

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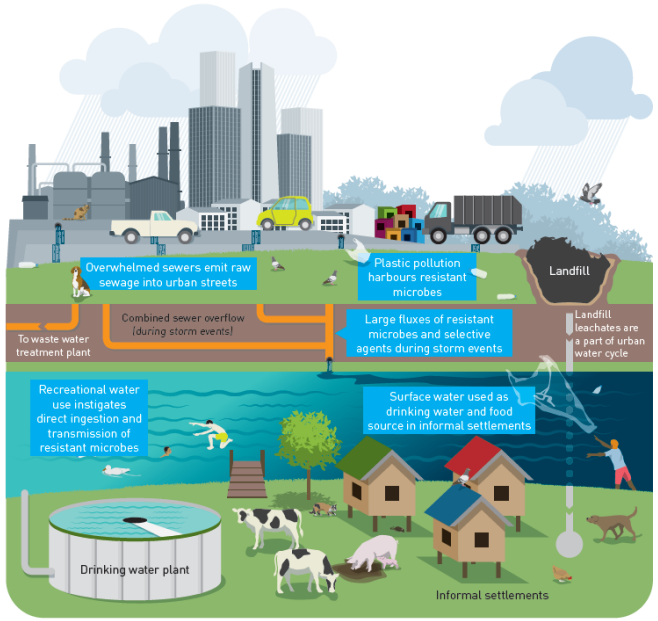
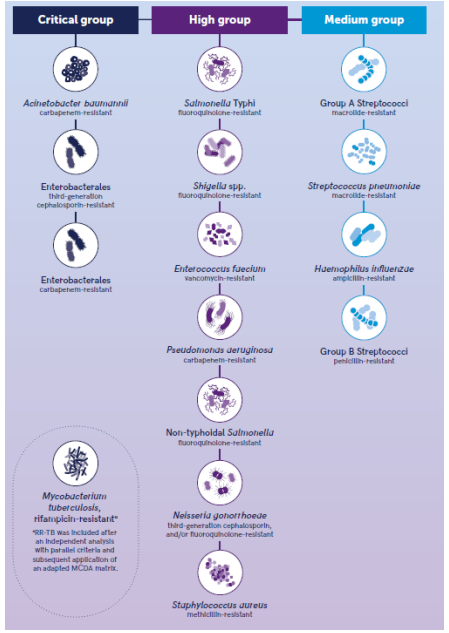
Introduction

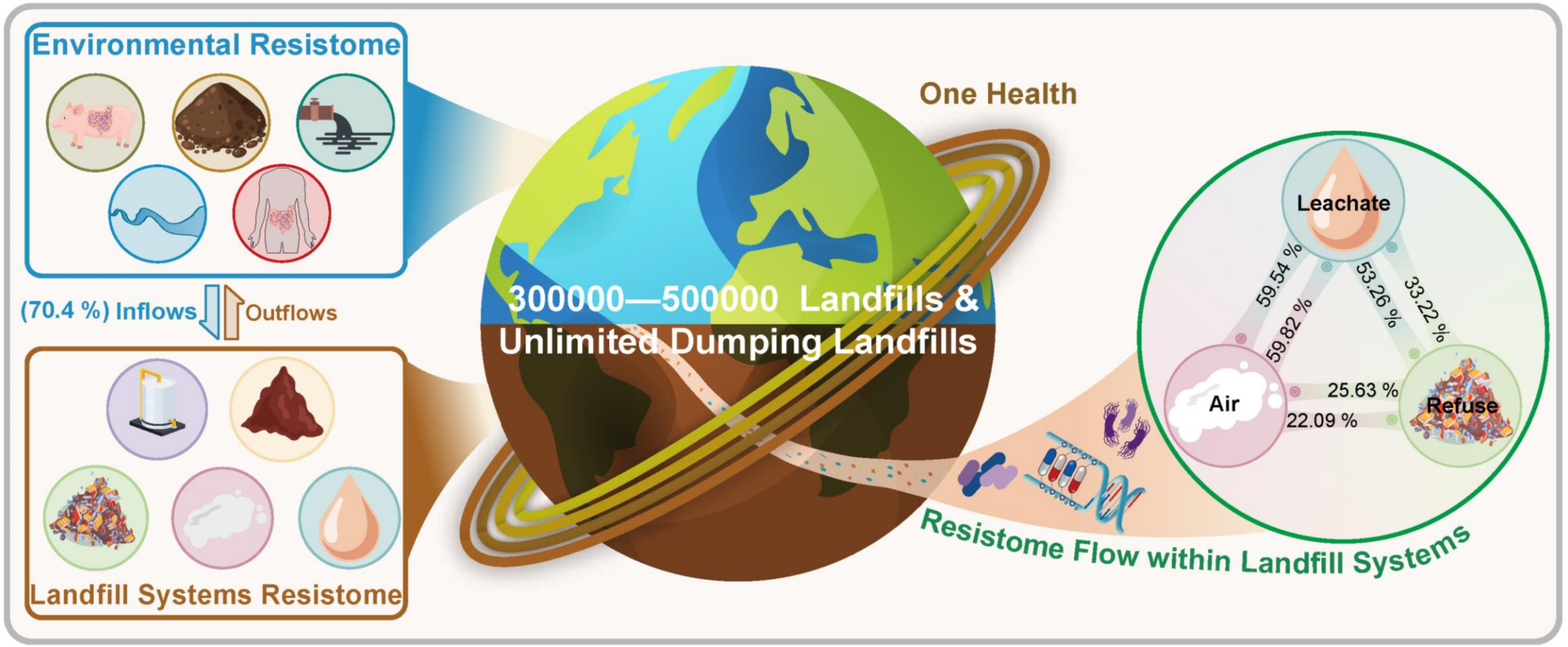
- Landfill resistomes is a crucial component in the "One Health" framework;
- Global distribution & transmission mechanisms of landfill resistomes remain poorly understood;
- Pathogens and associated risks in landfill systems remain largely unquantified.





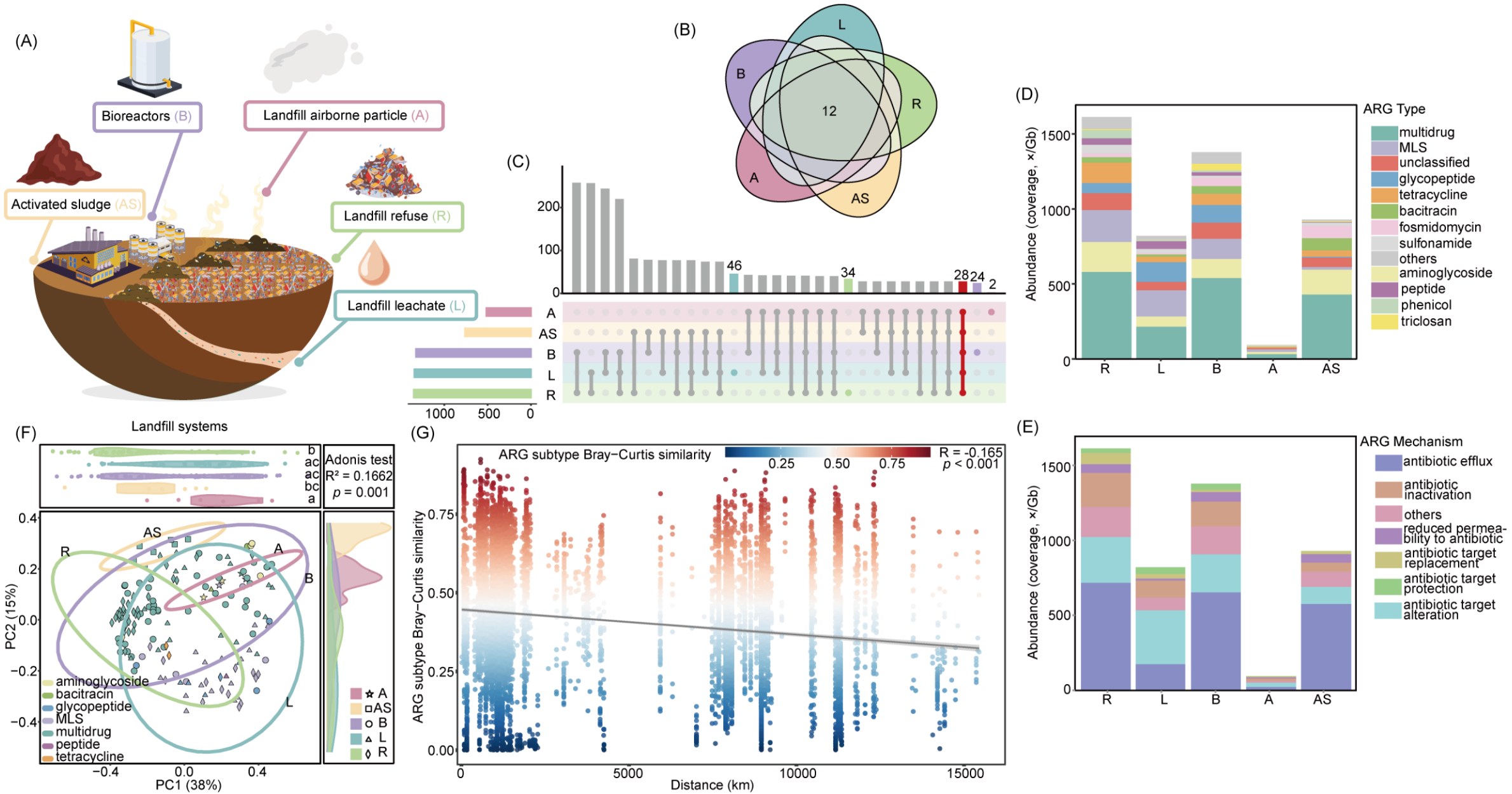
(World Bank Group, 2018; UNEP, 2023; WHO, 2024)

Highlights

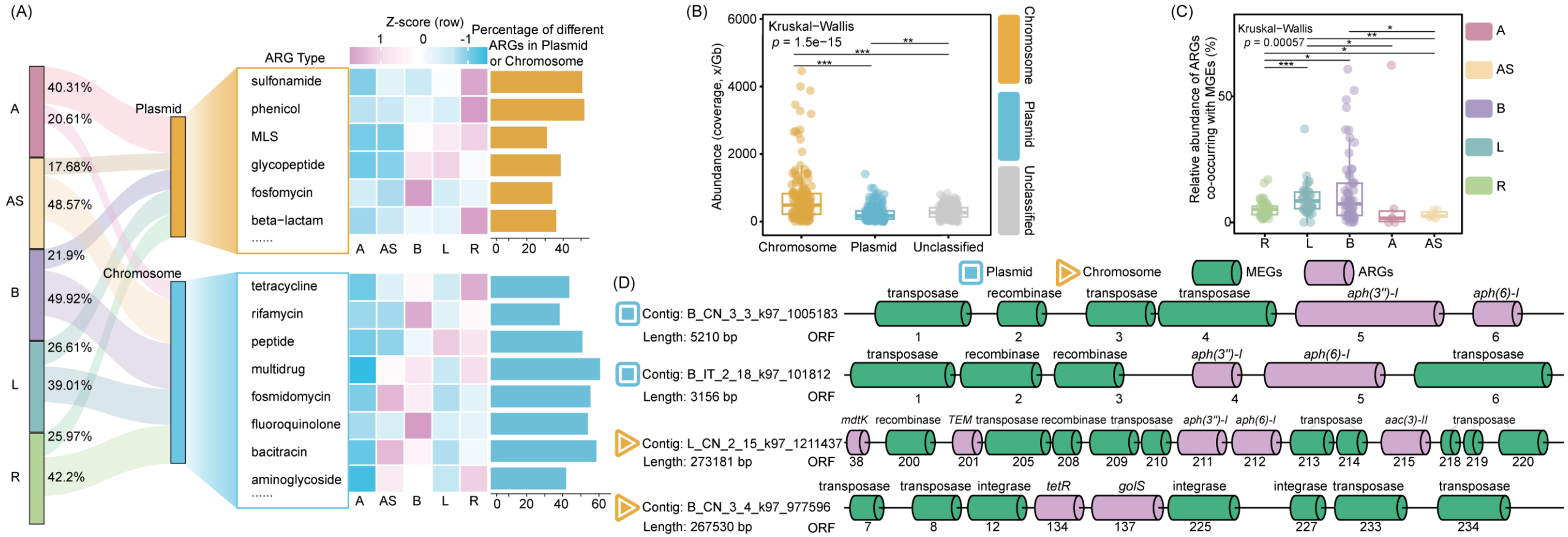


- This study characterized the resistome flow by tracking its pathways into, within, and out of landfill systems.

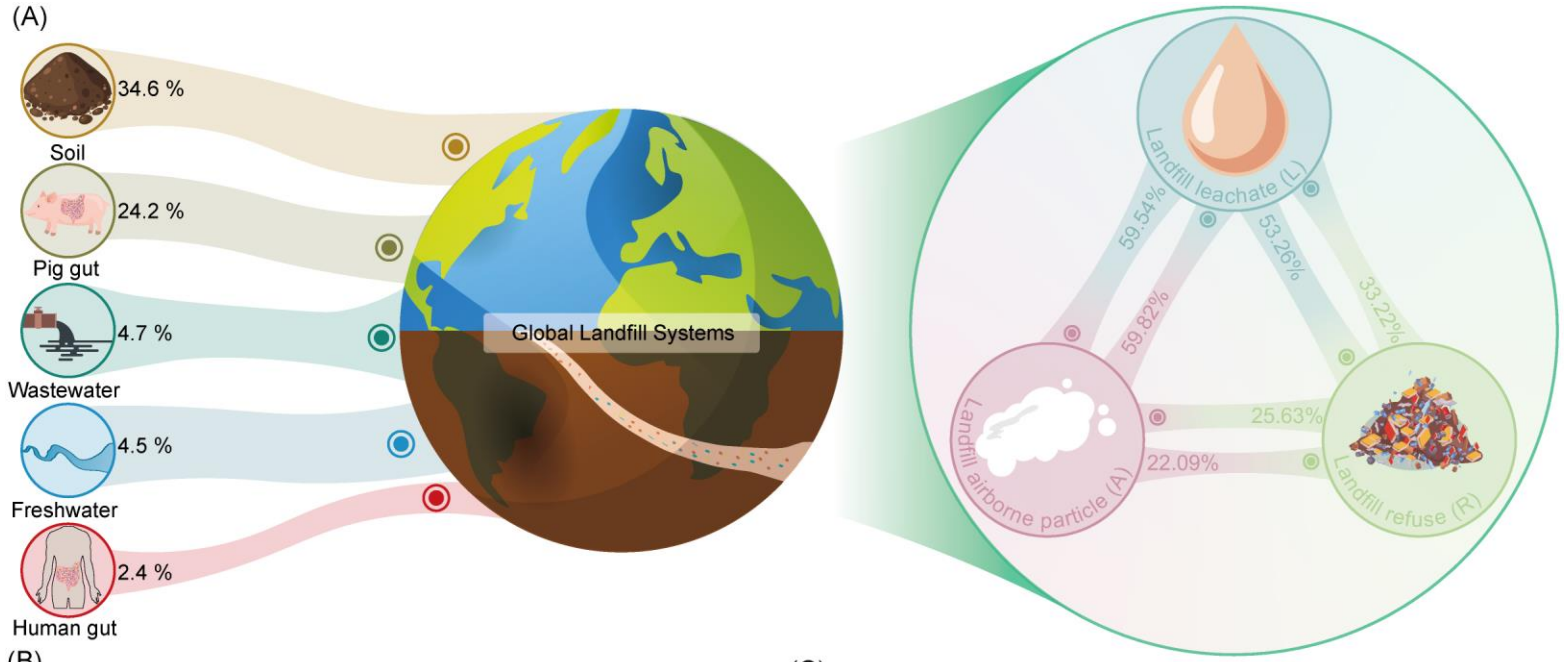
MDRGs are the main ARGs

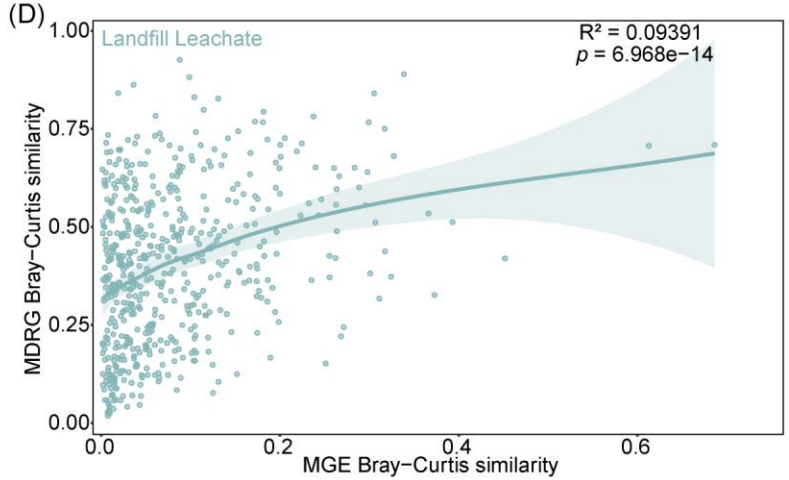


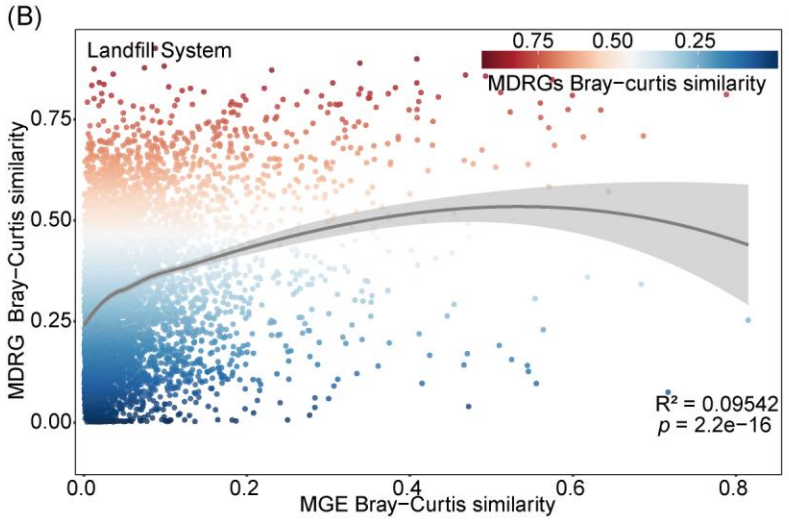
Higher ARG density on plasmid-associated contigs

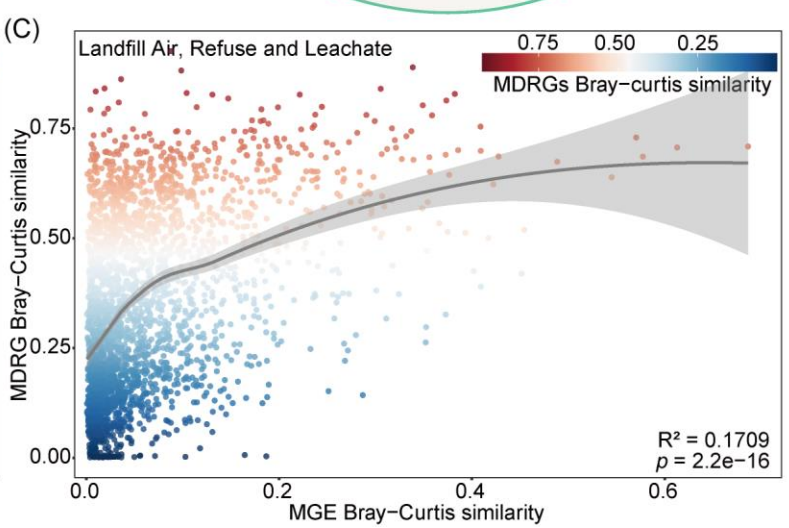


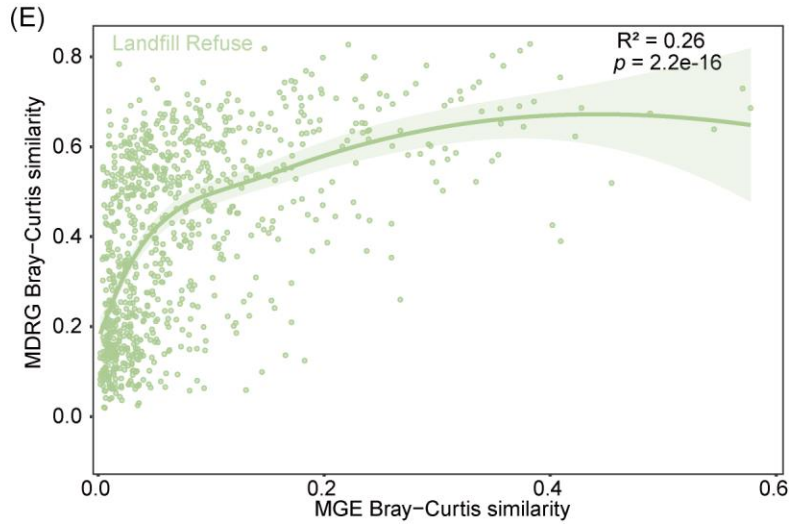
Evidence of ARG transmission from inputs to effluents



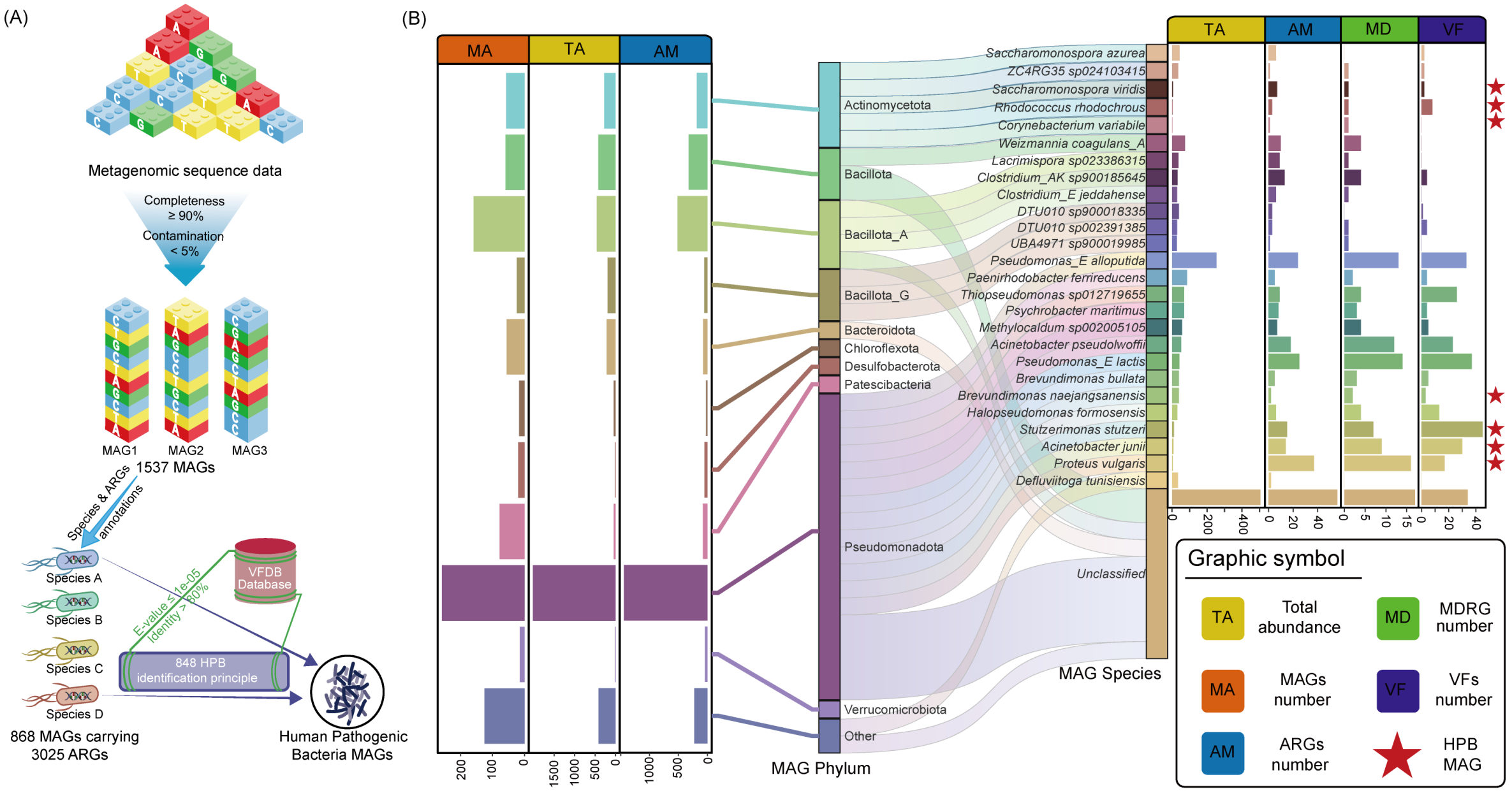




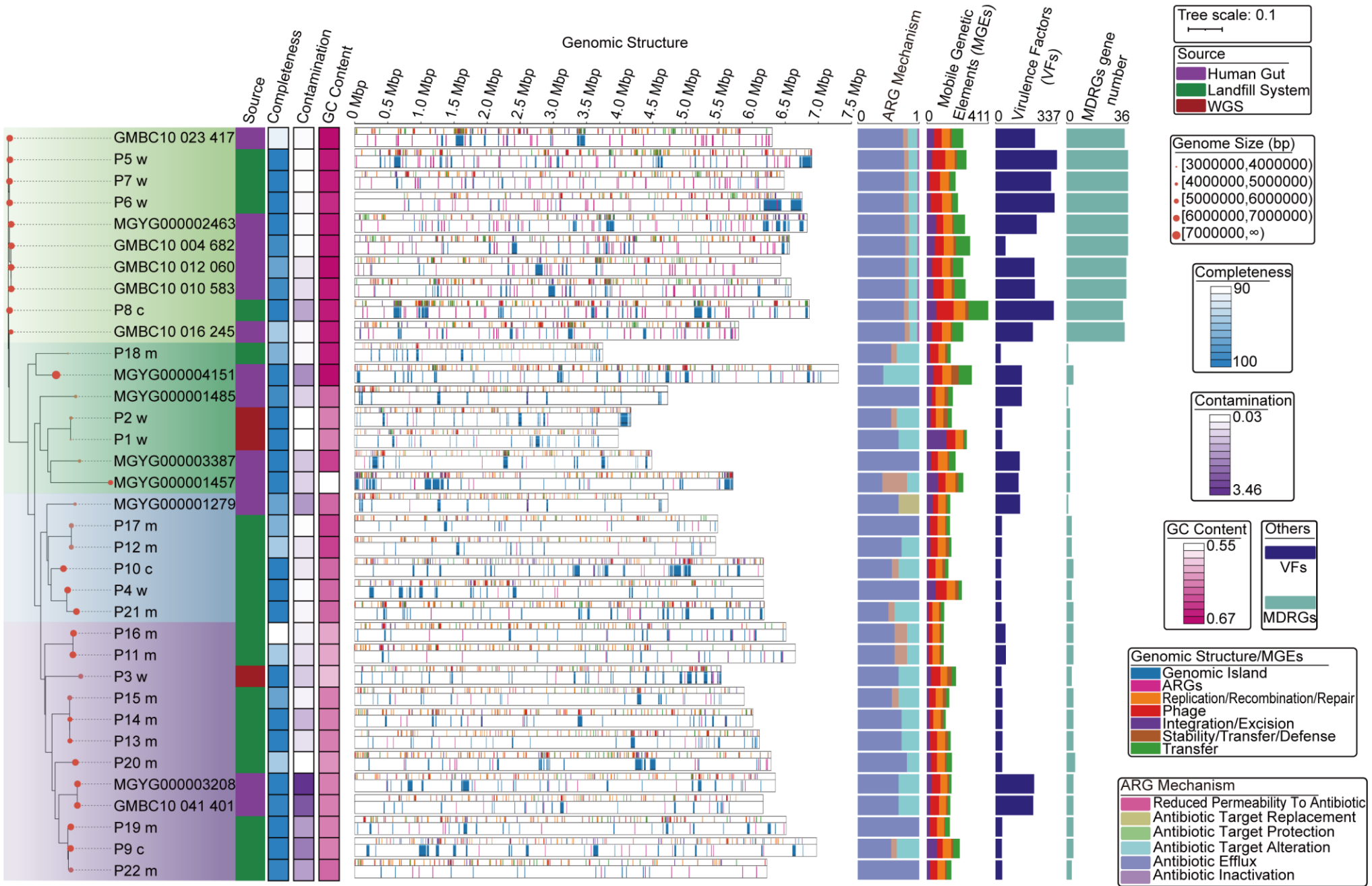




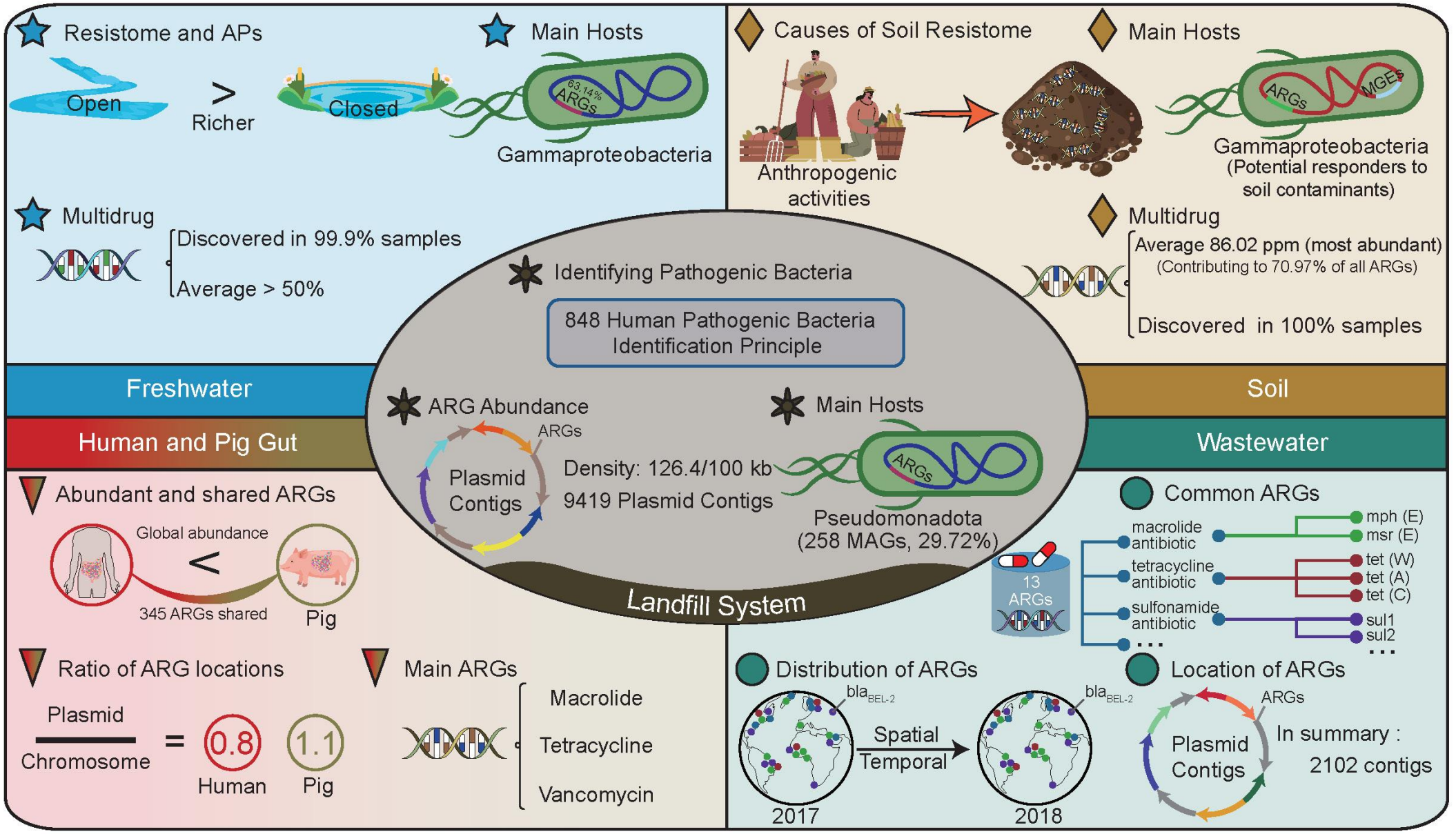
Phylum Pseudomonadota dominates resistome carriers



Pseudomonas spp. Genomes



Comparative ARG profile across representative environments



Summary

- We address the knowledge gap on landfill resistome highlighted in UNEP "Bracing for Superbugs" report;
- We also constructs resistome transmission pathways, delineating inflow to, internal movement within, and outflow from landfill systems;
- We further clarify the processes of governing resistomes emergency, evolution, and dissemination, underscoring implications for public health and environmental security.

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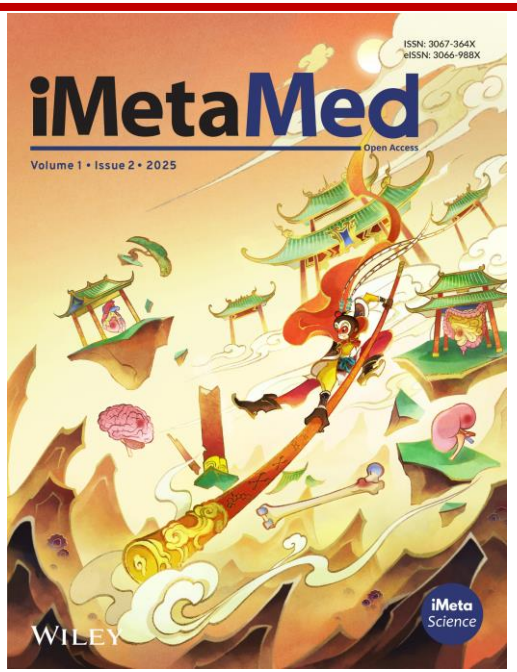

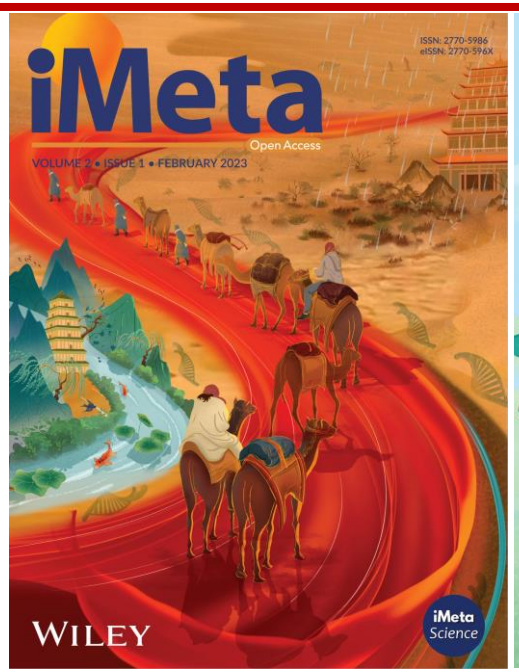

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