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623. Dynamic Nature of the Gut Resistome Among Infants in Singapore
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Background. The gut microbiome harbors antibiotic resistance genes (ARGs), known as the resistome, that has the potential to spread and contribute to the global
Methods. We analyzed ARGs among a subset of infants from the Growing Up in Singapore Towards Healthy Outcomes (GUSTO) birth cohort. The subset included 75 mostly term, healthy Singaporean infants born from November 2009 to May 2011. Stool samples were collected at Week 3 (W3), months 3 (M3), 6 (M6) and 12 (M12) were analyzed using shotgun metagenomics. Sequencing reads were assembled into contigs using USEARCH. ARGs were identified using ResFinder 2.1. Demographic, perinatal factors, pre- and postnatal antibiotic exposure were collected.

Results. Only four and eighty-eight stool samples from 75 infants were studied. Of the 169 ARGs detected, the four most common ARGs were blaZ, fosA, tet(M) and mef(A), conferring resistance to β-lactams, fosfomycin, tetracyclines, and macrolides respectively. The number of ARGs per infant increased over time (median: W3 = 18.0, M12 = 22.0, P < 0.05). At W3, 118 ARGs were detected among 28 infants. The most prevalent ARGs were fos(A) and blaZ (both 96.4%) at W3. Among the 22 infants who had samples at W3 and M12, only six of 118 ARGs detected at W3 were also present at M12. These were mef(D), msr(D), tet(W), erm(B), tet(M) and fosA, conferring macrolide and tetracycline resistance. Their prevalence among at M12 was 100%, 93.3%, 90.9%, 94%, 68.8% and 52%, respectively. ARGs were not associated with gender, race, delivery mode, peripartum or postnatal antibiotics in infancy. Of note, longitudinal analysis showed that only the cfx(A) gene, which confers β-lactam resistance, was marginally associated with antibiotic received in pregnancy than those whose mothers did not adjust (P < 0.05).

Conclusion. In regions with high endemic antimicrobial resistance such as Singapore, the infant gut harbors a diversity of ARGs as early as 3 weeks of age. Few ARGs persisted through infancy, implying the dynamic nature of the infant resistome. The lack of association of ARGs with most clinical variables evaluated here suggests that other unrecognized factors may contribute to the plasticity of ARGs in the infant gut resistome.

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