The Environmental Exposures and Inner- and Intercity Traffic Flows of the Metro System May Contribute to the Skin Microbiome and Resistome

The skin functions as the primary interface between the human body and the external environment. To understand how the microbiome varies within urban mass transit and influences the skin microbiota, we profiled the human palm microbiome after contact with handrails within the Hong Kong Mass Transit Railway (MTR) system. Intraday sampling time was identified as the primary determinant of the variation and recurrence of the community composition, whereas human-associated species and clinically important antibiotic resistance genes (ARGs) were captured as p.m. signatures. Line-specific signatures were notably correlated with line-specific environmental exposures and city characteristics. The sole cross-border line appeared as an outlier in most analyses and showed high relative abundance and a significant intraday increment of clinically important ARGs (24.1%), suggesting potential cross-border ARG transmission, especially for tetracycline and vancomycin resistance. Our study provides an important reference for future public health strategies to mitigate intracity and cross-border pathogen and ARG transmission.