High frequencies of antibiotic resistance genes in infants’ meconium and early fecal samples - DTU Orbit (12/02/2019)

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The gastrointestinal tract (GIT) microbiota has been identified as an important reservoir of antibiotic resistance genes (ARGs) that can be horizontally transferred to pathogenic species. Maternal GIT microbes can be transmitted to the offspring, and recent work indicates that such transfer starts before birth. We have used culture-independent genetic screenings to explore whether ARGs are already present in the meconium accumulated in the GIT during fetal life and in feces of 1-week-old infants. We have analyzed resistance to β-lactam antibiotics (BLr) and tetracycline (Tcr), screening for a variety of genes conferring each. To evaluate whether ARGs could have been inherited by maternal transmission, we have screened perinatal fecal samples of the 1-week-old babies’ mothers, as well as a mother–infant series including meconium, fecal samples collected through the infant’s 1st year, maternal fecal samples and colostrum. Our results reveal a high prevalence of BLr and Tcr in both meconium and early fecal samples, implying that the GIT resistance reservoir starts to accumulate even before birth. We show that ARGs present in the mother may reach the meconium and colostrum and establish in the infant GIT, but also that some ARGs were likely acquired from other sources. Alarmingly, we identified in both meconium and 1-week-olds’ samples a particularly elevated prevalence of mecA (>45%), six-fold higher than that detected in the mothers. The mecA gene confers BLr to methicillin-resistant Staphylococcus aureus, and although its detection does not imply the presence of this pathogen, it does implicate the young infant’s GIT as a noteworthy reservoir of this gene.

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