Antibiotic treatment of rat dams affects bacterial colonization and causes decreased weight gain in pups

Intergenerational transmission of bacteria during birth initiates the natural successional development of the intestinal microbiota in mammals. This process can be disrupted by antibiotic exposure, potentially affecting early-life microbiota-dependent metabolic programming. In the present study, we specifically investigate the metabolic consequences of exposing neonate Wistar rats to an antibiotic-perturbed low-diversity microbiota from birth until weaning, without exposing the pups directly to antibiotics. Here, we show that pups born from both amoxicillin and vancomycin-treated dams gain less weight than controls. This was concordant with lower feed intake as well as increased colonic expression of the PYY satiety hormone gene at weaning. The weight difference persists into adulthood even though the initial differences in gut microbiota subsided. Our results demonstrate that early-life exposure to an antibiotic-perturbed low-diversity microbiota is sufficient to cause changes in body weight persisting into adulthood.