Microbiota Composition in HIV-positive and HIV-Exposed Uninfected Pediatric Subjects

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A profound gut dysbiosis has been described in HIV+ adults, destabilizing the intestinal barrier and promoting disease progression. While in infants in utero HIV exposure and maternal microbiota seem to be the major players in shaping the microbiota composition and immune system, little is known on what happens in older pediatric subjects. We investigated fecal microbiota composition, intestinal barrier integrity and monocyte activation in HIV+ vs HIV-exposed uninfected (HEU) pediatric subjects.

We enrolled 80 children/adolescent (≤18 years), born from HIV+ mothers. Exclusion criteria: age <1year, hepatitis co-infection, prebiotic supplementation, antibiotic use in the past 2 weeks. Specimen: plasma, stool. Lab analyses: gut damage (I-FABP, E-Cadherin) and monocyte activation (sCD14) markers by ELISA; microbiota composition (alpha, beta diversity, relative abundance) by MiSeq Illumina tech. Statistical analyses as appropriate.

47 (59%) were HIV+ on cART, 33 (41%) HEU, with median age of 14 and 12 years respectively. The 2 groups significantly differ for feeding practice (p<.0001), delivery mode (p=.0005) and maternal cART during pregnancy (p<.0001). Interestingly, while I-FABP and E-Cadherin levels were similar (p=.960, p=.931), HIV+ showed higher sCD14 vs HEU (p<.0001). The gut microbiota analyses revealed a similar bacterial composition in terms of alpha diversity, beta diversity and relative abundance. Few differences were observed following the LEfSe analyses, with HIV+ showing bacteria belonging to the class of Clostridia alone, while HEU bacteria belonging to the class Clostridia, Bacteroidetes, Alphaproteobacteria. We restricted the analyses to individuals >5yrs (n=64), confirming no differences in microbiota composition. The LEfSe analyses highlighted higher prevalence of Clostridia in HIV+, Bacteroidetes and Actinobacteria in HEU.

In our cohort of HIV+ and HEU pediatric subjects, we describe similar gut microbiota and intestinal barrier integrity, yet higher sCD14 in HIV+. While the observation of comparable intestinal barrier integrity might support the positive role of cART in preserving gut integrity in pediatric subjects, the finding of higher monocyte activation seems to imply that residual inflammation, known driver of disease progression in the course of cART, lays its foundation already in the pediatric age.