Exclusive enteral nutrition mediates gut metabolic changes in children with Crohn’s disease

Background
The mechanism of action by which exclusive enteral nutrition (EEN) induces remission in active pediatric Crohn’s disease (CD) remains unknown. Profound modification of fecal metabolic profile in active CD has been described.

Aim
We aimed to (I) characterize the fecal metabolic profile associated with CD, EEN treatment or EEN response; and (II) identify specific metabolites that provide evidence for EEN’s mechanisms of action.

Methods
Inclusion: Children (<18 years) with therapy naïve CD starting EEN induction treatment (6 weeks; polymeric formula). Age and sex-matched healthy controls (HC).

Fecal samples collection

Metabolomic profile: 16S ribosomal RNA gene amplicons
- Diversity (Shannon index), principal component analysis, Bray-Curtis dissimilarity.

Metabolomic profile: 1H Nuclear Magnetic Resonance Spectroscopy.
- Orthogonal partial least-squares discriminant analysis (OPLS-DA).
- Cross-validation parameters: \( R^2 \) and \( Q^2 \).
- Metabolite(s) X - associated with CD, EEN treatment or EEN response - were extracted from OPLS-DA (Benjamini-Hochberg correction).

Conclusion
- No specific microbiome (change) associated with EEN induced remission.
- EEN potentially induces a shift in fecal metabolome.
- Several mono and poly amines differ between Crohn and Healthy controls, which may be compounds of interest.
- The mechanism of EEN likely involves metabolic changes.