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# A Refined Method for Fecal Matter Transplantation (FMT)

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We tested microbiota engraftment success in antibiotic-treated BALB/c mice using mouse-to-mouse fecal matter transplantation via oral gavage, pipette administration, or voluntary intake of a Nutella®-inoculum mixture.

## Methods

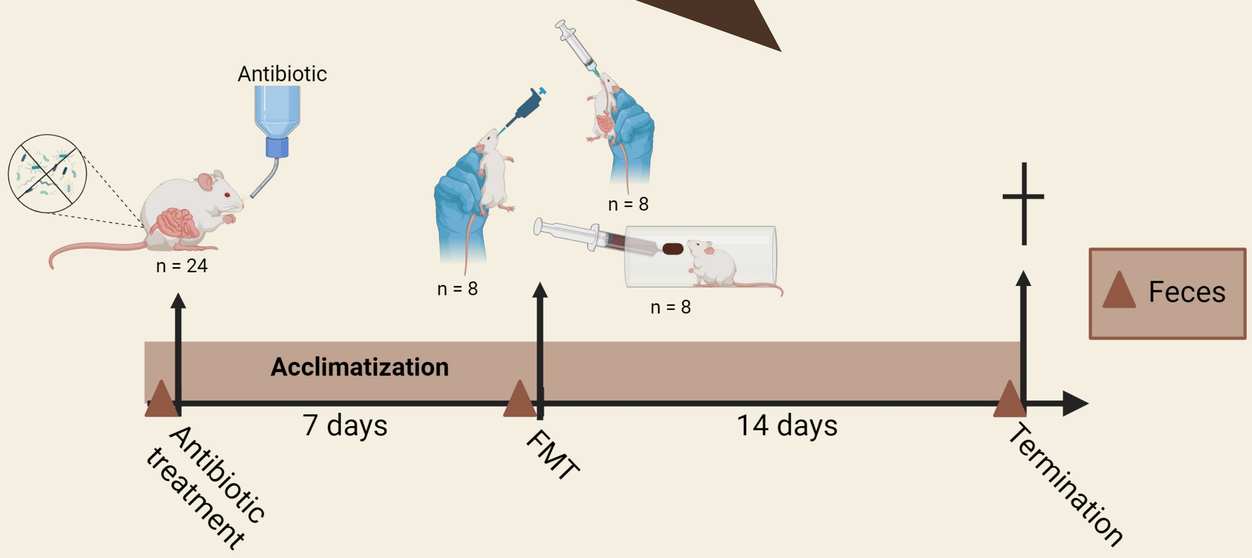


*Figure created with Biorender.com. Own pictures.*

## Hypothesis

- FMT is an expanding field of research, with more mice being subjected to forced oral administration, necessitating restraint.
- Restraining is stressful for the mice, time consuming, and may bias research results.
- Therefore, we hypothesized that using Nutella® for voluntary ingestion of FMT inoculum would increase animal welfare, while maintaining the same rate of microbiota engraftment.


## Key findings

- Preliminary results indicate equal microbiota engraftment success using either the Nutella® or pipette method for FMT, with slight compositional differences.
- Further differential abundance analysis will clarify specific differences in the methods' effects on final microbiota composition.
- Data including oral gavage administration is forthcoming.

## Results

### Alpha-diversity

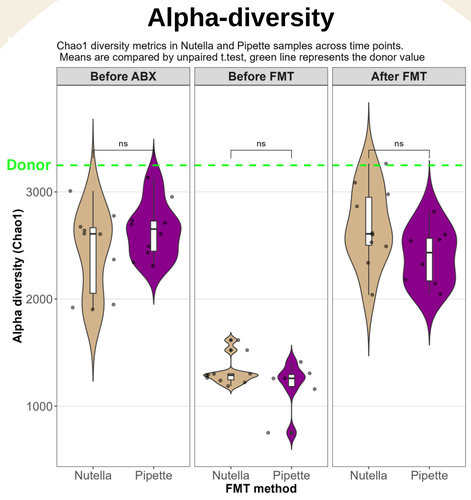


*Figure 1: Alpha diversity (Chao 1) Nutella or pipette treated mice at three different timepoints. Green line represents alpha-diversity of the donor used for FMT.*

Antibiotic treatment (ABX) reduced micobial diversity in the gut and FMT successfully restored that diversity in both groups.

### Engraftment rate

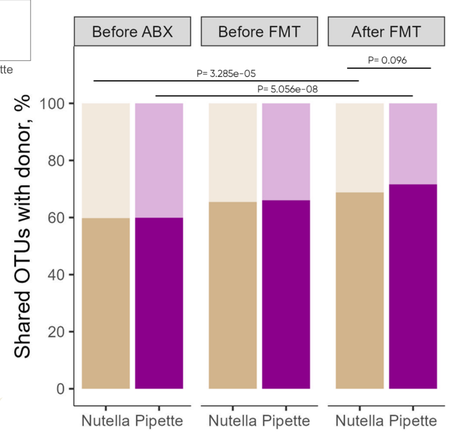


*Figure 2: Engraftment rate calculated as the rate of shared OTUs (prevalence) between the donor and recipient using the intersect function in R. Means compared with Welsch's t-test.*

Rate of shared OTUs between donor and recipients was significantly increased after FMT with no difference in engraftment rate between groups.

### Beta-diversity

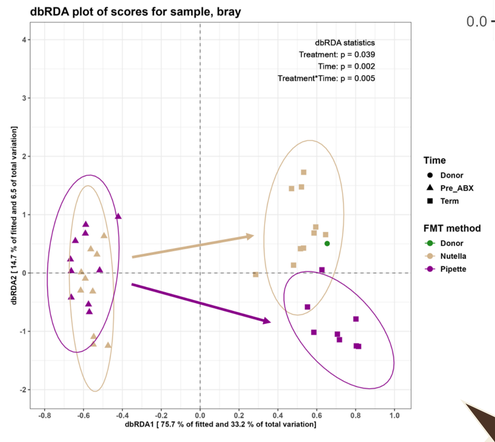


*Figure 3: Beta diversity (Bray-Curtis distance) statistically evaluated with a distance-based redundancy analysis (dbRDA) with 'Time' as blocking variable.*

No difference in compositional dissimilarity between recipient and donor indicates equally engraftment success, despite slightly different clustering.

### Distance to Donor

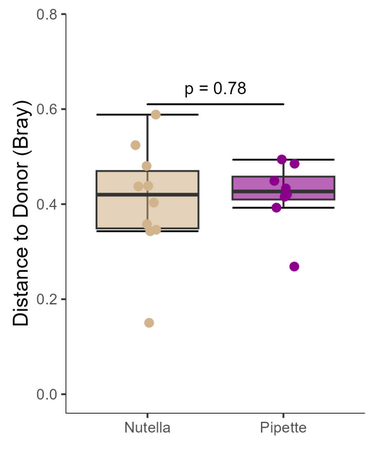


*Figure 4. Compositional dissimilarity (Bray-Curtis distance) between the donor and each recipient. Means compared with Welsch's t-test.*

Gut microbial composition in both groups transitioned towards the donor after FMT, however the two groups clustered slightly different.

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