Development of Differing Complex Microbiota in CD1 Mice

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**Background**
- Differences in gut microbiota (GM) have been shown to modulate many mouse models of disease including colorectal cancer, inflammatory bowel disease, and neurological disorders
- Little is known about early life mouse GM and how early differences in composition and diversity impact disease models

**Hypothesis**
- Pups will first be colonized with maternal Firmicutes and Bacteroidetes
- Diversity will increase with age until stabilizing at adulthood
- Pups with Harlan (HSD) GM will have higher diversity and richness than Jackson (JAX) and Taconic (TAC) GM profiles

**Methods**
- Obtained rederived CD1 mice with designated GM profiles
- Extracted and sequenced DNA from cecal, colonic, and fecal samples in pups 1, 2, and 3 weeks of age (n=12/GM/week)
- Performed statistical analysis using PERMANOVA, Principal Component Analysis (PCA) and 3-way ANOVA

**Development in CD1 Mice with Harlan (HSD) GM Profile**
- Bars represent mean ± standard error of the mean (SEM)

**Development in CD1 Mice with Jackson (JAX) GM Profile**
- Bars represent mean ± standard error of the mean (SEM)

**Development in CD1 Mice with Taconic (TAC) GM Profile**
- Bars represent mean ± standard error of the mean (SEM)

**Future Directions**
- Determine how complex vs. simple GM profiles impact neurological development in mice
- Determine whether neonatal GM modulates tolerance in adulthood
- Determine how cecal GM seeds the colon
- Assess small intestinal GM
- Determine impacts of GM ontogeny on mucosal immune system development

**Conclusions**
- While Firmicutes and Bacteroidetes dominated most samples, Proteobacteria outweighed both phyla in GMHSD week 1 neonates.
- The cecal, colonic, and fecal GM increased in richness and diversity with age
- Mice previously found to harbor a more complex microbiota in adulthood (GMHSD) had more diversity and richness than mice with simpler profiles (GMJAX, GMTAC).
- Compositionally, GM profiles are the markedly dissimilar at week 1 of age but converge towards adulthood.

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**Figures**
- **Fig 3** Stacked bar chart of microbiota composition of cecal, colonic, and fecal contents in GMHSD mice at weeks 1, 2, and 3.
- **Fig 4** Stacked bar chart of microbiota composition of cecal, colonic, and fecal contents in GMJAX and GMHSD mice at weeks 1, 2, and 3.
- **Fig 5** Stacked bar chart of microbiota composition of cecal, colonic, and fecal contents in GMJAX and GMHSD mice at weeks 1, 2, and 3.
- **Fig 6** PCA comparing cecal contents of GM profiles at 1, 2, and 3 weeks of age. Circles represent 95% confidence intervals.