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A Pig Model of the Human Gastro-intestinal Tract

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COLLABORATIVE RESEARCH OPPORTUNITIES WITH TUFTS CUMMINGS SCHOOL OF VETERINARY MEDICINE (TCSVM)

Moderator: Dr. Sawkat Anwer, PhD, DMVH, Tufts Cummings School of Veterinary Medicine (TCSVM)

Presenter: Dr. Giovanni Widmer, PhD, TCSVM
16S amplicon sequencing

V6: Illumina HiSeq2000
100-nt single-end sequencing

V1V2: Illumina HiSeq2500
150-nt single-end sequencing
16S rRNA PCR strategy

**Primary PCR V6**
- Adapter: `ACACTCTTTCCCTACGACTGACN60AGGTGNTGCATGGCTGTCGAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Custom sequencing primer: `N60AGGTGNTGCATGGCTGTCGAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Read primer: `N60AGGTGNTGCATGGCTGTCGAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Primers: 972-990 (forward) and 1051-1069 (reverse)
- Location: Custom sequencing primer

**Secondary PCR V6**
- Adapter: `ACACTCTTTCCCTACGACTGACN312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Read primer: `N312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Primers: 7-27 (forward) and 338-356 (reverse)
- Location: Barcode read primer

**Secondary PCR V1V2**
- Adapter: `ACACTCTTTCCCTACGACTGACN312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Read primer: `N312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Primers: 7-27 (forward) and 338-356 (reverse)
- Location: Barcode read primer

**Secondary PCR V1V2 with universal barcode primer**
- Adapter: `ACACTCTTTCCCTACGACTGACN312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Read primer: `N312ACTCCTACGGGAGGCAGCAGATCGGAAGAGCACACGTCTGAACTCCAGTCACNNNNNNADAPT`
- Primers: 7-27 (forward) and 338-356 (reverse)
- Location: Barcode read primer
fecal transplants: human -> pig
taxonomy

experiment 1
adult-Similac

experiment 2
infant-Similac

experiment 3
adult-solid

age (days)

phylum-level classification (count)

Actinobacteria
Bacteroidetes
Firmicutes
Tenericutes
Proteobacteria
unclassified
Verrucomicrobia
fecal transplant: PCoA based on Unifrac distance

axis 1 62%

axis 2 18%

numbers indicate day post-inoculation

inoculum (2 replicates)
- pig 8
- pig 9
- group 2 (clinda)
- pig 3
- pig 10
- group 3 (vanco)

UniFrac distance

D = 1

D = ~ 0.5

Lozupone et al., BMC Bioinformatics 2006

PCoA
fecal transplant: effect of diet

experiment 1
adult-Similac

experiment 2
infant-Similac

experiment 3
adult-solid
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