



center for microbiome informatics & therapeutics



Transmission of human-associated microbiota along family and social networks



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STRAIN-LEVEL TRANSMISSION OF COMMENSALS **OCCURS AFTER FMT AND VAGINAL BIRTH**



Li SS et al. Science 352 (6285): 586-589 (2016)

— Assignment error



Shao *et al. Nature* **574**: 117-121 (2019)



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FIJICOMP WAS DESIGNED TO INVESTIGATE **TRANSMISSION ALONG SOCIAL NETWORKS**





-stool samples -saliva samples -social connectivity metadata



From **300 individuals** in **5 different villages:**





Villages in district 2

OUR DETECTION METHOD RELIED ON DISTANCES AT THE SNP LEVEL





WE ALSO USED AN ORTHOGONAL APPROACH TO DETECT STRAIN-SPECIFIC 1kB REGIONS







SOCIALLY CONNECTED PAIRS SHARE MORE GUT BACTERIAL STRAINS







SOCIALLY CONNECTED PAIRS SHARE MORE GUT BACTERIAL STRAINS







SOCIALLY CONNECTED PAIRS SHARE MORE GUT BACTERIAL STRAINS







SOCIALLY CONNECTED PAIRS SHARE MORE ORAL BACTERIAL STRAINS







DRIVEN BY ABUNDANCE/'MASS ACTION'





THERE IS NO CLEAR PHYLOGENETIC **SIGNAL OF TRANSMISSION**

Gut microbiomes







Lentisphaerae Proteobacteria Tenericutes

Verrucomicrobia Spirochaetes







THERE IS NO CLEAR PHYLOGENETIC **SIGNAL OF TRANSMISSION**

Oral microbiomes







Lentisphaerae Proteobacteria Tenericutes

Verrucomicrobia Spirochaetes







GUT AND ORAL TRANSMISSION PATTERNS DIFFER





(Gut metagenomes)



GUT AND ORAL TRANSMISSION PATTERNS DIFFER

Gut microbiota





Oral microbiota





WOMEN MORE CLOSELY RESEMBLE THEIR SOCIAL CONTACTS THAN MEN

Gut microbiota



Brito*, Gurry* et al. Nature Microbiology 4: 964-971 (2019)



Oral microbiota





WE CAN PREDICT CERTAIN SPOUSAL PAIRS WITH HIGH ACCURACY





 True positives ——False negatives





Increased gut and oral microbiota similarity between social contacts



Gut and oral transmission likely occur through different mechanisms

CONCLUSIONS



Women more closely resemble their social contacts than men

Certain spousal pairs can be predicted from metagenomic sequencing with high accuracy

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