



**Supplementary Figure 8** | Microbial clades showing significant associations with gut immune function gene expression. Since the immune function genes were highly correlated (Fig. S3), we ran a principle component analysis (PCA) and used the first principle component (PC1) for the association testing to avoid multicollinearity and reduce the number of association testing. Eleven taxa showed a clear positive correlation with the gene expression of gut immune functions, while one taxa were negatively correlated with the gene expression of gut immune functions. Note that the expression of the immune genes increased as the PC1 of the PCA increased. FDR, false discovery rate.