

**Supplementary Figure 4.** Association between the abundance of OGAs-encoding genes and extra-intestinal diseases. Alteration of the abundance of OGAs-encoding genes in arthritis (A), obesity (B), liver cirrhosis (C), type II diabetes (DM2)-China (D), DM2-Sweden (E) and DM2-Denmark (F). The lower and upper hinges of boxplots presented in the figures correspond to the 25th and 75th percentiles, respectively. The midline is the median. The upper and lower whiskers extend from the hinges to the largest (or smallest) value no further than  $\times 1.5$  interquartile range from the hinge, defined as the distance between the 25th and 75th percentiles. Data beyond the end of the whiskers are plotted individually. *P* values were computed by Mann-Whitney U tests and corrected by false discovery rate, NS:  $P > 0.05$ .

