



**Supplementary Fig. 4. Supplemental analyses of liver metabolomics analysis and fecal microbiota analysis.** *A & B*: PLS-DA score in EW<sub>SD</sub> vs. C<sub>SD</sub> and EW<sub>SD</sub>+Leu vs. EW<sub>SD</sub>. *C & D*: Volcano plot of DEGs in EW<sub>SD</sub> vs. C<sub>SD</sub> and EW<sub>SD</sub> + Leu vs. EW<sub>SD</sub>. *E*: Altered bacteria in phylum level. *F*: Altered bacteria in genus level. \* $P < 0.05$ , \*\* $P < 0.01$ , \* (shown in red)  $P < 0.05$ .

0.10 versus C<sub>SD</sub> group. <sup>#</sup> $P < 0.05$ , <sup>##</sup> $P < 0.01$ , <sup>#</sup> (shown in red)  $P < 0.10$  in EW<sub>SD</sub>+Leu group versus EW<sub>SD</sub>.