Supplementary Material
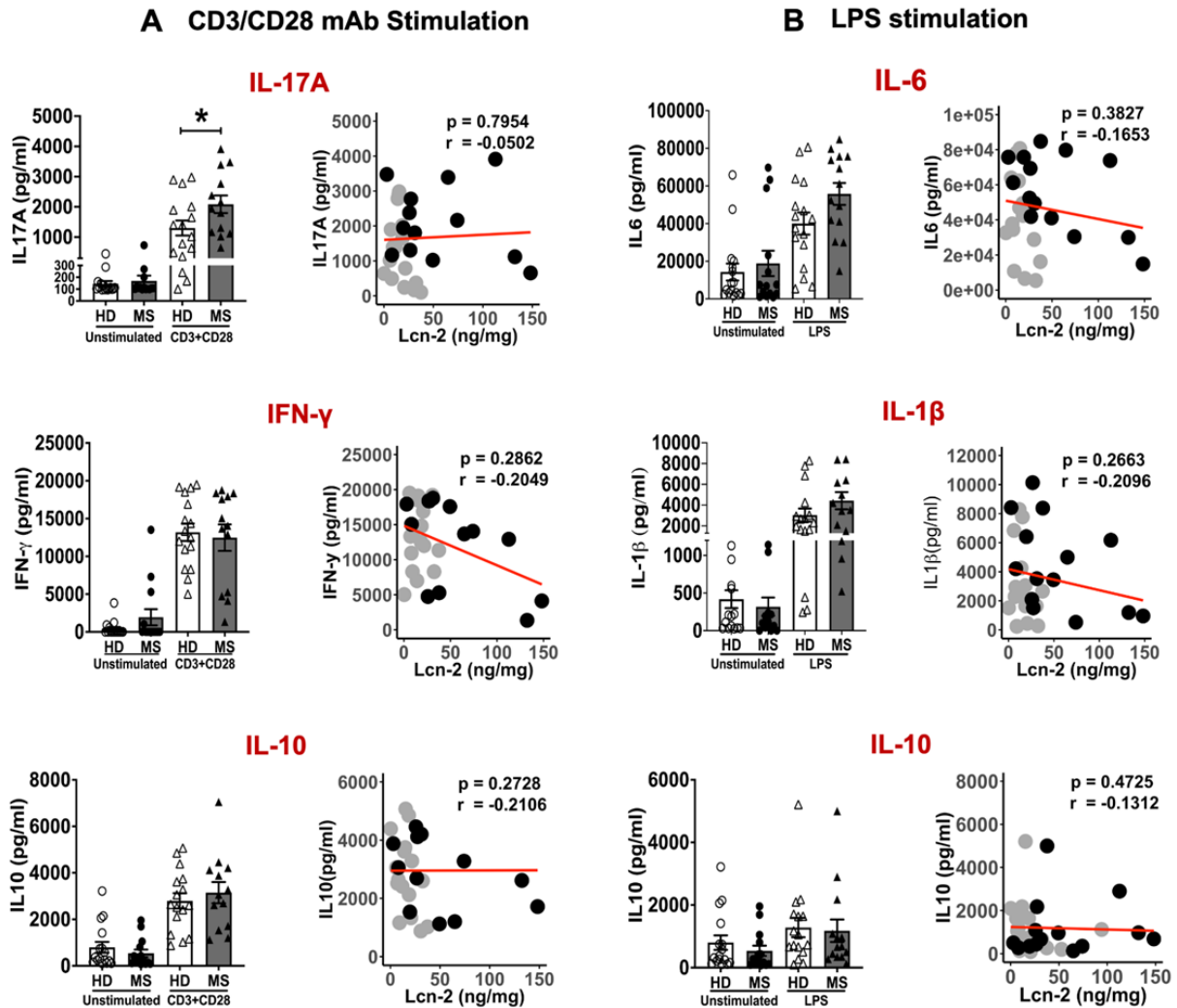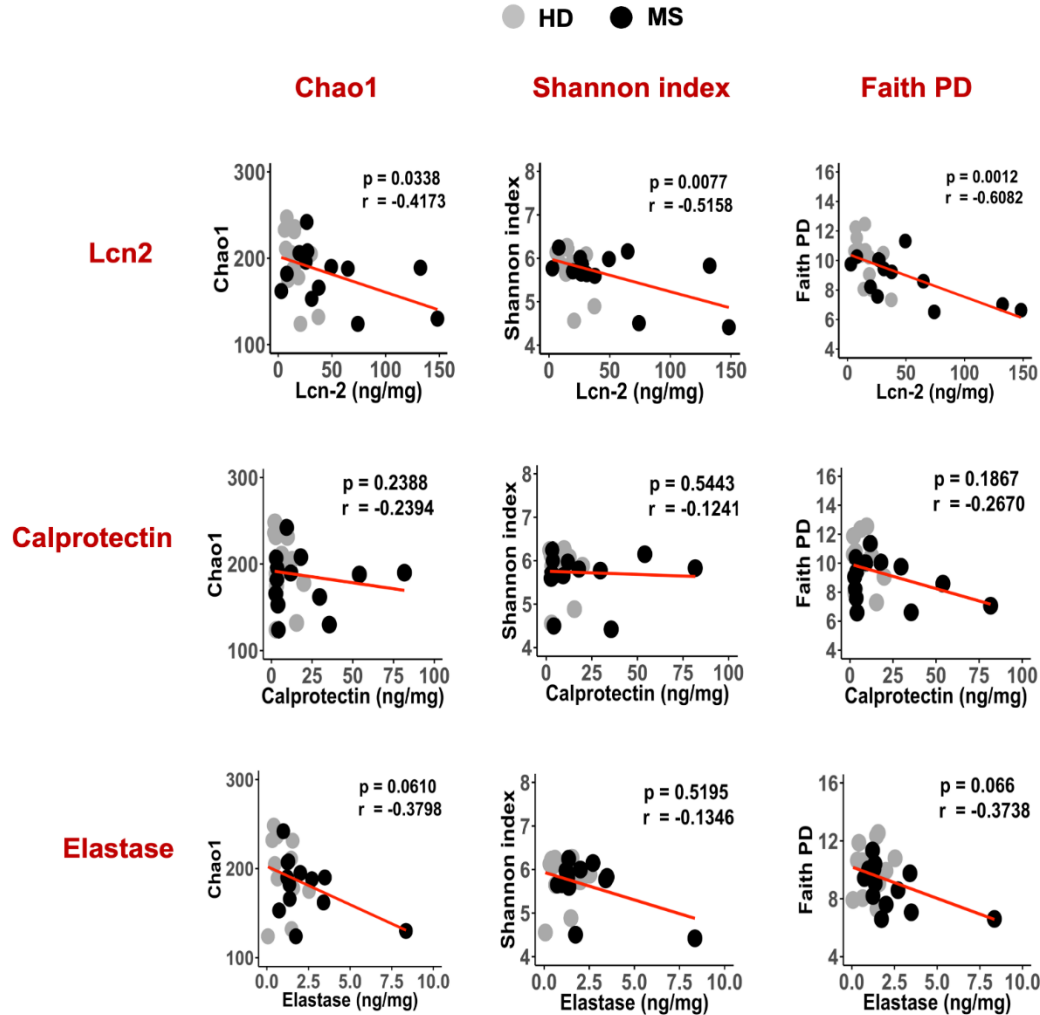

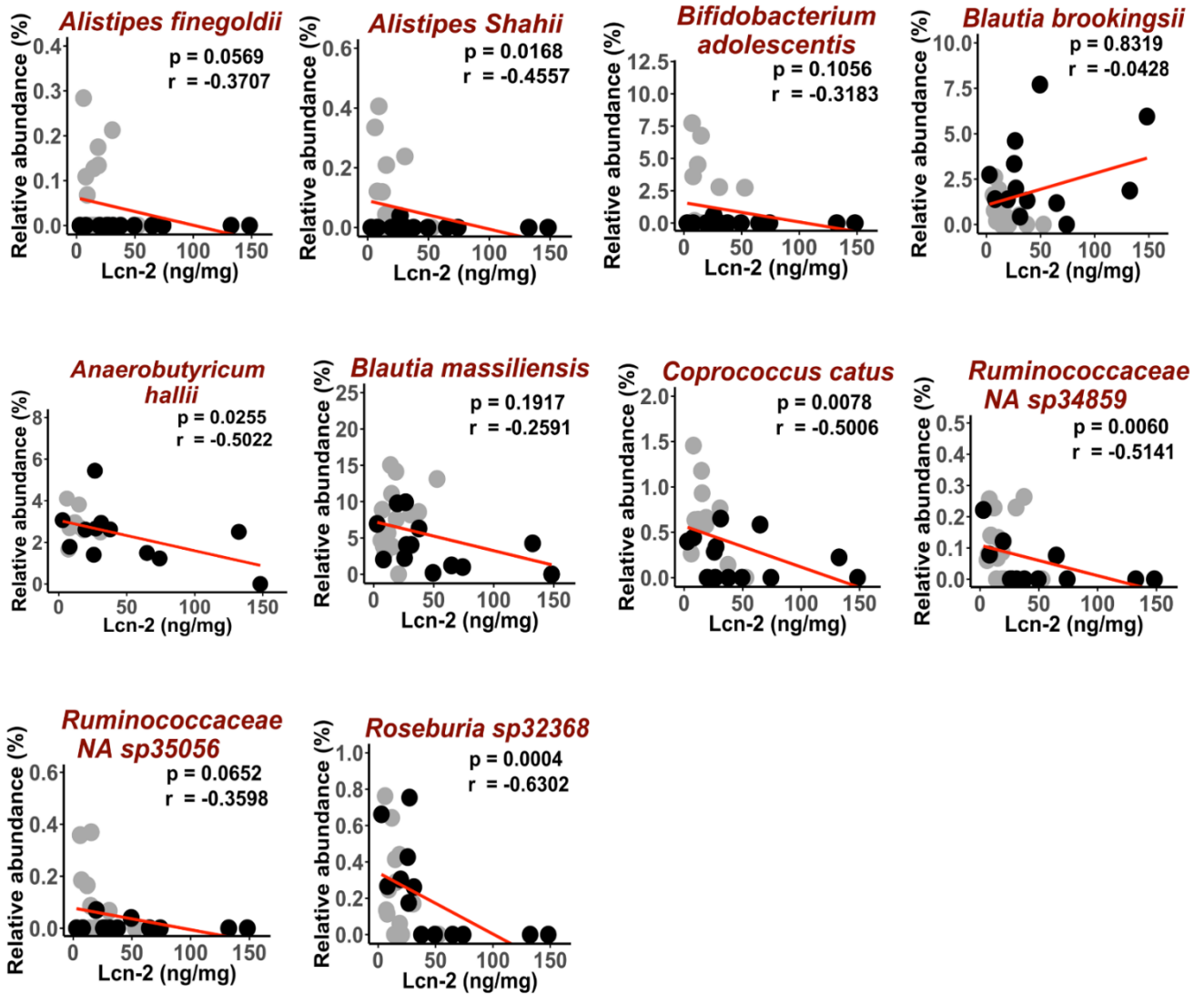**Supplementary Figure 1. Cytokine production by PBMC in HDs and RRMS patients.**

(A) Production of IL17A, IFN-γ, and IL10 in PBMCs isolated from HDs and RRMS patients with/without CD3/CD28 Abs stimulation, and their correlation with fecal Lcn-2 levels. (B) Production of IL6, IL1β and IL10 in PBMC isolated from HDs and RRMS patients with/without LPS stimulation, and their correlation with fecal Lcn-2 levels. Mean ± SEM. *P < 0.05.
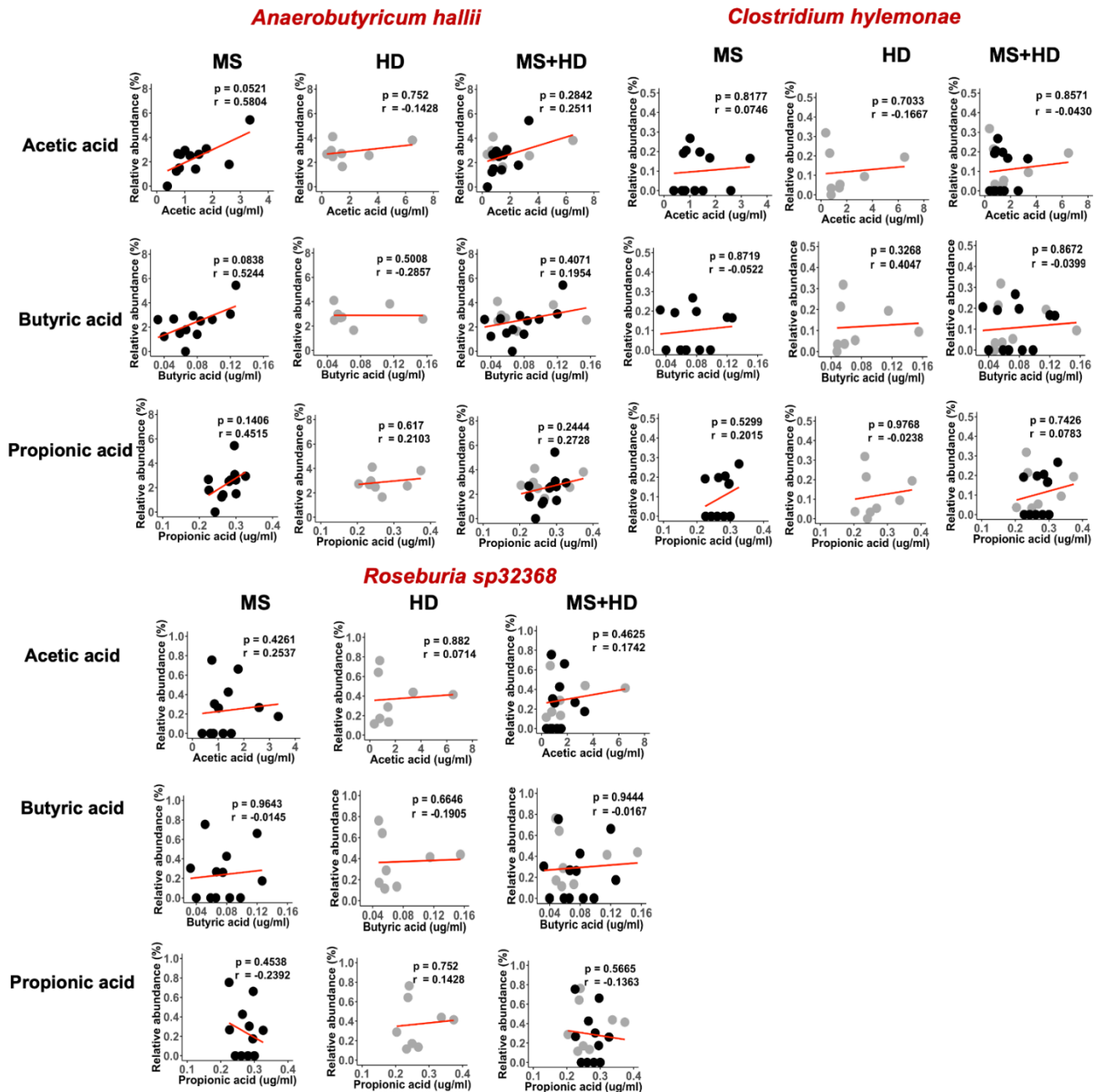
Supplementary Figure 2. Correlation between gut inflammation markers and alpha diversity.

Spearman correlations between alpha diversity (Chao1, Shannon index, and Fath PD) and Lcn-2, calprotectin, and elastase are shown. Each dot represents an individual subject. HDs; n=13, RRMS; n=13.

Supplementary Figure 3. Correlation between fecal Lcn-2 levels and RRMS-associated enteric bacteria. Spearman correlation between fecal Lcn-2 and bacterial taxa; *Alistipes finegoldii, Alistipes shahii, Bifidobacterium adolescentis, Blautia brookingsii, Anaerobutyricum* (*Eubacterium*) *hallii, Blautia massiliensis, Coprococcus catus, Ruminococcaceae NA sp 34859, Ruminococcaceae NA sp 35056, and Roseburia sp32368.* Each dot represents an individual subject.

Supplementary Figure 4. Association of MS-associated bacteria with serum SCFAs levels.

Correlation of *Anaerobutyricum* (*Eubacterium*) *hallii*, *Clostridium hylemonae, and Roseburia sp 32368* with serum acetic acid, butyric acid, or propionic acid levels. HDs; n=8, RRMS; n=12.