

Supplementary Information

Preparation of Se-*B. longum* DD98

The *B. longum* DD98 strain was isolated from the feces of a healthy human subject and was further selected using high-throughput screening. The selected strain DD98 was held in long-term preservation in the China General Microbiological Culture Collection Center (accession number GCMCC16573). The culture of *B. longum* DD98 in 20% glycerol was transferred twice to fresh Reinforced Clostridium Medium (RCM) broth for recovery and proliferation, and then incubated anaerobically at 37°C at a constant pH of 6.8 in a 6-L fermenter. After 9-11 hours of incubation when the bacteria reached the logarithmic growth stage, Na₂SeO₃ was added dropwise to the medium. The addition of Na₂SeO₃ from the beginning inhibited the proliferation of bacteria. The incubation continued for a total of 24 hours. The final concentration of Na₂SeO₃ in the medium was 18.5 µg/mL. This Na₂SeO₃ concentration was used, as bacteria grown with 18.5 µg/mL of Na₂SeO₃ showed greater ability of accumulating Se and transforming Na₂SeO₃ to more bioactive forms of Se in protein. The growth of bacteria was monitored using optical density (OD at 600 nm) and plate counts (CFU/mL) as well as the amount of NaOH added during fermentation (mL). At the end of fermentation, bacterial cells were harvested, washed, and then freeze-dried for subsequent studies.

Table. S1 Primers used for the RT-qPCR analyses

Gene	Forward Sequence (5'-3')	Reversed Sequence (5'-3')
IL-1β	AGCTTCAAATCTCGCAGCAG	TCTCCACAGCCACAATGGA
IL-6	TAGTCCTTCCTACCCCAATTTCC	TTGGTCCTTAGCCACTCCTTC
TNF-α	AGGCACTCCCCAAAAGAT	CAGTAGACAGAAGAGCGTGGTG
COX-2	CCCATTAGCAGCCAGTTGTC	CAGGATGCAGTGCTGAGTTC
Occludin	TTCCTCTGACCTTGAGTGTGG	CTCTTGCCCTTTCCTGCTTT
ZO-1	GCCGCTAAGAGCACAGCAA	GCCCTCCTTTTAACACATCAGA
β-actin	AGTGTGACGTTGACATCCGT	GCAGCTCAGTAACAGTCCGC

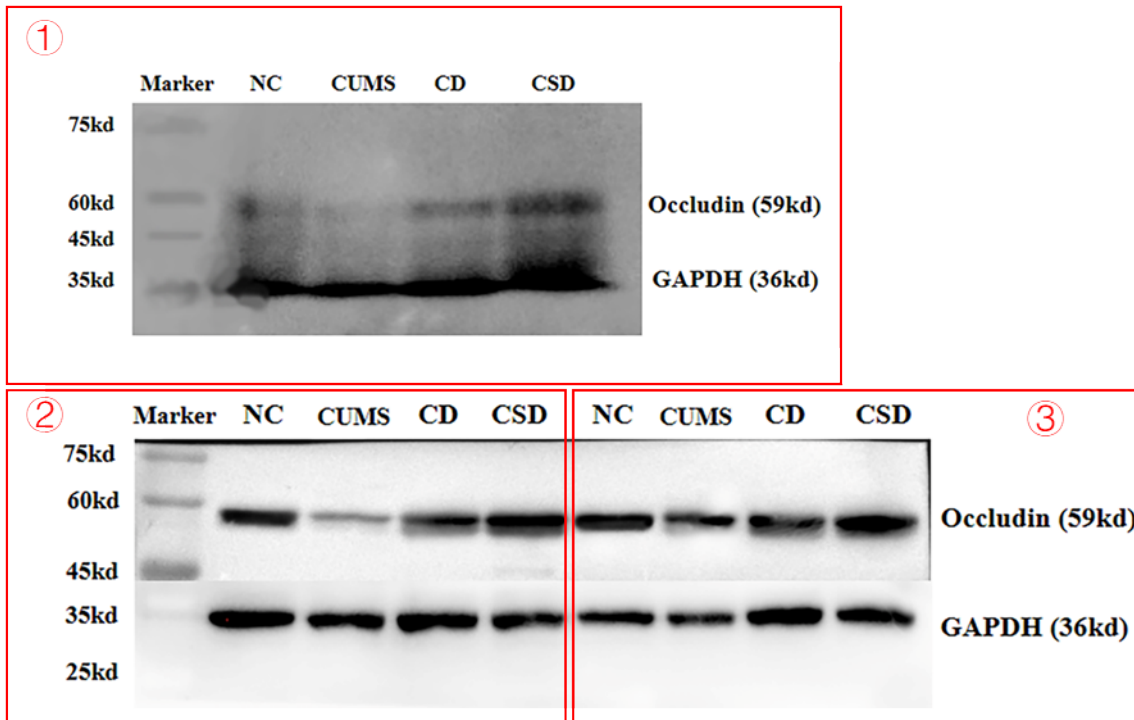


Fig. S1 Western blot analysis of occludin level in mice colon. NC, normal control group; CUMS, chronic unpredictable mild stress group; CD, CUMS + *B. longum* DD98 group; CSD, CUMS + *Se-B. longum* DD98 group

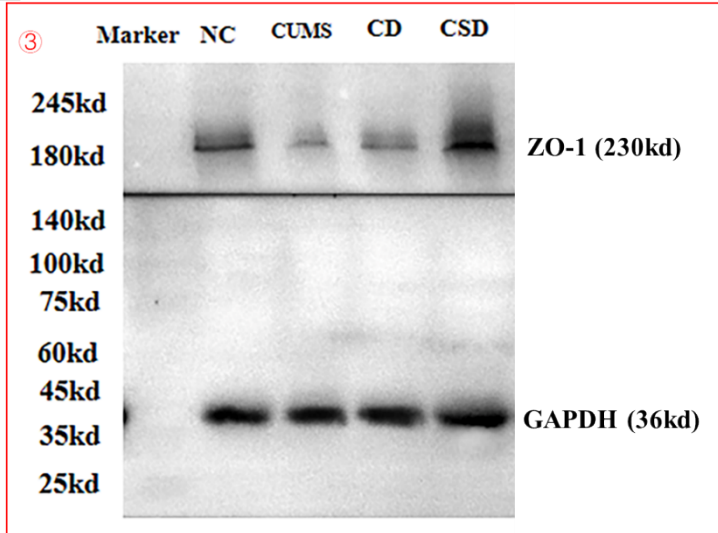
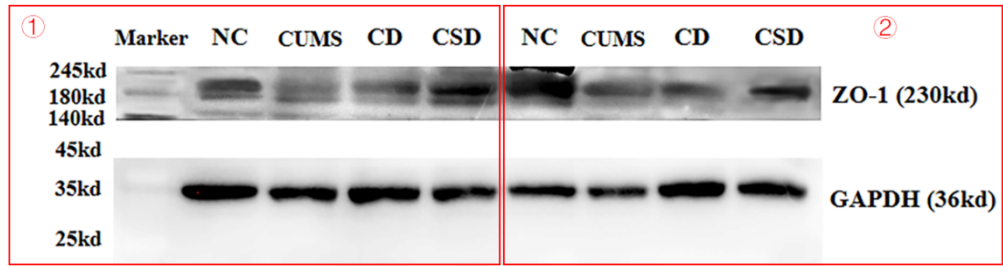


Fig. S2 Western blot analysis of ZO-1 level in mice colon. NC, normal control group; CUMS, chronic unpredictable mild stress group; CD, CUMS + *B. longum* DD98 group; CSD, CUMS + *Se-B. longum* DD98 group.

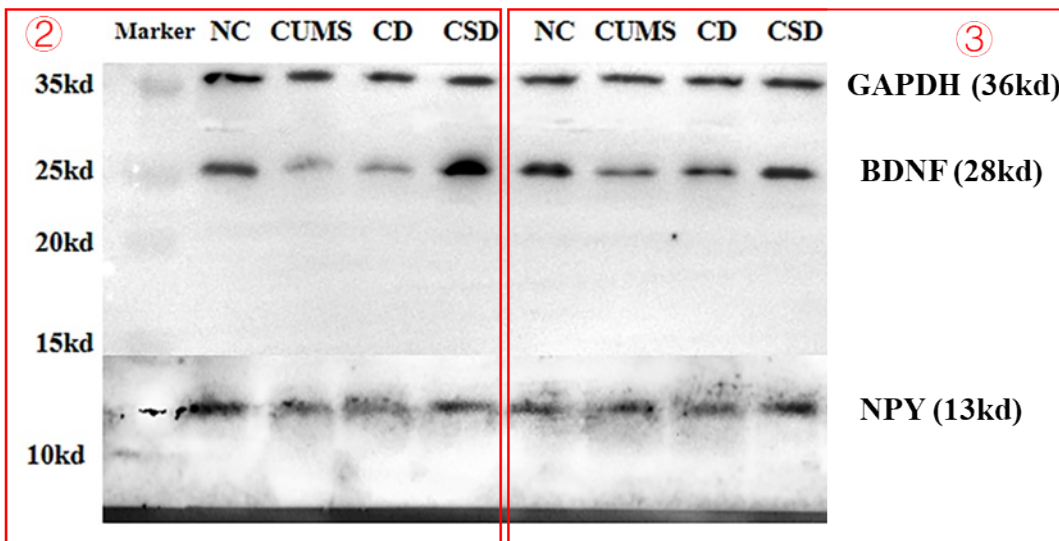
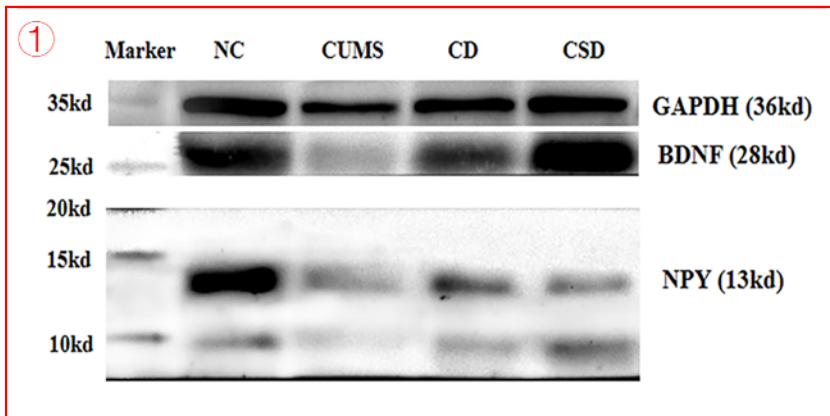


Fig. S3 Western blot analysis of BDNF and NPY level in mice cortex. NC, normal control group; CUMS, chronic unpredictable mild stress group; CD, CUMS + *B. longum* DD98 group; CSD, CUMS + *Se-B. longum* DD98 group; BDNF, brain-derived neurotrophic factor; NPY, neuropeptide Y.