

Table S1 Dietary recipes of the ethanol liquid diet and ethanol control liquid diet according to Lieber-DeCarli formulation

Heat content (1 kcal/mL)	Ethanol liquid diet	Ethanol control liquid diet
Fat (%)	35	35
Protein (%)	18	18
Carbohydrate (%)	19	47
Ethanol (%)	28	0

Table S2 Antibodies for western blot assay

Antibodies	Identifier	Company	Dilution ratio
HO-1	GB12104	Servicebio	1:1000
Nrf2	WL02135	Wanleibio	1:1000
Keap1	WL03285	Wanleibio	1:1500
NF-κB p-p65	abs130624	Absin	1:1000
inhibitor kappa Ba (IkBa)	abs122175	Absin	1:1000
toll-like receptor 4 (TLR4)	GB11519	Servicebio	1:1000
MyD88	WL02494	Wanleibio	1:500
Zonula occludens-1 (ZO-1)	WL03419	Wanleibio	1:1000
Claudin-1	WL03073	Wanleibio	1:2000
Claudin-4	WL05091	Wanleibio	1:1000
Occludin	WL01996	Wanleibio	1:1000
ADH	WL04351	Wanleibio	1:1000
ALDH	GB111881	Servicebio	1:1000
CYP2E1	K003265P	Solarbio	1:2000
MUC1	WL05237	Wanleibio	1:1000
MUC2	PA5-103083	Thermo Fisher	1:1000
MUC4	abs123916	Absin	1:1000
GAPDH	GB11002	Servicebio	1:2000

Table S3 The information of primer sequences

Primer name	Forward primer sequence	Reversed primer sequence
<i>GAPDH</i>	5'-ACCACAGTCCATGCCATCAC-3'	5'-AACGGTAGTGTCTTGTGA-3'
<i>ADH</i>	5'-AACAAATCCTGACCTTCTGA-3'	5'-ACATTCCAAGTTGCTCCT-3'
<i>ALDH</i>	5'-ATCCTCGGCTACATCAAATCG-3'	5'-GTCTTTACGTCCCCAACAC-3'
<i>CYP2E1</i>	5'-CGATTACGATGACAAGAA-3'	5'-GCTTCCAGGTAGATATTG-3'
<i>Nrf2</i>	5'-AAGCAAGAACGCCAGATAC-3'	5'-CACATCACAGTAGGAAGTT-3'
<i>Keap1</i>	5'-TGTGTATCACTGCTTCTCTGT-3'	5'-TTCTTCTGCCGCCTCTTC-3'
<i>HO-1</i>	5'-CGTGCTCGAATGAACACTCT-3'	5'-GGAAGCTGAGAGTGAGGGACC-3'

Table S4 Monosaccharide compositions of PGPs

Sample PGPs	Relative content percentage of monosaccharides (%)								
	Fuc	Ara	Gal	Glc	Xyl	Man	Rib	Gal-AC	Glc-AC
	0.391	0.089	7.085	85.66	0.024	6.431	0.121	0.056	0.143

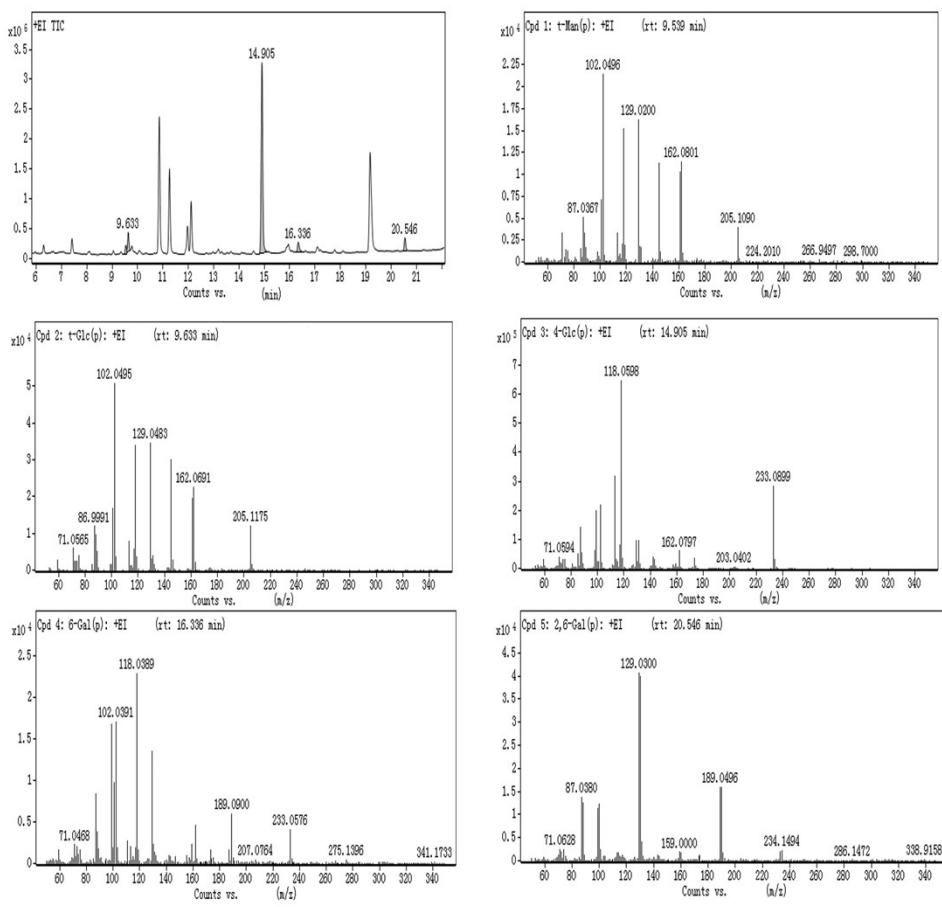


Figure S1 Total ion chromatogram of PGPs after methylation reaction by GC-MS and secondary mass spectrum at 9.539min, 9.633min, 14.905min, 16.336min and 20.546min.

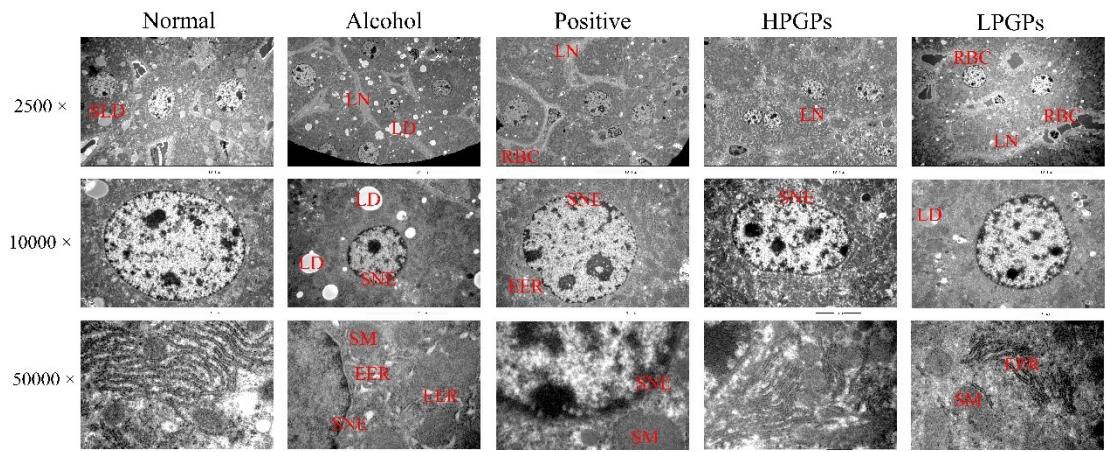


Figure S2 Transmission electron microscope photomicrographs of ultrathin liver sections from mice of different group. EER: expanded or fractured endoplasmic reticulum; LD: large lipid droplets; LN: large intercellular space; SLD: small lipid drops; SM: swollen mitochondria; SNE: irregular and shrunken nuclear envelope; RBC: red blood cells.

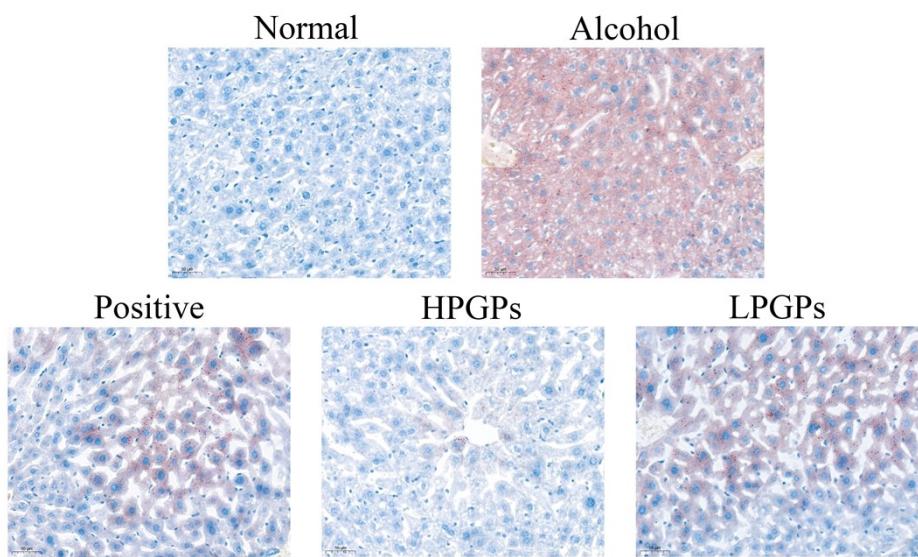


Figure S3 Hepatic histopathological observations in ALD mice (Oil Red O, 200 \times).

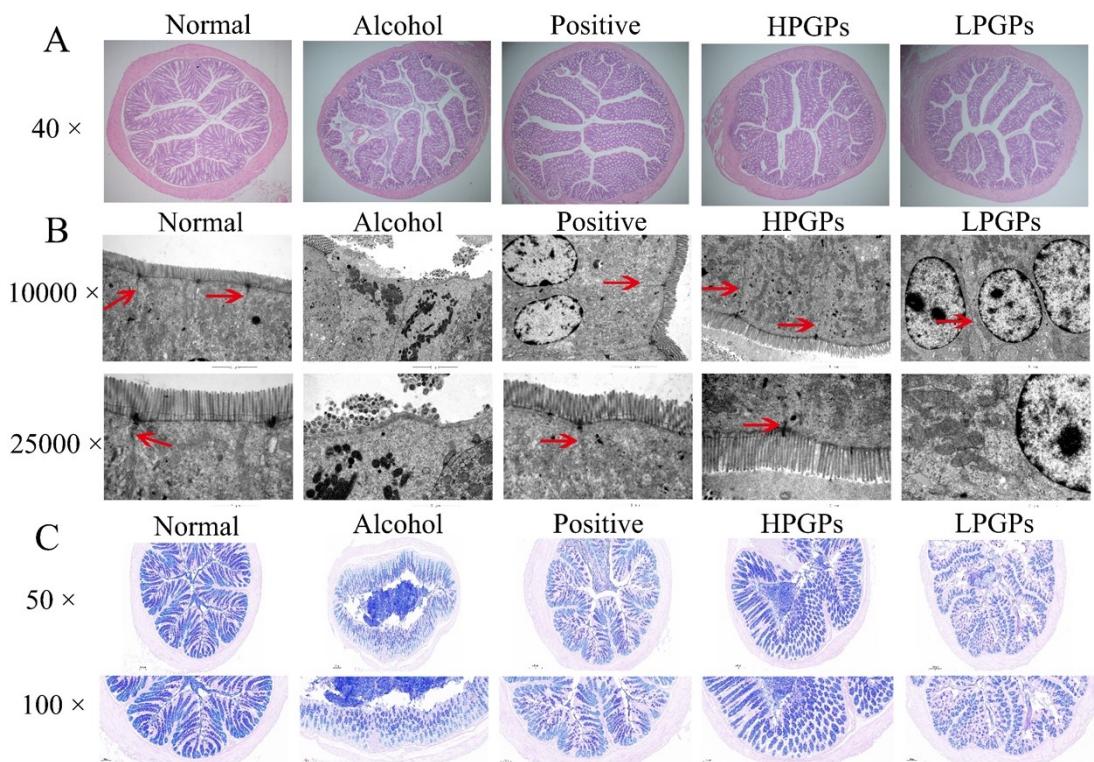


Figure S4 PGPs ameliorates intestinal barrier dysfunction induced by ALD. (A) Observe the pathological changes of mice intestinal tissue by H&E staining ($40 \times$); (B) TEM photomicrographs of ultrathin small intestine sections ($10000 \times$ and $25000 \times$, red arrows indicated tight junction); (C) Staining with ABPAS in intestines ($50 \times$ and $100 \times$, the blue aggregates were goblet cells).

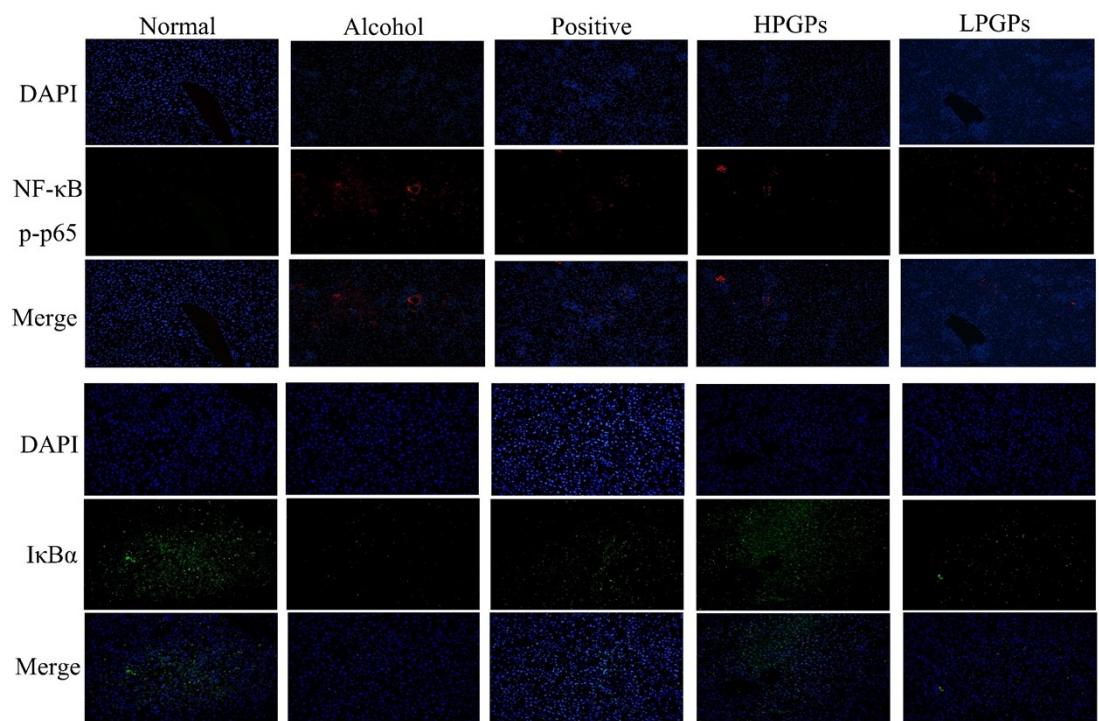


Figure S5 Immunofluorescence analysis for the expression of NF- κ B p-p65 (200 \times , Red fluorescent) and I κ B α (200 \times , Green fluorescent) in liver.

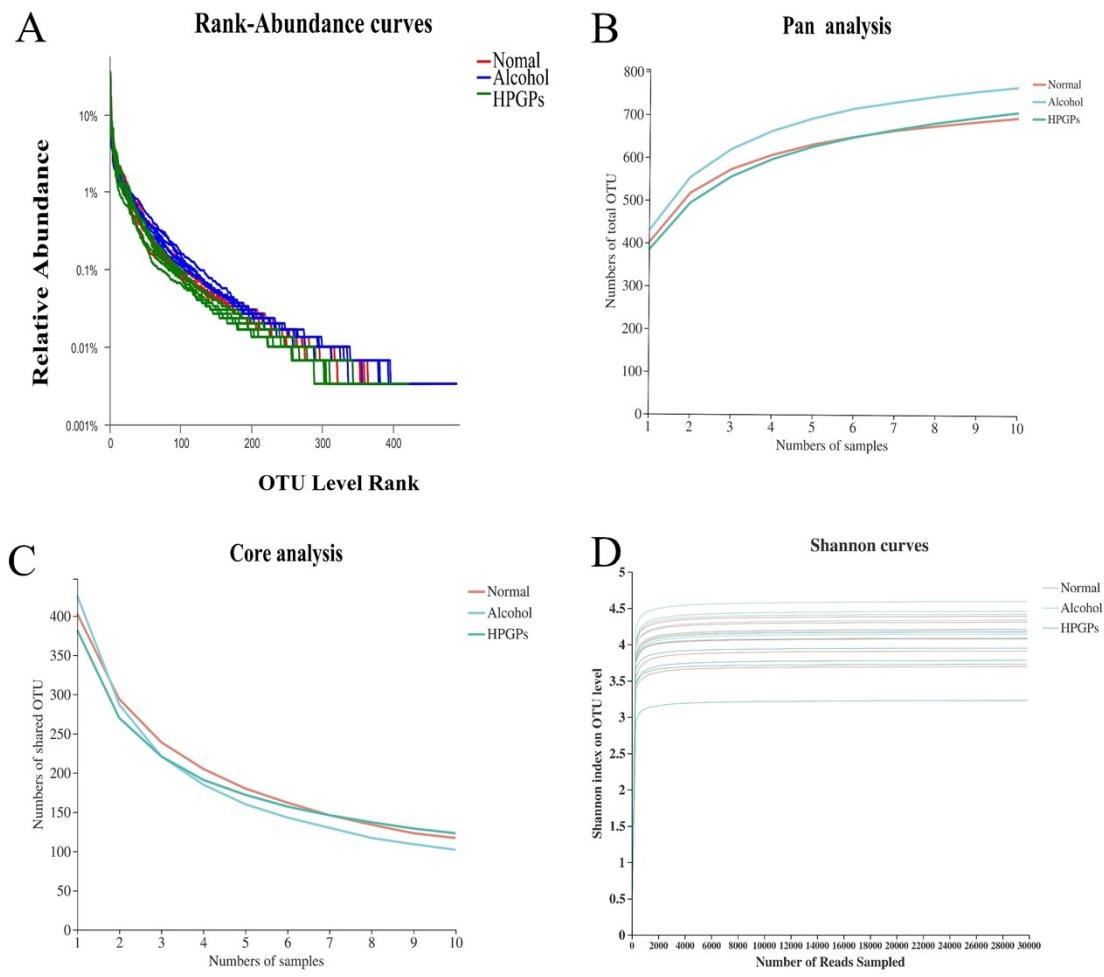


Figure S6 Biodiversity measures of the intestinal microbiota in all of the mice samples. (A) 1. Rank-Abundance curves; (B) Pan analysis; (C) Core analysis; (D) Rarefaction curve of Shannon

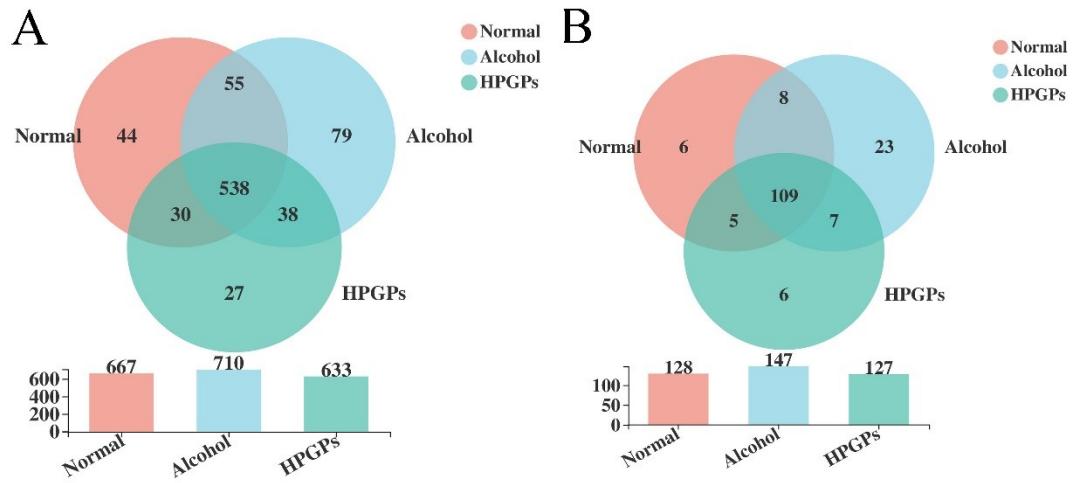


Figure S7 (A)Venn diagram analysis on OUT levels; (B) Venn diagram analysis on phylum levels.

Supplementations--The original sources of Western Blotting

Figure 3F-ADH



Figure 3F-ALDH



Figure 3F-CYP2E1



Figure 3F-GAPDH



Figure 4B-Nrf2

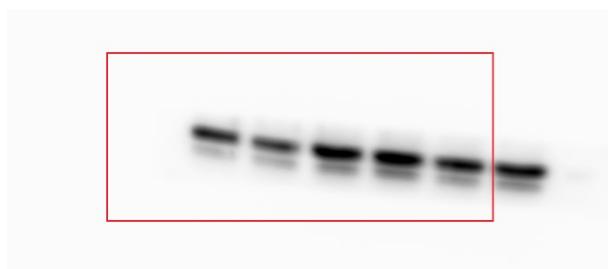


Figure 4B-Keap1



Figure 4B-HO-1

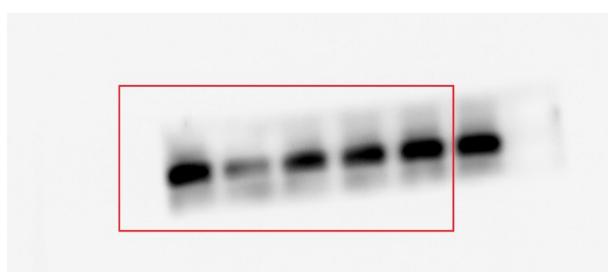


Figure 4B-GAPDH



Figure 5E-ZO-1

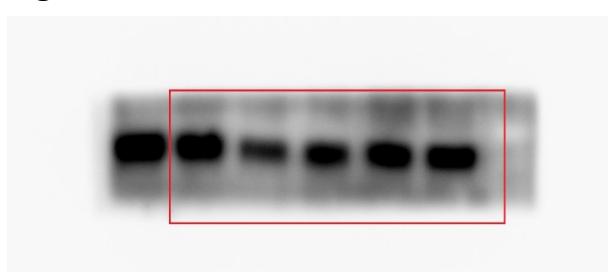


Figure 5E-Occludin



Figure 5E-Claudin-1



Figure 5E-Claudin-4

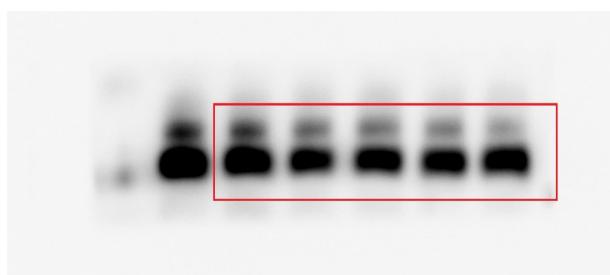


Figure 5E-GAPDH



Figure 5F-MUC1



Figure 5F-MUC2

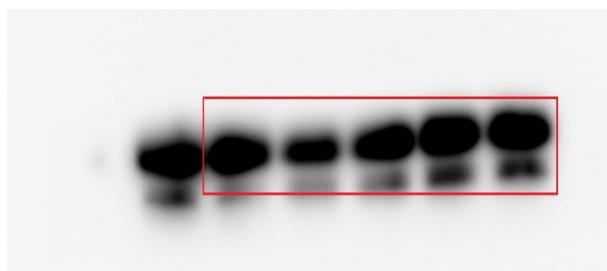


Figure 5F-MUC4



Figure 5F-GAPDH

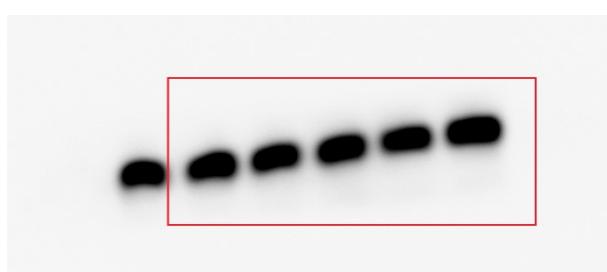


Figure 5I- I_kB α

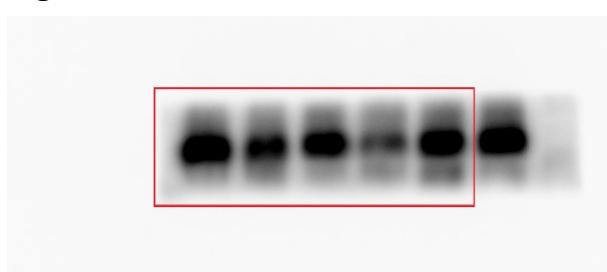


Figure 5I- NF- κ B p-p65

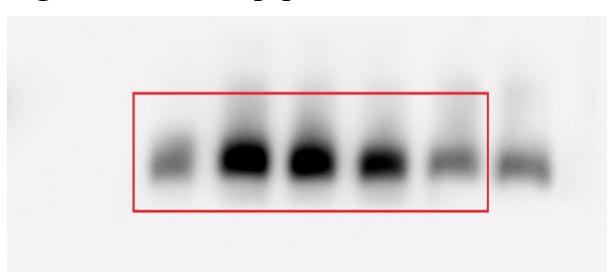


Figure 5I-MyD88

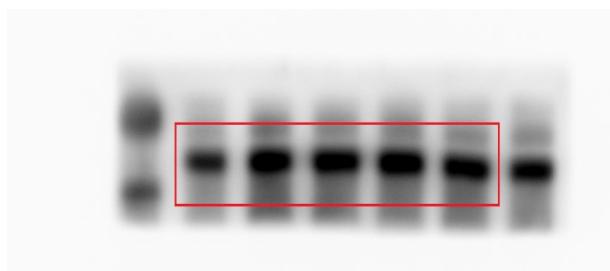


Figure 5I-TLR4



Figure 5I-GAPDH

