

1 **Supplementary Data**

2 **Wheat peptide alleviates DSS-induced colitis by activating the Keap1-Nrf2 signaling**
3 **pathway and maintaining the integrity of the gut barrier**

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Table S1. The assessment criteria for DAI scoring

score	weight loss(%)	fecal trait	fecal blood
0	weight does not change	normal	normal
1	$1\% < \text{weight loss} \leq 5\%$	soft but still shaped	
2	$5 < \text{weight loss} \leq 10\%$	loose stool	hemocult positive
3	$10 < \text{weight loss} \leq 15\%$	very soft	
4	$15\% < \text{weight loss}$	diarrhea	severe bleeding

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Table S2. Primers of RT-qPCR

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NCBI ID	Primer name	Sequence (5'-3')	Product size (bp)
<i>m-IL-1β</i>	<i>Forward</i>	<i>TGGACCTTCCAGGATGAGGACA</i>	<i>148</i>
	<i>primer</i>		
NM_008361	<i>Reverse primer</i>	<i>GTTTCATCTCGGAGCCTGTAGTG</i>	
<i>IL-6</i>	<i>Forward</i>	<i>CTGCAAGAGACTTCCATCCAG</i>	<i>131</i>
	<i>primer</i>		
NM_031168	<i>Reverse primer</i>	<i>AGTGGTATAGACAGGTCTGTTGG</i>	
<i>TNF-α</i>	<i>Forward</i>	<i>GGTGCCTATGTCTCAGCCTCTT</i>	<i>139</i>
	<i>primer</i>		
NM_013693	<i>Reverse primer</i>	<i>GCCATAGAACTGATGAGAGGGAG</i>	
<i>Cldn1 (claudin 1)</i>	<i>Forward</i>	<i>GGGGACAACATCGTGACCG</i>	<i>100</i>
	<i>primer</i>		
NM_016674.4	<i>Reverse primer</i>	<i>AGGAGTCGAAGACTTTGCACT</i>	
<i>Tjp1 (ZO-1)</i>	<i>Forward</i>	<i>GCCGCTAAGAGCACAGCAA</i>	<i>134</i>
	<i>primer</i>		
NM_009386.2	<i>Reverse primer</i>	<i>TCCCCACTCTGAAAATGAGGA</i>	
<i>Ocln (occludin)</i>	<i>Forward</i>	<i>TTGAAAGTCCACCTCCTTACAGA</i>	<i>129</i>
	<i>primer</i>		
NM_008756.2	<i>Reverse primer</i>	<i>CCGGATAAAAAGAGTACGCTGG</i>	

<i>actin beta</i>	<i>Forward</i>	<i>GGCTGTATTCCCCTCCATCG</i>	
	<i>primer</i>		<i>154</i>

NM_007393.5	<i>Reverse primer</i>	<i>CCAGTTGGTAACAATGCCATGT</i>
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Table S3. Composition of peptides in WP

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Peptide	-10lgP	Mass	Length	ppm	m/z	RT	Area Sample	Scan
GIIQPQQPAQ	48.12	1689.0	15	1.5	564.0	63.99	1.43E+09	30161
LEVIR								
VSYQQPQQQ	41.51	1636.7	14	0.6	819.4	29.9	1.14E+09	12018
YPSGQ								
LQFPQPQLP	38.89	1326.7	11	2.6	664.4	90.42	1.04E+09	44733
Y								
QPPFSQQQQ	37.34	1770.8	15	1.7	886.4	56.93	9.17E+08	26121
PPFSQQ								
GIIQPQQPAQ	45.69	1660.9	15	1.8	554.7	60.04	8.87E+08	27743
LEAIR								
SFQQPQQQY	42.45	1521.7	13	-2	761.9	30.27	7.70E+08	12306
PSGQ								
GIIQPQQPAQ	45.18	1646.9	15	3.5	550.0	57.6	7.51E+08	26508
LEGIR								
SQQPQQTFP	39.12	1412.7	12	-0.8	707.3	31.08	7.37E+08	12487
QPQ								
VSFQQPLQQ	37.44	1446.8	12	2.1	724.4	86.26	7.33E+08	42913
YPL								

GIIQPQQPAQ	48.24	1738.9	15	3.6	580.7	58.73	6.59E+08	27106
YEVIR								
VSFQQPQQQ	39.81	1650.8	14	-1.6	826.4	40.6	6.52E+08	17419
YPSSQ								
QQPILPQQPP	45.53	1634.8	14	-1.2	818.4	66.85	5.43E+08	31691
FSQQ								
QQPVLPQQS	46.99	1610.8	14	-3.4	806.4	55.04	5.00E+08	25490
PFSQQ								
VRVPVPQLQ	55.4	1814.0	16	1.8	908.0	53.7	4.50E+08	23979
PQNPSQQ								
LNPC(+57.02)								
KNILLQQC(+	55.98	1996.1	17	2.6	999.0	56.9	4.22E+08	26083
57.02)KPASL								
SGNVGESGL								
IDLPGC(+57.	50.39	1726.8	17	-0.4	864.4	63.33	4.16E+08	29607
02)PR								
GYYPPTSPQQ	38.92	1747.8	16	0.2	874.9	51.78	3.83E+08	23261
PGQGQQL								
APFASIVAGI	38.39	1186.6	13	3.2	594.3	88.8	3.81E+08	43886
GGQ								
SGSC(+57.02)	40.61	1135.5	11	3.8	568.8	39.73	3.72E+08	16983
VPGVAFR								

HLQPQQPIS	38.77	1302.7	11	-1.5	652.3	17.22	3.52E+08	5900
QQ								
RSAWEPQHP	44.72	1506.7	13	-3.9	754.3	22.16	3.49E+08	7890
SSPE								
GQGIIQPQQP	51.17	1874.0	17	0.6	625.7	63.97	3.43E+08	30021
AQLEVIR								
LLVAPGQC(								
+57.02)NLATI	49.35	1875.0	17	5.4	626.0	54.97	3.21E+08	25084
HNVR								
NIQVDPSPGQ	38.24	1183.6	11	3.9	592.8	33.86	3.18E+08	13941
VQ								
QQLVLPQQP	43.46	1636.9	14	-2.6	819.4	74.53	3.02E+08	35861
PFSQQ								
TNANSMVS	40.75	1328.7	13	0.5	665.3	23.75	3.01E+08	8914
HIAGK								
SQQPQQPFP	38.68	1408.7	12	-1.6	705.3	35.36	2.99E+08	14678
QPQ								
VQWPQQQP	46.84	1940.0	16	2.7	971.0	66.86	2.96E+08	31747
VPQPHQPF								
VQPQQLPQF	39.5	1838.0	15	4	613.7	86.09	2.87E+08	42650
EEIRNL								
YQQPQQQYP	40.52	1450.6	12	-2.1	726.3	21.82	2.86E+08	7881

SGQ								
VSFQQPQQQ	39.85	1620.8	14	-3.2	811.4	41.22	2.84E+08	17898
YPSGQ								
SQPQYSQPQ	42.38	1742.8	15	-1.2	872.4	29.1	2.82E+08	11488
QPISQQ								
YFIALPVPSQ	43.54	1697.9	15	2.2	850.0	86.89	2.81E+08	43175
PVDPR								
KELQSPQQS	38.16	1190.6	10	2.3	596.3	27.1	2.74E+08	10539
F								
VRVPVPQLQ	41.17	1259.8	11	-1.9	630.9	41.34	2.70E+08	17837
PK								
VFLQQQC(+5								
7.02)SPVAMP	37.48	1631.8	14	0.4	816.9	68.81	2.68E+08	32479
Q								
GIIQPQQPAQ	39.7	1320.7	12	0.5	661.4	52.38	2.63E+08	23555
LE								
LTSPQQSGQ	38.73	1652.8	16	0	827.4	32.34	2.52E+08	13352
GQQPGQL								
ALRPFDEVS	40.04	1188.6	10	1.4	397.2	33.21	2.42E+08	13639
R								
FQQPQQQYP	37.15	1434.7	12	-1.8	718.3	27.78	2.34E+08	10808
SGQ								

SRPDQSGLM								
ELPGC(+57.0	47.88	1798.8	16	5.8	600.6	48.8	2.24E+08	21649
2)PR								
KQGYDSPYH								
VS	44.99	1279.6	11	0.6	640.8	18.94	2.22E+08	6513
NILLQQC(+5								
7.02)KPASL	38.88	1383.8	12	-0.8	692.9	56.06	2.22E+08	25645
SFQQPLQQY								
PL	37.45	1347.7	11	-1.7	674.8	78.6	2.16E+08	38293
AFPPSQSQG								
GGPPQPPLA	46.6	1985.0	20	1.1	993.5	49.92	2.16E+08	22249
PR								
QQPVLPQQS								
PFS	37.62	1354.7	12	0.4	678.4	58.85	2.05E+08	27141
NILLQQC(+5								
7.02)KPASLV	39.19	1569.9	14	-1.5	785.9	60.49	2.03E+08	28045
S								
LNPC(+57.02)								
KNILLQQC(+	48.37	1883.0	16	-0.5	942.5	40.59	1.96E+08	17466
57.02)KPAS								
VRVPVPQLQ								
PQN	41.89	1373.8	12	0.4	687.9	51.79	1.95E+08	23262

SSQLHSSQNI	55.49	1907.9	17	1.7	955.0	67.06	1.95E+08	31744
FSGFDVR								
SFHALAQHD	39.77	1279.6	11	-0.6	427.6	15.3	1.90E+08	4848
VR								
GQGIIQPQQP	50.09	1846.0	17	2.5	616.3	60.04	1.81E+08	27762
AQLEAIR								
QQPPFSQQP	37.2	1608.8	14	1.3	805.4	46.75	1.78E+08	20860
PISQQ								
GQRPGQWL	42.47	1663.8	15	-3.2	832.9	36.09	1.70E+08	15380
QPGQGQQ								
IIQPQQPAQL	43.28	1631.9	14	-1.8	817.0	58.14	1.68E+08	26800
EVIR								
SIC(+57.02)H								
VMQQQC(+5	51.69	1974.9	15	0.4	659.3	30	1.68E+08	11873
7.02)C(+57.02								
)QQLR								
ERPWQQQPL	41.7	1864.9	15	3.2	933.5	60.8	1.64E+08	28409
PPQQSF								
SQVSFQQPQ	48.37	1835.8	16	0	918.9	42.86	1.51E+08	18462
QQYPSGQ								
GQGQHGY	49.9	1803.8	17	1.4	902.9	38.05	1.49E+08	16008
PTSPQLSGQ								

AQQPATQLP	38.27	1312.6	12	1.9	657.3	45.58	1.49E+08	19748
TVC(+57.02)								
DRC(+57.02)C								
(+57.02)KELY	53.78	1996.8	15	1.7	500.2	15.86	1.47E+08	5288
DASQHC(+57								
.02)R								
SFPPQQPYP	39.93	1859.9	15	0.6	621.0	43.98	1.47E+08	19887
QQRPKY								
GQPQQQVPI	42.49	1391.8	12	-1.5	696.9	41.22	1.46E+08	17703
EIR								
GSVQPQQLP	40.35	1982.0	17	3.9	992.0	86.73	1.45E+08	43080
QFEEIRNL								
YQQPQHTEP	42.1	1497.7	12	-1.7	749.9	30.22	1.42E+08	12096
QPQ								
GGSFYPGET	40.72	1577.7	15	-1.4	789.9	66.48	1.39E+08	31248
TPPQQL								
AQQLAAQLP								
AMC(+57.02)	42.89	1456.7	13	-1	729.4	51.08	1.39E+08	22861
R								
GYYPPTSPQQ	42.54	1496.7	14	-2.3	749.3	29.1	1.36E+08	11651
SGQGQ								
HKEFLFAGN	40.84	1380.7	11	2.1	461.2	37.34	1.35E+08	15809

YR								
KAQQPATQL	41.55	1440.7	13	-2.3	721.4	34.45	1.32E+08	14188
PTVC(+57.02)								
GYYPGVTSP	40.77	1095.5	10	1.6	548.8	30.31	1.29E+08	12228
R								
GGGPPQPPL	41.91	1142.6	12	2.9	572.3	28.03	1.28E+08	10709
APR								
SFPPQQPYP	41.76	1696.9	14	2.8	566.6	29.83	1.27E+08	12518
QQRPK								
GSVQPQQLP	44.97	1754.9	15	0.1	878.5	64.98	1.27E+08	30605
QFEEIR								
SQQQQVVGQ	37.04	1385.7	13	-2.5	693.9	26.55	1.24E+08	10296
GSLVQ								
LIPC(+57.02)								
RDVVLQQPN	38.25	1734.9	15	-1.4	868.5	63.74	1.22E+08	29872
IA								
GQPQQQVPI	42.53	1547.9	13	-3.2	774.9	30.96	1.22E+08	12536
EIRR								
YYPTSPQQS	37.65	1367.6	12	0.7	684.8	45	1.20E+08	19588
GQL								
C(+57.02)IPG	43.2	1720.9	14	-1.5	861.4	76.06	1.19E+08	36608
LERPWQQQP								

L

ILQQQLIPC(+

57.02)RDVVL	44.81	1822.0	15	1.5	912.0	73.35	1.18E+08	35347
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Q

GQPQQQVPV

43.42	1508.8	13	-2.4	755.4	46.84	1.13E+08	20734
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EIMR

VSFQQPLQQ

38.81	1688.9	15	-3	845.4	78.21	1.13E+08	38086
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YPLGQG

FHHQPQQTF

40.74	1618.8	13	2.8	540.6	21.99	1.09E+08	7921
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PQPQ

GSAFVVPPG

42.12	1905.0	19	2.5	636.0	60.58	1.08E+08	28207
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HPVVEIASSR

ILQQQLIPC(+

39.72	1267.7	10	0.8	634.9	46.97	1.07E+08	20770
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57.02)R

VSFQQPLQQ

38.5	1631.8	14	-5.2	816.9	78.41	1.04E+08	38260
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YPLGQ

SQPQYSQPQ

40.89	1614.8	14	-2.4	808.4	29.42	1.03E+08	11701
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QPISQ

ERPWQQQPL

39.92	1717.9	14	-2.3	859.9	40.6	1.00E+08	16936
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PPQQS

YSQPQPFRP

40.18	1246.6	10	0.1	624.3	30.22	9.34E+07	12162
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Q

QTFPHQPQQ	45.7	1777.9	15	-1.7	889.9	46.42	9.07E+07	20433
AFPQPQ								
GQGHIQPQQP	50.3	1924.0	17	1.1	642.3	58.77	9.07E+07	27175
AQYEVIR								
SQPQHQPVI	46.7	1531.8	13	-1.8	766.9	29.56	8.89E+07	11829
EITR								
LQQPLSQQP	39.66	1992.0	17	1.7	997.0	55.81	8.85E+07	25491
QQTFPQPQ								
DISPEC(+57.0								
2)HPVVVSPV	48.24	1952.9	18	-0.2	977.5	65.23	8.73E+07	30738
AGQY								
VSFQQPQQQ	37.93	1749.8	15	-0.7	875.9	52.51	8.66E+07	23825
YPSSQV								
ILPTMC(+57.								
02)SVNVPLY	45.48	1661.9	14	5.3	555.0	79.08	8.57E+07	38461
R								
IPQQLQC(+5	43.86	1277.7	11	-0.4	639.8	39.84	8.56E+07	17042
7.02)AAIH								
YDPTAYNTI	42.35	1325.7	11	-0.4	663.8	59.61	8.53E+07	27550
LR								
GSVQPQQLP	40.88	1696.9	15	5.3	566.6	68.13	8.49E+07	32343
QFAEIR								

FLKPVFTQQ								
REPE	48.73	1617.9	13	3	540.3	43.72	8.49E+07	19018
PSQQQPQEQ								
VPLVQ	42.05	1604.8	14	-1.9	803.4	45.77	8.30E+07	20330
C(+57.02)HPV								
VVSPVAGQY	48.11	1411.7	13	-1.3	706.9	45.79	8.05E+07	20165
QQC(+57.02)								
C(+57.02)QPL	54.19	1815.8	15	-0.5	908.9	44.44	7.96E+07	19327
AQISEQAR								
VSFQQPQQQ								
YPLGQ	43.09	1646.8	14	-2.6	824.4	59.51	7.80E+07	27405
WSIWPQSD								
C(+57.02)QV	51.2	1804.8	14	4.3	602.6	92.47	7.72E+07	46375
MR								
VRVPVPQLQ								
PQNPSQQQ	52.86	1942.0	17	2.5	972.0	53.18	7.63E+07	24004
LQNPSQQQP								
QEQVPLVQ	43.46	1960.0	17	1.5	981.0	53.92	7.53E+07	24416
TQQPQQPFP								
QSK	38.4	1412.7	12	-2.1	707.4	18.93	7.53E+07	6855
HWYYPTSPQ								
LSGQ	49.51	1562.7	13	-1.9	782.4	59.6	7.52E+07	27504

SLQQPGQQQ	38.06	1552.8	15	-3.7	777.4	24.76	7.47E+07	9424
QIGQQQ								
SFQQPQQQL	43.63	1896.9	16	1.1	949.5	35.05	7.41E+07	14576
GQQPQQQ								
YSQPQHPISQ	40.25	1311.6	11	-0.1	656.8	13.35	7.36E+07	4147
Q								
IIQPQQPAQY	40.43	1681.9	14	-0.6	842.0	52.72	7.29E+07	23657
EVIR								
DISPEC(+57.0								
2)HPVVVSPV	49.18	1789.9	17	0.7	895.9	53.08	7.05E+07	24031
AGQ								
GSVQPQQLP	38.41	1753.9	15	0.6	878.0	62.55	6.77E+07	29260
QFQEIR								
IFPQPQQTFP	40.48	1691.8	14	0	846.9	52.51	6.67E+07	23814
HQPQ								
NMQVDPSG	37.47	1868.8	16	-0.2	935.4	63.9	6.58E+07	29752
QVQWPQQQ								
GQHGYPTS	46.9	1618.7	15	-0.8	810.4	38.42	6.55E+07	16132
PQLSGQ								
IIQPQQPAQL	40.61	1603.9	14	-2.6	803.0	54.13	6.52E+07	24631
EAIR								
IIQPQQPAQL	41.84	1589.9	14	-1.5	796.0	51.78	6.49E+07	23313

EGIR								
C(+57.02)QAI	44.31	1380.7	12	-1	691.4	31.45	6.45E+07	12833
HNVAEAIR								
VSFQQPQQQ	37.73	1836.9	16	0.5	919.4	47.61	6.26E+07	20978
YPSSQVS								
C(+57.02)HPV	42.15	1248.6	12	-0.9	625.3	28.16	6.04E+07	11148
VVSPVAGQ								
HANLPHDPC								
(+57.02)VDPV	51.16	1750.8	16	2.6	584.6	54.57	5.92E+07	24892
APL								
SSYQVLQQL								
C(+57.02)C(+5	51.34	1909.9	15	1.4	956.0	71.64	5.88E+07	34217
7.02)QQLR								
DTFNLLEQR	43.65	1359.7	11	-0.3	680.9	53.69	5.80E+07	24297
PK								
LAGRLPWST	38.66	1169.7	11	3.3	585.8	76.45	5.78E+07	37100
GL								
LC(+57.02)C(								
+57.02)QQLW	48.91	1844.9	14	3.6	923.4	70.25	5.54E+07	33585
QIPEQSR								
LSNQLVEGQ	41.85	1751.9	15	0.4	877.0	64.88	5.46E+07	30312
NYVNFK								

VQPQQLPQF	37.01	1552.8	13	-1.4	777.4	66.66	5.33E+07	31464
AEIR								
VRVPVPQLQ	44.64	1557.9	14	-0.7	779.9	53.7	5.14E+07	24282
PQNPS								
SIILQEQQQG	41.18	1741.9	15	0	872.0	66.45	4.97E+07	31355
FVQPQ								
VLVTPGHC(								
+57.02)NVMT	45.1	1562.8	14	-1.5	782.4	38.18	4.96E+07	16094
VH								
GQGIIQPQQP	38.96	1505.8	14	-1.5	753.9	52.57	4.92E+07	23837
AQLE								
SFQQPQQQY	41.2	1551.7	13	-2.9	776.9	29.9	4.86E+07	11859
PSSQ								
TLGVDDQPL	37.68	1297.6	12	0.6	649.8	62.76	4.65E+07	29217
FHG								
NYLLQQC(+5	38.78	1447.7	12	-1.5	724.9	82.49	4.62E+07	40355
7.02)NPVSL								
NPSQQQPQE	39.88	1718.9	15	-4.2	860.4	46.61	4.57E+07	20469
QVPLVQ								
IFWGIPALLK	39.69	1312.8	11	3.7	657.4	95.39	4.56E+07	48342
R								
SIYSPGKPYL	39.19	1322.7	12	2.8	441.9	33.63	4.54E+07	13929

AK								
LTSGGLSC(+5	39.42	1448.7	13	2	483.9	36.74	4.49E+07	15481
7.02)PKDFPK								
SQQPFLQQP	37.67	1962.0	17	3.6	982.0	48.04	4.45E+07	21278
QQPSPQPQ								
SLKFSREEEL	37.68	1836.0	16	2.4	613.0	58.77	4.45E+07	26973
GVFAPK								
SAWEPQHPS	39.44	1350.6	12	-1.2	676.3	28.56	4.43E+07	11307
SPE								
GYYPPTSPQQ	42.57	1311.6	12	-1.3	656.8	29.17	4.41E+07	11660
SGQ								
QQPVLPPQQ	39.04	1589.8	14	-0.7	795.9	80.55	4.10E+07	39423
SPFPQ								
AIWTSIQGD	42.38	1521.8	14	1.1	761.9	96.44	4.03E+07	48773
LSGFK								
VFLQQQC(+5								
7.02)SPVAM(	39.12	1647.8	14	-0.7	824.9	51.92	3.97E+07	23436
+15.99)PQ								
DVVLQQHNI	40.68	1430.7	13	-3	716.4	24.01	3.87E+07	9112
AHAS								
GYYPPTSPQQ	37.84	1634.7	15	-1	818.4	33.23	3.87E+07	13422
PGQGQQ								

QQQPPFWQ	38.73	1869.9	15	3.1	936.0	85.49	3.80E+07	42217
QQPPFSQ								
QQC(+57.02)								
C(+57.02)GEL	51.77	1860.8	15	-0.7	931.4	35.68	3.78E+07	15087
ANIPQQC(+5								
7.02)R								
AQIIPQQPQQ	45.31	1957.0	17	2.3	979.5	79.58	3.78E+07	38825
PFPLQPQ								
GGSFYPGET	45.36	1990.0	18	1.4	996.0	50.05	3.66E+07	22520
TPPQQLQQR								
GQGQPGYYP								
TSPQQSGQG	51.6	1963.9	19	0.9	982.9	31.72	3.61E+07	12814
Q								
FLKPVFTQQ	38.88	1106.6	9	3	554.3	50.13	3.60E+07	22410
GQGQHGY	40.8	1418.6	13	-2.9	710.3	20.72	3.58E+07	7551
PTSPQ								
GYYP TSPQQ	39.92	1624.7	15	-2.9	813.4	28.75	3.51E+07	11327
SGQGQQ								
HQIPQQPQQ	40.12	1730.8	14	-1.3	866.4	29.43	3.51E+07	11640
FPQQQ								
NLPPRC(+57.	38.48	1890.9	17	0	946.5	39.51	3.50E+07	16874
02)NQGPPC(+								

57.02)NIPGT

VGHPEWEFP

39.27	1252.6	10	2	418.5	48.28	3.44E+07	21646
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R

GQGQHWYY

46.82	1932.9	17	0.8	967.4	60.15	3.41E+07	27899
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PTSPQLSGQ

QQPILPQQPP

39.93	1506.8	13	-3.4	754.4	86.6	3.37E+07	42818
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FSQ

RTAWEPHHP

40.23	1529.7	13	2.7	510.9	15.1	3.29E+07	4632
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SSPE

RSDPNSSVL

KDLPGC(+57.	55.87	1896.9	17	5.2	475.2	40.51	3.28E+07	17382
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02)PR

AQQPATQLP

TVC(+57.02)R	37.89	1599.8	14	-1.2	800.9	49.12	3.28E+07	21846
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M

GQPHQQVPV

38.61	1487.8	13	-1.7	744.9	23.81	3.13E+07	8873
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EITR

DVVLQQHSI

40.19	1271.7	11	2.2	636.8	52.48	3.11E+07	23613
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AY

AQGSVQPQQ

50.71	1896.0	17	2.8	633.0	68.18	3.11E+07	32379
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LPQFAEIR

SLQQPGQGQ	38.22	1794.9	17	-2	898.4	42.31	3.00E+07	18400
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QGHYPASL

KAQQPATQL

PTVC(+57.02)	43.85	1596.8	14	-5	799.4	25.34	2.99E+07	9772
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R

VFLQQQC(+5

7.02)IPVAMQ	43.88	1716.9	14	-0.8	859.4	66.05	2.99E+07	31184
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R

SGPPEHKLF

40.56	1747.9	15	0.6	438.0	63.9	2.84E+07	29892
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GFTYLR

SGQGQHGY

YPTSPQLSG	50.97	1890.8	18	0.9	946.4	37.99	2.81E+07	16075
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Q

C(+57.02)QA

VC(+57.02)SV	41.77	1534.7	13	-1.8	768.4	77.13	2.81E+07	37386
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AQIIMR

RQPQQPFYQ

37.25	1543.8	12	-2.3	772.9	29.68	2.73E+07	11797
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QPQ

SC(+57.02)EE

VRNQC(+57.0

43.7	1865.8	14	-3.1	467.5	9.27	2.73E+07	2192
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2)C(+57.02)K

QLR

QQPPFWQQ	38.71	1741.8	14	0.4	871.9	86.12	2.72E+07	42328
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QPPFSQ								
SFLQQQMNP								
C(+57.02)K	42.42	1379.6	11	-0.3	690.8	43.47	2.68E+07	18906
LAGRLPWST								
GLQMR	43.89	1584.9	14	5.4	529.3	67.96	2.63E+07	31956
QVVDQQLA								
GRLPW	39.52	1508.8	13	-0.7	755.4	79.75	2.51E+07	38998
GFVQPQQLP								
QFEEIR	42.61	1814.9	15	2.2	908.5	80.75	2.51E+07	39457
GAQKLC(+57								
.02)ANVC(+5	38.52	1275.6	11	-3.2	426.2	11.56	2.46E+07	3238
7.02)R								
GYYP TSPQH								
TGQR	44.49	1490.7	13	-4.3	746.4	15.64	2.44E+07	5240
IALPVPSQPV								
DPR	41.02	1387.8	13	0.2	694.9	59	2.43E+07	27272
SVYQELGVR	37.21	1049.6	9	1.9	525.8	43.22	2.35E+07	18899
DISPEC(+57.0								
2)HPVVVSPV	38.89	1533.7	14	-2.2	767.9	57.35	2.34E+07	26154
VRVPVPQLQ								
PQNPSQ	43.29	1685.9	15	-1.4	844.0	53.77	2.33E+07	24245
GKELHTPQE	39.23	1793.9	15	-0.7	897.9	26.38	2.28E+07	10195

QFPQQQ								
EQQQGVPI								
RPL	41.89	1376.8	12	-0.1	689.4	64.97	2.27E+07	30582
KAQQLAAQ								
LPAMC(+57.0	43.98	1584.8	14	-3.2	793.4	41.28	2.26E+07	17825
2)R								
YYNLHDRD								
GYRPIAR	37.37	1907.9	15	-0.2	382.6	27.58	2.21E+07	10672
DVVLQQHNI								
AH	42.85	1272.7	11	-2.3	637.3	22.23	2.19E+07	8237
SHGC(+57.02)								
PDGYHLTC(+	44.64	1933.9	16	4.4	645.6	50.83	2.18E+07	22916
+57.02)YVLR								
GAQKLC(+57								
.02)AGVC(+5	37.37	1218.6	11	0.9	610.3	10.98	2.18E+07	2938
7.02)R								
RYYPSVTSP								
QQV	39.39	1423.7	12	-2.8	712.9	41.32	2.15E+07	17869
LQQPGQGQ								
QGHYPASLQ	47.57	1835.9	17	1	919.0	34.08	2.13E+07	14010
IHDQERPQQ								
SFLQ	44.61	1624.8	13	-3.6	813.4	29.09	2.11E+07	11499

ELYDASQHC								
(+57.02)RC(+5	46.93	1892.8	15	3.2	474.2	18.8	2.11E+07	6508
7.02)EAVR								
LQC(+57.02)V								
GSQVPEAVL	37.56	1554.8	14	1.5	778.4	55.48	2.09E+07	25398
R								
C(+57.02)QAI								
HNVVHA	38.82	1147.6	10	-1.1	574.8	15.3	2.07E+07	4945
GYYPSTVSP								
R	37.22	1125.5	10	3.5	563.8	33.77	2.06E+07	13928
SLQQPGQGQ								
QPGQWQQ	38.83	1793.8	16	-0.7	897.9	39.48	2.01E+07	16762
VDPSGQVQ								
WPQQQPFR	38.1	1895.9	16	0.8	949.0	63.14	2.00E+07	29293
LYC(+57.02)C								
(+57.02)QELA								
EISQQC(+57.	45.03	1956.8	15	0.9	979.4	62.42	2.00E+07	29010
02)R								
GDSRDTFNL								
LEQRPK	38.41	1774.9	15	3.8	592.6	46.05	1.97E+07	20167
RDISPEC(+57								
.02)HPVVVSP	40.3	1946.0	18	-0.1	649.7	40.61	1.96E+07	17569

VAGQ								
RSTNLDWY								
	40.47	1436.7	12	3.9	479.9	46.18	1.94E+07	20323
KGPT								
EEHGDGRRP								
	42.08	1770.9	15	-0.4	443.7	22.25	1.83E+07	8229
YVFGPR								
YQPQQPAQH								
	42.09	1580.8	13	4.1	527.9	14.63	1.82E+07	4644
ESIR								
EEHTDLPVQ								
	38.11	1236.6	11	0.8	619.3	54.51	1.66E+07	24722
GL								
PC(+57.02)KN								
ILLQQC(+57.	38.66	1768.9	15	2.7	590.7	46.38	1.61E+07	20370
02)KPASL								
C(+57.02)QAI								
	44.33	1424.7	12	-0.7	713.4	39.13	1.57E+07	16752
HNVVESIR								
QQLFPQQPS								
	39.17	1433.7	12	-2	717.9	70.62	1.54E+07	33534
FSQ								
TSDPNSGVL								
KDLPGC(+57.	49.31	1811.9	17	-0.5	907.0	47.57	1.52E+07	21029
02)PR								
SGPWMWC(+								
57.02)DPAMG	48.28	1686.7	14	5.4	563.2	68.38	1.50E+07	32229
HR								

QQPLQQYPL	44.02	1930.0	17	0.5	966.0	76.24	1.48E+07	36770
GQGSFRPS								
DTYNLLEQR	44.04	1403.7	11	-0.1	702.9	43.67	1.43E+07	18984
PR								
RSFIQPSLQQ								
QLNPC(+57.0	51.61	1943.0	16	0.5	648.7	53.91	1.42E+07	24373
2)K								
GQQGYPTS	41.22	1803.8	16	1.5	602.3	16.73	1.40E+07	5573
PQHTGQR								
VVDQQLAG	42.98	1568.8	14	-3.1	785.4	73.99	1.38E+07	35698
RLPWST								
LSSC(+57.02)	42.4	1386.6	11	1	463.2	21.47	1.33E+07	7835
KDYVMER								
GYPTSPQQ	40.07	1903.9	17	2.7	953.0	43.78	1.32E+07	19345
LGQGQQR								
NLALQTLPA	38.47	1344.7	12	-1	673.3	76.38	1.32E+07	37057
MC(+57.02)N								
QQPQYLQPQ	37.36	1809.9	15	-0.6	906.0	46.36	1.30E+07	20483
QPISQQ								
LQSPQQSFS	38.3	1285.6	11	-0.1	643.8	22.91	1.28E+07	8903
HQ								
GQGQGGYY	39.34	1809.8	17	-1.5	905.9	29.17	1.26E+07	11663

PTSPQQSGQ								
EGLNVAC(+5	38.52	1441.7	13	-0.4	721.9	48.18	1.23E+07	21253
7.02)ENALPR								
GYYP TSPQQ	37.33	1126.5	10	1.7	564.3	29.16	1.23E+07	11662
S								
HHASLNFTC								
(+57.02)AEM	40.81	1572.7	13	3.1	525.2	31.34	1.21E+07	12593
R								
SDPNSSVLK								
DLPGC(+57.0	37.41	1740.8	16	-1.1	871.4	49.48	1.18E+07	22060
2)PR								
THHLQPQQP	40.5	1540.8	13	-2.6	771.4	13.38	1.15E+07	4033
ISQQ								
APFSSVVAGI	37.51	1188.6	13	-1.9	595.3	75.48	1.15E+07	36376
GGQ								
C(+57.02)HA								
VC(+57.02)G	45.01	1499.7	13	4	500.9	45.61	1.13E+07	19906
VAQVIMR								
C(+57.02)EAV	42.61	1269.6	10	3.3	424.2	45.08	1.12E+07	19704
RYFIGR								
VFLQQQC(+5	41.19	1901.0	16	3.2	951.5	73.02	1.12E+07	34953
7.02)SPVAMP								

QRL								
QQILQQQLIP								
C(+57.02)R	37.88	1523.8	12	-1.8	762.9	77.17	1.09E+07	37321
SSC(+57.02)L								
VMWEQC(+5								
7.02)C(+57.02	43.53	1955.8	15	0.6	978.9	71.07	1.00E+07	33875
)QQLK								
ILPTM(+15.99								
)C(+57.02)SV	39.44	1677.9	14	-0.3	839.9	64.98	9.97E+06	30409
NVPLYR								
ISFGIEASDL								
LK	40.19	1291.7	12	2	646.9	89.71	9.87E+06	44906
QQPQQQYPL								
GQGSFRPS	41.82	1944.9	17	0.2	973.5	60.79	9.76E+06	28256
SQVSYQQPQ								
QQYPSGQ	37.75	1851.8	16	0.9	926.9	31.71	9.64E+06	12930
ILQQQLIPC(+								
57.02)RDVVL	40.68	1950.1	16	3	976.0	71.56	9.64E+06	34145
QQ								
GDSRDTYNL								
LEQRPR	46.11	1818.9	15	2.8	607.3	37.1	9.60E+06	15698
LDDPAQELA	38.81	1654.8	15	4.3	552.6	56.79	9.54E+06	25991

FGRPAR								
QQQLFPQQP	40.1	1561.8	13	-0.5	781.9	70.06	9.29E+06	33375
SFSQ								
QQQLFPQQP	37.92	1433.7	12	-0.3	717.9	72.49	8.91E+06	34659
SFS								
C(+57.02)QAI	37.49	1090.5	9	0.7	546.3	15.31	8.81E+06	4932
HNVIH								
AAMVGHPE	41.34	1525.7	13	-1.4	763.9	58.75	8.65E+06	27094
WEFPR								
SC(+57.02)EE								
VRNQC(+57.0	40.86	1865.8	14	0.7	622.9	13.3	8.31E+06	3968
2)C(+57.02)Q								
QLR								
QQYPLGQGS	37.35	1463.7	13	6.8	732.9	62.12	8.03E+06	28851
FRPS								
GQHWYYPT	38.47	1747.8	15	-0.7	874.9	60.65	7.97E+06	28061
SPQLSGQ								
GQGSFRPSQ	40.16	1628.8	15	-2.3	815.4	14.87	7.96E+06	4722
QNPQAQ								
RYYPSVTC(+	41.96	1583.7	13	-3.2	792.9	38.18	7.49E+06	16214
57.02)PQQVS								
EEQSQAGPY	38.36	1702.7	15	-1.8	852.4	18.3	7.35E+06	6433

PGC(+57.02)Q

PR

ELKAC(+57.0

2)QQVMDQQ	44.88	1745.9	14	-6.8	873.9	37.58	7.34E+06	15829
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LR

IDDPSRADIY

40.11	1530.7	13	4.7	511.3	31.43	7.29E+06	12849
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NPR

C(+57.02)C(+5

7.02)QQLRD	37.76	1363.6	11	-1.8	682.8	11	7.27E+06	2977
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VSAK

SFSQPQHQV

41.96	1765.9	15	2.1	589.6	44.42	6.92E+06	19349
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PIEITR

QVVDQQLA

40.23	1696.9	15	-1.2	849.5	77.21	6.76E+06	37596
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GRLPWST

C(+57.02)KLT

SGLSC(+57.0	47.88	1736.9	15	3.4	580.0	37.36	6.45E+06	15705
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2)PKDFPK

SPQQPGQW

41.92	1974.9	17	1.7	988.5	27.59	6.23E+06	10867
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QQPEQGQPR

C(+57.02)C(+5

7.02)KELYDA	44.66	1725.7	13	-0.9	432.4	13.7	6.21E+06	4183
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SQHC(+57.02)

R

C(+57.02)QAI

38.58	1260.6	11	3.2	421.2	34.43	6.20E+06	14385
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HNVVHAI

DVVLQQHNI

40.11	1485.8	13	-4.9	743.9	17.13	5.86E+06	5731
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AHGR

SLQQPGQGQ

39.38	1526.7	15	-2	764.4	11.56	5.40E+06	3286
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QSGQGQ

AIWTSIQGD

45.14	1691.9	16	1.3	847.0	103.7	5.35E+06	53267
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LSGFKGL

YKAETQSVD

43.12	1543.8	13	-1.3	772.9	23.64	5.34E+06	8959
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FQTK

C(+57.02)C(+5

7.02)QQLRD

41.61	1679.8	13	0.5	420.9	11.07	5.18E+06	3003
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VSAKC(+57.0

2)R

SIC(+57.02)H

VM(+15.99)Q

QQC(+57.02)	48.19	1990.9	15	-0.5	664.6	29.87	5.01E+06	11916
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C(+57.02)QQL

R

ASEEQLHEL

37.09	1297.6	11	-3.7	649.8	18.81	4.85E+06	6552
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SR

VAPGQC(+57

.02)NLATIHN	40.67	1648.8	15	4	550.6	30.85	4.79E+06	12411
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VR

C(+57.02)QA

VC(+57.02)SV	45.96	1529.7	13	3.3	510.9	50.49	4.24E+06	22439
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AHVIMR

C(+57.02)PTE

41	1377.7	11	-2.9	345.4	11.79	4.18E+06	3335
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VKRDFAR

FSREEELGV

40.38	1507.8	13	3.3	503.6	53.85	3.37E+06	24249
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FAPK

RILPTMC(+5

7.02)SVNVPL	43.8	1818.0	15	3.2	607.0	70.95	3.33E+06	33746
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YR

C(+57.02)KAI

WTSIQGDLS	40	1809.9	16	6.7	604.3	87.3	3.22E+06	43305
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GFK

FHQITGDQC(

39.54	1647.8	13	0.1	550.3	12.51	3.20E+06	3660
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+57.02)HHLR

AIWTSIQGD

43.77	1578.8	15	-1.1	790.4	96.37	3.07E+06	48744
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LSGFKG

EGEASEQLQ

37.15	1563.6	13	-3.3	782.8	17.39	2.95E+06	5848
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C(+57.02)ERE

C(+57.02)C(+5

7.02)QQLESV 42.17 1265.5 10 -0.2 633.8 17.04 2.95E+06 5671

SR

SGGSGRPYH

37.61 1783.8 16 1.4 595.6 20.72 2.90E+06 7461

FGQESYR

SLQQC(+57.0

2)VQRC(+57. 37.14 1966.9 15 -2.9 394.4 10.41 2.82E+06 2678

02)HQDRPR

HADNFDDAI

43.3 1822.9 16 2.2 608.6 74.78 2.56E+06 36049

AKHPFIL

SAPEELVQQ

47.08 1768.9 16 2.3 885.5 105.4 2.51E+06 54336

VLSAGWR

2

SFGQPHQQV

46.8 1721.9 15 1.7 575.0 39.84 2.40E+06 16965

PVEITR

DC(+57.02)C(

+57.02)QELA

44.63 1953.8 15 0.8 977.9 81.9 2.36E+06 40139

NITNDWC(+5

7.02)R

C(+57.02)QAI

38.88 1076.5 9 1.2 539.3 10.69 2.34E+06 2872

HNVVH

LEPFPFEEHT

41.22 1967.0 17 9.2 984.5 100.4 2.33E+06 51305

DLPVQGL

6

LGATFSSHP								
	41.04	1959.0	18	4	654.0	95.78	2.32E+06	48366
NELIALFSR								
NVLIEFYAP								
WC(+57.02)G	38.26	1892.9	15	1.7	632.0	88.84	2.29E+06	44255
HC(+57.02)K								
DC(+57.02)C(								
+57.02)QQLA								
	37.94	1980.8	15	0.8	991.4	65.76	2.12E+06	30890
DINNEWC(+5								
7.02)R								
SGPELTIEMI						106.9		
	39.56	1825.0	17	5.7	913.5		1.94E+06	55014
LQAAQPK						8		
C(+57.02)QAI								
	38.8	1486.8	13	1.9	496.6	65.23	1.41E+06	30602
HNVVHAIL								
HRASLNFTC(								
	45.44	1591.7	13	4.6	531.6	31.14	1.27E+06	12558
+57.02)AEMR								
KFDGILGLG								
	41.7	1662.9	15	2.3	555.3	80.79	1.26E+06	39388
FKEIAR								
VNSWVEKV								
	42.59	1360.7	12	4	454.6	46.05	1.15E+06	20112
TSGR								
RVIYASQLT								
	39.43	1501.9	13	-2.4	376.5	21.98	1.12E+06	8037
AKPR								
KAPIRPDVIT	37.01	1648.0	14	1.1	413.0	40.63	9.95E+05	17479

FVHR								
TYPQQAGAI								
	37.25	1103.6	10	6.4	552.8	19.09	9.17E+05	6632
R								
AYLPVIESFG						102.4		
	44.49	1785.9	16	8	596.3		8.66E+05	52552
FSSTLR						3		
M(+15.99)VG								
	38.47	1399.6	11	3.5	467.6	50.12	8.60E+05	22402
HPEWEFPR								
KRHHASLNF								
TC(+57.02)AE	48.27	1856.9	15	1.2	465.2	21.06	7.79E+05	7647
MR								
KGYWQFDM								
	37.82	1812.9	16	3.9	605.3	94.07	7.45E+05	47445
GDVLIGGK								
ERC(+57.02)C								
(+57.02)QQLE	43.42	1550.7	12	0.8	517.9	15.1	5.43E+05	4804
SVSR								
QQPAQGQQP								
	38.7	1691.8	16	-1.7	846.9	10.32	4.76E+05	2623
GQGQQGR								
SILGALPVD								
						106.6		
VIANAYGIS	44.99	1928.1	19	5	643.7		4.55E+05	55009
						2		
R								
VLVTGAAG						100.8		
	42.65	1999.1	20	2.9	667.4		4.43E+05	51625
QIGYALVPM						7		

IAR

RSC(+57.02)E

EVQNPC(+57

41.38	1993.9	15	-1.2	665.6	14.19	3.61E+05	4436
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.02)C(+57.02)

QQLR

VLVTPGHC(

+57.02)NVM(	38.82	1578.8	14	6.2	527.3	38.28	2.91E+05	16244
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+15.99)TVH

RSTNLDWY

37.85	1662.9	14	5.9	555.3	79.5	0	38777
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KGPTLL

HQC(+57.02)

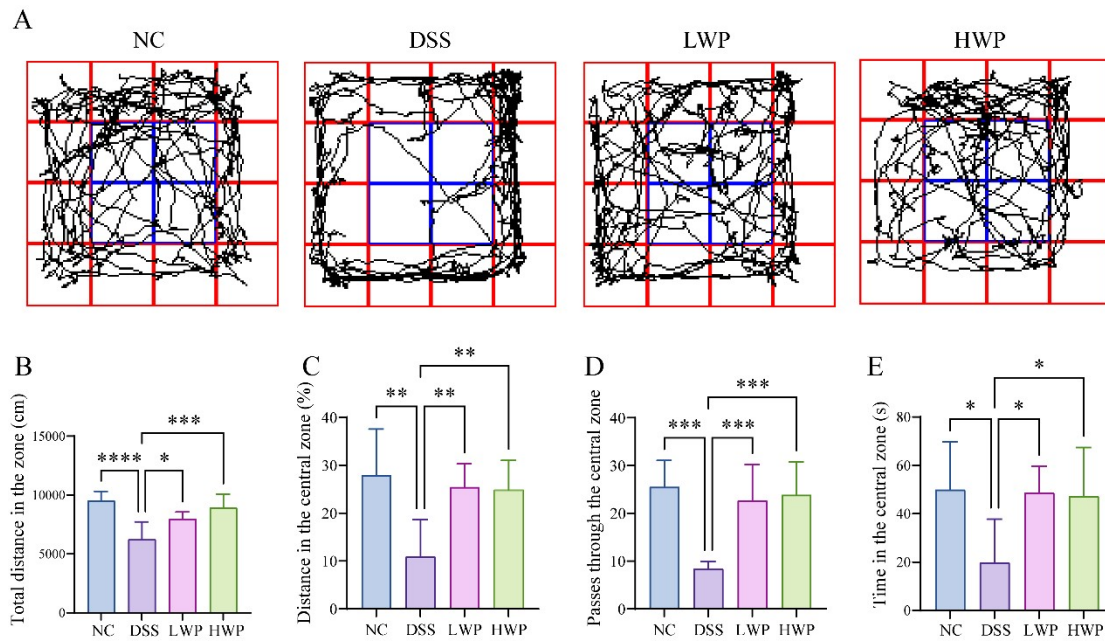
GGNVGDVV	38.72	1802.9	17	2.5	902.4	70.07	0	33324
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NIPIQ

EGEASEQLQ

38.98	1434.6	12	-4	718.3	15.34	0	4933
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C(+57.02)ER



26

27

28 **Figure S1.** Effect of WP intervention on behavioral deficits in DSS-induced colitis mice in the

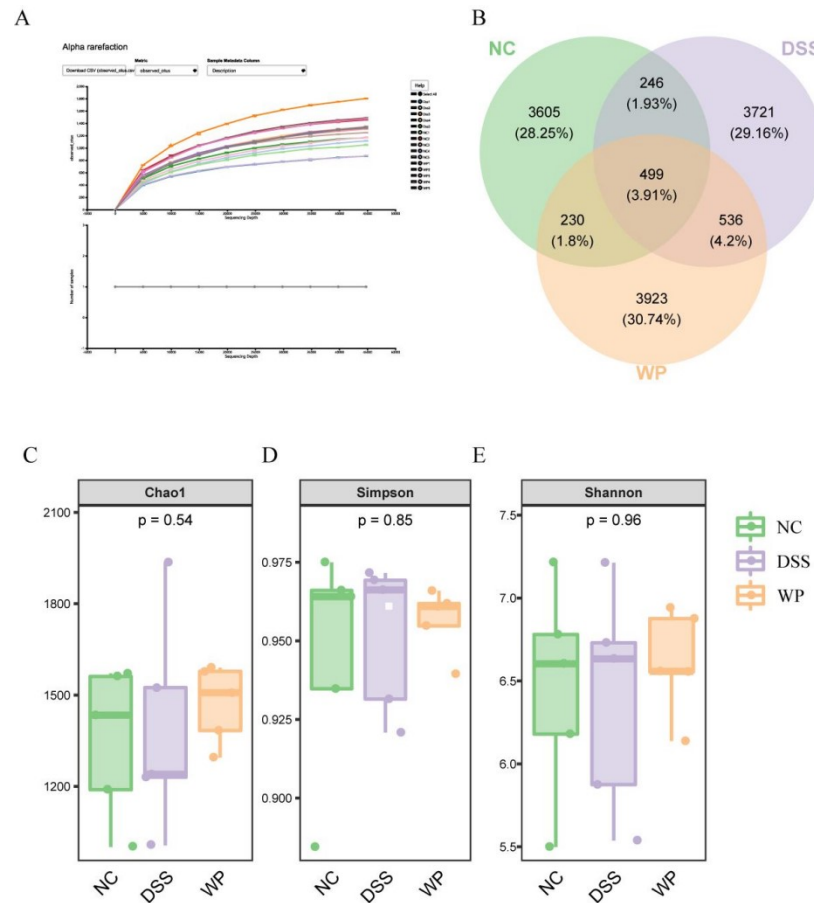
29 OFT experiment. (A) Movement trajectories of representative mice in each group in the OFT

30 experiment; total distance in the zone (B), distance moved internally (C), number of times entering

31 the internal area (D), and the time spent in the interior (E) (n = 8). *P < 0.05; **P < 0.01; ***P <

32 0.001; ****P < 0.0001.

33

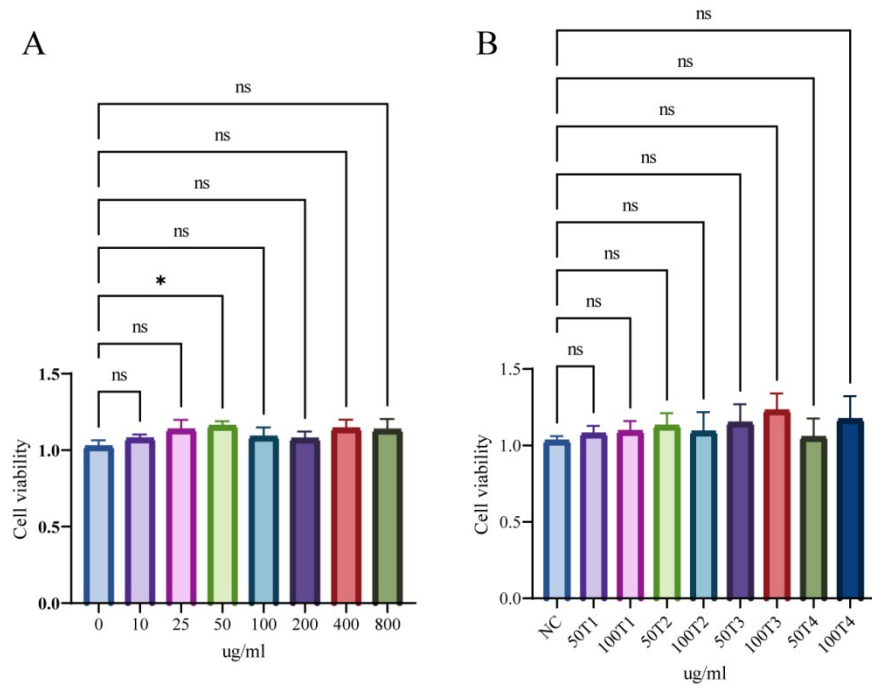


34

35

36 **Figure S2.** Alpha-diversity of the mouse gut microbiota. (A) Representative number of species
 37 observed (OTU) in the three groups. (B) Dilution curves of gut microbes. (C) The Chao 1 index,
 38 (D) Shannon index, and (E) Simpson index

39



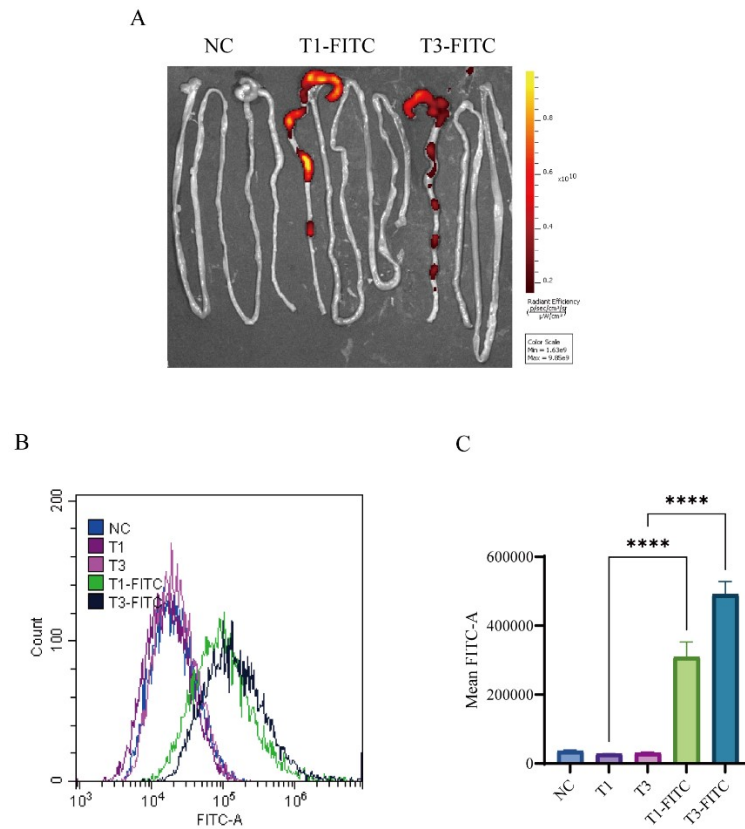
40

41 **Figure S2.** Assessment of the effect of WP on Caco-2 cell viability. (A) Effect of different

42 concentrations of WP on Caco-2 cell viability. (B) Effect of different concentrations of WP on

43 Caco-2 cell viability.

44



45

46 **Figure S4.** Gastrointestinal distribution and cellular uptake of FITC-labeled

47 GIIQPQQPAQLEVIR (T1-FITC) and QPPFSQQQPPFSQQ (T3-FITC). (A) The distribution of

48 T1-FITC and T3-FITC in the gastrointestinal tract at 6 hours. (B-C) Flow cytometry result and

49 statistic data of FITC expression in Caco2 cell after treatment with TI-FITC and T2-FITC (n=3).

50 *P < 0.05; **P < 0.01; ***P < 0.001; ****P < 0.0001.