

Supplementary Table 1. The identification of 36 compounds of exosome-like nanoparticles derived from *Portulaca oleracea* L.

No.	Compound	Formula	RT. (min)	m/z	Ion mode
1	2-hydroxypyridine	C ₅ H ₅ NO	122.964	96.0443346	POS
2	benzoic acid	C ₇ H ₆ O ₂	28.0695	121.029494	NEG
3	adenosine	C ₁₀ H ₁₃ N ₅ O ₄	208.306	268.104332	POS
4	adenine	C ₅ H ₅ N ₅	156.9395	134.047078	NEG
5	phenylethylamine	C ₈ H ₁₁ N	238.297	122.096392	POS
6	picolinic acid	C ₆ H ₅ NO ₂	240.467	122.024941	NEG
7	4-hydroxycinnamic acid	C ₉ H ₈ O ₃	224.0765	163.04022	NEG
8	3-hydroxycinnamic acid	C ₉ H ₈ O ₃	273.059	163.040516	NEG
9	kynurenic acid	C ₁₀ H ₇ NO ₃	221.8405	188.035317	NEG
10	suberic acid	C ₈ H ₁₄ O ₄	269.76	173.082276	NEG
11	2-isopropylmalic acid	C ₇ H ₁₂ O ₅	170.469	175.061148	NEG
12	azelaic acid	C ₉ H ₁₆ O ₄	303.213	187.097885	NEG
13	gentisic acid	C ₇ H ₆ O ₄	137.814	153.019329	NEG
14	dl-tryptophan	C ₁₁ H ₁₂ N ₂ O ₂	164.442	205.096935	POS
15	phthalic acid	C ₈ H ₆ O ₄	208.757	165.019578	NEG
16	l-pyroglutamic acid	C ₅ H ₇ NO ₃	85.1939	130.049716	POS
17	salsolinol	C ₁₀ H ₁₃ NO ₂	138.789	180.101826	POS
18	chlorogenic acid	C ₁₆ H ₁₈ O ₉	213.135	353.087981	NEG
19	d-pantothenic acid	C ₉ H ₁₇ NO ₅	193.46	218.103416	NEG
20	3,5-dihydroxybenzoic acid	C ₇ H ₆ O ₄	184.042	153.019309	NEG
21	dl-phenylalanine	C ₉ H ₁₁ NO ₂	191.075	164.07186	NEG
22	guanosine	C ₁₀ H ₁₃ N ₅ O ₅	155.5835	284.098682	POS
23	guanine	C ₅ H ₅ N ₅ O	187.233	152.056848	POS
24	demethyl-coclaurine	C ₁₆ H ₁₇ NO ₃	245.174	272.128012	POS
25	cytosine	C ₄ H ₅ N ₃ O	179.299	112.050507	POS
26	neolitsine	C ₁₉ H ₁₇ NO ₄	104.798	324.129896	POS
27	n-feruloylputrescine	C ₁₄ H ₂₀ N ₂ O ₃	234.223	265.155271	POS
28	isochamaejasmine	C ₃₀ H ₂₂ O ₁₀	46.4151	543.133259	POS
29	cryptochlorogenic acid	C ₁₆ H ₁₈ O ₉	227.4295	353.088007	NEG
30	l-canavanine	C ₅ H ₁₂ N ₄ O ₃	359.294	221.085847	NEG
31	fustin	C ₁₅ H ₁₂ O ₆	63.0181	333.064021	NEG
32	methylmalonic acid	C ₄ H ₆ O ₄	126.179	117.019297	NEG
33	trans-ferulic acid	C ₁₀ H ₁₀ O ₄	230.449	193.051183	NEG
34	salidroside	C ₁₄ H ₂₀ O ₇	236.523	299.11467	NEG
35	3,4-dihydroxyphenylacetic acid	C ₈ H ₈ O ₄	217.241	167.035184	NEG

36	6-hydroxynicotinic acid	$\text{C}_6\text{H}_5\text{NO}_3$	124.926	138.019626	NEG
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Supplementary Table 2. The identification of 31 metabolites in Dextran sulfate sodium (DSS)-induced colitis mouse model

No.	Metabolite	Mode	HMDB ID	Adducts	Formula	M/Z	Retention time	Mass Error	DSS/Control			PELNs/DSS		
									VIP	FC	Ternd	VIP	FC	Ternd
1	Solamargine	pos	HMDB0258362	M+2Na	C ₄₃ H ₇₃ NO ₁₅	456.741451	2.5815	7.423760857233349	2.6358	2.3883	up	4.4547	0.4536	down
2	Ketorolac	pos	HMDB0014608	M+ACN+Na	C ₁₅ H ₁₃ NO ₃	319.1067291	3.3802	5.55120166437752	2.8243	3.0389	up	4.1418	0.4665	down
3	Esmolol	pos	HMDB0014333	M+H	C ₁₆ H ₂₅ NO ₄	296.1850259	3.6151	-2.06247262	3.0566	0.3814	down			
4	N,N-dimethyl-2-(9-propanoyl-1-oxa-9-azaspiro[5.5]undecan-4-yl)acetamide	pos	-	M+H	C ₁₆ H ₂₈ N ₂ O ₃	297.2164525	4.2418	-2.757006637	3.071	0.4522	down			
5	Calcitroic acid	pos	HMDB0006472	M+Na	C ₂₃ H ₃₄ O ₄	397.2320259	4.8974	-7.760526407	2.8342	0.3499	down			
6	Tramadol	pos	HMDB0259401; HMDB0014339	M+NH ₄	C ₁₆ H ₂₅ NO ₂	281.2216662	5.8141	-2.615421626	3.0275	0.0594	down			
7	Nordihydrocapsaicin	pos	HMDB0036328	M+NH ₄	C ₁₇ H ₂₇ NO ₃	311.2316671	5.5028	-4.270763505	2.6907	0.3413	down			
8	5,6-Dihydroxyprostaglandin F1a	pos	HMDB0012109	M+ACN+H	C ₂₀ H ₃₆ O ₇	430.278671	5.4872	-3.240145021	2.9454	0.3275	down			
9	MG(22:6(4Z,7Z,10Z,13Z,16Z,19Z)/0:0/0:0)	pos	HMDB0011587	M+Na	C ₂₅ H ₃₈ O ₄	425.2631278	5.4103	-7.71242108	2.8213	0.4803	down			
10	Gly-pro-arg-pro	pos	HMDB0252829	M+NH ₄	C ₁₈ H ₃₁ N ₇ O ₅	443.2741158	5.3801	3.81693849438178	3.4027	0.2676	down			
11	Asymmetric dimethylarginine	pos	HMDB0001539	2M+Na	C ₈ H ₁₈ N ₄ O ₂	427.2789266	5.2496	9.28601903229756	4.118	0.0053	down			
12	Valylisoleucine	pos	HMDB0029130	2M+Na	C ₁₁ H ₂₂ N ₂ O ₃	483.3163173	4.574	2.19726449821767	3.3837	0.2566	down			
13	5-Pentyl-1,4-dioxan-2-one	pos	HMDB0059936	2M+NH ₄	C ₉ H ₁₆ O ₃	362.2526566	4.4915	-3.072753469	2.971	0.4802	down			
14	Isopentenyl adenosine	pos	HMDB0304396	M+H-H ₂ O	C ₁₅ H ₂₁ N ₅ O ₄	318.1537791	4.4837	-6.823137971	2.397	0.3575	down			
15	Mofebutazone	pos	HMDB0254828	2M+ACN+H	C ₁₃ H ₁₆ N ₂ O ₂	506.280603	4.1247	9.52509205799444				3.8173	2.0383	up
16	PS(LTE4/18:2(9Z,12Z))	pos	HMDB0281665	M+2H	C ₄₇ H ₇₉ N ₂ O ₁₃ PS	472.2617451	3.2399	5.1873623270422	2.4345	2.6601	up			
17	Geldanamycin	pos	HMDB0252665	M+ACN+H	C ₂₉ H ₄₀ N ₂ O ₉	602.3127277	3.0365	9.85459529634543	2.7168	3.6846	up	4.0225	0.4022	down

18	3-Indole carboxylic acid glucuronide	neg	HMDB0013189	M+FA-H	C ₁₅ H ₁₅ NO ₈	382.0776796	3.5725	-0.85950631	2.5465	2.1133	up			
19	Pyrazofurin	neg	HMDB0256946	2M+FA-H	C ₉ H ₁₃ N ₅ O ₆	563.1607671	3.5725	3.26920654965248	2.5227	2.4042	up			
20	(Z)-2-Methyl-2-butene-1,4-diol 4-O-beta-D-Glucopyranoside	neg	HMDB0041187	M-H	C ₁₁ H ₂₀ O ₇	263.113214	3.9994	-1.561922659	3.2917	0.2893	down	3.9303	2.37	up
21	4-Hydroxy-5-(3',4',5'-trihydroxyphenyl)-valeric acid-O-methyl-O-glucuronide	neg	HMDB0059970	M-H2O-H	C ₁₈ H ₂₄ O ₁₃	429.1033749	4.2766	-1.059557298	3.1082	7.7614	up			
22	N-[2-(Dimethylamino)ethyl]-N-methyl-4-[(4-[4-morpholin-4-yl-7-(2,2,2-trifluoroethyl)-7H-pyrrolo[2,3-d]pyrimidin-2-yl]phenyl} carbamoyl)amino]benzamide	neg	HMDB0260359	M+K-2H	C ₃₁ H ₃₅ F ₃ N ₈ O ₃	661.2322008	4.6381	8.28784448173256	3.2221	2.2115	up			
23	3-[1-[3-(Dimethylamino)propyl]-5-methoxy-1H-indol-3-yl]-4-(1H-indol-3-yl)-1H-pyrrole-2,5-dione	neg	HMDB0252906	M+K-2H	C ₂₆ H ₂₆ N ₄ O ₃	479.148673	4.8029	-0.956346319				4.2767	2.2161	up
24	Dexamethasone isonicotinate	neg	HMDB0251081	M+Cl	C ₂₈ H ₃₂ FNO ₆	532.1896897	4.9865	-2.167096629	2.7322	2.2472	up			
25	Diosmetin-7-O-Rutinoside	neg	HMDB0029548	M-H	C ₂₈ H ₃₂ O ₁₅	607.1661751	5.4515	-1.099600059	2.8004	3.0877	up			
26	5-Hydroxyoctadecanoic acid	neg	HMDB0112180	M+K-2H	C ₁₈ H ₃₆ O ₃	337.212756	5.4742	-7.640552673	2.957	0.4864	down			
27	Chembl4569322	neg	HMDB0256658	M+Cl	C ₂₈ H ₃₂ F ₆ N ₂ O ₂	577.2057505	6.851	-0.826920146	2.4857	2.1868	up			
28	11'-Carboxy-alpha-chromanol	neg	HMDB0012515	M+Na-2H	C ₂₆ H ₄₂ O ₄	439.2845575	6.3637	3.7767630379927497	3.7914	7.8583	up			
29	2-(p-Acetamidophenyl)-2-ethylglutarimide	neg	HMDB0247904	M-H2O-H	C ₁₅ H ₁₈ N ₂ O ₃	255.1141191	5.8299	0.7944062848170409	2.7147	2.0941	up			
30	Indole-3-acetyl-myo-inositol	neg	HMDB0031182	M+FA-H	C ₁₆ H ₁₉ NO ₇	382.1141214	4.2193	-0.692374135	2.8211	5.5536	up			
31	4-Amino-1-[(2R,3S,4S,5R)-3,4-dihydroxy-5-(hydroxymethyl)oxolan-2-yl]oxypyrimidin-2-one	neg	HMDB0257637	2M+FA-H	C ₉ H ₁₃ N ₅ O ₆	563.1611151	3.8481	3.94068499946002	2.4881	6.1985	up			

Supplementary Table 3. The identification of 38 metabolites in microbiota-transplanted colitis mouse model

No.	Metabolite	Mode	HMDB ID	Adducts	Formula	M/Z	Retention time	Mass Error	FMT-DSS/ FMT-Control			FMT-PELNs/ FMT-DSS		
									VIP	FC	Ternd	VIP	FC	Ternd
1	1-Nitro-7- glutathionyl-8-hydroxy-7,8-dihydronaphthalene	pos	HMDB0060329	M+H, M+Na, M+NH4	C ₂₀ H ₂₄ N ₄ O ₉ S	497.132081	3.8662	-3.214415386				3.1047	2.0359	up
2	4',7-Dihydroxy-2'-methoxy-3'-prenylisoflavan	pos	HMDB0034010	M+H, 2M+Na, M+Na	C ₂₇ H ₂₄ O ₄	363.1588692	6.3357	6.435958906386452	2.2152	0.4306	down	4.1845	3.8052	up
3	L-Histidinol	pos	HMDB0003431	2M+ACN+H	C ₆ H ₁₁ N ₃ O	324.2160488	2.8887	6.3763997114803885	2.4756	2.6648	up	2.3492	0.4649	down
4	(+)-Lysergic acid	pos	HMDB0242256	2M+Na	C ₁₆ H ₁₆ N ₂ O ₂	559.2354093	3.1067	7.14803388787377	2.4905	0.4972	down			
5	Pantolactone	pos	HMDB0059876; HMDB0303902	2M+ACN+Na	C ₇ H ₁₂ O ₂	320.1848551	3.3492	6.34783245613886				2.6376	0.4937	down
6	Leu Ser Glu Lys	pos	-	M+H	C ₂₀ H ₃₇ N ₅ O ₈	476.2701795	3.7644	-2.756479045				2.475	2.0245	up
7	1-Galactopyranosyl-5-fluorouracil	pos	HMDB0258079	M+H-H ₂ O	C ₁₀ H ₁₃ FN ₂ O ₇	275.0687242	3.874	4.56569476003901				2.8809	3.704	up
8	Kinetensin 4-7	pos	HMDB0012986	M+CH ₃ OH+H	C ₂₆ H ₃₇ N ₉ O ₆	604.3213099	3.8896	1.9934045883381				3.1114	2.5412	up
9	1-Hydroxy-2,12,15-heneicosatrien-4-one	pos	HMDB0036741	M+2Na-H	C ₂₇ H ₃₆ O ₂	365.2423898	4.6589	-0.953930182	2.6247	2.0501	up			
10	Carglumic acid	pos	HMDB0015673	2M+NH4	C ₆ H ₁₀ N ₂ O ₅	398.1482502	5.1443	-9.255532406	3.5424	0.1714	down			
11	Orinapterin	pos	HMDB0000817; HMDB0000468; HMDB0000633	M+Na, M+K	C ₉ H ₁₁ N ₅ O ₃	260.0733325	0.5428	-8.762258391	2.9425	2.2553	up			
12	LysoPE(0:0/18:3(9Z,12Z,15Z))	pos	HMDB0011479	M+H	C ₂₃ H ₄₂ NO ₇ P	476.2760113	6.3357	-2.429114308	3.2024	0.4255	down			
13	Lotrafiban	pos	HMDB0254173	M+ACN+H	C ₂₃ H ₃₂ N ₄ O ₄	470.2740281	6.0322	-5.027412915				2.4336	0.492	down
14	Leucyl-leucine	pos	HMDB0254039; HMDB0028933	M+Na	C ₁₂ H ₂₄ N ₂ O ₃	267.1693238	4.9609	5.77647444668131	2.5585	0.4123	down			

15	Arginyllysine	pos	HMDB0028714	M+ACN+H	C ₁₂ H ₂₆ N ₆ O ₃	344.2428341	4.6047	7.8416558116674					2.5809	0.4987	down
16	3'-O-Methylgancaonin P	pos	HMDB0040813	M+NH4	C ₂₁ H ₂₀ O ₇	402.1534296	4.3978	-3.381397199					3.3273	2.1871	up
17	PC(17:2(9Z,12Z)/0:0)	pos	HMDB0256157	M+2Na-H	C ₂₅ H ₄₈ NO ₇ P	550.2857346	4.2418	-4.491958733	2.7604	0.4916	down				
18	Mofebutazone	pos	HMDB0254828	2M+ACN+H	C ₁₃ H ₁₆ N ₂ O ₂	506.280603	4.1247	9.52509205799444	2.5787	0.3392	down	2.5364	3.1379	up	
19	Leu Glu Leu	pos	-	M+H	C ₁₇ H ₃₁ N ₃ O ₆	374.2275791	4.0774	-2.634025579	2.393	0.493	down				
20	Hyaluronan biosynthesis, precursor 1	pos	HMDB0060071	M+CH3OH+H	C ₁₄ H ₂₁ NO ₁₁	412.1424136	3.9447	-6.694794674	2.8857	0.4678	down	3.4842	2.3939	up	
21	Val Thr Ile	pos	-	M+H	C ₁₅ H ₂₉ N ₃ O ₅	332.2168796	3.4193	-3.375051097	2.4094	0.4233	down	2.5925	2.3742	up	
22	Glutaminylproline	pos	HMDB0028805	M+NH4	C ₁₀ H ₁₇ N ₃ O ₄	261.1548867	1.3964	-3.475270785				2.0858	2.0069	up	
23	L-erythro-4-Hydroxyarginine	pos	HMDB0034326	M+ACN+H	C ₆ H ₁₄ N ₄ O ₃	232.1398794	0.504	-2.821745195	2.9516	0.4437	down				
24	4-Aminobutyraldehyde	pos	HMDB0001080	2M+K	C ₄ H ₆ NO	213.1017247	3.1379	9.985424288193439	3.4427	0.2082	down	2.9959	4.1239	up	
25	Acetylcysteine	pos	HMDB0001890; HMDB0000574	M+H	C ₅ H ₉ NO ₃ S	164.037227	4.234	-2.230288417				3.053	2.2434	up	
26	Pantethine	neg	HMDB0003828; HMDB0256114	M+Cl, M+FA-H, M-H	C ₂₂ H ₄₂ N ₄ O ₈ S ₂	589.2130344	4.7479	-1.395142943	3.692	0.2211	down	2.3893	2.932	up	
27	Crocin 4	neg	HMDB0039122	M+Na-2H	C ₂₇ H ₃₆ O ₉	525.2081242	1.2134	-4.910999787	3.1814	0.4782	down				
28	Miproxifene phosphate	neg	HMDB0254746	M-H2O-H	C ₂₉ H ₃₆ NO ₅ P	490.2149654	1.6534	-0.595644608				3.3353	4.2476	up	
29	1-Deoxy-D-glucitol	neg	HMDB0041500	2M-H	C ₆ H ₁₄ O ₅	331.1617389	2.9206	2.3127134131733196	2.8086	0.4495	down	3.2161	2.4086	up	
30	Pyrazofurin	neg	HMDB0256946	2M+FA-H	C ₉ H ₁₃ N ₃ O ₆	563.1607671	3.5725	3.26920654965248	2.3348	0.3603	down	3.2827	3.3561	up	
31	Glutamyltryptophan	neg	HMDB0028830	2M+FA-H	C ₁₆ H ₁₉ N ₃ O ₅	711.2659569	5.3056	4.22144147309292	2.8294	0.4484	down	3.0357	2..3705	up	
32	Acetyl dehydrorishitinol	neg	HMDB0302966	M+Na-2H	C ₁₇ H ₂₂ O ₂	279.1346535	5.6532	-7.724988056	2.8948	0.43	down	3.0822	2.4839	up	
33	Glycyl-prolyl-arginyl-valyl-valyl-glutamic acid	neg	HMDB0252831	M+Na-2H	C ₂₈ H ₄₉ N ₉ O ₉	676.3363159	5.8619	-5.609254489	3.5807	0.1908	down	2.3185	3.6768	up	
34	1-Ethyl-2-pyrrolidinone	neg	HMDB0243878	2M+Hac-H	C ₆ H ₁₁ NO	285.1811662	5.9659	-3.593784155				22.7045	7.3692	up	
35	3-keto Fusidic acid	neg	HMDB0060745	M+Na-2H	C ₃₁ H ₄₆ O ₇	551.2984365	7.0354	-1.103442593	3.1104	0.468	down				
36	11'-Carboxy-alpha-chromanol	neg	HMDB0012515	M+Na-2H	C ₂₆ H ₄₂ O ₄	439.2845575	6.3637	3.7767630379927497	2.5612	2.7905	up				

37	3-Hydroxytrideca-4,6-dienoylcarnitine	neg	HMDB0241325	M+FA-H	C ₂₀ H ₃₅ NO ₅	414.2489461	5.5637	-2.112380882	2.0168	2.9494	up	2.1687	0.3725	down
38	Dodec-6-enedioylcarnitine	neg	HMDB0241230	M+Na-2H	C ₁₉ H ₃₃ NO ₆	392.2073594	5.4173	5.128352801299321				2.2242	0.4991	down
39	Ampicillin	neg	HMDB0014559	M-H	C ₁₆ H ₁₉ N ₃ O ₄ S	348.1018429	5.1689	-1.454481234				2.3583	0.367	down
40	(R)-1-O-[b-D-Glucopyranosyl-(1->6)-b-D-glucopyranoside]-1,3-octanediol	neg	HMDB0032799	M-H ₂ O-H	C ₂₀ H ₃₈ O ₁₂	451.2190593	4.8921	1.22016251309586	3.0224	0.4551	down	3.2283	2.1959	up
41	Fluprostenol	neg	HMDB0252405	M+Cl	C ₂₃ H ₂₉ F ₃ O ₆	493.1640854	4.8109	6.68018686436687	2.4233	0.4811	down			
42	Alloimperatorin	neg	HMDB0301848	M+Na-2H	C ₁₆ H ₁₄ O ₄	291.0655708	4.6316	6.272112982819822				3.5406	45.0623	up
43	4-Acetylzearalenone	neg	HMDB0039100	M+K-2H	C ₂₀ H ₂₄ O ₆	397.1069765	4.2892	3.00653825010279				2.8977	0.4919	down
44	4-Amino-1-[(2R,3S,4S,5R)-3,4-dihydroxy-5-(hydroxymethyl)oxolan-2-yl]oxypyrimidin-2-one	neg	HMDB0257637	2M+FA-H	C ₉ H ₁₃ N ₃ O ₆	563.1611151	3.8481	3.94068499946002				2.9159	4.6804	up
45	10-Formyldihydrofolate	neg	HMDB0006485	M-H	C ₂₀ H ₂₁ N ₇ O ₇	470.1422977	3.4377	-1.426174903				2.3739	0.3248	down
46	Hydromorphone-3-glucoside	neg	HMDB0061144	M+Cl	C ₂₃ H ₂₉ NO ₈	482.155595	2.9474	-6.983946246				2.4659	2.2431	up
47	Dichlorprop	neg	HMDB0251202	M-H	C ₉ H ₈ Cl ₂ O ₃	232.9757293	1.0486	-8.734569121	3.0697	0.2133	down	4.0133	6.0552	up
48	Hippuric acid sulfate	neg	HMDB0304910	M+Cl	C ₉ H ₉ NO ₆ S	293.9859341	0.7996	5.69389929472283				3.1726	2.1683	up