

**Hypoglycemic effect of polysaccharide from *Astragalus membranaceus* on type 2
diabetic mice based on “gut microbiota-mucosal barrier”**

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Table S1. Chemical properties and composition of APP extracted from *A. membranaceus*.

Item	APP
Yield (%)	3.64%
Neutral sugar (%)	68.77 ± 0.24%
Uronic acid (%)	16.21 ± 0.12%
Protein (%)	2.66 ± 0.09%
Monosaccharide composition (Molar ratio, %)	
Arabinose	13.60%
Galactose	7.20%
Glucose	63.73%
Xylose	0.25%
Mannose	0.13%
Galacturonic acid	14.73%
Glucuronic acid	0.37%
Molecular weight distribution	
Peak 1	161.15 kDa
Content	80.02%
Peak 2	5022 Da
Content	19.98%

Table S2. Spearman correlations among 5 key genera and T2DM-related indicators altered by APP.

		<i>Allobaculum</i>		<i>Lactobacillus</i>		<i>Cupriavidus</i>		<i>Halomonas</i>		<i>Shigella</i>	
		r	P	r	P	r	P	r	P	r	P
Serum	Body weight	0.741	0.002	0.777	0.001	-0.471	0.076	-0.482	0.069	-0.777	0.001
	FBG	-0.627	0.012	-0.633	0.011	0.481	0.070	0.612	0.015	0.939	0.000
	HOMA-IR	-0.756	0.001	-0.775	0.001	0.524	0.045	0.611	0.016	0.873	0.000
	TC	-0.756	0.001	-0.709	0.003	0.327	0.234	0.742	0.002	0.807	0.000
	TG	-0.655	0.008	-0.639	0.010	0.442	0.099	.688	0.005	0.934	0.000
	LDL-C	-0.608	0.016	-0.644	0.010	0.541	0.037	0.519	0.048	0.945	0.000
	HDL-C	0.630	0.012	0.622	0.013	-0.420	0.119	-0.622	0.013	-0.901	0.000
	D-LA	-0.864	0.000	-0.875	0.000	0.574	0.025	0.684	0.005	0.645	0.009
	DAO	-0.918	0.000	-0.884	0.000	0.306	0.268	0.687	0.005	0.600	0.018
	LPS	-0.790	0.000	-0.825	0.000	0.562	0.029	0.579	0.024	0.857	0.000
Colon	TNF- α	-0.907	0.000	-0.917	0.000	0.458	0.086	0.622	0.013	0.720	0.002
	IL-10	0.050	0.858	0.120	0.670	-0.196	0.483	0.065	0.817	-0.633	0.011
	IL-6	-0.655	0.008	-0.611	0.016	0.360	0.187	0.731	0.002	0.818	0.000
	IL-1 β	-0.884	0.000	-0.818	0.000	0.164	0.560	0.709	0.003	0.578	0.024
	Colon length	0.053	0.850	0.038	0.892	-0.197	0.482	-0.290	0.295	-0.503	0.056
	SOD	0.790	0.000	0.677	0.006	-0.120	0.670	-0.874	0.000	-0.710	0.003
	CAT	0.891	0.000	0.863	0.000	-0.349	0.202	-0.699	0.004	-0.699	0.004
	MDA	-0.711	0.003	-0.644	0.010	0.295	0.286	0.786	0.001	0.720	0.002

	GSH	0.959	0.000	0.896	0.000	-0.230	0.411	-0.765	0.001	-0.601	0.018
	Liver index	-0.789	0.000	-0.687	0.005	0.153	0.587	0.851	0.000	0.720	0.002
	AST	-0.840	0.000	-0.818	0.000	0.327	0.234	0.633	0.011	0.644	0.010
	ALT	-0.697	0.004	-0.622	0.013	0.311	0.259	0.835	0.000	0.770	0.001
Liver	Hepatic	0.707	0.003	0.635	0.011	-0.263	0.344	-0.799	0.000	-0.831	0.000
	glycogen										
	TC	-0.747	0.001	-0.739	0.002	0.465	0.080	0.679	0.005	0.838	0.000
	TG	-0.724	0.002	-0.645	0.009	0.241	0.388	0.810	0.000	0.810	0.000

Supplementary Figure Captions:

Fig. S1. Food consumption (A), water consumption (C) and body weight (E) curves of experimental mice were measured throughout the 6-weeks period. Food consumption (B), water consumption (D) and body weight (F) of experimental mice were measured at week 6. Data were presented as means \pm SEM. * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; ns, not statistically significant.

Fig. S2. The levels of (A) GSH, (B) CAT, (C) SOD, and (D) MDA in liver of experimental mice were analyzed after 6 weeks of APP and MA treatment. Data were presented as means \pm SEM. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$; ns, not statistically significant.

Fig. S3. APP improved the pathological characteristics of epididymal adipose in T2DM mice. The effects of APP on (A) epididymal fat weight and (B) epididymal fat index were studied. Data were presented as means \pm SEM. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$; ns, not statistically significant. H&E staining was conducted of (C) epididymal adipose (400 \times).

Fig. S4. APP improved the pathological characteristics of pancreas in T2DM mice. The effects of APP on (A) pancreas weight and (B) pancreas index were studied. Data were presented as means \pm SEM. * $P < 0.05$, ** $P < 0.01$; ns, not statistically significant. H&E staining was conducted of (C) pancreas (400 \times).

Fig. S1.

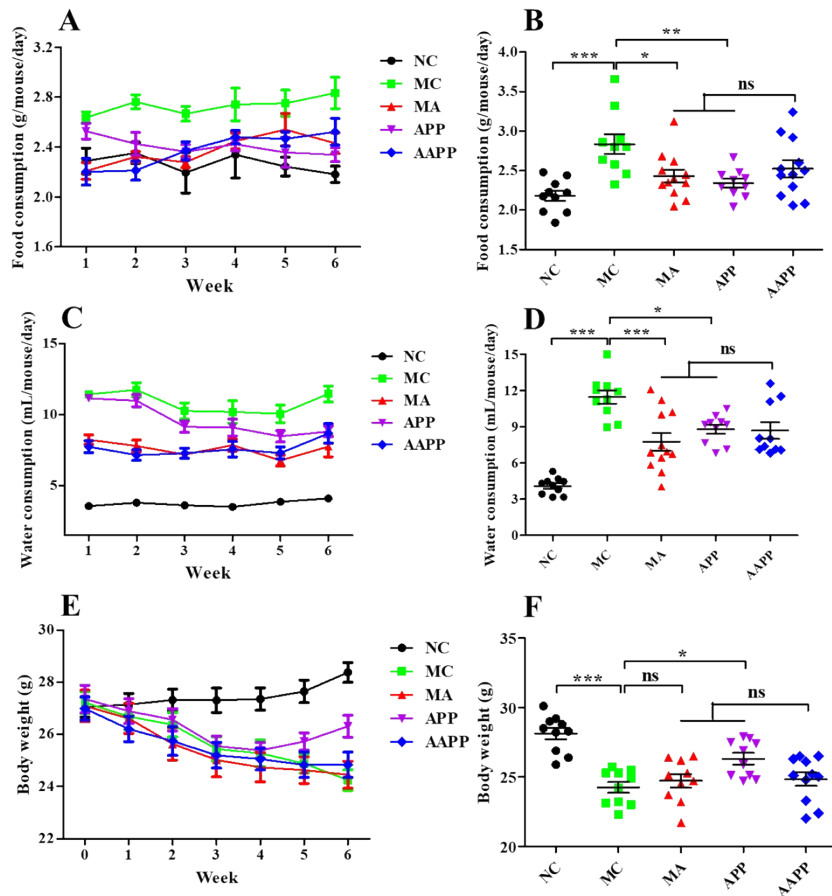


Fig. S2.

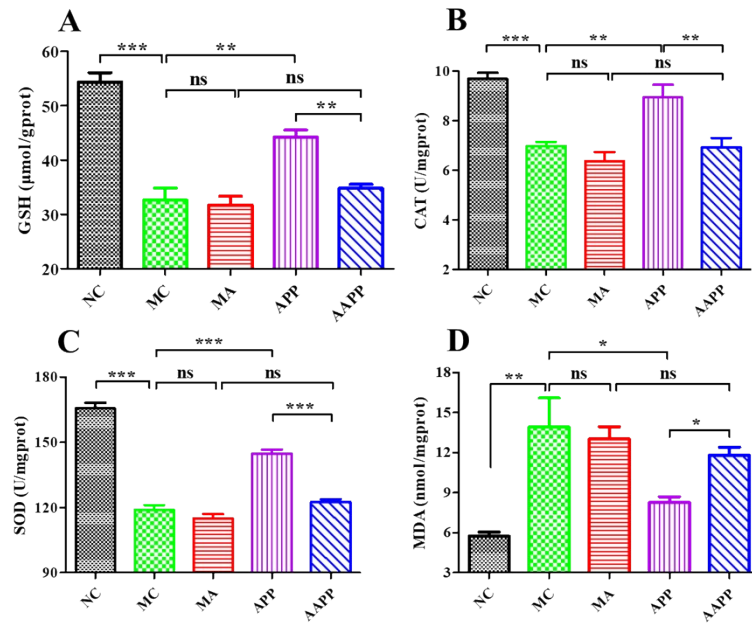


Fig. S3.

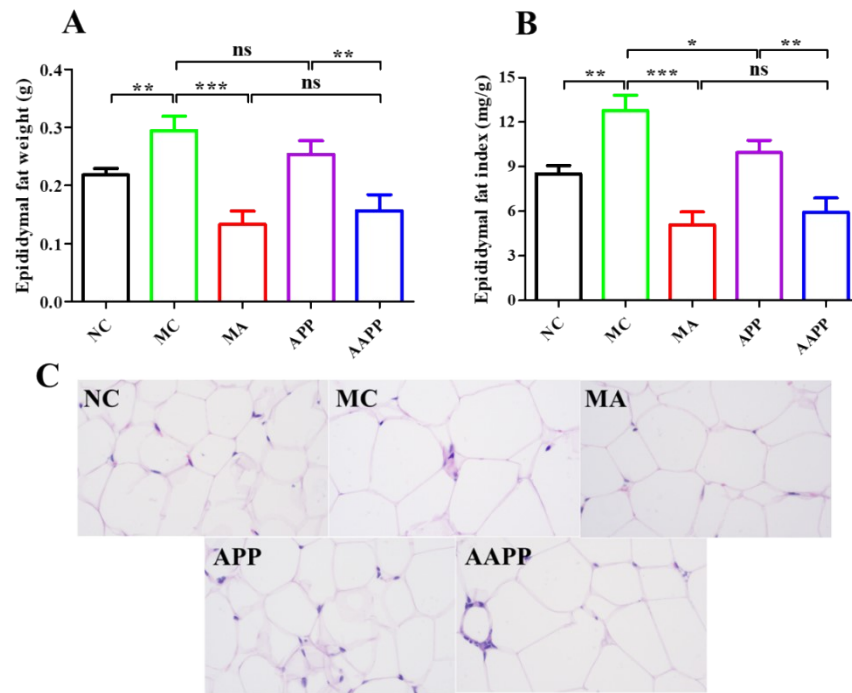


Fig. S4.

