BIOLOGICAL ACTIVITY:

Astragalus polysaccharide, one active component of the polysaccharides extract of Astragulus, attenuates TNF-α-induced insulin resistance by suppressing miR-721 and activating PPAR-γ and PI3K/Akt in 3T3-L1 adipocytes.

**IC50 & Target:** PPAR-γ [1]

**In Vitro:** Astragalus Polysaccharides (APS) are active components of the polysaccharides extract of Astragulus, which has important antioxidant, anti-hypertensive, and immunomodulatory roles. Astragalus Polysaccharides (APS) attenuates TNF-α-induced insulin resistance by suppressing miR-721 and activating PPAR-γ and PI3K/Akt in 3T3-L1 adipocytes. Astragalus Polysaccharides (APS) has a strong anti-inflammatory effect, and enhances the gene expression of an inflammatory marker peroxisome proliferator-activated receptor gamma (PPAR-γ) in a time- and dose-dependent manner. Astragalus Polysaccharides (APS) reverses the PPAR-mediated suppression of genes involved in glucose utilization. The expression of miR-721 is suppressed by Astragalus Polysaccharides (APS) in a dose-dependent manner. Also, the expression of PPAR-γ was increased in a dose-dependent manner. Treatment with Astragalus Polysaccharides (APS) attenuates the miR-721-inhibited expressions of PPAR-γ, p-Akt, and GLUT4. In the presence of insulin, Astragalus Polysaccharides (APS) upregulates the expression of PPAR-γ, p-Akt, PI3K, and GLUT4 in the miR-721 mimics. The expression levels of PPAR-γ, p-Akt, PI3K, and GLUT4 in miR-721+Astragalus Polysaccharides (APS)+insulin group are lower than that in the Astragalus Polysaccharides (APS)+insulin group [1].

**In Vivo:** To determine whether Astragalus Polysaccharides (APS) could preserve heart function in vivo, a heart failure model is generated using Doxorubicin-treated C57BL/6 mice. As shown by H&E staining, Doxorubicin-induced heart failure is associated with decreased thickening of the left ventricular wall and ventricular dilation. The number of apoptotic cells is dramatically higher in hearts of Doxorubicin-treated C57BL/6 mice (26.44±7.72%) compared with hearts from control mice (2.55±0.65%) as demonstrated by TUNEL staining. Importantly, pretreatment with Astragalus Polysaccharides (APS) attenuates Doxorubicin-induced cardiomyocyte apoptosis (15.54±6.06%). Moreover, Western blot analysis reveals that Astragalus Polysaccharides (APS) suppresses Doxorubicin-induced caspase 3 and caspase 9 activation. In addition, Bcl2 protein expression is dramatically upregulated in Astragalus Polysaccharides (APS) pretreated mice [2].

**PROTOCOL** (Extracted from published papers and Only for reference)

**Cell Assay:** [1] Astragalus Polysaccharides (20000-60000 mol/L) are used. After inducing insulin resistance to 3T3-L1 cell, the effect of Astragalus Polysaccharides (APS) is examined on glucose uptake. Glucose uptake tests of the insulin resistance resistant 3T3-L1 cells are performed after treatment with Astragalus Polysaccharides (0.01, 0.05, 0.1, 0.5, 1, 5, and 10 μg/mL) for 60 min to obtain an optimum concentration of Astragalus Polysaccharides (APS). And then, the glucose uptake tests of the insulin-resistant 3T3-L1 cells are performed after treatment with the optimum concentration of Astragalus Polysaccharides (APS) for 0, 15, 30, 60, 120, 240, and 480 min to further obtain the optimal incubation time. To investigate the effect of Astragalus Polysaccharides (APS) on insulin sensitivity, the insulin-resistant 3T3-L1 cells are treated with 0.1 or 1 μg/mL Astragalus Polysaccharides (APS) in the presence of 100 nM insulin.
for 60 min, and then followed by glucose uptake tests[1].

**Animal Administration:** Astragalus Polysaccharides (APS) is dissolved in PBS to 10 mg/mL and then diluted with DMEM culture medium containing 10% FBS at different concentrations (Mice)[2].

Eight-week-old male C57BL/6 mice are used. Normal control (NC) mice orally receive an equivalent volume of placebo (saline). Doxorubicin-treated mice (DOX) are injected with a single dose of Doxorubicin dissolved in normal saline (20 mg/kg i.p.) and receive an orally equivalent volume of saline. Doxorubicin plus Astragalus Polysaccharides (APS) treatment mice (DOX+APS) are pretreated with Astragalus Polysaccharides (1.5 g/kg) for 3 days by gavage and administered Astragalus Polysaccharides (APS) for 3 additional days after the injection of the same dose Doxorubicin as the DOX group. The dosage of DOX and Astragalus Polysaccharides (APS) is modified. All of the mice in the 3 groups are euthanized 5 days after the initial injection of Doxorubicin.

**References:**
