

International Conference on

Pancreatic Disorders and Treatment

October 17-19, 2016 Chicago, USA



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The antidiabetic activity and mechanism of total lignans from *Fructus Arctii* in KKAY mice

Research Background: *Fructus Arctii*, called “Niubangzi” in China (Great burdock achene in English), is a well-known Chinese materia medica. It is the dried ripe fruit of *Arctium lappa* L. (family *Asteraceae*) and was included in the Chinese pharmacopoeia for its traditional therapeutic actions.

Aim of the study: To study antidiabetic activity and mechanism of total lignans from *Fructus Arctii* (TLFA) in KKAY mice, a spontaneous type 2 diabetic animal model.

Materials & Methods: TLFA was extracted from *Fructus Arctii* and purified as described previously. Male KKAY mice and C57BL/6J mice were used in this study, KKAY mice were gavaged once daily with either solvents (0.3% CMC-Na), TLFA (250 mg/kg), TLFA (125 mg/kg) or Metformin (200 mg/kg) for 11 weeks. Besides common evaluation indexes of antidiabetic activity such as blood glucose level, body weight, oral glucose tolerance test (OGTT), glycated hemoglobin, as well as lipid metabolism parameters in mice serum was analyzed. Histopathological examination of the pancreas, white adipose tissue, liver and skeletal muscle was performed by optical microscope. The gene expressions of protein tyrosine phosphatase 1B (PTP1B), leptin, adiponectin and glucose transporter type 4 (GLUT4) were determined by real-time PCR. The protein levels of the above molecules and PPAR- γ , ACC, p-ACC, AKT, phospho-Akt (p-Akt), AMPK, p-AMPK, insR and GSK3 β were measured by Western blot.

Results: TLFA demonstrated significant hypoglycemic activity in KKAY mice and showed potential to inhibit weight gain. The results of real-time PCR and Western blot showed that TLFA downregulated leptin, PTP1B while it upregulated adiponectin and GLUT4 ($p < 0.05$). The protein level of AMPK, p-AMPK, GLUT4 and insR was also increased while the protein level of ACC, p-Akt, Akt was decreased ($p < 0.05$).

Conclusion: The results of this study indicate that TLFA has significant antidiabetic potential in KKAY mice. And this potential could be associated with activation of AMPK, insR and GLUT4 pathways and upregulated gene expression of adiponectin and GLUT4, with downregulation of Akt pathway and downregulated gene expression of leptin and PTP1B. It has a great potential to be further developed as a novel therapeutic agent for diabetes in humans.

Biography

Zhaohui Xua has received his PhD in Pharmacognosy in 2000 and *Fructus Arctii* is the object of his Doctoral research topic. He has committed his research to the treatment of *Fructus Arctii* in type 2 diabetes for over 20 years. He has published nearly 20 papers on the anti-diabetic activity of *Fructus Arctii*. He has made a useful exploration of the material basis and mechanism of the anti-diabetic activity of *Fructus Arctii*.

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