ReishiMax protects liver and improves liver functions in an experimental hepatitis model

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Abstract

Literature reported that Reishi (*Ganoderma lucidum*) is capable of protecting liver. This study is to examine the liver protective functions of ReishiMax (RM), a proprietary product containing both extract of *G. lucidum* fruit body and cracked spores of *G. lucidum* (Pharmanex). We used a CCl_4 (20%, 0.5ml/rat)-induced liver injury rat model. RM was given daily to rats at a dose of 208, 624, or 1664 mg/kg by gavage, starting one week prior to CCl_4 injection, and continuously after CCl_4 injection for 8 weeks to the end of experiment. CCl_4 injection caused liver injuries in the vehicle control group, featuring increase in serum GOT and GPT, liver collagen, and spleen weight, decreases in serum albumin and liver total protein. RM supplementation reduced the transaminases ($p<0.05$~0.01) and liver collagen ($p<0.01$); prevented the reductions of serum albumin ($p<0.05$) and liver total protein ($p<0.05$); reduced spleen weight ($p<0.05$). Histopathology examination showed apparent improvement of liver structure in RM-treated rats. Our results demonstrated that RM protects the liver from chemical injuries, improves liver functions, and prevents injury-associated liver fibrosis/cirrhosis.

Introduction

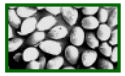
***Ganoderma lucidum* (Reishi)**

- Used for millenium as a longevity-promoting herbal tonic
- In animal studies, enhancing immune functions, improving glucose metabolism, liver protection, anti-cancer, antioxidant, and benefiting nerve system
- Active components:
  - (1) *G. lucidum* polysaccharides
  - (2) Highly oxygenated triterpenes
- *G. lucidum* triterpenes' functions:
  - (1) actinociceptive,
  - (2) anti-HIV,
  - (3) inhibition of release of histamine,
  - (4) inhibition of HMG-CoA reductase,
  - (5) inhibition of angiotensin convertin enzyme,
  - (6) antihepatoma, antihepatotoxic, and improving liver functions

Ganoderma lucidum

Proprietary Manufacturing Process

Reishi extract



Reishi spores

Cracking Process

Cracked Reishi spores

ReishiMax

6.0% Reishi triterpenes

13.5% Reishi polysaccharides

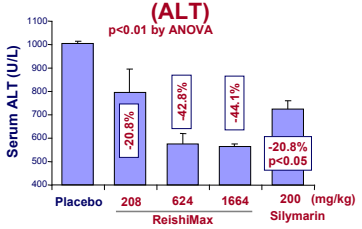
To examine the liver protecting effects of ReishiMax in mice with CCl_4-induced experimental hepatitis

Normal mice placebo control		(n=10)
Placebo		(n=12)
ReishiMax	208 mg/kg	(n=12)
ReishiMax	624 mg/kg	(n=12)
ReishiMax	1164 mg/kg	(n=12)
Silymarin	200 mg/kg	(n=12)

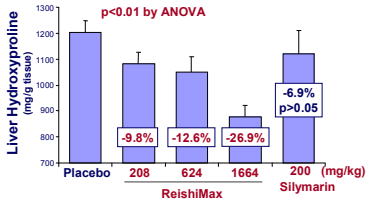
-1 0 1 2 3 4 5 6 7 8 (Weeks)

CCl_4 100 mg p.o. twice every week

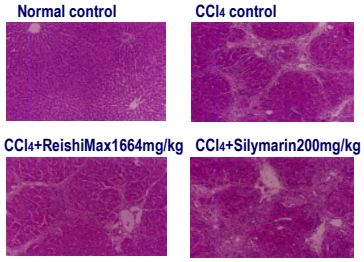
Reduction of serum transaminase (ALT)



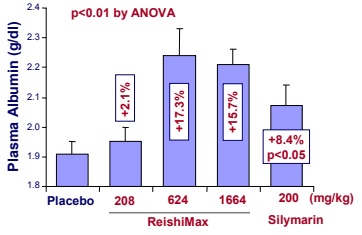
Reduction of Liver Hydroxyproline (collagen)



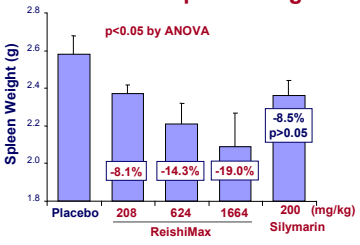
Liver architecture (HE staining)



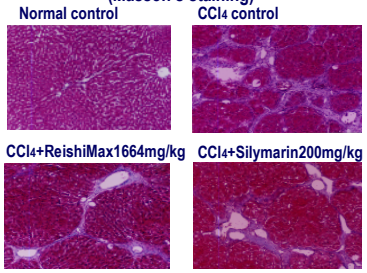
Increase in plasma albumin



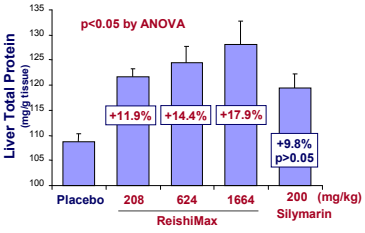
Reduction of Spleen Weight



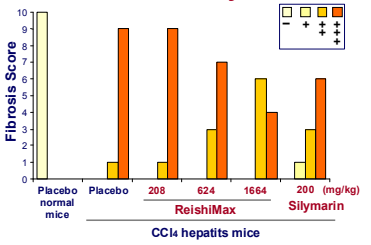
Collagen content & structure (Masson's staining)



Increase in Liver Total Protein



Reduction of Severity of Fibrosis



Summary

In mice with CCl_4-induced experimental hepatitis, oral ReishiMax supplementation

- ↓Serum transaminases (ALT &AST)
- ↑Plasma albumin and total liver proteins
- ↓Liver collagen
- ↓Spleen weight
- ↓Severity of liver necrosis & fibrosis

Conclusion

Oral administration of ReishiMax protects the liver from chemical injuries, improves liver functions, and prevents injury-associated liver fibrosis/cirrhosis.