

Cite this as: Tao CHEN, Shipeng LI, Dewen DENG, Weiye ZHANG, Jianjun ZHANG, Zhongyang SHEN. Key role of interferon regulatory factor 1 (IRF-1) in regulating liver disease: progress and outlook[J]. Journal of Zhejiang University Science B, 2024, 25(6): 451-470.

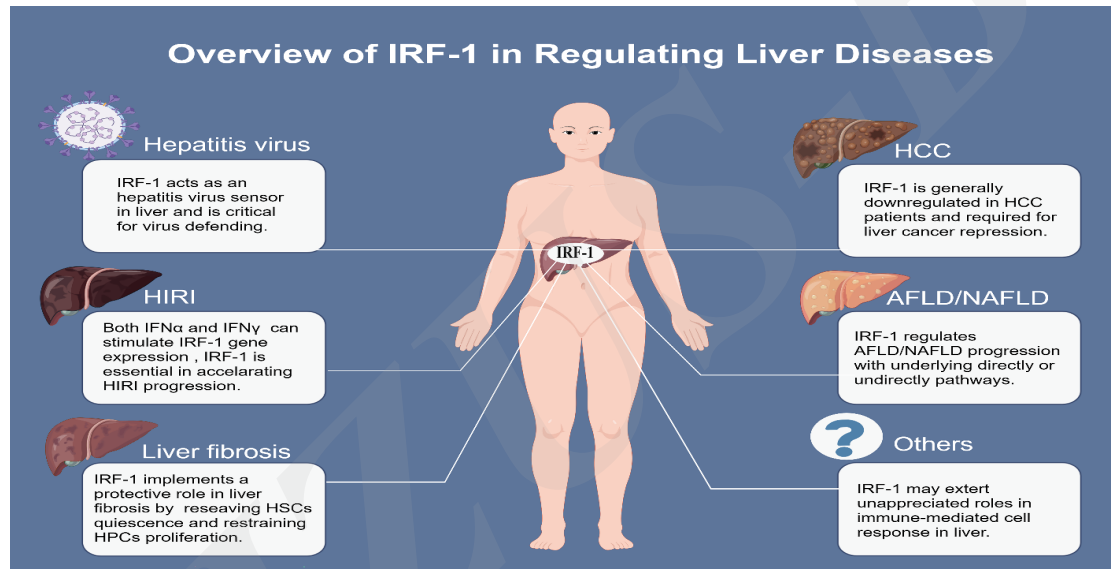
<http://doi.org/10.1631/jzus.B2300159>

Key role of interferon regulatory factor 1 (IRF-1) in regulating liver disease: progress and outlook

Key words: IRF-1; hepatitis virus; liver fibrosis; HIRI; liver cancer; review

Research Summary

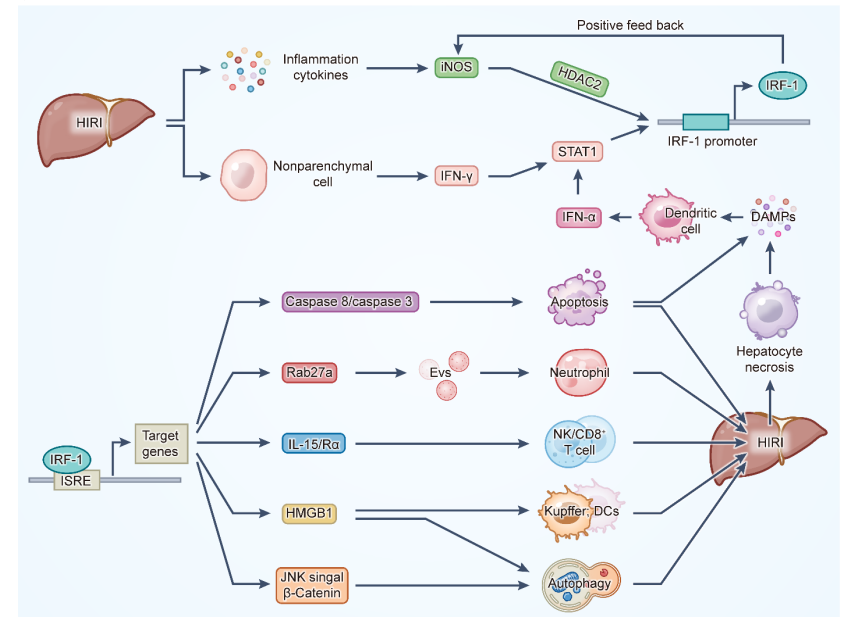
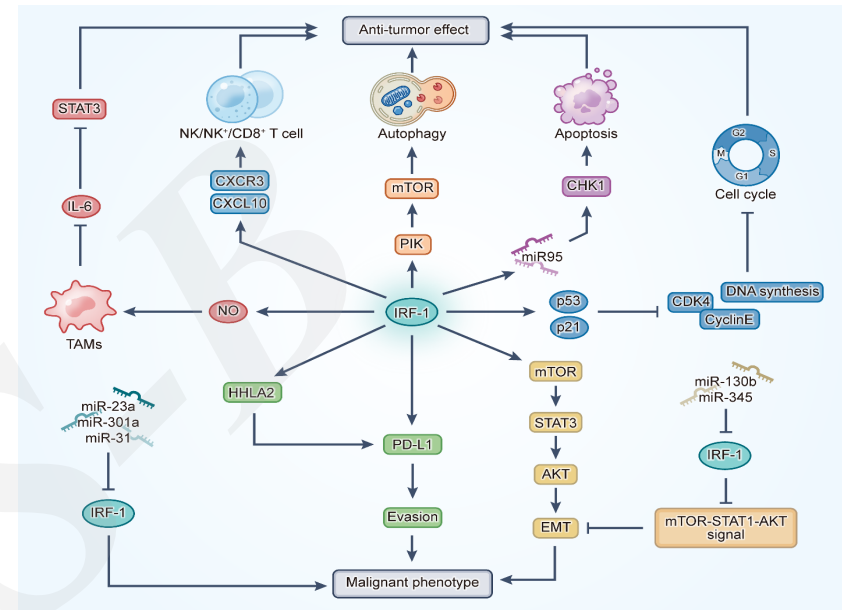
This review mainly focused on the function of interferon regulatory factor 1 (IRF-1) in regulating liver disease, and summarized the key roles it played in the following aspects:



- Inhibited the replication of the hepatitis virus (A/B/C/E)
- Alleviated the progression of liver fibrosis
- Aggravated hepatic ischemia-reperfusion injury (HIRI)
- Suppressed liver cancer progression
- Regulated AFLD/NAFLD evolution
- ...

Innovation points

- **Introduction** of the basic function of IRF-1 and current situation of liver disease.
- **Summary** of the most updated research progress about IRF-1 in regulating liver disease with basic medical research and clinical studies.
- **Emphasis** of the newly identified interplay among IRF-1 in various of liver disease and decipher translational medicine applications of IRF-1 in liver disease treatment.



Innovation points

A comprehensive table was generated to summarize the latest knowledge about compounds in liver disease models treatment that involved IRF-1 signal.

Compound	Model	IRF-1 signaling involvement	Main effects and Outcomes
Zhankuic acid A	ConA-induced hepatitis in mice	inhibited IFN- γ /STAT1/IRF-1 pathway	anti-inflammation; inhibited lymphocyte activation
(5R)-5-hydroxytryptolide	ConA-induced hepatitis in mice	activated IFN- γ /STAT1/IRF-1 pathway in spleen	eliminated activated T cell; decreased inflammatory cytokines; blocked mRNA expression of chemokines
Huganbuzure granule	ConA-induced immune liver injury in mice	inhibited JAK1/STAT1/IRF-1 signaling	inhibited the production of inflammatory factors; inhibited hepatocyte apoptosis; regulated balance of immunity cells
Glycyrrhizic acid ammonium salt	ConA-induced immune liver injury in mice	inhibited JAK1/STAT1/IRF-1 signaling	decrease hepatocyte apoptosis; suppressed oxidative stress; regulated balance of Th cells
Chlorogenic acid	HIRI in mice	reduced IRF-1/HMGB1/TLR4/ NF- κ B signaling	decreased oxidative stress, mitochondrial damage, and apoptosis
Anethole	HIRI in mice	reduced both nuclear translocation of IRF-1 and IRF-1/HMGB1/TLR signaling	decreased pro-inflammatory factors and alleviated HIRI
Ginsenoside Rh2	liver fibrosis in mice	upregulated IRF-1 to reduce SLC7A11 expression in HSCs	promoted HSCs ferroptosis and HSCs inactivation

Table 1 | Compounds involving the IRF-1 signal in liver diseases.