Investigation on correlation between expression of CD58 molecule and severity of hepatitis B

Li Sheng, Jie Li, Bao-Tai Qi, Yu-Qiang Ji, Zhao-Jun Meng, Ming Xie

ABSTRACT

AIM: To investigate the correlation between expression of CD58 and severity of hepatitis B.

MATERIALS AND METHODS

Sample collection and processing
Forty-three patients with hepatitis B were selected from outpatients and inpatients of the Department of Infectious Diseases of First Hospital of Xi'an Jiaotong University and Second Hospital of Xi'an Jiaotong University. The patients were divided into four groups, namely mild chronic hepatitis B group (n = 12), moderate chronic hepatitis B group (n = 11), severe chronic hepatitis B group (n = 10) and severe hepatitis B group (n = 10). Eleven healthy persons were taken as normal control group. The diagnostic code for Hepatitis B which edited by 5th Chinese Academic committee of Infection Disease and Parasite in 2000 was used as the classification criteria.

RESULTS: The levels of sCD58 in serum and membrane CD58 molecule in PBMC of patients with hepatitis B were significantly higher than that in normal controls (P < 0.05). Level of CD58 was related to the levels of serumal TBIL, DBIL, IBIL, ALT and AST.

CONCLUSION: The level of CD58 molecule (in both serum and PBMC form) of patients with hepatitis B is related to the degree of liver damage.

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Key words: Hepatitis B; CD58; Liver damage

INTRODUCTION

Hepatitis B is caused by Hepatitis B virus (HBV), but the pathogenesis of hepatitis B is not well understood. HBV infects human liver cells but has no direct cytopathic effect on these cells. Therefore, it is unlikely that direct viral cytotoxicity is the primary cause of pathology in vivo. Several studies have suggested that hepatitis B may be mediated in part by immunopathologic mechanisms. As one of the intercellular adhesion molecules, CD58 provided co-stimulatory signals for the activation of T lymphocyte, it plays an important role in promoting the adhesion of T cells to targeted cells[1-3]. In this study, we used double antibody sandwich ELISA and direct immunofluorescence to analyze the levels of sCD58 in serum and the expression of CD58 on the surface of PBMC of patients with hepatitis B, and compared with those levels of healthy controls to evaluate the role of CD58 in the pathogenesis of hepatitis B.
Content of membrane CD58 molecule

The results showed that the level of membrane CD58 molecule in PBMC of patients with HBV infection was significantly higher than that of the normal group and the differences among the groups were significant ($P < 0.05$). The levels of membrane CD58 molecule increased significantly in an order from light chronic hepatitis B, medium group, severe group and severe hepatitis B. The membrane CD58 molecule in PBMC might relate to the severity of the disease (Figures 2-5, Table 1).

**DISCUSSION**

CD58 is also called lymphocyte function associated antigen-3 (LFA-3)\(^{[4-6]}\), which belongs to the CD2 family. As an important co-stimulating molecule, CD58 plays an important role in promoting the adhesion of T cells to targeted cells, and enhancing the recognition and sensitivity of T lymphocyte to the superantigen\(^{[7-9]}\). CD58 promotes hyperplasia and activation of T cell\(^{[1,2]}\), promotes T cells to soak inflammatory parts and takes part in signal transmission of T cells. Combined with CD2 molecules on the surface of NK cells, CD58 increases the adhesion between NK cells and target cells, activates NK cells\(^{[10,11]}\), and increases the toxin of the cells\(^{[12,13]}\). After integrating...
with activated T cells, CD58 and CD2 facilitate interferon γ and IL-2 mRNA record and translate, differentiate CD4+ T to Th1 and further initiate the immune response of the cell[3,14]. Some researchers proved that integrated with matching cells, CD58 may boost the ability of activated T cells and NK cells[15,16].

Our experiment showed that the levels of sCD58 in serum and membrane CD58 molecule in PBMC of patients with HBV infection were significantly higher than that of the normal group. The levels of CD58 varied from different groups of patients with hepatitis B, correlated to the severity of the disease. The results also showed that the percentage of CD58+ cell of patients with hepatitis B might be related with TBIL, DBIL, IBIL, ALT and AST, which prove the expression of CD58 is closely associated with the severity of the disease. The results also showed that the combination of CD58 and CD2 activated T cells might enhance the elimination of viruses through activating T and NK cells and promoting cell immune response. However, this would also lead to the damage of liver cells.

### Table 1 The liver function

| Group                        | n  | TBIL (μmol/L) | DBIL (μmol/L) | IBIL (μmol/L) | ALT (IU/L) | AST (IU/L) |
|------------------------------|----|---------------|---------------|---------------|------------|------------|
| Normal control               | 11 | 11.25 ± 1.14  | 3.12 ± 1.54   | 6.41 ± 1.85   | 25.19 ± 2.58| 19.57 ± 3.06|
| Chronic hepatitis B (mild)   | 12 | 15.14 ± 3.26  | 15.92 ± 2.03  | 10.39 ± 2.63  | 63.33 ± 3.68 | 46.67 ± 9.81 |
| Chronic hepatitis B (moderate)| 11 | 39.21 ± 8.73  | 25.21 ± 7.11  | 23.74 ± 3.87  | 98.21 ± 18.90| 114.43 ± 12.80|
| Chronic hepatitis B (severe) | 10 | 105.33 ± 17.67| 49.88 ± 8.62  | 50.86 ± 16.05 | 221.61 ± 18.19| 157.01 ± 22.54|
| Severe hepatitis B           | 10 | 143.57 ± 23.15| 75.26 ± 6.56  | 117.35 ± 15.27| 116.73 ± 28.57| 94.82 ± 41.49|

*P < 0.05, compared with control group.

![Figure 5](image-url) Content of membrane CD58 molecule in severe hepatitis B.

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