The mannose binding lectin gene influences the severity of chronic liver disease in cystic fibrosis

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Abstract
Chronic liver disease is a major complication of cystic fibrosis. Its incidence and severity show marked heterogeneity, even among the homogeneous group of homozygous F508 patients, suggesting that environmental or genetic factors other than the deletion F508 may influence the development of cystic fibrosis related liver disease. We investigated whether the allelic variants of mannose binding lectin, an important protein of the innate immune system, could be associated with the presence of cirrhosis in a population of 216 homogeneous homozygous F508 patients. Analysis of the data shows that the presence of cirrhosis in cystic fibrosis patients is significantly associated with a mutated mannose binding lectin genotype (homozygous or compound heterozygous for mannose binding lectin variant variants). The modulating role of mannose binding lectin in the occurrence of cirrhosis in cystic fibrosis could be explained by the fact that hepatotoxic damage from viruses or bacteria might be increased by the immunodeficiency associated with mannose binding lectin variants and might facilitate the degradation of liver status. These data highlight the crucial role of mannose binding lectin in the clinical outcome of cystic fibrosis, as it has recently been shown that the mannose binding lectin gene is a modulating gene of the respiratory involvement in cystic fibrosis patients. (J Med Genet 2001;38:310–311)

Keywords: cystic fibrosis; cirrhosis; mannose binding lectin; modulating gene

Material and methods
We studied the association between the allelic variants of mannose binding lectin and the presence of liver cirrhosis among cystic fibrosis patients. To avoid any phenotypic heterogeneity as a result of allelic heterogeneity in the cystic fibrosis transmembrane regulator gene, we identified, in association with the French National Observatory for Cystic Fibrosis, a homogeneous homozygous F508 population of 216 patients, whose mannose binding lectin genotype was determined by means of denaturing gradient gel electrophoresis. The presence of liver cirrhosis was defined on the basis of the association of firm hepatomegaly, ultrasonographic findings of liver heterogeneity and micro- or macronodular formation, and portal hypertension, defined as the presence of splenomegaly, reversed blood flow in the portal vein, and dilated collateral veins.

Results
Among the 216 patients, we identified two groups: (1) a first group of 203 patients homozygous or heterozygous for mannose binding lectin wild type alleles (NM+NM group), of whom 11 (5.4%) showed evidence of cirrhosis, and (2) a second group of 13 patients homozygous or compound heterozygous for mutations in the mannose binding lectin gene (MM group), of whom four (30.8%) had cirrhosis. The two groups were comparable in age and sex ratio (mean age 14.5 (SD 8.7) and 17.9 (SD 8.4) years respectively, t test; sex ratio 0.86 and 1.43 respectively, corrected chi-square). Analysis of the data showed a significantly higher prevalence of cystic fibrosis related cirrhosis in the group of patients homozygous or compound heterozygous for mutations in the mannose binding lectin gene (MM group) compared with the group of patients homozygous or heterozygous for its wild type.
This suggests the need for screening such patients for the mannose binding lectin gene, in order to identify at risk patients, who could benefit from adapted follow up and clinical care, as the effectiveness of bile acid therapy might be higher if started in patients with early stage liver disease.13

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