SIGNIFICANCE STATEMENT

Pierson syndrome is a genetic proteinuric kidney disease that manifests as congenital nephrotic syndrome with diffuse mesangial sclerosis and eye and neurologic abnormalities. It is caused by mutations in the *LAMB2* gene that encodes laminin $\beta 2$, a component of the GBM's laminin $\alpha 5\beta 2\gamma 1$ (LM-521) heterotrimer. In an attempt to restore the missing LM-521 in *Lamb2* mutant mice that model Pierson syndrome, they were injected iv with human LM-521. The injected protein accumulated in the endothelial aspect of the GBM and reduced proteinuria until 3 weeks of age, after which nephrotic syndrome developed. These promising results show that GBM composition can be altered by protein therapy and provide hope for patients with GBM abnormalities, either genetic or acquired.