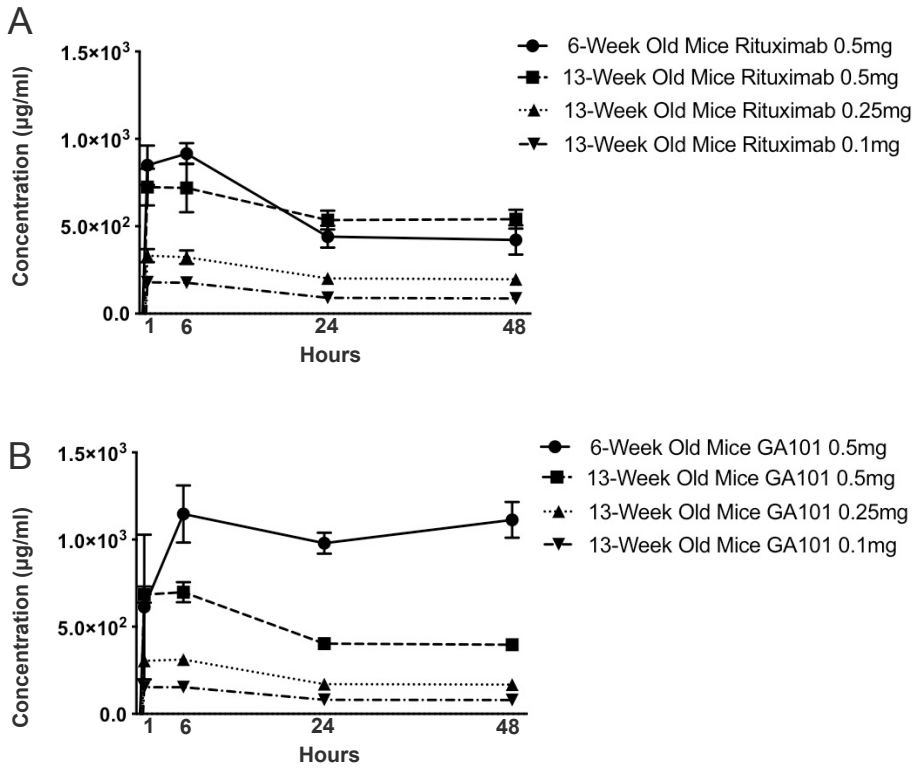
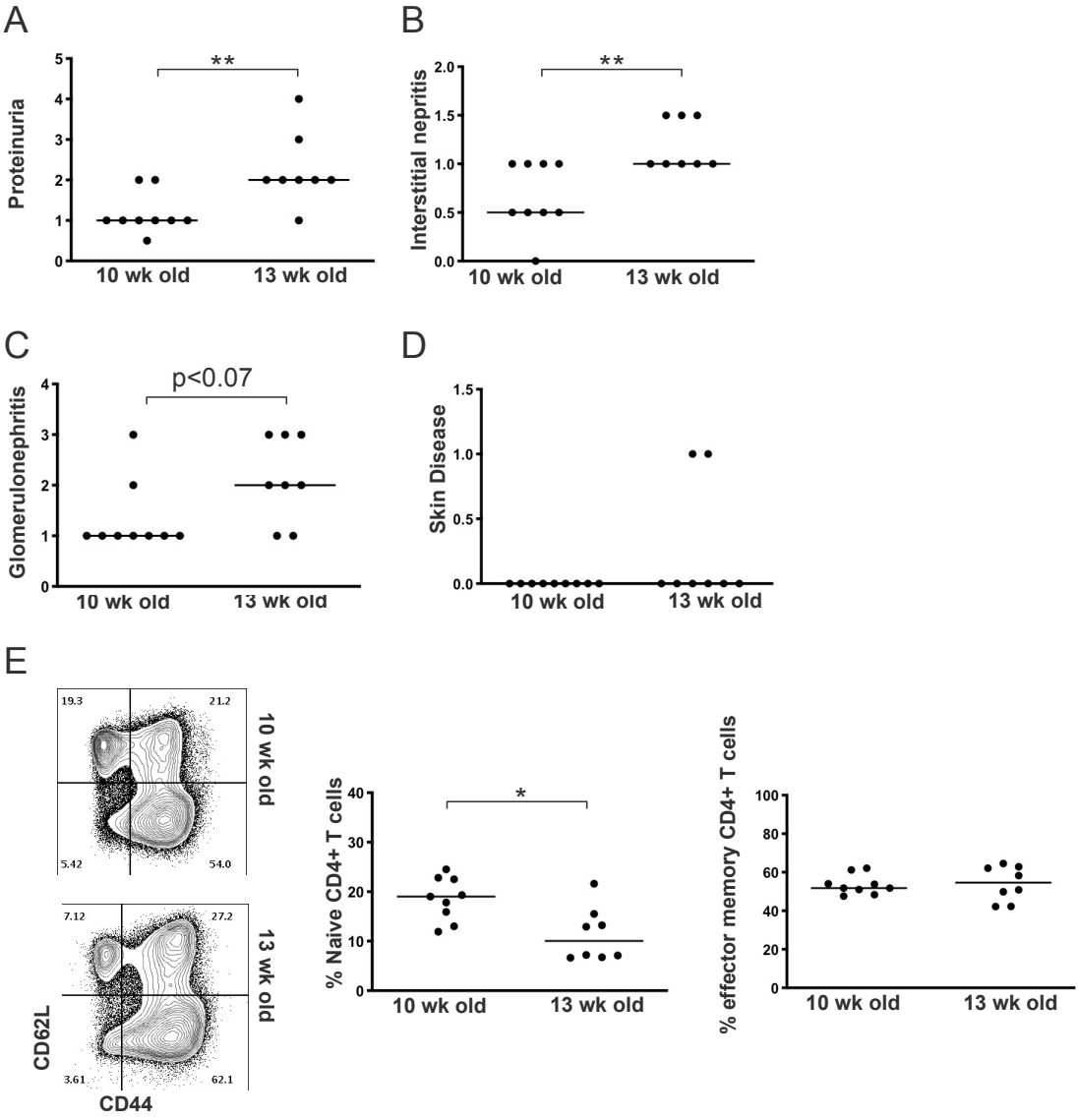


Supplemental Figure 1. Pharmacokinetics of Rituximab and GA101. 6-week old hCD20 MRL/lpr mice were i.p. injected with 0.5 mg Rituximab or GA101 and serum collected at pre-injection, 1 hour, 6 hours, 24 hours, and 48 hours. There were 3 mice per group. 13-week old hCD20 MRL/lpr mice were i.p. injected with 0.5 mg, 0.25 mg, or 0.1 mg Rituximab or GA101 and serum collected at 1 hour, 6 hours, 24 hours, and 48 hours. There were 4 mice per group. (A) Average anti-idiotype Rituximab over time. (B) Average anti-idiotype GA101 over time. Each symbol represents average mouse serum concentration with standard deviation.



Supplemental Figure 2. Early and established disease of MRL/lpr mice. 10 and 13 week old female hCD20 MRL/lpr mice comparison of disease activity. (A) Proteinuria was evaluated by dipstick assay the day prior to sacrifice. (B & C) H&E stained kidneys sections were scored for interstitial nephritis and glomerulonephritis. (D) Skin disease scores. (E) Flow Cytometry representative gating and quantitation of percent of effector memory ($CD44^{hi}$/ $CD62L^{lo}$) $CD4^{+}$ T cells. Data are combined from 2 independent experiments. Each symbol represents an individual mouse and bars represent medians. Statistics were calculated by two-tailed Mann-Whitney test. *p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001.

Supplemental Table 1. Antibodies used in this study

Antibody	Characteristics	Mechanism of action
Rituximab	Human IgG1	ADCC/ADCP, CDC, direct cell death
Obinutuzumab: GA101	Human IgG1 with glycoengineered/afucosylated Fc region for enhanced FcgRIIIa affinity (Moessner et al, Blood, 2010)	Enhanced ADCC/ADCP, low CDC, enhanced direct cell death
Non-glycoengineered obinutuzumab: wtGA101	Human IgG1 with wildtype non-glycoengineered/fully fucosylated Fc region (Moessner et al, Blood, 2010)	ADCC/ADCP, low CDC, enhanced direct cell death
GA101 P329G LALA mutant (Mutant GA101)	Human IgG1 with P329G LALA mutation in Fc-region to abolish Fc-immune effector functions (Herter et al, Haematologica, 2018)	No ADCC/ADCP, no CDC, enhanced direct cell death
Murinized rituximab	muIgG2a based on sequence of parental 2B8 antibody	ADCC/ADCP, CDC, direct cell death
Murinized GA101	Glycoengineered muIgG2a Fc region fused to human Fab fragment from obinutuzumab in order to retain elbow hinge angle in the Fab fragment that has been shown to be responsible for enhanced direct cell death induction	Enhanced ADCC/ADCP, low CDC, enhanced direct cell death
Murinized non-glycoengineered obinutuzumab: wtGA101	Non-glycoengineered muIgG2a Fc region fused to human Fab fragment from obinutuzumab in order to retain elbow hinge angle in the Fab fragment that has been shown to be responsible for enhanced direct cell death induction	ADCC/ADCP, low CDC, enhanced direct cell death