Supplementary Methods and Materials

**Biotinylated antibody preparation.** In order to test the anti-EMP2 IgG1 antibody by IHC, antibody was biotinylated using the EZ-Link Sulfo-NHS-Biotin and Biotinylation Kit (ThermoScientific, Rockford, IL). Briefly, anti-EMP2 IgG1 was dialyzed in PBS and incubated with different ratios of a 1 mg/ml solution of NHS-Biotin for 2 hrs at 4°C. Excess biotin was removed using a desalting column. Biotin incorporation into the antibody was estimated using a HABA and avidin assay.

**Pharmacokinetic analysis.** For pharmacokinetic analysis of anti-EMP2 IgG1, female Balb/c mice (age 6-10 wk; Charles River) were injected i.v. with 10 mg/kg of Trastuzumab or anti-EMP2 IgG1 (three mice per group). To assess circulating levels of total antibody, blood was collected retro-orbitally from three animals at 2, 24, 72, and 168 h post-injection. The samples were left at room temperature for 30 min until the blood coagulated. Subsequently, serum was obtained by centrifuging the samples at 10,000 × g for 5 min at 4°C, after which serum samples were stored at −70°C. Total human antibody concentrations or reactivity against an EMP2 peptide in the serum samples were measured by ELISA as described in the Materials and Methods.