**Supplementary Information**

**Materials and methods**

**Surface Plasmon Resonance measurements**

The affinity (KD) for the binding of human and murine FcRs, and human CD147 antigen to IgG mAbs were measured on a multi-SPR array system (ProteOn XPR36TM, Bio-Rad) and data analysis was performed using ProteOn Manager Software (Bio-Rad). Briefly, the running buffer PBST (0.005% Tween-20 in PBS) was used continuously throughout the entire experiment at 25° C. A ProteOn GLC sensor chips (Bio-Rad) was activated for 6min using a mixture of 0.2M EDC and 5mM sulfo-NHS at a flow rate of 20μl /min, followed by 260μl of 10μg/mL Metuzumab or cHAb18 mAb diluted in 10mM acetate buffer at pH4.5. The surface was then deactivated with 150μl of 1M Ethanolamine Hydrochloride (pH 8.5). For FcγRs affinity studies, individual Fc receptors at various concentrations were injected into the cells at 10μL/min for 2 min, to ensure a steady state of binding was reached, followed by 6 min dissociation. The sensor surface was regenerated through a prolonged wash (3 min) with HBS-EP buffer until the baseline was restored. A reference cell without antibodies was prepared by a similar procedure. For CD147 antigen binding assays, 5 different concentration of human CD147 antigen (0.375, 0.75, 1.5, 3, and 6nM) were injected in channels 1 to 5, respectively, at flow rate of 50μl /min, 3min. A reference channel was prepared in the same manner without injection of CD147 antigen. The SPR binding responses were collected and analyzed using the ProteOn data manager program.

**ADCC assays**

In vitro ADCC assays were performed with human lung cancer cell lines as targets, and human peripheral blood mononuclear cells (PBMCs) isolated from the blood of normal volunteers, or murine peripheral blood mononuclear cells (mPBMCs) obtained from SCID-mice as effector cell. The human NK cells were enriched from the hPBMCs using mouse anti-human CD57 (FITC) mAb, and murine NK cells were enriched from the mPBMCs using Rat anti-mouse CD335 (NKp64), PerCP-Cy®5.5 mAb, the murine macrophages/monocytes were enriched from the PBMCs using rat anti-mouse CD14 (FITC) mAb by flow cytometry sorting. In brief, the target cells (1 × 104 per well) were washed with PBS and preincubated with antibodies for 30 min at 37℃ in serum-free RPMI-1640 supplemented with 0.1% BSA prior to the addition of the effector cells at an effector/target ratio of 30:1 (5:1 when NKs or macrophages/monocytes were used as effectors). The cells were incubated for an additional 24 h prior to the detection of cell death by measuring lactate dehydrogenase (LDH) activity in the medium using a Cytotoxicity Detection Kit (LDH; Roche) according to the manufacturer’s protocols. Cytotoxicity (expressed as a percentage) = (experimental cell lysis - spontaneous effector lysis - spontaneous target lysis) / (maximum target lysis - spontaneous target lysis) × 100%. All assays were performed in triplicate.

**Tissue cross-reactivity studies**

Tissue cross-reactivity of Metuzumab was evaluated in FFPE tissue sections from a selected panel of Cynomolgus monkey, Rhesus monkey, rat, and human tissues. Human lung cancer tissue arrays (Chaoying Biotechnology Co., LTD, China.) were included as positive control. Slides were microwaved for 10 min in 10mM sodium citrated (pH6.0), cooled for 30 min at 25℃. After incubating for10 min in 3% H2O2 to block endogenous peroxidase, and blocking for 1hr in 10% goat serum, slides were incubated overnight in a humidity chamber with biotinylated Metuzumab (30μg/ml). Binding was visualized with streptavidin-conjugated peroxidase (ZsBio, China) and DAB detection system (ZsBio, China). Sections were analyzed using a bright-field microscope. The staining results were evaluated by 2 experienced pathologist in a blinded manner and classified into four categories: of 0 (no visible staining), 1+ (light brown), 2+ (mid-brown), and 3+ (dark brown), respectively, with the same intensity covering more than 75% of the staining area.