

CLAIMS

1. A recombinant binding protein comprising an amino acid sequence that has at least 90% amino acid sequence identity with SEQ ID NO: 21, wherein said recombinant binding protein comprises two designed ankyrin repeat domains with binding specificity for human epidermal growth factor receptor 2 (HER2) and two designed ankyrin repeat domains with binding specificity for serum albumin,

wherein said two designed ankyrin repeat domains with binding specificity for serum albumin flank said two designed ankyrin repeat domains with binding specificity for HER2, and

wherein said recombinant binding protein is capable of binding to HER2 and serum albumin simultaneously.

2. The recombinant binding protein of claim 1, wherein each of said two designed ankyrin repeat domains with binding specificity for serum albumin comprises the amino acid sequence of SEQ ID NO: 14.

3. The recombinant binding protein of any of claims 1 to 2, wherein said recombinant binding protein comprises an amino acid sequence that has at least 95% amino acid sequence identity with the recombinant binding protein consisting of SEQ ID NO: 21.

4. The recombinant binding protein of any of claims 1 to 3, wherein each of said designed ankyrin repeat domains with binding specificity for serum albumin exhibits improved storage stability in PBS compared to a designed ankyrin repeat domain with binding specificity for serum albumin comprising the amino acid sequence of SEQ ID NO: 13.

5. The recombinant binding protein of any of claims 1 to 4, wherein said recombinant binding protein comprises the amino acid sequence of SEQ ID NO: 21.

6. The recombinant binding protein of any of claims 1 to 5, wherein said recombinant binding protein consists of the amino acid sequence of SEQ ID NO: 21.

7. The recombinant binding protein of any of claims 1 to 6, wherein said recombinant binding protein inhibits BT474 cell proliferation with an inhibition constant below 10^{-7}M .
8. The recombinant binding protein of any of claims 1 to 7, wherein said recombinant binding protein at a concentration of 100 nM exhibits stronger downregulation of AKT-S473 phosphorylation in BT474 cells than Trastuzumab at a concentration of 100 nM.
9. A nucleic acid encoding the recombinant binding protein of any of claims 1 to 8.
10. A pharmaceutical composition comprising the recombinant binding protein of any of claims 1 to 8 or the nucleic acid of claim 9, and a pharmaceutically acceptable carrier and/or diluent.
11. The pharmaceutical composition of claim 10 for use in the treatment of a disease.
12. The pharmaceutical composition of claim 10 for use in the treatment of cancer.
13. The pharmaceutical composition of claim 10 for use in the treatment of breast cancer, ovarian cancer, gastric cancer, stomach cancer, uterine cancer, colorectal cancer, bladder cancer, or HER2 overexpressing cancer.
14. A kit comprising the recombinant binding protein of any of claims 1 to 8 or the nucleic acid of claim 9 or the pharmaceutical composition of claim 10.
15. A method for producing the recombinant binding protein of any of claims 1 to 8, the method comprising the steps of (i) expressing said binding protein in bacteria, and (ii) purifying said binding protein using chromatography.