

CLAIMS

What is claimed is

1. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO: 72, the heavy chain variable region domain CDR2 comprises SEQ ID NO:73, and the heavy chain variable region domain CDR3 selected from the group consisting of SEQ ID NO:3, 9, 23, 31, 39, and 47; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:74, the light chain variable region domain CDR2 comprises SEQ ID NO:75, and the light chain variable region domain CDR3 comprises SEQ ID NO:76.
2. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO: 1, the heavy chain variable region domain CDR2 comprises SEQ ID NO:2, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:3; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:4, the light chain variable region domain CDR2 comprises SEQ ID NO:5, and the light chain variable region domain CDR3 comprises SEQ ID NO:6.
3. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO: 7, the heavy chain variable region domain CDR2 comprises SEQ ID NO:8, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:9; and a light chain variable domain comprising a

CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:10, the light chain variable region domain CDR2 comprises SEQ ID NO:11, and the light chain variable region domain CDR3 comprises SEQ ID NO:12.

4. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO: 21, the heavy chain variable region domain CDR2 comprises SEQ ID NO:22, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:23; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:24, the light chain variable region domain CDR2 comprises SEQ ID NO:25, and the light chain variable region domain CDR3 comprises SEQ ID NO:26.
5. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO:29, the heavy chain variable region domain CDR2 comprises SEQ ID NO:30, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:31; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:32, the light chain variable region domain CDR2 comprises SEQ ID NO:33, and the light chain variable region domain CDR3 comprises SEQ ID NO:34.
6. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable

domain CDR1 comprises SEQ ID NO:37, the heavy chain variable region domain CDR2 comprises SEQ ID NO:38, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:39; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:40, the light chain variable region domain CDR2 comprises SEQ ID NO:41, and the light chain variable region domain CDR3 comprises SEQ ID NO:42.

7. An isolated antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78), wherein the antibody comprises a heavy chain variable domain comprising a CDR1, CDR2, and a CDR3, wherein the heavy chain variable domain CDR1 comprises SEQ ID NO:45, the heavy chain variable region domain CDR2 comprises SEQ ID NO:46, and the heavy chain variable region domain CDR3 comprises SEQ ID NO:47; and a light chain variable domain comprising a CDR1, CDR2, and CDR3, wherein the light chain variable domain CDR1 comprises SEQ ID NO:48, the light chain variable region domain CDR2 comprises SEQ ID NO:49, and the light chain variable region domain CDR3 comprises SEQ ID NO:50.
8. The isolated antibody of claim 2, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 13 and/or a light chain variable domain comprising SEQ ID NO: 14.
9. The isolated antibody of claim 3, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 15 and/or a light chain variable domain comprising SEQ ID NO: 16.
10. The isolated antibody of claim 4, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 27 and/or a light chain variable domain comprising SEQ ID NO: 28.

11. The isolated antibody of claim 5, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 35 and/or a light chain variable domain comprising SEQ ID NO: 36.
12. The isolated antibody of claim 6, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 43 and/or a light chain variable domain comprising SEQ ID NO: 44.
13. The isolated antibody of claim 7, wherein the antibody comprises a heavy chain variable domain comprising SEQ ID NO: 51 and/or a light chain variable domain comprising SEQ ID NO: 52.
14. The antibody of any one of claims 1-13, wherein the antibody is selected from the group consisting of a humanized antibody, a single chain variable fragment (scFv) antibody, an antibody fragment, or a chimeric antibody.
15. The antibody of any one of claims 1-14, wherein the antibody is conjugated directly or indirectly to a payload selected from the group consisting of a therapeutic agent, an imaging agent, or a combination thereof.
16. A method of enhancing radiotherapy in a subject in need thereof comprising administering an effective amount of a composition comprising an antibody that specifically binds to 78-kDa glucose-regulated protein (GRP78) such that radiotherapy is enhanced, wherein the antibody is conjugated directly or indirectly to a payload selected from the group consisting of a therapeutic agent, an imaging agent, or a combination thereof and wherein the antibody is an isolated antibody of claims 1-13.
17. The method of claim 9, further comprising administering ionizing radiation to the subject.

18. The method of claim 9, further comprising imaging the subject.
19. The method of claim 9, wherein, the therapeutic agent is one or more of a CAR-bearing immune effector cell, a BITE, or a DART.
20. A method of imaging a tumor or a cancer in a subject in need thereof, the method comprising administering a composition comprising the conjugated GRP78 to the subject, and imaging cancer in a subject, using an antibody of claims 1-13, wherein the antibody is conjugated to an imaging agent.
21. A method of treating a tumor or a cancer in a subject in need thereof comprising administering an effective amount of a composition comprising an antibody of anyone of claims 1-13, wherein the antibody is conjugated directly or indirectly to a therapeutic agent.