

CLAIMS

WHAT IS CLAIMED IS:

1. A minimal arrestin domain-containing protein 1 (ARRDC1) comprising:
an arrestin domain,
at least one PSAP (SEQ ID NO: 122) or PTAP (SEQ ID NO: 123) motif, and
at least one or at least two PPXY motifs, wherein the minimal ARRDC1 is shorter than full-length ARRDC1 protein.
2. The minimal ARRDC1 of claim 1, wherein the minimal ARRDC1 is less than 400 amino acids in length.
3. The minimal ARRDC1 of claims 1 or 2, wherein the minimal ARRDC1 is less than 350 amino acids in length.
4. The minimal ARRDC1 of any of claims 1-3, wherein at least one PPXY motif is either PPEY (SEQ ID NO: 124) or PPSY (SEQ ID NO: 125).
5. The minimal ARRDC1 of any of claims 1-3, wherein the minimal AARRDC1 comprises at least two PPXY motifs, and the at least two PPXY motifs are PPEY (SEQ ID NO: 124) and PPSY (SEQ ID NO: 125).
6. The minimal ARRDC1 of any of claims 1-5, wherein the minimal ARRDC1 comprises an amino acid sequence that is at least 85% identical, at least 90% identical, at least 95% identical, or is 100% identical to the amino acid sequence set forth in SEQ ID NO: 1.
7. An arrestin domain-containing protein 1 (ARRDC1)-mediated microvesicle (ARMM) comprising the minimal ARRDC1 of any of claim 1-6.

8. The microvesicle of claim 7, wherein the microvesicle further comprises a TSG101 protein or fragment thereof.
9. The microvesicle of claims 7 or 8 further comprising an agent.
10. The microvesicle of claim 9, wherein the agent comprises a nucleic acid, a protein, or a small molecule.
11. The microvesicle of claims 9 or 10, wherein the agent comprises an enzyme, an antibody, a Fab, a Fab', a F(ab')₂, a Fd, a scFv, a Fv, a dsFv, a diabody, and an affibody.
12. The microvesicle of claims 9 or 10, wherein the agent comprises an RNA or a DNA.
13. The microvesicle of any of claims 9-12, wherein the agent comprises a detectable label.
14. The microvesicle of any of claims 9-13, wherein the agent is covalently bound or conjugated via a linker to the minimal ARRDC1 protein or fragment thereof, or the TSG101 protein or fragment thereof.
15. The microvesicle of any of claims 9-11, 13, or 14, wherein the agent comprises at least one, at least two, at least three, at least four, or at least five WW domain or variant thereof.
16. The microvesicle of any of claims 9-11 and 13-15, wherein the agent comprises a Cas9 protein.
17. A microvesicle-producing cell comprising:
a recombinant expression construct encoding a minimal ARRDC1 protein of any of claims 1-6 under the control of a heterologous promoter, and

a recombinant expression construct encoding a cargo protein under the control of a heterologous promoter.

18. A method of delivering a cargo to a target cell, the method comprising contacting the target cell with the microvesicle of any of claims 7-16.

19. A method of gene editing comprising contacting the target cell with the microvesicle of any of claims 7-16.

20. A nucleic acid comprising a nucleotide sequence encoding the minimal arrestin domain-containing protein 1 (ARRDC1) of any of claims 1-6.