

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 PPXY motif, wherein the minimal ARRDC1 is less than 400 amino acids in length and is able to drive the formation of ARRDC1-mediated microvesicles (ARMMS).
2. The minimal ARRDC1 of claim 1, wherein the minimal ARRDC1 is less than 375 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 1-4, wherein the minimal AARRDC1 comprises at least two PPXY motifs, and the at least two PPXY motifs are either both PPEY (SEQ ID NO: 124) , both PPSY (SEQ ID NO: 125), or 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 ARMM of claim 7, wherein the ARMM further comprises a TSG101 protein or fragment thereof.
9. The ARMM of claims 7 or 8 further comprising an agent.
10. The ARMM of claim 9, wherein the agent is a nucleic acid, a protein, or a small molecule.
11. The ARMM of claims 9 or 10, wherein the agent is an enzyme, an antibody, a Fab, a Fab', a F(ab')₂, a Fd, a scFv, a Fv, a dsFv, a diabody, or an affibody.
12. The ARMM of claims 9 or 10, wherein the agent is an RNA or a DNA.
13. The ARMM of any of claims 9-12, wherein the agent comprises a detectable label.
14. The ARMM of any of claims 9-13, wherein the agent is covalently bound or conjugated via a linker to the minimal ARRDC1 protein, or the TSG101 protein or fragment thereof.
15. The ARMM 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 domains or variants thereof.
16. The ARMM 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 *in vitro* or *ex vivo*, the method comprising contacting the target cell with the microvesicle of any of claims 7-16.
19. A method of gene editing comprising contacting a target cell *in vitro* or *ex vivo* 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.
21. Use of the ARMM of any of claims 7-16 in the manufacture of a medicament for treating a disease associated or caused by a mutation.
22. The ARMM of any of claims 7-16 for use as a medicament.