CLAIMS

1. Use of a polypeptide comprising a C-terminal domain of Cardiac Myosin binding protein C (MYBPC3) in the preparation of a medicament for treating a disorder associated with abnormal ryanodine receptor type 2 (RYR2) function in a subject.

2. Use of a nucleic acid comprising a nucleotide sequence encoding a polypeptide comprising a C-terminal domain of Cardiac Myosin binding protein C (MYBPC3) in the preparation of a medicament for treating a disorder associated with abnormal ryanodine receptor type 2 (RYR2) function in a subject.

3. The use of claim 1 or claim 2, wherein the abnormal RYR2 function is caused by one or more mutations in RYR2.

4. The use of claim 3, wherein the mutation in RYR2 causes excessive diastolic Ca^{2+} release in cardiomyocytes in the subject.

5. The use of any one of claims 1-4, wherein the polypeptide comprises an amino acid sequence that is at least 80% identical to any one of SEQ ID NOs: 1-16 or 53-64.

6. The use of claim 5, wherein the polypeptide comprises the amino acid sequence of any one of SEQ ID NOs: 1-16 or 53-64.

7. The use of any one of claims 2-6, wherein the nucleotide sequence is operably linked to a promoter.

8. The use of any one of claims 2-7, wherein the nucleic acid is a vector.

9. The use of claim 8, wherein the vector is an expression vector.

10. The use of claim 9, wherein the expression vector is a viral vector.

11. The use of claim 10, wherein the viral vector is selected from a lentiviral vector, a retroviral vector, or a recombinant adeno-associated virus (rAAV) vector.

12. The use of claim 11, wherein the viral vector is a rAAV vector further comprising two AAV inverted terminal repeats (ITRs) flanking the nucleotide sequence encoding the polypeptide and the promoter.

13. The use of claim 11, wherein the rAAV vector is packaged in a rAAV particle.

14. The use of claim 13, wherein the rAAV particle further comprises a capsid protein.

15. The use of claim 14, wherein the capsid protein is of a serotype selected from AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV6.2, AAV7, AAV8, AAV9, AAV.rh8, AAV.rh10, AAV.rh39, AAV.43, AAV2/2-66, AAV2/2-84, and AAV2/2-125, or a variant thereof.

16. The use of claim 15, wherein the capsid protein is of a serotype AAV9.

17. The use of any one of claims 11-16, wherein the rAAV is a self-complementary AAV (scAAV).

18. The use of any one of claims 2-12, wherein the nucleotide sequence encoding the polypeptide is codon-optimized.

19. The use of any one of claims 2-6, wherein the nucleic acid is a messenger RNA (mRNA).

20. The use of claim 19, wherein the mRNA is a modified mRNA.

21. The use of any one of claims 1-20, wherein the polypeptide or the nucleic acid is to be delivered to a cardiomyocyte in the subject.

22. The use of any one of claims 1-21, wherein the disorder is arrhythmia.

23. The use of claim 22, wherein the arrhythmia is inherited or acquired.

24. The use of claim 23, wherein the inherited arrhythmia is Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT).

25. The use of claim 23, wherein the acquired arrhythmia is a ventricular arrhythmia or a supraventricular arrhythmia.

26. The use of claim 25, wherein the ventricular arrhythmia is ventricular tachycardia, ventricular fibrillation, or premature ventricular contraction.

27. The use of claim 25, wherein the supraventricular arrhythmia is atrial fibrillation, atrial flutter, atrial tachycardia, premature atrial contraction, or paroxysmal supraventricular tachycardia.

28. The use of any one of claims 1-21, wherein the disorder is heart failure.

29. The use of claim 25, wherein the polypeptide or the nucleic acid to be administered to the subject reduces the excessive diastolic Ca^{2+} release in cardiomyocytes in the subject.

30. The use of any one of claims 1-29, wherein the subject is human.

31. The use of any one of claims 1-30, wherein the administration is via injection.

32. Use of a recombinant adeno-associated virus (rAAV) in the preparation of a medicament for treating arrhythmia in a subject, wherein the rAAV comprises a capsid protein of serotype AAV9 and a nucleotide sequence encoding a polypeptide comprising a C-terminal domain of Cardiac Myosin binding protein C (MYBPC3).

33. The use of claim 32 wherein the polypeptide comprises an amino acid sequence that is at least 80% identical to any one of SEQ ID NOs: 1-16 or 53-64.

34. The use of claim 32 or claim 33, wherein the polypeptide comprises the amino acid sequence of any one of SEQ ID NOs: 1-16 or 53-64.

35. The use of claim 32, wherein the polypeptide consists of the amino acid sequence of any one of SEQ ID NOs: 1-16 or 53-64.

36. A recombinant adeno-associated virus (rAAV) comprising a capsid protein and a nucleotide sequence encoding a polypeptide comprising a C-terminal domain of Cardiac Myosin binding protein C (MYBPC3).

37. The rAAV of claim 33, wherein the polypeptide comprises the amino acid sequence of any one of SEQ ID NOs: 1-16 or 53-64.

38. The rAAV of claim 33, wherein the polypeptide consists of the amino acid sequence of any one of SEQ ID NOs: 1-16 or 53-64.

39. Use of the rAAV of any one of claims 36-38 in the preparation of a medicament for treating a disorder associated with abnormal ryanodine receptor type 2 (RYR2) function.