

CLAIMS

1. An isolated polypeptide encoded by *Sghrt*.
- 5 2. The polypeptide according to claim 1, wherein the polypeptide comprises a mitochondrial polypeptide.
3. The polypeptide according to claim 1 or claim 2, wherein the polypeptide shares at least 75% sequence identity with any one of
10 SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25.
4. The polypeptide according to any one of claims 1-3, wherein the
15 polypeptide comprises a micropeptide.
5. The polypeptide according to any one of claims 1-4, wherein the polypeptide comprises a homo-oligomer.
- 20 6. A method of assessing heart function in a subject, the method comprising:
determining an expression level of the polypeptide according to any one of claims 1-5 in a sample obtained from the subject;
comparing the expression level to a reference expression level,
25 wherein if the expression level exceeds the reference expression level, the subject is considered to have impaired or deteriorated heart function.
7. The method according to claim 6, wherein the reference expression
30 level comprises an expression level of the polypeptide in a healthy population.

8. The method according to claim 6, wherein the reference expression level comprises an expression level of the polypeptide in an earlier sample obtained from the subject.

5 9. The method according to any one of claims 6-8, the method further comprising administering to the subject an inhibitor of the polypeptide.

10. A method of treating impaired heart function in a subject, the method comprising:

10 inhibiting an expression of the polypeptide according to any one of claims 1-5 in the subject.

11. A method of identifying a potential drug for treating impaired heart function, the method comprising:

15 determining a first expression level of the polypeptide according to any one of claims 1-5 in a cell;

exposing the cell to a drug candidate; and

determining a second expression level of the polypeptide after the exposure,

20 wherein if the second expression level is lower than the first expression level, then the drug candidate is identified as a potential drug for treating impaired heart function.

12. An inhibitor of the polypeptide according to any one of claims 1-5.

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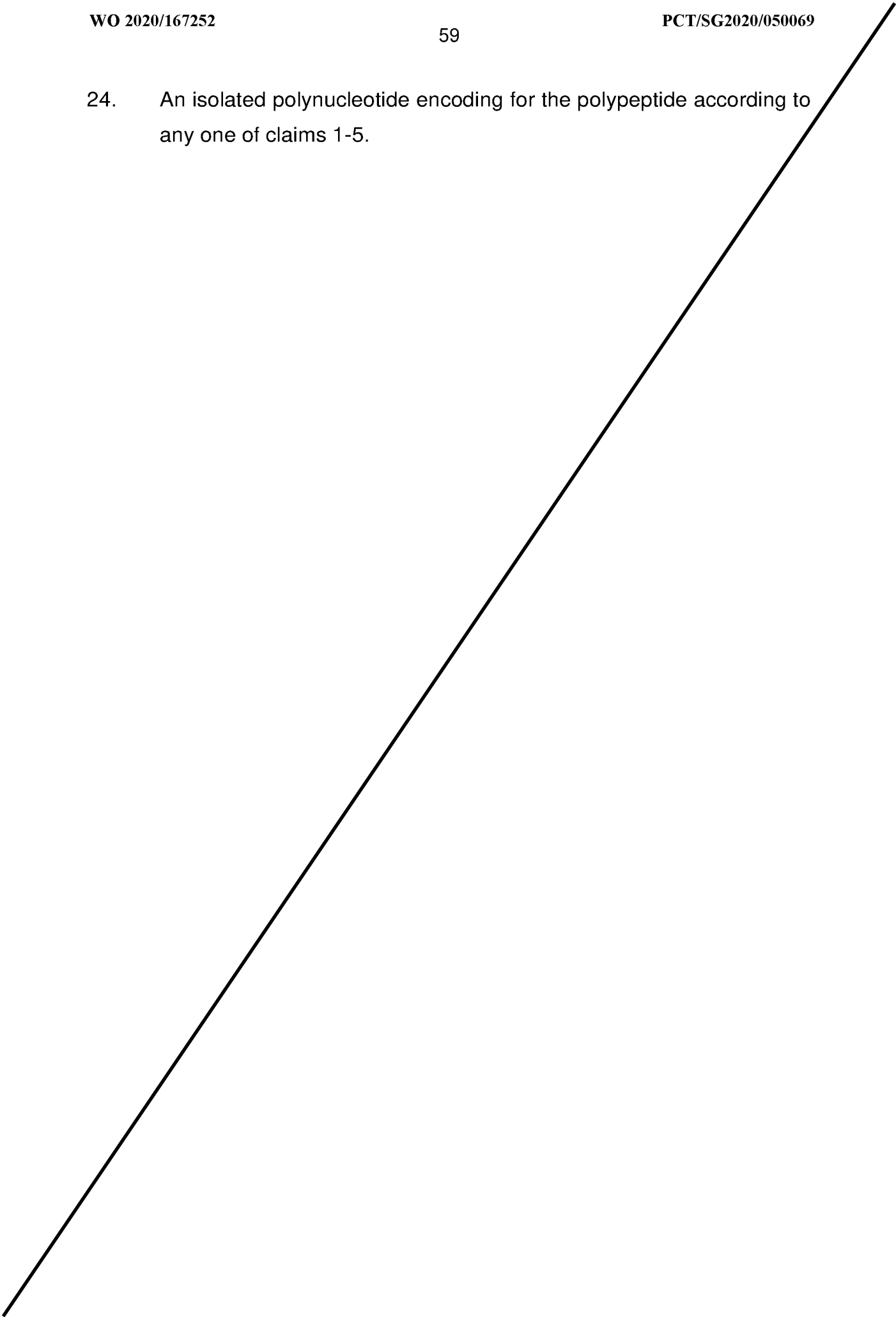
13. The inhibitor according to claim 12 for use in therapy.

14. The inhibitor according to claim 12 for use in treating impaired heart function.

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15. Use of the inhibitor according to claim 12 in the manufacture of a medicament for the treatment of impaired heart function.

16. The method, the inhibitor or the use according to any one of claims 6-11 and 14-15, wherein the impaired heart function is selected from the group consisting of: myocardial infarction, heart failure, coronary artery disease, narrowing of the arteries, heart attack, abnormal heart rhythms, arrhythmias, heart failure, heart valve disease, congenital heart disease, heart muscle disease, cardiomyopathy, pericardial disease, aorta disease, marfan syndrome, genetic cardiomyopathy, non-genetic cardiomyopathy, heart hypertrophy, pressure overload-induced heart dysfunction, and damaged heart tissue.
17. A pharmaceutical composition comprising the inhibitor according to claim 12, and a suitable carrier, adjuvant, diluent and/or excipient.
18. A vector comprising a polynucleotide sequence encoding for the polypeptide according to any one of claims 1-5 or the inhibitor according to claim 12.
19. A host cell transfected with the vector according to claim 18.
20. A transgenic non-human subject comprising a polynucleotide construct encoding for the polypeptide according to any one of claims 1-5.
21. The polypeptide according to any one of claims 1-5 coupled to a detectable label.
22. A method of dedifferentiating and/or proliferating a heart cell, the method comprising:
inhibiting the expression of the polypeptide according to any one of claims 1-5 in the heart cell.
23. A cell produced by the method according to claim 22, or progenies or cell derivatives thereof.

24. An isolated polynucleotide encoding for the polypeptide according to any one of claims 1-5.
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CLAIMS

1. A method of assessing heart function in a subject, the method comprising:

determining an expression level of a polypeptide encoded by *Sghrt* in a sample obtained from the subject, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25;

comparing the expression level of the polypeptide to a reference expression level, in which if the expression level exceeds the reference expression level, the subject is considered to have impaired or deteriorated heart function.

2. A method according to Claim 1, in which the reference expression level comprises:

- (a) an expression level of the polypeptide in a healthy population; or
- (b) an expression level of the polypeptide in an earlier sample obtained from the subject.

3. A method of identifying a potential drug for treating impaired heart function, the method comprising:

determining a first expression level of a polypeptide encoded by *Sghrt* in a cell, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25;

exposing the cell to a drug candidate; and

determining a second expression level of the polypeptide after the exposure, in which if the second expression level is lower than the first expression level, then the drug candidate is identified as a potential drug for treating impaired heart function.

4. An inhibitor of a polypeptide encoded by *Sghrt*, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO:

3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25, further in which the inhibitor comprises a nucleic acid, antibody or antibody fragment such as an antigen-binding fragment.

5. An inhibitor of a polypeptide encoded by *Sghrt* for use in therapy, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25.
6. An inhibitor of a polypeptide encoded by *Sghrt* for use in treating impaired heart function, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25.
7. Use of an inhibitor of a polypeptide encoded by *Sghrt* in the manufacture of a medicament for the treatment of impaired heart function, in which the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24 and SEQ ID NO: 25.
8. A method according to Claim 1, 2 or 3, an inhibitor for use according to Claim 6 or use according to Claim 7, in which the impaired heart function is selected from the group consisting of: myocardial infarction, heart failure, coronary artery disease, narrowing of the arteries, heart attack, abnormal heart rhythms, arrhythmias, heart failure, heart valve disease, congenital heart disease, heart muscle disease, cardiomyopathy, pericardial disease, aorta disease, marfan syndrome, genetic cardiomyopathy, non-genetic cardiomyopathy, heart hypertrophy, pressure overload-induced heart dysfunction, and damaged heart tissue.
9. A pharmaceutical composition comprising an inhibitor according to Claim 4 and a suitable carrier, adjuvant, diluent and/or excipient.
10. A vector comprising a polynucleotide sequence encoding an inhibitor according to Claim 4.

11. A host cell transfected with a vector according to Claim 10.

12. A method of dedifferentiating and/or proliferating a heart cell *in vitro* or *ex-vivo*, the method comprising:

5 inhibiting the activity of a polypeptide encoded by Sghrt in the heart cell, in which
the polypeptide shares at least 90% sequence identity with any one of SEQ ID NO:
1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6,
SEQ ID NO: 7, SEQ ID NO: 18, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24
and SEQ ID NO: 25.