

CLAIMS**What is claimed:**

1. A method of treating atrial fibrillation (AF) or atrial flutter in a patient, comprising administering to a patient a pharmaceutical composition comprising sulcardine or a pharmaceutically acceptable salt thereof, wherein the method is characterized by ECG parameters increase by no more than about 25%, wherein the ECG parameters comprise QRS, PDur, PR, or QTcF, or any combination thereof.
2. The method of claim 1, wherein the ECG parameters further comprise a decrease in JTpc by no more than about 25 msec; and no change in TpTe.
3. The method of claim 1 or 2, wherein the ECG parameters further comprise an increases in heart rate (HR) of no more than about 25%; or wherein the ECG parameters further comprise an increase in HR that is not clinically significant.
4. The method of any one of claims 1 to 3, wherein the maximum ECG parameter change occurs prior to or at about Tmax.
5. The method of any one of claims 1 to 4, wherein the method inhibits early after depolarization.
6. The method of any one of claims 1 to 5, wherein the method increases or decreases diastolic and/or systolic blood pressure by no more than about 25%.
7. The method of any one of claims 1 to 6, wherein the method does not induce a 2nd or 3rd degree heart block.
8. The method of any one of claims 1 to 7, wherein sulcardine, or a pharmaceutically acceptable salt thereof, is administered at a dose of 200 mg, 350 mg, 500 mg, or 600 mg.
9. The method of any one of claims 1 to 8, wherein the pharmaceutically acceptable salt is ethane-1,2-disulfonic acid, naphthalene-1,5-disulfonic acid, 1-hydroxy-2-naphthoic acid, naphthalene-2-sulfonic acid, dihydro sulfonic acid, hydrochloric acid, or hydrobromic acid.
10. The method of any one of claims 1 to 9, wherein the QT and/or QRS intervals increases by about 5% to about 20% after the administration of the composition.

11. The method of any one of claims 1 to 10, wherein a mean average plasma profile characterized by a C_{max} after administering 200 mg of the compound, of at least about 1,500 ng/mL at about T_{max}, and at most 25% of C_{max} at about 1.0 hours after administration.
12. The method of any one of claims 1 to 10, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 350 mg of the compound, of at least about 3,000 ng/mL at about T_{max}, and at most 25% of C_{max} at about 1.0 hours after administration.
13. The method of any one of claims 1 to 10, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 500 mg of the compound, of at least about 4,000 ng/mL at about T_{max}, and at most 25% of C_{max} at about 1.0 hours after administration.
14. The method of any one of claims 1 to 10, wherein the composition produces a mean plasma profile characterized by an average C_{max} after administering 600 mg of the compound, of at least about 5,500 ng/mL at about T_{max}, and at most 25% of C_{max} at about 1.0 hours after administration.
15. The method of any one of claims 1 to 14, wherein the plasma concentration is decreases by at least about 75% within about 1 hour after administration.
16. The method of any one of claims 1 to 15, wherein the administration comprises intravenous injection, intramuscular injection, intraperitoneal injections, subcutaneous injection, or oral consumption.
17. The method of any one of claims 1 to 16, wherein sulcardine, or a pharmaceutically acceptable salt thereof, is administered over a period less than about 1 hour.
18. The method of claim 17, wherein sulcardine, or a pharmaceutically acceptable salt thereof, is administered over a period of about 30 minutes.
19. The method of claim 17, wherein sulcardine, or a pharmaceutically acceptable salt thereof, is administered over a period of about 15 minutes.
20. The method of any one of claims 1 to 19, wherein sulcardine, or a pharmaceutically acceptable salt thereof, is administered at a rate that does not produce an arrhythmia or a clinically significant change in heart rate or blood pressure.

21. The method of any one of claims 1 to 20, wherein the AF is acute AF.
22. The method of any one of claims 1 to 20, wherein the AF is paroxysmal AF.
23. The method of any one of claims 1 to 20, wherein the AF is recurring AF.
24. The method of any one of claims 1 to 20, wherein the treatment is for atrial flutter.
25. The method of any one of claims 1 to 24, wherein the method inhibits late sodium channels, fast sodium channels, L-type calcium channels in the heart, or a combination thereof, in the patient.
26. The method of any one of claims 1 to 25, wherein a bimodal effect on QTc can occur including prolongation in QTc at lower drug exposure levels (doses) in association with INa cardiac ion channel inhibition followed by a potential plateauing or decrease in QTc interval at higher drug exposure levels (doses) associated with increasing inhibitory effect on Na_L and ICa cardiac ion channels.
27. A pharmaceutical composition comprising a compound, wherein the compound is sulcardine, or a pharmaceutically acceptable salt thereof, wherein the composition produces one or more ECG parameter changes comprising increases of less than 25% in heart rate, QRS, PDur, PR, or QTcF.
28. The pharmaceutical composition of claim 27, wherein the composition comprises an inhibitor of Na_L in addition to INa and LCa and induces:
 - (i) a reduction or no change in JTpc of NMT of about 15 to 25 msec; and
 - (ii) no effect or increase in TpTe.
29. The pharmaceutical composition of claim 27 or 28, wherein the composition results in inhibition of early after depolarizations (EADs).
30. The pharmaceutical composition of any one of claims 27 to 29, wherein the ECG parameters further comprise heart rate.
31. The pharmaceutical composition of any one of claims 27 to 30, wherein an attenuation in prolongation or a shortening in QTc follows an increase in QTc interval.
32. The pharmaceutical composition of any one of claims 27 to 31, wherein the ECG parameter changes occur prior to, or at Tmax.

33. The pharmaceutical composition of any one of claims 27 to 32, wherein the composition has no material effect on heart rate or increases or decreases diastolic and/or systolic blood pressure by no more than about 25% prior to, or at T_{max}.
34. The pharmaceutical composition of any one of claims 27 to 33, wherein the composition does not induce 2nd or 3rd degree heart block.
35. The pharmaceutical composition of any one of claims 27 to 34, wherein the pharmaceutically acceptable salt is ethane-1,2-disulfonic acid, naphthalene-1,5-disulfonic acid, 1-hydroxy-2-naphthoic acid, naphthalene-2-sulfonic acid, dihydro sulfonic acid, hydrochloric acid, or hydrobromic acid.
36. The pharmaceutical composition of any one of claims 27 to 35, wherein the composition comprises 200 mg, 350 mg, 500 mg, or 600 mg of sulcardine, or a pharmaceutically acceptable salt thereof.
37. The pharmaceutical composition of any one of claims 27 to 36, wherein the composition is administered to a subject in need by parenteral administration, intravenous infusion or oral consumption.
38. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 200 mg of the compound, of at least about 1,500 ng/mL at about 0.5 hours after administration, and at most 25% of C_{max} at about 1.0 hours after administration.
39. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 350 mg of the compound, of at least about 3,000 ng/mL at about 0.5 hours after administration, and at most 25% of C_{max} at about 1.0 hours after administration.
40. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 500 mg of the compound, of at least about 4,000 ng/mL at about 0.5 hours after administration, and at most 25% of C_{max} at about 1.0 hours after administration.
41. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by a C_{max} after administering 600 mg of the compound, of at least about 5,500 ng/mL at about 0.5 hours after administration, and at most 25% of C_{max} at about 1.0 hours after administration.

42. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by an AUC after administering 200 mg of the compound, of at least about 1,200 ng.h/mL at about 0.5 hours after administration.
43. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by an AUC after administering 350 mg of the compound, of at least about 2,800 ng.h/mL at about 0.5 hours after administration.
44. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by an AUC after administering 500 mg of the compound, of at least about 4,000 ng.h/mL at about 0.5 hours after administration.
45. The pharmaceutical composition of any one of claims 27 to 37, wherein the composition produces a mean average plasma profile characterized by an AUC after administering 200 mg of the compound, of at least about 5,200 ng.h/mL at about 0.5 hours after administration.
46. A method of treating atrial fibrillation (AF) or atrial flutter, comprising administering to a human subject in need thereof sulcardine, or a pharmaceutically acceptable salt thereof, wherein an amount of sulcardine, or a pharmaceutically acceptable salt thereof is sufficient to achieve a Tmax of plasma concentration of sulcardine, or a pharmaceutically acceptable salt thereof of about less than 2.0 hours.
47. The method of claim 46, wherein the administration results in:
 - (i) an increase of less than about 25% in QRS, PDur, PR, and QTcF;
 - (iii) a reduction of less than 10% in JTp; and
 - (iii) no effect or increase in TpTe.
48. The method of claim 46 or 47, wherein the pharmaceutically acceptable salt is ethane-1,2-disulfonic acid, naphthalene-1,5-disulfonic acid, 1-hydroxy-2-naphthoic acid, naphthalene-2-sulfonic acid, hydrochloric acid, or hydrobromic acid.
49. The method of any one of claims 46 to 48, wherein the sulcardine, or a pharmaceutically acceptable salt thereof is administered to a subject in need by intravenous injection, intraperitoneal injection, or oral consumption.
50. The method of any one of claims 46 to 49, wherein the method produces a change in QTc interval that does not increase by more than about 20% after administration.

51. The method of any one of claims 46 to 50, wherein the method produces an increased in QTc interval from about 5% to about 20% after administration.
52. The method of any one of claims 46 to 51, wherein the sulcardine, or a pharmaceutically acceptable salt thereof is administered over a period of less than about 1 hour.
53. The method of claim 52, wherein the sulcardine, or a pharmaceutically acceptable salt thereof, is administered over a period of about 30 minutes.
54. The method of any one of claims 52 or 53, wherein the sulcardine, or a pharmaceutically acceptable salt thereof, is administered at a rate that does not produce an arrhythmia or a clinically significant change in heart rate or blood pressure.
55. The method of any one of claims 46 to 54, wherein the sulcardine, or a pharmaceutically acceptable salt thereof is administered after less than 7 days after the onset of symptoms without need for anticoagulation.
56. The method of any one of claims 46 to 55, wherein the sulcardine, or a pharmaceutically acceptable salt thereof is administered no more than 72 hours after the onset of symptoms.
57. The method of any one of claims 46 to 56, wherein the AF is acute AF.
58. The method of any one of claims 46 to 56, wherein the AF is paroxysmal AF.
59. The method of any one of claims 46 to 56, wherein the AF is recurring AF.
60. The method of any one of claims 46 to 56, wherein treatment is for atrial flutter.