

CLAIMS

1. An ion-channel blocker comprising a Kv1.3 inhibitor component, said Kv1.3
 5 inhibitor component comprising:
 the sequence of PaT1:
 QMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR;
 or a variant thereof which differs from PaT1 by up to 9 substitutions, insertions or
 deletions, wherein any substitutions or deletions are at amino acid positions selected
 10 from positions 1-5, 7-11, 13-15, 17-23, 25, 28-31, 33 and 35-37; and
 wherein said Kv1.3 inhibitor component has Kv1.3 inhibitor activity and is selective for
 Kv1.3;
 or a pharmaceutically acceptable salt thereof.
- 15 2. An ion channel blocker or pharmaceutically acceptable salt according to claim
 1 wherein one or more of positions 28, 31, 34, 35, 36 or 37, or one or more of
 positions 28, 31, 34 and 35, are identical to the corresponding position in PaT1.
3. An ion channel blocker or pharmaceutically acceptable salt according to claim
 20 2 wherein all of positions 28, 31, 34 and 35, or all of positions 28, 31, 34, 35, 36 and
 37, are identical to the corresponding positions in PaT1.
4. An ion channel blocker or pharmaceutically acceptable salt according to any
 one of the preceding claims wherein the Kv1.3 inhibitor component comprises the
 25 sequence of PaT1:
 QMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 or differs from PaT1 by up to 9 substitutions, insertions or deletions, wherein any
 substitutions or deletions are made only at the following positions wherein, if different
 30 from PaT1:
 the residue at position 1 is selected from N, P, I, V, H, Y and S or is deleted;
 the residue at position 2 is selected from Nle, I, V, L, T, Q and E or is deleted;
 the residue at position 3 is selected from E, S and N or is deleted;
 35 the residue at position 4 is selected from Nle, I, V, L, A, E and S or is deleted;
 the residue at position 5 is selected from K, Q, A, L, E and D or is deleted;

- the residue at position 7 is selected from K, R, Q, E, F and A;
- the residue at position 8 is selected from I, H, S, L, Y and G;
- the residue at position 9 is selected from A, Abu, P, F, V and L;
- the residue at position 10 is selected from R, K, P, A, Q and L;
- 5 the residue at position 11 is selected from Q and D;
- the residue at position 13 is selected from L, A, E, Q, I, K, H, D, V and G;
- the residue at position 14 is selected from V, K, E, L, D and 2-amino-5-carboxypentanoyl;
- the residue at position 15 is selected from S, L and P;
- 10 the residue at position 17 is selected from K, Y, R, Q, D, V and E or is deleted;
- the residue at position 18 is selected from D, A, Y, G, V, Q, hQ and L or is deleted ;
- the residue at position 19 is selected from R, Y and Q or is deleted;
- the residue at position 20 is selected from Y, E and R or is deleted;
- the residue at position 21 is selected from R, H, E and D;
- 15 the residue at position 22 is selected from R, M, D, L and C;
- the residue at position 23 is selected from R, K, hK, P, G and H;
- the residue at position 26 is homo-lysine;
- the residue at position 28 is selected from Nle, A and L;
- the residue at position 29 is V;
- 20 the residue at position 30 is selected from G and D;
- the residue at position 31 is selected from D, Q, E and H;
- the residue at position 33 is selected from H, V, D, Q and R;
- the residue at position 35 is selected from T, F(4-NH₂), F(4-F), F(4-NO₂) and F(4-CH₃);
- 25 the residue at position 36 is selected from Q, S and G or is deleted;
- the residue at position 37 is selected from K, E, S and C or is deleted.

5. An ion channel blocker or pharmaceutically acceptable salt according to claim 4 wherein the Kv1.3 inhibitor component differs from PaT1 by up to 9 substitutions,
- 30 insertions or deletions, wherein any substitutions or deletions are made only at the following positions wherein, if different from PaT1:

- the residue at position 1 is selected from N, P, I, V, H, Y and S or is deleted;
- the residue at position 2 is selected from Nle, I, V, L, T, Q and E or is deleted;
- 35 the residue at position 3 is selected from E, S and N or is deleted;
- the residue at position 4 is selected from Nle, I, V, L, A, E and S or is deleted;
- the residue at position 5 is selected from K, Q, A and L or is deleted;

- the residue at position 7 is selected from K, R and Q;
- the residue at position 8 is selected from I, H, S, L, Y and G;
- the residue at position 9 is selected from A, Abu, P, F, V and L;
- the residue at position 10 is selected from R, K and P;
- 5 the residue at position 11 is Q;
- the residue at position 13 is selected from L, A, E, Q, I, K, H and G;
- the residue at position 14 is selected from V, K, E, L and 2-amino-5-carboxypentanoyl;
- the residue at position 15 is selected from S and L;
- 10 the residue at position 17 is selected from K, Y, R, Q and D or is deleted;
- the residue at position 18 is selected from D, A, Y, G, V, Q, hQ and L or is deleted ;
- the residue at position 19 is selected from R, Y and Q or is deleted;
- the residue at position 20 is selected from Y, E and R or is deleted;
- the residue at position 21 is selected from R, H and E;
- 15 the residue at position 22 is selected from R, M, D, L and C;
- the residue at position 23 is selected from R, K, hK, P and G;
- the residue at position 28 is Nle;
- the residue at position 30 is selected from G and D;
- the residue at position 31 is selected from D, Q, E and H;
- 20 the residue at position 33 is selected from H, V, D, Q and R;
- the residue at position 35 is selected from T, F(4-NH₂), F(4-F), F(4-NO₂) and F(4-CH₃);
- the residue at position 36 is selected from Q, S and G or is deleted;
- the residue at position 37 is selected from K, S and C or is deleted.

25

6. An ion channel blocker or pharmaceutically acceptable salt according to claim 5 wherein the Kv1.3 inhibitor component differs from PaT1 by up to 9 substitutions, insertions or deletions, wherein any substitutions or deletions are made only at the following positions wherein, if different from PaT1:

30

- the residue at position 1 is selected from N, P, V, H, Y and S or is deleted;
- the residue at position 2 is selected from Nle, I, V and L or is deleted;
- the residue at position 3 is selected from E and S or is deleted;
- the residue at position 4 is selected from Nle, I, V, L, E and S or is deleted;
- 35 the residue at position 7 is selected from K and R;
- the residue at position 8 is selected from I and H;
- the residue at position 9 is selected from Abu and L;

- the residue at position 10 is selected from R and K;
the residue at position 11 is Q;
the residue at position 13 is selected from L, A, E, Q, V and G;
the residue at position 14 is selected from V, K, E, L and 2-amino-5-
5 carboxypentanoyl;
the residue at position 15 is selected from S and L;
the residue at position 17 is selected from K, Y and R or is deleted;
the residue at position 18 is selected from D, A, Y, G, V, Q, hQ and L or is deleted ;
the residue at position 19 is selected from R and Y or is deleted;
10 the residue at position 20 is selected from Y, E and R or is deleted;
the residue at position 21 is selected from R, H and E;
the residue at position 22 is selected from R and C;
the residue at position 23 is selected from R, K, hK, P and G;
the residue at position 28 is Nle;
15 the residue at position 30 is G;
the residue at position 33 is selected from H, V and R;
the residue at position 35 is selected from F(4-NH₂), F(4-F), F(4-NO₂) and F(4-CH₃);
the residue at position 36 is selected from Q, S and G or is deleted;
the residue at position 37 is selected from S and C or is deleted.
- 20
7. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component contains no more than 3 deletions, no more than two deletions, or no more than one deletion compared to the sequence of PaT1.
- 25
8. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein none of positions 20-33 is deleted.
9. An ion channel blocker or pharmaceutically acceptable salt according to any
30 one of the preceding claims wherein, if the Kv1.3 inhibitor component contains more than one deletion, one of those deletions is at position 1.
10. An ion channel blocker or pharmaceutically acceptable salt according to claim
9 wherein, if the Kv1.3 inhibitor component contains more than two deletions, two of
35 those deletions are at positions 1 and 2.

11. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component differs from PaT1 by up to 9 substitutions, insertions or deletions, wherein any substitutions or deletions are made only at the following positions wherein, if different from PaT1:

- 5
- the residue at position 1 is selected from N and P or is deleted;
 - the residue at position 2 is Nle, I, V and L;
 - the residue at position 3 is selected from E and S;
 - the residue at position 4 is Nle, I, V and L;
 - 10 the residue at position 8 is I;
 - the residue at position 10 is R;
 - the residue at position 11 is Q;
 - the residue at position 13 is A;
 - the residue at position 14 is V;
 - 15 the residue at position 18 is selected from D, Y and A;
 - the residue at position 19 is R;
 - the residue at position 20 is Y;
 - the residue at position 21 is R;
 - the residue at position 22 is selected from R and C;
 - 20 the residue at position 23 is selected from R and G;
 - the residue at position 28 is Nle;
 - the residue at position 30 is G;
 - the residue at position 33 is H;
 - the residue at position 37 is C.

25

12. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component comprises a maximum of three insertions as compared to the sequence of PaT1.

- 30 13. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the residue at position 1 is not Q.

14. An ion channel blocker or pharmaceutically acceptable salt according to claim 13 wherein the Kv1.3 inhibitor component comprises 1N, 1P or 1*.

35

15. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein one, two or all three of the residues at positions 2, 4 and 28 of the Kv1.3 inhibitor component are not methionine.
- 5 16. An ion channel blocker or pharmaceutically acceptable salt according to claim 15 comprising one of the following combinations of residues:
 2* + 4Nle, 4I, 4V or 4L;
 2Nle + 4Nle, 4I, 4V or 4L;
 2I + 4Nle, 4I, 4V or 4L;
 10 2V + 4Nle, 4I, 4V or 4L; or
 2L + 4Nle, 4I, 4V or 4L.
17. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor comprises 28Nle.
- 15 18. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component contains the residues 22S + 23I or 22R + 23G.
- 20 19. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component contains the residues 13A and/or 18A.
20. An ion channel blocker or pharmaceutically acceptable salt according to claim 25 19 wherein the Kv1.3 inhibitor component contains one of the following combination of residues:
 2Nle + 13A;
 2Nle + 18A;
 2Nle + 13A + 18A;
 30 2Nle + 4Nle + 13A + 28Nle;
 2Nle + 4Nle + 18A + 28Nle;
 2Nle + 4Nle + 13A + 18A + 28Nle;
 2Nle + 4Nle + 28Nle;
 2Nle + 3E + 4Nle + 28Nle;
 35 2Nle + 3E + 4Nle + 18A + 28Nle;
 1P + 2Nle + 4Nle + 28Nle;
 1P + 2Nle + 3E + 4Nle + 28Nle; or

1P + 2Nle + 3E + 4Nle + 18A + 28Nle.

21. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component contains the residues 22C + 37C.

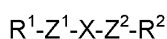
5

22. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims which is a fusion protein comprising the Kv1.3 inhibitor component and one or more heterologous polypeptide sequences.

10 23. An ion channel blocker or pharmaceutically acceptable salt according to claim 22 wherein the Kv1.3 inhibitor component is inserted within a heterologous scaffold polypeptide.

24. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the ion channel blocker has a maximum length of 200 amino acids, 150 amino acids, 125 amino acids, 100 amino acids, 75 amino acids or 50 amino acids.

25 25. An ion channel blocker or pharmaceutically acceptable salt according to any of the preceding claims having the formula:



where

25

R^1 is hydrogen, C_{1-4} alkyl, acetyl, formyl, benzoyl or trifluoroacetyl;

R^2 is OH or NH_2

30 X is a Kv1.3 inhibitor having the sequence of PaT1 or a variant thereof as described in any of the preceding claims, and
 Z^1 and Z^2 are independently sequences of up to 10 amino acid residues; with the proviso that the ion channel blocker has a maximum length of 50 amino acids.

35 26. An ion channel blocker or pharmaceutically acceptable salt according to claim 25 wherein Z^1 comprises or consists of the sequence GG or SG.

27. An ion channel blocker or pharmaceutically acceptable salt according to claim 25 or 26 wherein Z² comprises or consists of the sequence RRTA, HRRK, QSKA, AGPR, RSRT, RHKR, GGKR, PKTA, TDAR, HRQQ, RPRH, ARNA, TGRK, HERT, NTRT, QRNG, AHRN, PRSA, QRQS, QRRK, ARAK, AKRD, RDKT, HRRK, RAKR, 5 QRTR, ATRH, ARRS, AKTR, NRQR or PRNT.

28. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims wherein the Kv1.3 inhibitor component comprises one of the sequences:

10

QMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 QMDMRCSASVECKQKCLKAIGRGFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGRGFGKCMNKKCKCYPR
 MDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NIDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDVRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCKDAIGSIFGKCMNKKCKCYPR
 NMEMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 N[Ni^e]DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMD[Ni^e]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKC[Ni^e]NKKCKCYPR
 NMDMRCSASVECKVKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQLCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCKKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLDAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIRSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIESIFGKCMNKKCKCYPR
 NMDMRCKASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSISVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASRECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVQCKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECLQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECAQKCLKAIGSIFGKCMNKKCKCYPR

NMDMRCSASVECKEKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKLKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAHISIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSKFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSRFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNGKCKCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCHCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKVCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCRASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECEQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKKKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]S[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSHSVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKQSCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCKAIGSIFGKC[Nie]NKKCKCYPR
NMDMRCSASVECKQKCYKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCRKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLYAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKYIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKRIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAYGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAEGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKARGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAGSIFGKCMNKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSPFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASKECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
H[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
Y[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR

V[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
S[Nie]D[Nie]RCSA[Abu]VECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFG[homo-Lys]CMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NH₂)]PR
S[Nie]D[Nie]RCSASVECGQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECVQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECK[2-Amino-5-carboxypentanoyl]KCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYQ
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCR CYPR
S[Nie]DERCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLGAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLVAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQSCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQLCLAAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSASVECKEKCLQAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKEKCL[homo-Gln]AIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSASVECKQKCLAAIGCIFGKC[Nie]NKKCKCYPC
P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSALVECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSAVVECKQKCLKAIGSIFGKCMNKKCKC(3)YPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-F)]PR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NO₂)]PR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-CH₃)]PR
[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
NID[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
PIE[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLLAIGSIFGKC[Nie]NKKCKCYPR
PIDERCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
PIE[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR

P[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR
P[Nie]E[Nie]RCSASVECAQKCLAAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
SKCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYP
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYS
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYG-NH₂
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCY-NH₂
RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR
CSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
P[Nie]E[Nie]RCSASVECKEKCLAAIGSIFGKC[Nie]NKKCKCYPR
p[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYR
[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRY
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRL
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRH
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRE
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRKS
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRFE
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRHR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRAK
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYP-[(4-amino-5-hydroxypentyl)guanidine]
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-[4-amino-5-hydroxypentanamide]
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRST
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRRY
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR

P[Nie]E[Nie]RCSLSVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSAPVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASPECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASQECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASVECLQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASVECKQPCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCEASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCFASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSYSVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSAFVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR

29. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims comprising or consisting of one of the sequences:

QMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 QMDMRCSASVECKQKCLKAIGRGFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGRGFGKCMNKKCKCYPR
 MDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NIDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDVRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCKDAIGSIFGKCMNKKCKCYPR
 GGNMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMEMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 SGNMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 N[Nie]DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMD[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
 NMDMRCSASVECKVKCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQLCLKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCKKAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLDAIGSIFGKCMNKKCKCYPR
 NMDMRCSASVECKQKCLKAIRSIFGKCMNKKCKCYPR

NMDMRCSASVECKQKCLKAIESIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPRRRTA
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPRHRRK
NMDMRCKASVECKQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSISVECKQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASRECKQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVQCKQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECLQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECAQKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKEKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKLKCLKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAHISIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSKFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSRFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNGKCKCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCHCYPR
NMDMRCSASVECKQKCLKAIGSIFGKCMNKKVCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCRASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECEQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKKKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]S[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSHSVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKQSCLKAIGSIFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCKAIGSIFGKC[Nie]NKKCKCYPR
NMDMRCSASVECKQKCYKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCRKAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLYAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLAIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKYIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKRIGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKIGSIFGKCMNKKCKCYPR

NMDMRCSASVECKQKCLKAYGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAEGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKARGSIFGKCMNKKCKCYPR
NMDMRCSASVECKQKCLKAGSIFGKCMNKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSPFGKC[Nie]NKKCKCYPR
N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
H[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
Y[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
V[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
S[Nie]D[Nie]RCSA[Abu]VECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFG[homo-Lys]CMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NH₂)]PR
S[Nie]D[Nie]RCSASVECGQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECVQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECK[2-Amino-5-carboxypentanoyl]KCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYQ
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCR CYPR
S[Nie]DERCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLGAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLVAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQSCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECAQLCLAAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSASVECKEKCLQAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECKEKCL[homo-Gln]AIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSASVECKQKCLAAIGCIFGKC[Nie]NKKCKCYPC
P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC
S[Nie]D[Nie]RCSALVECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSAVVECKQKCLKAIGSIFGKCMNKKCKCYPR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-F)]PR
S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NO₂)]PR

S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-CH₃)]PR
[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
NID[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
PIE[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLLAIGSIFGKC[Nie]NKKCKCYPR
PIDERCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
PIE[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR
P[Nie]E[Nie]RCSASVECAQKCLAAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
SKCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYP
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYS
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYG-NH₂
CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCY-NH₂
RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
LRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR
CSASVECKQKCLKAIGSIFGKCMNKKCKCYPR
P[Nie]E[Nie]RCSASVECKEKCLAAIGSIFGKC[Nie]NKKCKCYPR
p[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYR
[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRR
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRY
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRL
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRH
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRE
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRKS
P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRFE

P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRHR
 P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRAK
 P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYP-[(4-amino-
 5-hydroxypentyl)guanidine]
 P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-[4-amino-
 5-hydroxypentanamide]
 P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRST
 P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRRY
 P[Nie]E[Nie]RCSSSVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSLSVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSAPVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASPECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASQECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASVECLQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSASVECKQPCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCEASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCFASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSYSVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR
 P[Nie]E[Nie]RCSAFVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR

30. An ion channel blocker or pharmaceutically acceptable salt according to any one of the preceding claims selected from:

H-QMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 1)
H-QMDMRCSASVECKQKCLKAIGRFGKCMNKKCKCYPR-OH	(Cpd. 2)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 3)
H-NMDMRCSASVECKQKCLKAIGRFGKCMNKKCKCYPR-OH	(Cpd. 4)
H-MDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 5)
H-DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 6)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 7)
H-NIDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 8)
H-NMDVRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 9)
H-NMDMRCSASVECKQKCKDAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 10)
H-GGNMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 11)
H-NMEMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 12)
H-SGNMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 13)

H-N[Nie]DMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 14)
H-NMD[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 15)
H-NMDMRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 16)
H-NMDMRCSASVECKVKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 17)
H-NMDMRCSASVECKQLCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 18)
H-NMDMRCSASVECKQKCKKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 19)
H-NMDMRCSASVECKQKCLDAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 20)
H-NMDMRCSASVECKQKCLKAIRSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 21)
H-NMDMRCSASVECKQKCLKAIESIFGKCMNKKCKCYPR-NH ₂	(Cpd. 22)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPRRRTA-NH ₂	(Cpd. 23)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCKCYPRHRRK-NH ₂	(Cpd. 24)
H-NMDMRCKASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 25)
H-NMDMRCSISVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 26)
H-NMDMRCSASRECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 27)
H-NMDMRCSASVQCKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 28)
H-NMDMRCSASVECLQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 29)
H-NMDMRCSASVECAQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 30)
H-NMDMRCSASVECKEKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 31)
H-NMDMRCSASVECKLKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 32)
H-NMDMRCSASVECKQKCLKAHISIFGKCMNKKCKCYPR-NH ₂	(Cpd. 33)
H-NMDMRCSASVECKQKCLKAIGSKFGKCMNKKCKCYPR-NH ₂	(Cpd. 34)
H-NMDMRCSASVECKQKCLKAIGSRFGKCMNKKCKCYPR-NH ₂	(Cpd. 35)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNGKCKCYPR-NH ₂	(Cpd. 36)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKCHCYPR-NH ₂	(Cpd. 37)
H-NMDMRCSASVECKQKCLKAIGSIFGKCMNKKVCYPR-NH ₂	(Cpd. 38)
H-N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 39)
H-N[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 40)
H-P[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 41)
H-N[Nie]D[Nie]RCRASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 42)
H-N[Nie]D[Nie]RCSASVECEQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 43)
H-N[Nie]D[Nie]RCSASVECQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 44)

H-N[Nle]D[Nle]RCSASVECKKKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 45)
H-N[Nle]S[Nle]RCSASVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 46)
H-N[Nle]D[Nle]RCSHSVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 47)
H-N[Nle]D[Nle]RCSASVECKQSCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 48)
H-N[Nle]D[Nle]RCSASVECKQKCKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 49)
H-NMDMRCSASVECKQKCYKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 50)
H-NMDMRCSASVECKQKCRKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 51)
H-NMDMRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 52)
H-NMDMRCSASVECKQKCLYAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 53)
H-NMDMRCSASVECKQKCLAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 54)
H-NMDMRCSASVECKQKCLKYIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 55)
H-NMDMRCSASVECKQKCLKRIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 56)
H-NMDMRCSASVECKQKCLKIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 57)
H-NMDMRCSASVECKQKCLKAYGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 58)
H-NMDMRCSASVECKQKCLKAEGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 59)
H-NMDMRCSASVECKQKCLKARGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 60)
H-NMDMRCSASVECKQKCLKAGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 61)
H-N[Nle]D[Nle]RCSASVECKQKCLKAIGSPFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 62)
H-N[Nle]D[Nle]RCSASKECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 63)
H-H[Nle]D[Nle]RCSASVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 64)
H-Y[Nle]D[Nle]RCSASVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 65)
H-S[Nle]D[Nle]RCSASVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 66)
H-V[Nle]D[Nle]RCSASVECKQKCLKAIGSIFGKC[Nle]NKKCKCYPR-NH ₂	(Cpd. 67)
H-S[Nle]D[Nle]RCSA[Abu]VECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 68)
H-S[Nle]D[Nle]RCSASVECKQKCLKAIGSIFG[homo-	(Cpd. 69)

Lys]CMNKKCKCYPR-NH ₂	
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NH ₂)]PR-NH ₂	(Cpd. 70)
H-S[Nie]D[Nie]RCSASVECGQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 71)
H-S[Nie]D[Nie]RCSASVECVQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 72)
H-S[Nie]D[Nie]RCSASVECK[2-Amino-5-carboxypentanoyl]KCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 73)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKCYQ-NH ₂	(Cpd. 74)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCRCYPR-NH ₂	(Cpd. 75)
H-S[Nie]DERCSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 76)
H-S[Nie]D[Nie]RCSASVECKQKCLGAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 77)
H-S[Nie]D[Nie]RCSASVECKQKCLVAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 78)
H-S[Nie]D[Nie]RCSASVECAQSCCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 79)
H-S[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 80)
H-S[Nie]D[Nie]RCSASVECAQLCLAAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 81)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 82)
H-P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC-NH ₂	(Cpd. 83)
H-S[Nie]D[Nie]RCSASVECKEKCLQAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 84)
H-P[Nie]D[Nie]RCSASVECKEKCL[homo-Gln]AIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 85)
H-CSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC-NH ₂	(Cpd. 86)
H-S[Nie]D[Nie]RCSASVECKQKCLAAIGCIFGKC[Nie]NKKCKCYPC-NH ₂	(Cpd. 87)
H-P[Nie]D[Nie]RCSASVECKQKCLKAIGCIFGKC[Nie]NKKCKCYPC-OH	(Cpd. 88)
H-S[Nie]D[Nie]RCSALVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 89)
H-S[Nie]D[Nie]RCSAVVECKQKCLKAIGSIFGKCMNKKCKCYPR-NH ₂	(Cpd. 90)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-F)]PR-NH ₂	(Cpd. 91)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-NO ₂)]PR-NH ₂	(Cpd. 92)
H-S[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKCMNKKCKC[F(4-CH ₃)]PR-NH ₂	(Cpd. 93)
H-[Nie]D[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 94)
H-NID[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 95)

H-PIE[Nie]RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 96)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 97)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 98)
H-P[Nie]E[Nie]RCSASVECKQKCLLAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 99)
H-PIDERSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 100)
H-PIE[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 101)
H-P[Nie]D[Nie]RCSASVECAQKCLAAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 102)
H-P[Nie]E[Nie]RCSASVECAQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 103)
H-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 104)
Ac-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 105)
H-RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 106)
Ac-SKCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 107)
Ac-LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-NH ₂	(Cpd. 108)
Ac-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPS-NH ₂	(Cpd. 109)
Ac-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYS-NH ₂	(Cpd. 110)
Ac-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYG-NH ₂	(Cpd. 111)
Ac-CSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCY-NH ₂	(Cpd. 112)
Ac-RCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 113)
H-LRCSASVECKQKCLKAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 114)
Ac-LRCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 115)
Ac-LRCSASVECKQKCLAAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 116)
H-CSASVECKQKCLKAIGSIFGKCMNKKCKCYPR-OH	(Cpd. 117)
H-P[Nie]E[Nie]RCSASVECKEKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 118)
H-p[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 119)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYR-OH	(Cpd. 120)
H-[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPR-OH	(Cpd. 121)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRR-OH	(Cpd. 122)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRY-OH	(Cpd. 123)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRL-OH	(Cpd. 124)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRH-OH	(Cpd. 125)
H-P[Nie]E[Nie]RCSASVECKQKCLAAIGSIFGKC[Nie]NKKCKCYPRE-OH	(Cpd. 126)

OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRKS-	(Cpd. 127)
OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRFE-	(Cpd. 128)
OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRHR-	(Cpd. 129)
OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRAK-	(Cpd. 130)
OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYP-[(4-	(Cpd. 131)
amino-5-hydroxypentyl)guanidine]	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-[4-	(Cpd. 132)
amino-5-hydroxypentanamide]	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRST-	(Cpd. 133)
OH	
H-P[Nle]E[Nle]RCSASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPRRY-	(Cpd. 134)
OH	
H-P[Nle]E[Nle]RCSSSVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 135)
H-P[Nle]E[Nle]RCSLSVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 136)
H-P[Nle]E[Nle]RCSAPVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 137)
H-P[Nle]E[Nle]RCSASPECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 138)
H-P[Nle]E[Nle]RCSASQECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 139)
H-P[Nle]E[Nle]RCSASVECLQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 140)
H-P[Nle]E[Nle]RCSASVECKQPCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 141)
H-P[Nle]E[Nle]RCEASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 142)
H-P[Nle]E[Nle]RCFASVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 143)
H-P[Nle]E[Nle]RCSYSVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 144)
H-P[Nle]E[Nle]RCSAFVECKQKCLAAIGSIFGKC[Nle]NKKCKCYPR-OH	(Cpd. 145)

31. A nucleic acid encoding an ion channel blocker, a Kv1.3 inhibitor component, or a peptide Z^1 -X- Z^2 as defined in any of the preceding claims.

5 32. An expression vector comprising a nucleic acid according to claim 31.

33. A host cell comprising a nucleic acid according to claim 31 or an expression vector according to claim 32 and capable of expressing an ion channel blocker, a Kv1.3 inhibitor component, or a peptide Z^1 -X- Z^2 as defined in any of claims 1 to 27.

34. A method of synthesising an ion channel blocker according to any of claims 1 to 30, the method comprising:
- (a) synthesising the ion channel blocker by means of solid-phase or liquid-phase peptide synthesis methodology and recovering the peptide thus obtained;
 - (b) expressing the ion channel blocker from a nucleic acid construct that encodes the ion channel blocker and recovering the expression product; or
 - (c) expressing a precursor peptide from a nucleic acid construct that encodes the precursor peptide sequence, recovering the expression product, and modifying the precursor peptide to yield the ion channel blocker.
35. A pharmaceutical composition comprising an ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30, in admixture with a pharmaceutically acceptable carrier.
36. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in a method of medical treatment.
37. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in a method of inhibiting or reducing inflammation.
38. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in the treatment of an inflammatory condition or disorder.
39. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 38 wherein the inflammatory condition or disorder is an autoimmune disorder, allergy or hypersensitivity, allograft rejection, or graft versus host disease.
40. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 38 or claim 39 wherein the inflammatory condition or disease is hay fever, asthma, anaphylaxis, allergic rhinitis, urticaria, eczema, alopecia areata, dermatomyositis, inclusion body myositis, polymyositis, ankylosing spondylitis, vasculitis, arthritis (including rheumatoid arthritis, osteoarthritis, psoriatic arthritis), Sjogren's syndrome, systemic lupus erythematosus (SLE), uveitis, inflammatory fibrosis (e.g. scleroderma, lung fibrosis, cirrhosis), chronic obstructive pulmonary

- disease (COPD), hepatitis, chronic inflammatory demyelinating polyneuropathy, inflammatory bowel disease, colitis (e.g. Crohn's disease and ulcerative colitis), erythema, thyroiditis, psoriasis, atopic dermatitis, allergic contact dermatitis, scleroderma, glomerulonephritis, inflammatory bone resorption, multiple sclerosis,
- 5 type 1 diabetes, transplant rejection or graft-versus-host disease.
41. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in a method of inhibiting weight gain, promoting weight loss, reducing excess body weight or treating obesity, or in the treatment of obesity
- 10 linked inflammation, obesity linked gallbladder disease or obesity induced sleep apnoea.
42. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in treatment of a condition caused by or associated with
- 15 impaired glucose control.
43. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 42 wherein the condition is metabolic syndrome, insulin resistance, glucose intolerance, pre-diabetes, increased fasting glucose or type 2 diabetes.
- 20
44. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in treatment of a smooth muscle proliferative disorder.
45. An ion channel blocker or pharmaceutically acceptable salt for use according
- 25 to claim 44 wherein said disorder is restenosis.
46. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in the treatment of a neuroinflammatory or neurodegenerative disorder.
- 30
47. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 46, wherein said disorder is Alzheimer's disease, multiple sclerosis (MS), Parkinson's disease or amyotrophic lateral sclerosis (ALS).
- 35
48. An ion channel blocker or pharmaceutically acceptable salt according to any one of claims 1 to 30 for use in treatment of cancer.

49. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 48 wherein said cancer is breast cancer, prostate cancer or lymphoma.
50. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 49 wherein said lymphoma is non-Hodgkin lymphoma (NHL).
51. An ion channel blocker or pharmaceutically acceptable salt for use according to claim 50 wherein said NHL is large B-cell lymphoma, follicular lymphoma, Burkitt lymphoma, immunoblastic large cell lymphoma, precursor B-lymphoblastic lymphoma, mantle cell lymphoma, mycosis fungoides, anaplastic large cell lymphoma, peripheral T-cell lymphoma, precursor T-lymphoblastic lymphoma or Sézary syndrome.