CLAIMS

1. An insulin analog comprising at least two mutations relative to the parent insulin, wherein the insulin analog comprises
   a) a mutation at position B16 which is substituted with a branched-chain amino acid and/or a mutation at position B25 which is substituted with a branched-chain amino acid,
   b) a mutation at position A14 which is substituted with an amino acid selected from the group consisting of glutamic acid (Glu), aspartic acid (Asp) and histidine (His). and, optionally,
   c) a mutation at position B30.

2. The insulin analog of claim 1, wherein the parent insulin is human insulin, porcine insulin, or bovine insulin.

3. The insulin analog of claims 1 and 2, wherein the branched-chain amino acid is selected from the group consisting of valine (Val), isoleucine (Ile), and leucine (Leu).

4. The insulin analog of claim 3, wherein the branched-chain amino acid is valine (Val).

5. The insulin analog of any one of claims 1 to 4, wherein the amino acid at position A14 is substituted with glutamic acid (Glu).

6. The insulin analog of any one of claims 1 to 5, wherein the mutation at position B30 is the deletion of the amino acid at position B30 of the parent insulin (Des(B30)-mutation).

7. The insulin analog of any one of claims 1 to 6, wherein said insulin analog further comprises a mutation at position B3 which is substituted with a glutamic acid (Glu).

8. The insulin analog of any one of claims 1 to 7, wherein said insulin further comprises a mutation at position A21 which is substituted with glycine (Gly).

9. The insulin analog of any one of claims 1 to 8, wherein the B chain of the insulin analog comprises or consists of an amino acid sequence selected from the group consisting of

   FVNQHLCGSHLVEALYLVCGERGFLYTPK (SEQ ID NO: 22)
   FVNQHLCGSHLVEALYLVCGERGFIYTPK (SEQ ID NO: 44)
   FVNQHLCGSHLVEALYLVCGERGFVYTPK (SEQ ID NO: 48)

FVEQHLCGSHLVEALYLVCGERGFVYTPK (SEQ ID NO: 50)
FVNQHLCGSHLVEALILVCGERGFIYTPK (SEQ ID NO: 58)
FVEQHLCGSHLVEALILVCGERGFIYTPK (SEQ ID NO: 60)
FVNQHLCGSHLVEALILVCGERGFVYTPK (SEQ ID NO: 64)
FVEQHLCGSHLVEALILVCGERGFVYTPK (SEQ ID NO: 66)
FVNQHLCGSHLVEALVLVCGERGFIYTPK (SEQ ID NO: 70)
FVNQHLCGSHLVEALVLVCGERGFVYTPK (SEQ ID NO: 76)
FVEQHLCGSHLVEALVLVCGERGFVYTPK (SEQ ID NO: 78)
FVEQHLCGSHLVEALVLVCGERGFVYTPK (SEQ ID NO: 80)
FVNQHLCGSHLVEALYLVCGERGFLYTPKT (SEQ ID NO: 85)
FVNQHLCGSHLVEALYLVCGERGFVYTPKT (SEQ ID NO: 86)
FVNQHLCGSHLVEALYLVCGERGFIYTPKT (SEQ ID NO: 87)
FVNQHLCGSHLVEALYLVCGERGFVYTPKT (SEQ ID NO: 88)
FVEQHLCGSHLVEALYLVCGERGFVYTPKT (SEQ ID NO: 89)
FVNQHLCGSHLVEALILVCGERGFIYTPKT (SEQ ID NO: 90)
FVEQHLCGSHLVEALILVCGERGFIYTPKT (SEQ ID NO: 91)
FVNQHLCGSHLVEALILVCGERGFVYTPKT (SEQ ID NO: 92)
FVEQHLCGSHLVEALILVCGERGFVYTPKT (SEQ ID NO: 93)
FVNQHLCGSHLVEALVLVCGERGFIYTPKT (SEQ ID NO: 94)
FVNQHLCGSHLVEALVLVCGERGFVYTPKT (SEQ ID NO: 95)
FVEQHLCGSHLVEALVLVCGERGFVYTPKT (SEQ ID NO: 96), and
FVEQHLCGSHLVEALVLVCGERGFVYTPKT (SEQ ID NO: 97).

10. The insulin analog of any one of claims 1 to 9, comprising
    (a) an A chain having an amino acid sequence as shown in SEQ ID NO: 43 (GIVEQCCTSICSLEQLENYCN) and a B chain having an amino acid sequence as shown in SEQ ID NO: 44 (FVNQHLCGSHLVEALYLVCGERGFIYTPK),
    (b) an A chain having an amino acid sequence as shown in SEQ ID NO: 47 (GIVEQCCTSICSLEQLENYCN) and a B chain having an amino acid sequence as shown in SEQ ID NO: 48 (FVNQHLCGSHLVEALYLVCGERGFVYTPK), or
    (c) an A chain having an amino acid sequence as shown in SEQ ID NO: 77 (GIVEQCCTSICSLEQLENYCN) and a B chain having an amino acid sequence as shown in SEQ ID NO: 78 (FVEQHLCGSHLVEALVLVCGERGFVYTPK).

11. An insulin analog selected from the group consisting of
    Glu(A14)Leu(B16)Des(B30)-human insulin,
    Glu(A14)Ile(B16)Des(B30)-human insulin,
    Glu(A14)Val(B16)Des(B30)-human insulin,
    Glu(A14)Leu(B16)-human insulin,

Glu(A14)Ile(B16)-human insulin,
Glu(A14)Val(B16)-human insulin,
Glu(A14)Leu(B25)Des(B30)-human insulin,
Glu(A14)Ile(B25)Des(B30)-human insulin,
Glu(A14)Val(B25)Des(B30)-human insulin,
Glu(A14)Leu(B25)-human insulin,
Glu(A14)Ile(B25)-human insulin,
Glu(A14)Val(B25)-human insulin,
Glu(A14)Gly(A21)Glu(B3)Val(B25)Des(B30)-human insulin,
Glu(A14)Ile(B16)Ile(B25)Des(B30)-human insulin,
Glu(A14)Glu(B3)Ile(B16)Ile(B25)Des(B30)-human insulin,
Glu(A14)Ile(B16)Val(B25)Des(B30)-human insulin,
Glu(A14)Gly(A21)Glu(B3)Ile(B16)Val(B25)Des(B30)-human insulin,
Glu(A14)Val(B16)Ile(B25)Des(B30)-human insulin,
Glu(A14)Val(B16)Val(B25)Des(B30)-human insulin,
Glu(A14)Glu(B3)Val(B16)Val(B25)Des(B30)-human insulin,
Glu(A14)Gly(A21)Glu(B3)Val(B16)Val(B25)Des(B30)-human insulin,
Glu(A14)Gly(A21)Glu(B3)Val(B25)-human insulin,
Glu(A14)Ile(B16)Ile(B25)-human insulin,
Glu(A14)Glu(B3)Ile(B16)Ile(B25)-human insulin,
Glu(A14)Ile(B16)Val(B25)-human insulin,
Glu(A14)Gly(A21)Glu(B3)Ile(B16)Val(B25)-human insulin,
Glu(A14)Val(B16)Ile(B25)-human insulin,
Glu(A14)Val(B16)Val(B25)-human insulin,
Glu(A14)Glu(B3)Val(B16)Val(B25)-human insulin, and
Glu(A14)Gly(A21)Glu(B3)Val(B16)Val(B25)-human insulin.

12. An insulin B chain comprising at least two mutations relative to the B chain of the parent insulin, wherein the B chain comprises a) a mutation at position B16 which is substituted with a branched-chain amino acid, and/or a mutation at position B25 which is substituted with a branched-chain amino acid, and b) a mutation at position B30, wherein the mutation at position B30 is the deletion of threonine at position B30 of the parent insulin (Des(B30)-mutation).

13. A proinsulin comprising an insulin A chain and an insulin B chain, wherein the insulin B chain comprises at least one mutation relative to B chain of a parent insulin, wherein the B chain comprises a mutation at position B16 which is substituted with a branched-chain amino acid and/or a mutation at position B25 which is substituted with a branched-chain amino acid, and wherein the insulin A chain of said proinsulin

comprises a mutation at position A14 which is substituted with an amino acid selected from glutamic acid (Glu), aspartic acid (Asp) and histidine (His).

14. A polynucleotide encoding the insulin analog of any one of claims 1 to 11, the insulin B chain of claim 12, and/or the proinsulin of claim 13.

15. A host cell comprising insulin analog of any one of claims 1 to 11, the insulin B chain of claims 12, the proinsulin of claim 13, and/or the polynucleotide of claim 14.