CLAIMS

1. A method for the solid-phase synthesis of a polypeptide comprising a pre-determined amino acid sequence, the method comprising coupling cycles of amino acid building blocks to an amino acid chain,
wherein said amino acid building blocks comprise an unprotected C-terminal carboxyl group and a protected N-terminal amino group,
and wherein said amino acid chain comprises an unprotected N-terminal amino group,
wherein at least one coupling cycle comprises the steps:

(a) coupling the amino acid building block C-terminally at the unprotected N-terminal amino group of the amino acid chain, so that an amide bond is formed between the amino acid chain and the amino acid building block,

(b) contacting the product obtained in step (a) with a capping reagent comprising a capping compound, wherein the capping compound binds to an unprotected N-terminal amino group of the amino acid chain to which no building block has been coupled in step (a), and wherein the capping compound is acetic anhydride, and

(c) de-protecting the N-terminal amino group of the amino acid building block,
wherein the capping reagent comprises 0.5-5 % v/v of acetic anhydride and 0.2-2 % v/v of diisopropylethylamine.

~~2. The method of claim 1, wherein the capping compound is selected from the group consisting of acetic anhydride (CAS 108-24-7), homologues of acetic anhydride, benzoyl chloride (CAS 98-88-4), *N*-(benzyloxycarbonyloxy)succinimide (CAS 13139-17-8), benzyl chloroformate (CAS 501-53-1), esters of chloroformic acid, 1-acetylimidazole (CAS 2466-76-4), di-*tert*-butyl dicarbonate (CAS 24424-99-5) and *N*-(*tert*-butoxycarbonyloxy)succinimide (CAS 13139-12-3).~~

~~3.~~2. ~~The method of claim 1 or 2~~The method of claim 1, wherein the capping reagent comprises 1-3 % v/v of acetic anhydride, preferably 2 % v/v of acetic anhydride.

4.3. The method of any one of the preceding claims, wherein the capping reagent comprises 0.5-2 % v/v of diisopropylethylamine, preferably 1 % v/v of diisopropylethylamine.

5.4. The method of any one of the preceding claims, wherein the capping reagent comprises 1 % v/v of diisopropylethylamine and 2 % v/v of acetic anhydride.

6.5. The method of any one of the preceding claims, wherein the capping reagent comprises ~~DMF.~~N, N-dimethylformamide (DMF).

7.6. The method of any one of the preceding claims, wherein the step (b) is performed at a temperature of 15-25 °C.

8.7. The method of any one of the preceding claims, wherein the step (b) is performed for 5 to 15 min.

9.8. The method of any one of the preceding claims, wherein the amino acid building block comprises an α-amino acid.

10.9. The method of any one of the preceding claims, wherein the amino acid building block is selected from Arg, Glu, Gln, Leu and Gly.

11.10. ~~11.~~ The method of any one of the preceding claims, wherein the polypeptide ~~is~~is a glucagon-like peptide 1 (GLP-1) agonist selected from GLP-1, ~~analogs and derivatives thereof,~~ exendin-3, ~~analogs and derivatives thereof, and~~ exendin-4~~, analogs and derivatives thereof.~~ and analogues of exendin-4 selected from the group consisting of:

~~12.~~ H-desPro^{36}-exendin-4-Lys$_6$-NH$_2$,
H-des(Pro^{36,37})-exendin-4-Lys$_4$-NH$_2$,
H-des(Pro^{36,37})-exendin-4-Lys$_5$-NH$_2$,
desPro^{36}[Asp^{28}]exendin-4 (1-39),
desPro^{36}[IsoAsp^{28}]exendin-4 (1-39),
desPro^{36}[Met(O)^{14},Asp^{28}]exendin-4 (1-39),
desPro^{36}[Met(O)^{14},IsoAsp^{28}]exendin-4 (1-39),
desPro^{36}[Trp(O$_2$)^{25},Asp^{28}]exendin-4 (1-39),
desPro^{36}[Trp(O$_2$)^{25},IsoAsp^{28}]exendin-4 (1-39),
desPro^{36}[Met(O)^{14}Trp(O$_2$)^{25},Asp^{28}]exendin-4 (1-39),
desPro^{36}[Met(O)^{14}Trp(O$_2$)^{25},IsoAsp^{28}]exendin-4(1-39)

desPro^{36}[Asp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[IsoAsp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Met(O)^{14},Asp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Met(O)^{14},IsoAsp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Trp(O$_2$)^{25},Asp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Trp(O$_2$)^{25},IsoAsp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Met(O)^{14}Trp(O$_2$)^{25},Asp^{28}]exendin-4 (1-39)-Lys$_6$-NH$_2$,
desPro^{36}[Met(O)^{14}Trp(O$_2$)^{25},IsoAsp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36}[Asp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
desAsp^{28}Pro^{36},Pro^{37},Pro^{38}exendin-4(1-39)-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Asp^{28}]exendin-4(1-39)-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Asp^{28}]exendin-4(1-39)-NH$_2$,
desPro^{36},Pro^{37},Pro^{38}[Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
H-desAsp^{28} Pro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25}]exendin-4(1-39)-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-NH$_2$,
desPro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36}[Met(O)^{14},Asp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
desMet(O)^{14} Asp^{28} Pro^{36}, Pro^{37}, Pro^{38}exendin-4(1-39)-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}]exendin-4(1-39)-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}] exendin-4(1-39)-NH$_2$,
desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}] exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36}[Met(O)^{14}, Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-Lys$_6$-NH$_2$,
desAsp^{28}Pro^{36},Pro^{37},Pro^{38}[Met(O)^{14}, Trp(O$_2$)^{25}]exendin-4(1-39)-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14}, Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Asp^{28}]exendin-4(1-39)-NH$_2$,
desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14}, Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-(Lys)$_6$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$,
H-Asn-(Glu)$_5$-desPro^{36},Pro^{37},Pro^{38}[Met(O)^{14},Trp(O$_2$)^{25},Asp^{28}]exendin-4(1-39)-(Lys)$_6$-NH$_2$, and pharmaceutically acceptable salts thereof.

~~12.~~11. The method of any one of the preceding claims, wherein the polypeptide is selected from exendin-4, lixisenatide, albiglutide, dulaglutide and semaglutide.

~~13.~~12. ~~13.~~ Use of a composition for acetylation of an unprotected amino group in solid phase polypeptide synthesis, said composition comprising 0.5-5 % v/v of acetic anhydride and 0.2-2 % v/v of diisopropylethylamine in DMF.

~~14.~~13. ~~14.~~ The use of claim ~~13~~12, herein the composition comprises 1 % v/v of diisopropylethylamine and 2 % v/v of acetic anhydride in DMF.