WHAT IS CLAIMED IS:

1. An isolated peptide comprising the amino acid sequence:

HX2QGTFTSDX10SXl2X13LX15X16X17X18AX20X21FX23X24WLX27X28GX30;

wherein X2 is G or S, X10 is Y or K, X12 is K, E, R, or S, X13 is K or Y, X15 is D or E, X16 is S or G, X17 is E, R, Q, or K, X18 is R, S, or A, X20 is R, K, or Q, X21 is D or E, X23 is V or I, X24 is A or Q, X27 is E or V, X28 is A or K, and X30 is G or R (SEQ ID NO:4)~~.~~,

~~2. The peptide of claim 1,~~ wherein X2 is S, X15 is D, X16 is S, X20 is R, X21 is D, X23 is V, X24 is A, X28 is A, and X30 is G (SEQ ID NO:5)~~.~~,

~~3. The peptide of claim 2, wherein if X17 is E, then X18 is R, and if X17 is R, then X18 is S (SEQ ID NOs:6 and 7).~~

~~4. The peptide of claim 2 or claim 3, wherein X10 is Y, X12 is K, and X13 is K, and X27 is V (SEQ ID NOs:8 and 9).~~

~~5. The peptide of claim 2 or claim 3, wherein X10 is K, X13 is Y, and X27 is E (SEQ ID NOs: 10 and 11).~~

~~6. The peptide of claim 5, wherein X12 is E (SEQ ID NOs: 12 and 13).~~

~~7. The peptide of claim 5, wherein X12 is R (SEQ ID NOs: 14 and 15).~~

~~8. The peptide of claim 4, comprising the amino acid sequence SEQ ID NO: 16.~~

wherein the peptide ~~9. The peptide of claim 6,~~ comprising the amino acid sequence HSQGTFTSDKSEYLDSERARDFVAWLEAGG (~~SEQ ID NO: 17 or~~ SEQ ID NO: 19) for use in treating a disease or condition caused or characterized by excess body weight in a subject, wherein an effective amount of the peptide is to be administered to the subject.

2. An isolated peptide comprising the amino acid sequence:

HX2QGTFTSDX10SXl2X13LX15X16X17X18AX20X21FX23X24WLX27X28GX30;

wherein X2 is G or S, X10 is Y or K, X12 is K, E, R, or S, X13 is K or Y, X15 is D or E, X16 is S or G, X17 is E, R, Q, or K, X18 is R, S, or A, X20 is R, K, or Q, X21 is D or E, X23 is V or I, X24 is A or Q, X27 is E or V, X28 is A or K, and X30 is G or R (SEQ ID NO:4),

wherein X2 is S, X15 is D, X16 is S, X20 is R, X21 is D, X23 is V, X24 is A, X28 is A, and X30 is G (SEQ ID NO:5),

wherein the peptide comprising the amino acid sequence HSQGTFTSDKSEYLDSERARDFVAWLEAGG (SEQ ID NO: 19) for use in treatment of reducing body weight in a subject, wherein an effective amount of the peptide is to be administered to the subject.

3. The peptide for use of claim 2,

~~10. The peptide of claim 7, comprising the amino acid sequence SEQ ID NO: 18.~~

~~11. The peptide of any one of claims 1 to 10, wherein the carboxyl group of X30 is amidated.~~

~~12. The peptide of any one of claims 1 to 10, wherein the carboxyl group of X30 is the unmodified acid.~~

~~13. The peptide of any one of claims 1 to 12, further comprising a modification to an amino acid.~~

~~14. The peptide of claim 13, wherein the modification is the addition of an acyl moiety.~~

~~15. The peptide of claim 13 or claim 14, wherein the modification is a palmitoyl moiety on the N(epsilon) group of a lysine residue.~~

~~16. The peptide of claim 15,~~ wherein ~~the palmitoyl group is linked~~ attached to the lysine at position 10 of ~~via a linker.~~

~~17. T~~the peptide ~~of claim 16, wherein the linker~~ is gammaE-palmitoyl-~~glutamate~~.

~~18. The peptide of any one of claims 1 to 17, wherein the peptide binds to a glucagon receptor, binds to a GLP- 1 receptor, or binds to both a glucagon and a GLP- 1 receptor.~~

~~19. The peptide of any claim 18, which binds to a glucagon receptor.~~

~~20. The peptide of claim 18 or claim 19, wherein the glucagon receptor is a mouse glucagon receptor or a human glucagon receptor.~~

~~21. The peptide any one of claims 18 to 20, which binds to a human glucagon receptor with an EC50 in the cAMP assay 1 of less than 10,000 pM, less than 5000 pM, less than 2500 pM, less than 1000 pM, less than 900 pM, less than 800 pM, less than 700 pM, less than 600 pM, less than 500 pM, less than 400 pM, less than 300 pM, less than 200 pM, less than 100 pM, less than 50 pM, less than 25 pM, less than 20 pM, less than 15 pM, less than 10 pM, less than 5 pM, less than 4 pM, less than 3 pM, or less than 2 pM.~~

~~22. The peptide of any one of claims 18 to 21, which binds to a GLP-1 receptor.~~

~~23. The peptide of claim 18 or claim 22, wherein the GLP-1 receptor is a mouse GLP-1 receptor or a human GLP-1 receptor.~~

~~24. The peptide of claim 22 or claim 23, which binds to a human GLP-1 receptor with an EC50 in the cAMP assay 1 of less than 10,000 pM, less than 5000 pM, less than 2500 pM, less than 1000 pM, less than 900 pM, less than 800 pM, less than 700 pM, less than 600 pM, less than 500 pM, less than 400 pM, less than 300 pM, less than 200 pM, less than 100 pM, less than 50 pM, less than 25 pM, less than 20 pM, less than 15 pM, less than 10 pM, less than 5 pM, less than 4 pM, less than 3 pM, or less than 2 pM.~~

~~25. The peptide of any one of claims 1 to 24, which is an agonist of GLP-1 activity, an agonist of glucagon activity, or an agonist of both GLP-1 and glucagon activity.~~

~~26. The peptide of any one of claims 18 to 25, which binds to both a glucagon receptor and a GLP-1 receptor, wherein the peptide exhibits at least about 2-fold, 5-fold, or 10-fold greater activity relative to the natural ligand at the GLP-1 receptor than at the glucagon receptor.~~

~~27. The peptide of any one of claims 1 to 26, further comprising a heterologous moiety associated with the peptide.~~

~~28. The peptide of claim 27, wherein the heterologous moiety is a protein, a peptide, a protein domain, a linker, an organic polymer, an inorganic polymer, a polyethylene glycol (PEG), biotin, an albumin, a human serum albumin (HSA), a HSA FcRn binding portion, an antibody, a domain of an antibody, an antibody fragment, a single chain antibody, a domain antibody, an albumin binding domain, an enzyme, a ligand, a receptor, a binding peptide, a non-FnIII scaffold, an epitope tag, a recombinant polypeptide polymer, a cytokine, or a combination of two or more of the recited moieties.~~

~~29. A pharmaceutical composition comprising the peptide of any one of claims 1 to 28, and a carrier.~~

~~30. A kit comprising the composition of claim 29.~~

~~4~~31. The use of an isolated peptide comprising the amino acid sequence:

HX2QGTFTSDX10SXl2X13LX15X16X17X18AX20X21FX23X24WLX27X28GX30;

wherein X2 is G or S, X10 is Y or K, X12 is K, E, R, or S, X13 is K or Y, X15 is D or E, X16 is S or G, X17 is E, R, Q, or K, X18 is R, S, or A, X20 is R, K, or Q, X21 is D or E, X23 is V or I, X24 is A or Q, X27 is E or V, X28 is A or K, and X30 is G or R (SEQ ID NO:4),

wherein X2 is S, X15 is D, X16 is S, X20 is R, X21 is D, X23 is V, X24 is A, X28 is A, and X30 is G (SEQ ID NO:5),

wherein the peptide comprising the amino acid sequence HSQGTFTSDKSEYLDSERARDFVAWLEAGG (SEQ ID NO: 19) ~~effective amount of the peptide of any one of claims 1 to 28 or the composition of claim 29~~ in the manufacture of a medicament for treating ~~the treatment or prevention of~~ a disease or condition caused or characterized by excess body weight in a subject, wherein an effective amount of the medicament is to be administered to the subject.

5~~32~~. The use of claim 4~~31~~, wherein the disease or condition is obesity.

6~~33~~. The use of claim 4~~31~~, wherein the disease or condition is type 2 diabetes.

~~34. The use of any one of claims 30 to 33, wherein the peptide is administered by injection.~~

~~35. The use of claim 34, wherein the injection is administered subcutaneously.~~

~~36. The use of claim 34 or claim 35, wherein the peptide is administered once per day.~~

~~37. The use of any one of claims 29 to 36, wherein the subject is human.~~

7~~38~~. The use of an isolated peptide comprising the amino acid sequence:

HX2QGTFTSDX10SXl2X13LX15X16X17X18AX20X21FX23X24WLX27X28GX30;

wherein X2 is G or S, X10 is Y or K, X12 is K, E, R, or S, X13 is K or Y, X15 is D or E, X16 is S or G, X17 is E, R, Q, or K, X18 is R, S, or A, X20 is R, K, or Q, X21 is D or E, X23 is V or I, X24 is A or Q, X27 is E or V, X28 is A or K, and X30 is G or R (SEQ ID NO:4),

wherein X2 is S, X15 is D, X16 is S, X20 is R, X21 is D, X23 is V, X24 is A, X28 is A, and X30 is G (SEQ ID NO:5),

wherein the peptide comprising the amino acid sequence HSQGTFTSDKSEYLDSERARDFVAWLEAGG (SEQ ID NO: 19) ~~effective amount of the peptide of any one of claims 1 to 28 or the composition of claim 29~~ in the manufacture of a medicament for a treatment to reduce body weight in a subject, wherein an effective amount of the medicament is to be administered to the subject.

8. The use of claim 7, wherein attached to the lysine at position 10 of the peptide is a gammaE-palmitoyl.