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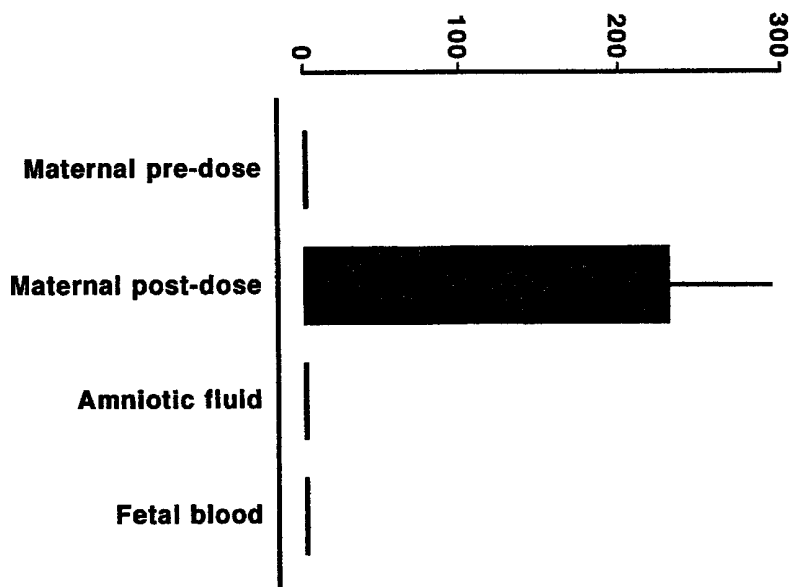
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(54) Title: USE OF EXENDINS AND AGONISTS THEREOF FOR THE TREATMENT OF GESTATIONAL DIABETES MELITUS



(57) Abstract: Methods for treating gestational diabetes which comprise administration of an effective amount of an exendin or an exendin agonist, alone or in conjunction with other compounds or compositions that lower blood glucose levels.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DESCRIPTIONUse Of Exendins And Agonists Thereof
For The Treatment Of Gestational Diabetes MellitusField Of The Invention

5 The present invention relates to methods for treating gestational diabetes mellitus comprising administration of an effective amount of an exendin or an exendin agonist alone or in conjunction with other compounds or compositions that affect blood glucose control, such as an insulin or an
10 amylin agonist. Pharmaceutical compositions for use in the methods of the invention are also disclosed.

Background

 The following description summarizes information relevant to the present invention. It is not an admission
15 that any of the information provided herein is prior art to the presently claimed invention, nor that any of the publications specifically or implicitly referenced are prior art to that invention.

Gestational Diabetes Mellitus

20 Gestational diabetes mellitus ("GDM") is a disorder associated with elevated circulating plasma glucose. Although the diagnostic criteria for GDM have been the subject of controversy for decades, it was defined by the Third Workshop Conference on Gestational Diabetes Mellitus
25 as carbohydrate intolerance of varying severity with onset or first recognition during pregnancy, irrespective of the glycemic status after delivery. Metzger (ed.) Proceedings of the Third International Workshop Conference on Gestational Diabetes Mellitus, Diabetes 40(Suppl. 2), 1991. Despite
30 advances in clinical management of GDM, there are problems associated with GDM which persist, including elevated rate of perinatal morbidity and elevated rate of malformations in

newborns. Persson et al., Diabetes and Pregnancy, In International Textbook of Diabetes Mellitus, Second Edition, John Wiley & Sons 1997 (Alberti et al. Eds.). For example, it has been reported that, when the mean blood glucose level is greater than 105 mg/dl, there is a greater risk for the development of large-for-gestational age ("LGA") infants when compared with a control population. Id. Additional reported consequences of untreated GDM include an increased incidence of macrosomia, respiratory distress syndrome, and other abnormalities of fetal metabolism. Langer, Am. J. Obstet Gynecol. 176:S186, 1997; American Diabetes Association: Self-Monitoring of Blood Glucose Consensus Statement, Diabetes Care 17:81-82, 1994("ABA Consensus Statement"); Coetzee & Jackson, S. Afr. Med. J. 56:467-475, 1979. It has been clearly established by those in the field that tight glycemic control can serve as the primary prevention of fetal disease relating to GDM. Drexel et al., Diabetes Care 11:761-768, 1988; Roversi et al., Diabetes Care 3:489-494, 1980; Langer & Mazze, Am. J. Obstet Gynecol. 159:1478-1483, 1988; Langer et al., Am. J. Obstet Gynecol. 161:646-653, 1989). GDM results in a greater incidence of intrauterine death or neonatal mortality. Position Statement American Diabetes Association: Gestational Diabetes Mellitus, Diabetes Care 21 (Suppl. 1):S60-61, 1998. GDM pregnancies are at an increased risk for fetal macrosomia and neonatal morbidities including neural tube defects, hypoglycemia, hypocalcemia, hypomagnesemia, polycythemia and hyperbilirubinemia and subsequent childhood and adolescent obesity. Sicaardi, Gestational Diabetes. Other complications to the woman include increased rates of cesarean delivery, hypertensive disorders including preeclampsia and urinary tract infections.

It has been reported that approximately 4% of all pregnancies (135,000 cases annually) are complicated by GDM, however, it has been estimated that the incidence may range from 1% to 14% of all pregnancies, depending on the

population and diagnostic tests employed. ADA Consensus Statement, supra.

Normally during pregnancy, fasting plasma levels of insulin gradually increase to reach concentrations that are approximately twice as high in the third trimester as they were outside of pregnancy. Women with gestational diabetes mellitus ("GDM") have fasting insulin levels comparable to or higher than those of normal pregnant women with the highest levels seen in women with GDM who are obese. Insulin secretion also increases gradually in pregnancy and also reaches a maximum during the third trimester. However, the relative increase in secretion is significantly smaller in women with GDM than in normal glucose tolerant ("NGT") women. The first-phase insulin response in NGT women is significantly higher than in GDM women; second phase insulin response was similarly increased during pregnancy in both groups. This finding is consistent with the finding that GDM women have a later time of peak insulin concentration during an oral glucose tolerance test than do NGT women. Consistent with this observation, the insulin response per unit of glycemic stimulus is significantly higher in NGT women than in GDM women (90% and 40%, respectively). The fact that glucose tolerance deteriorates in both normal and GDM pregnancies while at the same time, insulin secretion increases indicates a decrease in insulin sensitivity. Comparative results from an intravenous glucose tolerance test and a hyperinsulinemic, euglycemic clamp showed a sensitivity decrease during pregnancy in both groups of 50-60%, but GDM women had a slightly lower sensitivity. In another study using radioactive glucose, turnover of glucose and amino acids in GDM women was comparable to NGT women only when insulin concentrations 3-5 fold higher in the GDM group were used. Thus, it appears that GDM is due to a combination of diminished insulin sensitivity and an impaired ability to increase insulin secretion and has, in

fact, many features in common with type 2 diabetes. Normal or near normal glycemic control returns upon parturition.

Clinical Diagnosis:

It is common clinical practice to screen women for elevated glucose and glucose intolerance between weeks 24 and 28 of gestation, especially women with any one the following four characteristics: age ≥ 25 ; race/ethnicity of Hispanic, Native American, Asian, African-American or Pacific Islander origin; obese or a family history of diabetes. In addition, women with previous pregnancies with complications due to a large weight fetus/neonate are usually tested. In some medical centers all pregnant women are tested. Indeed, certain investigators have found that historical risk factors account for only roughly half of the women known to have GDM. Carr, Diabetes Care 21(Suppl. 2):B14-B18, 1998. Additionally, there is some reported evidence that advancing maternal age is associated with increased incidence of GDM. Id.

The clinical diagnosis is generally based on a multi-step process. The evaluation is most typically performed by measuring plasma glucose 1 hour after a 50-gram oral glucose challenge test in either the fasted or the unfasted state. If the value in the glucose challenge test is ≥ 140 mg/dl, a 3-hr 100 g oral glucose tolerance test is done. If two or more of the following criteria are met, the patient is considered in need of glycemic control: fasted venous plasma ≥ 105 mg/dl, venous plasma ≥ 190 mg/dl at 1 hr, venous plasma ≥ 165 mg/dl at 2 hr or venous plasma ≥ 145 mg/dl at 3 hr. Williams et al., Diabetes Care 22: 418 - 421, 1999. Variations of this test are also used by some. See, e.g., Coustan, Gestational Diabetes In Diabetes in America, 2d ed. National Institutes of Health Publication No. 95-1468, 1995.

Current Clinical Therapy:

The current therapeutic approach for GDM is to control plasma glucose for the remainder of the gestation (i.e., the third trimester through parturition). GDM has many features in common with type 2 diabetes. The endocrine (impaired insulin secretion) and metabolic (insulin resistance) abnormalities that characterize both forms of diabetes are similar. In general, pregnancy is characterized by increases in both insulin resistance and insulin secretion. Women with GDM fail to respond with increased insulin to the decrease in insulin sensitivity.

A significant correlation has been shown to exist between late-stage gestational maternal glucose levels and preeclampsia, macrosomia, Cesarean section delivery and phototherapy for hyperbilirubinemia. Sermer et al., Diabetic Care 21 (Suppl. 2):B33-B42, 1998. It has also been determined that the length of hospitalization of the new mother and the length of time the neonate spent in the nursery could be correlated to the degree of elevation of plasma glucose in the pregnant woman. Id. Tallarigo, et al. reported a striking rise in the risk of fetal macrosomia (9.9 vs. 27.5%) and preeclampsia/Cesarean sections (19.9 vs. 40.0%) in women with abnormal glucose tolerance when compared to NGT women. Tallarigo et al., N. Engl. J. Med. 315:989-992, 1986.

Thus, the goals for therapy of GDM are to achieve and maintain as near normal glycemia as feasible with a special emphasis to keep postprandial glucose concentrations within the normal range. Optimal therapeutic strategies are safe and efficacious in achieving a metabolic balancing without creating complications, which may include ketosis and/or hypoglycemia. Jovanovic, Diabetes Care 21(Suppl. 2):B131-B137, 1998. The initial therapeutic approach is through diet. Jovanovic-Peterson & Peterson, J. Am. Coll. Nutr. 9:320-325, 1990.

If diet or diet and exercise are not effective (i.e., failure is fasting glucose \geq 105 mg/dl and/or a 2-hr postprandial plasma glucose of \geq 120 mg/dl on 2 or more occasions within a 1- to 2-week period), then insulin therapy (preferably, human insulin) is considered appropriate. ADA Position Statement, supra.

Oral glucose-lowering agents are not recommended during pregnancy. Kuhl et al., *Diabetic Care* 21 (Suppl. 2): B19-B26, 1998. Although sulfonylureas are used in the treatment of type 2 diabetes due to their activity in increasing insulin sensitivity, these agents are contraindicated for use in GDM. Jovanovic, *Diabetes Care* 21 (Suppl. 2):B131-B137, 1998. See also Kahn & Shechter, *Insulin, Oral Hypoglycemic Agents, and the Pharmacology of the Endocrine Pancreas*, In Goodman & Gilman's *The Pharmacological Basis of Therapeutics* (8th ed. 1993 Goodman Gilman et al. eds.). Oral hypoglycemic drugs traverse the placenta, and may cause prolonged severe hypoglycemia in the newborn. Persson et al., supra.

The difficulties with, and the highly variable approaches to insulin therapy in GDM have been reviewed, for example, by Langer, et al. Langer, *Diabetes Care* 21(Suppl.2):B91-B98, 1998. The problems commonly associated with insulin therapy in a non-pregnant population remain when used in the treatment of GDM. They are determination of the proper dose, maintenance of good glucose control through each 24-hr period, possible hypoglycemia and weight gain. Hypoglycemia can result when insulin is administered to control postprandial plasma glucose, but the fetus demands for energy in the presence of excess insulin later causes the glucose level to drop to a hypoglycemic level. This physiological state can be dangerous to both the mother and the fetus. Excess weight gain is undesirable in any pregnancy. Another problem with insulin therapy is the day-to-day and week-to-week variability in glucose control vs. insulin dose.

Thus, it can be appreciated that an effective means to treat gestational diabetes remains a major challenge and a superior method of treatment would be of great utility. Such a method, and compounds and compositions which are useful therefor, have been invented and are described and claimed herein.

Exendins and Exendin Agonists

Exendins are peptides that were first isolated from the salivary secretions of the Gila-monster, a lizard found in Arizona, and the Mexican Beaded Lizard. Exendin-3 is present in the salivary secretions of Heloderma horridum, and exendin-4 is present in the salivary secretions of Heloderma suspectum (Eng, J., et al., J. Biol. Chem., 265:20259-62, 1990; Eng, J., et al., J. Biol. Chem., 267:7402-05, 1992). The exendins have some sequence similarity to several members of the glucagon-like peptide family, with the highest homology, 53%, being to GLP-1[7-36]NH₂ (Goke, et al., J. Biol. Chem., 268:19650-55, 1993). GLP-1[7-36]NH₂, also known as proglucagon[78-107] and most commonly as "GLP-1," has an insulinotropic effect, stimulating insulin secretion from pancreatic β -cells; GLP-1 also inhibits glucagon secretion from pancreatic α -cells (Orskov, et al., Diabetes, 42:658-61, 1993; D'Alessio, et al., J. Clin. Invest., 97:133-38, 1996). GLP-1 is reported to inhibit gastric emptying (Williams B, et al., J Clin Endocrinol Metab 81 (1): 327-32, 1996; Wettergren A, et al., Dig Dis Sci 38 (4): 665-73, 1993), and gastric acid secretion. (Schjoldager BT, et al., Dig Dis Sci 34 (5): 703-8, 1989; O'Halloran DJ, et al., J Endocrinol 126 (1): 169-73, 1990; Wettergren A, et al., Dig Dis Sci 38 (4): 665-73, 1993). GLP-1[7-37], which has an additional glycine residue at its carboxy terminus, also stimulates insulin secretion in humans (Orskov, et al., Diabetes, 42:658-61, 1993). A transmembrane G-protein adenylate-cyclase-coupled receptor believed to be responsible for the insulinotropic

effect of GLP-1 is reported to have been cloned from a β -cell line (Thorens, Proc. Natl. Acad. Sci. USA 89:8641-45 (1992)).

Exendin-4 potently binds at GLP-1 receptors on insulin-secreting β TC1 cells, at dispersed acinar cells from guinea pig pancreas, and at parietal cells from stomach; the peptide is also said to stimulate somatostatin release and inhibit gastrin release in isolated stomachs (Goke, et al., J. Biol. Chem. 268:19650-55, 1993; Schepp, et al., Eur. J. Pharmacol., 69:183-91, 1994; Eissele, et al., Life Sci., 55:629-34, 1994). Exendin-3 and exendin-4 were reported to stimulate cAMP production in, and amylase release from, pancreatic acinar cells (Malhotra, R., et al., Regulatory Peptides, 41:149-56, 1992; Raufman, et al., J. Biol. Chem. 267:21432-37, 1992; Singh, et al., Regul. Pept. 53:47-59, 1994). The use of exendin-3 and exendin-4 as insulinotrophic agents for the treatment of diabetes mellitus and the prevention of hyperglycemia has been proposed (Eng, U.S. Patent No. 5,424,286).

C-terminally truncated exendin peptides such as exendin-4[9-39], a carboxyamidated molecule, and fragments 3-39 through 9-39 have been reported to be potent and selective antagonists of GLP-1 (Goke, et al., J. Biol. Chem., 268:19650-55, 1993; Raufman, J.P., et al., J. Biol. Chem. 266:2897-902, 1991; Schepp, W., et al., Eur. J. Pharm. 269:183-91, 1994; Montrose-Rafizadeh, et al., Diabetes, 45(Suppl. 2):152A, 1996). Exendin-4[9-39] is said to block endogenous GLP-1 in vivo, resulting in reduced insulin secretion. Wang, et al., J. Clin. Invest., 95:417-21, 1995; D'Alessio, et al., J. Clin. Invest., 97:133-38, 1996). The receptor apparently responsible for the insulinotropic effect of GLP-1 has reportedly been cloned from rat pancreatic islet cell (Thorens, B., Proc. Natl. Acad. Sci. USA 89:8641-8645, 1992). Exendins and exendin-4[9-39] are said to bind to the cloned GLP-1 receptor (rat pancreatic β -cell GLP-1 receptor (Fehmann HC, et al., Peptides 15 (3):

453-6, 1994) and human GLP-1 receptor (Thorens B, et al., Diabetes 42 (11): 1678-82, 1993). In cells transfected with the cloned GLP-1 receptor, exendin-4 is reportedly an agonist, i.e., it increases cAMP, while exendin[9-39] is identified as an antagonist, i.e., it blocks the stimulatory actions of exendin-4 and GLP-1. Id.

Exendin-4[9-39] is also reported to act as an antagonist of the full length exendins, inhibiting stimulation of pancreatic acinar cells by exendin-3 and exendin-4 (Raufman, et al., J. Biol. Chem. 266:2897-902, 1991; Raufman, et al., J. Biol. Chem., 266:21432-37, 1992). It is also reported that exendin[9-39] inhibits the stimulation of plasma insulin levels by exendin-4, and inhibits the somatostatin release-stimulating and gastrin release-inhibiting activities of exendin-4 and GLP-1 (Kolligs, F., et al., Diabetes, 44:16-19, 1995; Eissele, et al., Life Sciences, 55:629-34, 1994).

Methods for regulating gastrointestinal motility using exendin agonists are described and claimed in United States Application Serial No. 08/908,867, filed August 8, 1997, entitled, "Methods for Regulating Gastrointestinal Motility," which application is a continuation-in-part of United States Application Serial No. 08/694,954, filed August 8, 1996, which enjoys common ownership with the present invention and is hereby incorporated by reference.

Methods of reducing food intake using exendin agonists are described and claimed in United States Application Serial No. 09/003,869, filed January 7, 1998, entitled, "Use of Exendin and Agonists Thereof for the Reduction of Food Intake," claiming the benefit of Provisional Application Nos. 60/034,905, filed January 7, 1997, 60/055,404, filed August 7, 1997, 60/065,442 filed November 14, 1997, and 60/066,029 filed November 14, 1997. These applications also enjoy common ownership with the present invention and are hereby incorporated by reference.

Exendins have also been found to have inotropic and diuretic effects. International Application No. PCT/US99/02554, filed February 5, 1999, 1998, claiming the benefit of Provisional Application No. 60/075,122, filed 5 February 13, 1998. These applications also enjoy common ownership with the present invention and are hereby incorporated by reference.

Additionally, exendins have been found to suppress glucagon secretion (United States Provisional Application 10 No. 60/132,017, entitled, "Methods for Glucagon Suppression," filed April 30, 1999, docket no. 242/168, which enjoys common ownership with the present invention and is hereby incorporated by reference).

Exendin [9-39] has been used to investigate the 15 physiological relevance of central GLP-1 in control of food intake (Turton, M.D. et al. Nature 379:69-72, 1996). GLP-1 administered by intracerebroventricular injection inhibits food intake in rats. This satiety-inducing effect of GLP-1 delivered ICV is reported to be inhibited by ICV injection 20 of exendin [9-39] (Turton, supra). However, it has been reported that GLP-1 does not inhibit food intake in mice when administered by peripheral injection (Turton, M.D., Nature 379:69-72, 1996; Bhavsar, S.P., Soc. Neurosci. Abstr. 21:460 (188.8), 1995).

25 Summary Of The Invention

The present invention concerns the surprising discovery that exendins and exendin agonists do not cross the placenta, and yet have a profound and prolonged effect on blood glucose, rendering them ideal agents for the treatment 30 of gestational diabetes mellitus.

The present invention is directed to novel methods for treating gestational diabetes mellitus comprising the administration of an exendin, for example, exendin-3 [SEQ ID NO. 1: His Ser Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln 35 Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn

Gly Gly Pro Ser Ser Gly Ala Pro Pro Pro Ser], or exendin-4 [SEQ ID NO. 2: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly Pro Ser Ser Gly Ala Pro Pro Pro Ser], or
5 other compounds which effectively bind to the receptor at which exendin exerts its actions which are beneficial in the treatment of gestational diabetes mellitus.

In a first aspect, the invention features a method of treating gestational diabetes mellitus in a subject
10 comprising administering to the subject a therapeutically effective amount of an exendin or an exendin agonist. By an "exendin agonist" is meant a compound that mimics the effects of exendin in the treatment of gestational diabetes mellitus by binding to the receptor or receptors where
15 exendin causes one or more of these effects. Exendins and exendin agonists should be especially beneficially in the treatment of GDM because, due to their actions to inhibit gastric emptying, administration of such compounds should not result in increased weight gain. Additionally, in
20 animal and human studies to date, administration of exendins and exendin agonists have not resulted in an increased incidence of hypoglycemia.

Exendin agonist compounds include exendin acids, for example exendin-3 acid and exendin-4 acid. Preferred
25 exendin agonist compounds include those described in International Application No. PCT/US98/16387, entitled, "Novel Exendin Agonist Compounds," filed August 6, 1998, claiming the benefit of United States Provisional Patent Application Serial No. 60/055,404, entitled, filed August 8,
30 1997; International Application No. PCT/US98/24220 entitled, "Novel Exendin Agonist Compounds," filed November 13, 1998, claiming priority on United States Provisional Patent Application Serial No. 60/065,442, filed November 14, 1997; and International Application No. PCT/US98/24273 entitled,
35 "Novel Exendin Agonist Compounds," filed November 13, 1998, claiming priority on United States United States Provisional

Patent Application Serial No. 60/066,029, filed November 14, 1997; all of which enjoy common ownership with the present application and all of which are incorporated by this reference into the present application as though fully set forth herein. Additional preferred exendin agonist compounds are those described and claimed in United States Provisional Application Serial No. 60/132,018, entitled, "Modified Exendins and Exendin Agonists," filed April 30, 1999, docket no. 242/040, which enjoys common ownership with the present application and which is incorporated by this reference into the present application as though fully set forth herein.

By "gestational diabetes mellitus" or "GDM" is meant any degree of glucose intolerance with onset or first recognition during pregnancy.

Thus, in a first embodiment, the present invention provides a method for treating gestational diabetes in a subject comprising administering to said subject a therapeutically effective amount of an exendin or an exendin agonist. Preferred exendin agonist compounds include those described in International Application Nos. PCT/US98/16387, PCT/US98/24220, and PCT/US98/24273, which have been incorporated by reference in the present application. Preferably, the subject is a vertebrate, more preferably a mammal, and most preferably a human woman. In preferred aspects, the exendin or exendin agonist is administered parenterally, more preferably by injection. In a most preferred aspect, the injection is a peripheral injection. Preferably, about 1 μ g-30 μ g to about 1 mg of the exendin or exendin agonist is administered per day. More preferably, about 1-30 μ g to about 500 μ g, or about 1-30 μ g to about 50 μ g of the exendin or exendin agonist is administered per day. Most preferably, about 3 μ g to about 50 μ g of the exendin or exendin agonist is administered per day.

In one preferred aspect, the exendin or exendin agonist used in the methods of the present invention is exendin-3.

In another preferred aspect, said exendin is exendin-4. Other preferred exendin agonists include exendin-4 (1-30) [SEQ ID NO 6: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly], exendin-4 (1-30) amide [SEQ ID NO 7: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly-NH₂], exendin-4 (1-28) amide [SEQ ID NO 40: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂], ¹⁴Leu, ²⁵Phe exendin-4 amide [SEQ ID NO 9: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly Pro Ser Ser Gly Ala Pro Pro Pro Ser-NH₂], ¹⁴Leu, ²⁵Phe exendin-4 (1-28) amide [SEQ ID NO 41: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂], and ¹⁴Leu, ²²Ala, ²⁵Phe exendin-4 (1-28) amide [SEQ ID NO 8: His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu Glu Glu Ala Val Arg Leu Ala Ile Glu Phe Leu Lys Asn-NH₂].

In the methods of the present invention, the exendins and exendin agonists may be administered separately or together with one or more other compounds and compositions that exhibit a long term or short-term blood glucose control action, including, but not limited to other compounds and compositions that comprise an insulin or an amylin agonist. Suitable amylin agonists include, for example, [^{25,28,29}Pro]-human amylin (also known as "pramlintide," previously referred to as "AC-137," and , referred to in its acetate salt form by its trademark SYMLIN™ (pramlintide acetate), as described in "Amylin Agonist Peptides and Uses Therefor," U.S. Patent No. 5,686,511, issued November 11, 1997, and salmon calcitonin.

Brief Description Of The Drawings

Figure 1 depicts the amino acid sequences for certain exendin agonist compounds useful in the present invention [SEQ ID NOS 9-39].

5 Figure 2 depicts concentrations of exendin-4 (AC2993) in plasma and amniotic fluid of rats after 21µg subcutaneous injection.

10 Figure 3 depicts concentrations of exendin-4 (AC2993) in plasma and amniotic fluid of rats after 210µg subcutaneous injection.

Detailed Description Of The Invention

Exendins and exendin agonists are useful as described herein in view of their pharmacological properties. Activity as exendin agonists can be indicated by activity in the assays described below. Effects of exendins or exendin agonists in treating gestational diabetes can be identified, evaluated, or screened for, using the methods described in the Examples below, or other methods known in the art for determining effects on blood glucose control.

20 Exendin Agonist Compounds

Exendin agonist compounds are those described in International Application No. PCT/US98/16387, filed August 6, 1998, entitled, "Novel Exendin Agonist Compounds," which claims the benefit of United States Provisional Application No. 60/055,404, filed August 8, 1997, including compounds of the formula (I) [SEQ ID NO. 3]:

Xaa₁ Xaa₂ Xaa₃ Gly Thr Xaa₄ Xaa₅ Xaa₆ Xaa₇ Xaa₈
Ser Lys Gln Xaa₉ Glu Glu Glu Ala Val Arg Leu
Xaa₁₀ Xaa₁₁ Xaa₁₂ Xaa₁₃ Leu Lys Asn Gly Gly Xaa₁₄
30 Ser Ser Gly Ala Xaa₁₅ Xaa₁₆ Xaa₁₇ Xaa₁₈-Z

wherein Xaa₁ is His, Arg or Tyr; Xaa₂ is Ser, Gly, Ala or Thr; Xaa₃ is Asp or Glu; Xaa₄ is Phe, Tyr or naphthylalanine; Xaa₅ is Thr or Ser; Xaa₆ is Ser or Thr; Xaa₇ is Asp or Glu; Xaa₈ is Leu, Ile, Val, pentylglycine or Met; Xaa₉ is Leu,

Ile, pentylglycine, Val or Met; Xaa₁₀ is Phe, Tyr or naphthylalanine; Xaa₁₁ is Ile, Val, Leu, pentylglycine, tert-butylglycine or Met; Xaa₁₂ is Glu or Asp; Xaa₁₃ is Trp, Phe, Tyr, or naphthylalanine; Xaa₁₄, Xaa₁₅, Xaa₁₆ and Xaa₁₇ are
5 independently Pro, homoproline, 3Hyp, 4Hyp, thioproline, N-alkylglycine, N-alkylpentylglycine or N-alkylalanine; Xaa₁₈ is Ser, Thr or Tyr; and Z is -OH or -NH₂; with the proviso that the compound is not exendin-3 or exendin-4.

Preferred N-alkyl groups for N-alkylglycine, N-alkylpentylglycine and N-alkylalanine include lower alkyl
10 groups preferably of 1 to about 6 carbon atoms, more preferably of 1 to 4 carbon atoms. Suitable compounds include those listed in Figure 10 having amino acid sequences of SEQ. ID. NOS. 9 to 39.

15 Preferred exendin agonist compounds include those wherein Xaa₁ is His or Tyr. More preferably Xaa₁ is His.

Preferred are those compounds wherein Xaa₂ is Gly.

Preferred are those compounds wherein Xaa₉ is Leu, pentylglycine or Met.

20 Preferred compounds include those wherein Xaa₁₃ is Trp or Phe.

Also preferred are compounds where Xaa₄ is Phe or naphthylalanine; Xaa₁₁ is Ile or Val and Xaa₁₄, Xaa₁₅, Xaa₁₆ and Xaa₁₇ are independently selected from Pro, homoproline, thioproline or N-alkylalanine. Preferably N-alkylalanine
25 has a N-alkyl group of 1 to about 6 carbon atoms.

According to an especially preferred aspect, Xaa₁₅, Xaa₁₆ and Xaa₁₇ are the same amino acid residue.

Preferred are compounds wherein Xaa₁₈ is Ser or Tyr,
30 more preferably Ser.

Preferably Z is -NH₂.

According to one aspect, preferred are compounds of formula (I) wherein Xaa₁ is His or Tyr, more preferably His; Xaa₂ is Gly; Xaa₄ is Phe or naphthylalanine; Xaa₉ is Leu, pentylglycine or Met; Xaa₁₀ is Phe or naphthylalanine; Xaa₁₁
35 is Ile or Val; Xaa₁₄, Xaa₁₅, Xaa₁₆ and Xaa₁₇ are independently

selected from Pro, homoproline, thioproline or N-alkylalanine; and Xaa₁₈ is Ser or Tyr, more preferably Ser. More preferably Z is -NH₂.

According to an especially preferred aspect, especially preferred compounds include those of formula (I) wherein:
5 Xaa₁ is His or Arg; Xaa₂ is Gly; Xaa₃ is Asp or Glu; Xaa₄ is Phe or naphthylalanine; Xaa₅ is Thr or Ser; Xaa₆ is Ser or Thr; Xaa₇ is Asp or Glu; Xaa₈ is Leu or pentylglycine; Xaa₉ is Leu or pentylglycine; Xaa₁₀ is Phe or naphthylalanine;
10 Xaa₁₁ is Ile, Val or t-butyltylglycine; Xaa₁₂ is Glu or Asp; Xaa₁₃ is Trp or Phe; Xaa₁₄, Xaa₁₅, Xaa₁₆, and Xaa₁₇ are independently Pro, homoproline, thioproline, or N-methylalanine; Xaa₁₈ is Ser or Tyr; and Z is -OH or -NH₂; with the proviso that the compound does not have the formula
15 of either SEQ. ID. NOS. 1 or 2. More preferably Z is -NH₂. Especially preferred compounds include those having the amino acid sequence of SEQ. ID. NOS. 9, 10, 21, 22, 23, 26, 28, 34, 35 and 39.

According to an especially preferred aspect, provided
20 are compounds where Xaa₉ is Leu, Ile, Val or pentylglycine, more preferably Leu or pentylglycine, and Xaa₁₃ is Phe, Tyr or naphthylalanine, more preferably Phe or naphthylalanine. These compounds will exhibit advantageous duration of action and be less subject to oxidative degradation, both in vitro
25 and in vivo, as well as during synthesis of the compound.

Exendin agonist compounds also include those described in International Application No. PCT/US98/24210, filed November 13, 1998, entitled, "Novel Exendin Agonist compounds," which claims the benefit of United States
30 Provisional Application No. 60/065,442, filed November 14, 1997, including compounds of the formula (II) [SEQ ID NO. 4]:

Xaa₁ Xaa₂ Xaa₃ Gly Xaa₅ Xaa₆ Xaa₇ Xaa₈ Xaa₉ Xaa₁₀
Xaa₁₁ Xaa₁₂ Xaa₁₃ Xaa₁₄ Xaa₁₅ Xaa₁₆ Xaa₁₇ Ala Xaa₁₉ Xaa₂₀
35 Xaa₂₁ Xaa₂₂ Xaa₂₃ Xaa₂₄ Xaa₂₅ Xaa₂₆ Xaa₂₇ Xaa₂₈-Z₁; wherein

- Xaa₁ is His, Arg or Tyr;
 Xaa₂ is Ser, Gly, Ala or Thr;
 Xaa₃ is Asp or Glu;
 Xaa₅ is Ala or Thr;
 5 Xaa₆ is Ala, Phe, Tyr or naphthylalanine;
 Xaa₇ is Thr or Ser;
 Xaa₈ is Ala, Ser or Thr;
 Xaa₉ is Asp or Glu;
 Xaa₁₀ is Ala, Leu, Ile, Val, pentylglycine or Met;
 10 Xaa₁₁ is Ala or Ser;
 Xaa₁₂ is Ala or Lys;
 Xaa₁₃ is Ala or Gln;
 Xaa₁₄ is Ala, Leu, Ile, pentylglycine, Val or Met;
 Xaa₁₅ is Ala or Glu;
 15 Xaa₁₆ is Ala or Glu;
 Xaa₁₇ is Ala or Glu;
 Xaa₁₉ is Ala or Val;
 Xaa₂₀ is Ala or Arg;
 Xaa₂₁ is Ala or Leu;
 20 Xaa₂₂ is Ala, Phe, Tyr or naphthylalanine;
 Xaa₂₃ is Ile, Val, Leu, pentylglycine, tert-butylglycine
 or Met;
 Xaa₂₄ is Ala, Glu or Asp;
 Xaa₂₅ is Ala, Trp, Phe, Tyr or naphthylalanine;
 25 Xaa₂₆ is Ala or Leu;
 Xaa₂₇ is Ala or Lys;
 Xaa₂₈ is Ala or Asn;
 Z₁ is-OH,
 -NH₂
 30 Gly-Z₂,
 Gly Gly-Z₂,
 Gly Gly Xaa₃₁-Z₂,
 Gly Gly Xaa₃₁ Ser-Z₂,
 Gly Gly Xaa₃₁ Ser Ser-Z₂,
 35 Gly Gly Xaa₃₁ Ser Ser Gly-Z₂,
 Gly Gly Xaa₃₁ Ser Ser Gly Ala-Z₂,

Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆-Z₂,
Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇-Z₂ or
Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇ Xaa₃₈-Z₂;
Xaa₃₁, Xaa₃₆, Xaa₃₇ and Xaa₃₈ are independently Pro,
5 homoproline, 3Hyp, 4Hyp, thioproline,
N-alkylglycine, N-alkylpentylglycine or
N-alkylalanine; and
Z₂ is -OH or -NH₂;

10 provided that no more than three of Xaa₃, Xaa₅, Xaa₆, Xaa₈,
Xaa₁₀, Xaa₁₁, Xaa₁₂, Xaa₁₃, Xaa₁₄, Xaa₁₅, Xaa₁₆, Xaa₁₇, Xaa₁₉,
Xaa₂₀, Xaa₂₁, Xaa₂₄, Xaa₂₅, Xaa₂₆, Xaa₂₇ and Xaa₂₈ are Ala.
Preferred N-alkyl groups for N-alkylglycine, N-
alkylpentylglycine and N-alkylalanine include lower alkyl
15 groups preferably of 1 to about 6 carbon atoms, more
preferably of 1 to 4 carbon atoms.

Preferred exendin agonist compounds include those
wherein Xaa₁ is His or Tyr. More preferably Xaa₁ is His.

Preferred are those compounds wherein Xaa₂ is Gly.

20 Preferred are those compounds wherein Xaa₁₄ is Leu,
pentylglycine or Met.

Preferred compounds are those wherein Xaa₂₅ is Trp or
Phe.

Preferred compounds are those where Xaa₆ is Phe or
25 naphthylalanine; Xaa₂₂ is Phe or naphthylalanine and
Xaa₂₃ is Ile or Val.

Preferred are compounds wherein Xaa₃₁, Xaa₃₆, Xaa₃₇ and
Xaa₃₈ are independently selected from Pro, homoproline,
thioproline and N-alkylalanine.

30 Preferably Z₁ is -NH₂.

Preferable Z₂ is -NH₂.

According to one aspect, preferred are compounds of
formula (II) wherein Xaa₁ is His or Tyr, more preferably His;
Xaa₂ is Gly; Xaa₆ is Phe or naphthylalanine; Xaa₁₄ is Leu,
35 pentylglycine or Met; Xaa₂₂ is Phe or naphthylalanine; Xaa₂₃
is Ile or Val; Xaa₃₁, Xaa₃₆, Xaa₃₇ and Xaa₃₈ are independently

selected from Pro, homoproline, thioproline or N-alkylalanine. More preferably Z₁ is -NH₂.

According to an especially preferred aspect, especially preferred compounds include those of formula (II) wherein:

5 Xaa₁ is His or Arg; Xaa₂ is Gly or Ala; Xaa₃ is Asp or Glu; Xaa₅ is Ala or Thr; Xaa₆ is Ala, Phe or naphthylalanine; Xaa₇ is Thr or Ser; Xaa₈ is Ala, Ser or Thr; Xaa₉ is Asp or Glu; Xaa₁₀ is Ala, Leu or pentylglycine; Xaa₁₁ is Ala or Ser; Xaa₁₂ is Ala or Lys; Xaa₁₃ is Ala or Gln; Xaa₁₄ is Ala, Leu or
10 pentylglycine; Xaa₁₅ is Ala or Glu; Xaa₁₆ is Ala or Glu; Xaa₁₇ is Ala or Glu; Xaa₁₉ is Ala or Val; Xaa₂₀ is Ala or Arg; Xaa₂₁ is Ala or Leu; Xaa₂₂ is Phe or naphthylalanine; Xaa₂₃ is Ile, Val or tert-butylglycine; Xaa₂₄ is Ala, Glu or Asp; Xaa₂₅ is Ala, Trp or Phe; Xaa₂₆ is Ala or Leu; Xaa₂₇ is Ala or Lys; Xaa₂₈ is Ala or Asn; Z₁ is -OH, -NH₂, Gly-Z₂, Gly Gly-Z₂, Gly Gly Xaa₃₁-Z₂, Gly Gly Xaa₃₁ Ser-Z₂, Gly Gly Xaa₃₁ Ser Ser-Z₂, Gly Gly Xaa₃₁ Ser Ser Gly-Z₂, Gly Gly Xaa₃₁ Ser Ser Gly Ala-Z₂, Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆-Z₂, Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇-Z₂, Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆
20 Xaa₃₇ Xaa₃₈-Z₂; Xaa₃₁, Xaa₃₆, Xaa₃₇ and Xaa₃₈ being independently Pro homoproline, thioproline or N-methylalanine; and Z₂ being -OH or -NH₂; provided that no more than three of Xaa₃, Xaa₅, Xaa₆, Xaa₈, Xaa₁₀, Xaa₁₁, Xaa₁₂, Xaa₁₃, Xaa₁₄, Xaa₁₅, Xaa₁₆, Xaa₁₇, Xaa₁₉, Xaa₂₀, Xaa₂₁, Xaa₂₄, Xaa₂₅, Xaa₂₆, Xaa₂₇ and Xaa₂₈
25 are Ala. Especially preferred compounds include those having the amino acid sequence of SEQ. ID. NOS. 40-61.

According to an especially preferred aspect, provided are compounds where Xaa₁₄ is Leu, Ile, Val or pentylglycine, more preferably Leu or pentylglycine, and Xaa₂₅ is Phe, Tyr
30 or naphthylalanine, more preferably Phe or naphthylalanine. These compounds will be less susceptible to oxidative degradation, both in vitro and in vivo, as well as during Synthesis of the Compound.

Exendin agonist compounds also include those described
35 in International Patent Application No. PCT/US98/24273, filed November 13, 1998, entitled, "Novel Exendin Agonist

Compounds," which claims the benefit of United States Provisional Application No. 60/066,029, filed November 14, 1997, including compounds of the formula (III) [SEQ ID NO. 5]:

- 5 Xaa₁ Xaa₂ Xaa₃ Xaa₄ Xaa₅ Xaa₆ Xaa₇ Xaa₈ Xaa₉ Xaa₁₀
Xaa₁₁ Xaa₁₂ Xaa₁₃ Xaa₁₄ Xaa₁₅ Xaa₁₆ Xaa₁₇ Ala Xaa₁₉ Xaa₂₀
Xaa₂₁ Xaa₂₂ Xaa₂₃ Xaa₂₄ Xaa₂₅ Xaa₂₆ Xaa₂₇ Xaa₂₈-Z₁; wherein
- 10 Xaa₁ is His, Arg, Tyr, Ala, Norval, Val
or Norleu;
Xaa₂ is Ser, Gly, Ala or Thr;
Xaa₃ is Ala, Asp or Glu;
Xaa₄ is Ala, Norval, Val, Norleu or Gly;
Xaa₅ is Ala or Thr;
- 15 Xaa₆ is Phe, Tyr or naphthylalanine;
Xaa₇ is Thr or Ser;
Xaa₈ is Ala, Ser or Thr;
Xaa₉ is Ala, Norval, Val, Norleu, Asp or Glu;
Xaa₁₀ is Ala, Leu, Ile, Val, pentylglycine or Met;
- 20 Xaa₁₁ is Ala or Ser;
Xaa₁₂ is Ala or Lys;
Xaa₁₃ is Ala or Gln;
Xaa₁₄ is Ala, Leu, Ile, pentylglycine, Val or Met;
Xaa₁₅ is Ala or Glu;
- 25 Xaa₁₆ is Ala or Glu;
Xaa₁₇ is Ala or Glu;
Xaa₁₉ is Ala or Val;
Xaa₂₀ is Ala or Arg;
Xaa₂₁ is Ala or Leu;
- 30 Xaa₂₂ is Phe, Tyr or naphthylalanine;
Xaa₂₃ is Ile, Val, Leu, pentylglycine, tert-butylglycine
or Met;
Xaa₂₄ is Ala, Glu or Asp;
Xaa₂₅ is Ala, Trp, Phe, Tyr or naphthylalanine;
- 35 Xaa₂₆ is Ala or Leu;
Xaa₂₇ is Ala or Lys;

Xaa₂₈ is Ala or Asn;

Z₁ is -OH,

-NH₂,

Gly-Z₂,

5 Gly Gly-Z₂,

Gly Gly Xaa₃₁-Z₂,

Gly Gly Xaa₃₁ Ser-Z₂,

Gly Gly Xaa₃₁ Ser Ser-Z₂,

Gly Gly Xaa₃₁ Ser Ser Gly-Z₂,

10 Gly Gly Xaa₃₁ Ser Ser Gly Ala-Z₂,

Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆-Z₂,

Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇-Z₂,

Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇ Xaa₃₈-Z₂ or

Gly Gly Xaa₃₁ Ser Ser Gly Ala Xaa₃₆ Xaa₃₇ Xaa₃₈ Xaa₃₉-Z₂;

15 wherein

Xaa₃₁, Xaa₃₆, Xaa₃₇ and Xaa₃₈ are independently

Pro, homoproline, 3Hyp, 4Hyp, thioproline,

N-alkylglycine, N-alkylpentylglycine or

N-alkylalanine; and

20 Z₂ is -OH or -NH₂;

provided that no more than three of Xaa₃, Xaa₄, Xaa₅,

Xaa₆, Xaa₈, Xaa₉, Xaa₁₀, Xaa₁₁, Xaa₁₂, Xaa₁₃, Xaa₁₄, Xaa₁₅, Xaa₁₆,

Xaa₁₇, Xaa₁₉, Xaa₂₀, Xaa₂₁, Xaa₂₄, Xaa₂₅, Xaa₂₆, Xaa₂₇ and Xaa₂₈

are Ala; and provided also that, if Xaa₁ is His, Arg or Tyr,

25 then at least one of Xaa₃, Xaa₄ and Xaa₉ is Ala.

Definitions

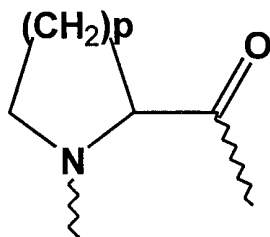
In accordance with the present invention and as used herein, the following terms are defined to have the following meanings, unless explicitly stated otherwise.

30 The term "amino acid" refers to natural amino acids, unnatural amino acids, and amino acid analogs, all in their D and L stereoisomers if their structure allow such stereoisomeric forms. Natural amino acids include alanine (Ala), arginine (Arg), asparagine (Asn), aspartic acid
35 (Asp), cysteine (Cys), glutamine (Gln), glutamic acid (Glu),

glycine (Gly), histidine (His), isoleucine (Ile), leucine (Leu), Lysine (Lys), methionine (Met), phenylalanine (Phe), proline (Pro), serine (Ser), threonine (Thr), typtophan (Trp), tyrosine (Tyr) and valine (Val). Unnatural amino acids include, but are not limited to azetidinecarboxylic acid, 2-aminoadipic acid, 3-aminoadipic acid, beta-alanine, aminopropionic acid, 2-aminobutyric acid, 4-aminobutyric acid, 6-aminocaproic acid, 2-aminoheptanoic acid, 2-aminoisobutyric acid, 3-aminoisbutyric acid, 2-aminopimelic acid, tertiary-butylglycine, 2,4-diaminoisobutyric acid, desmosine, 2,2'-diaminopimelic acid, 2,3-diaminopropionic acid, N-ethylglycine, N-ethylasparagine, homoproline, hydroxylysine, allo-hydroxylysine, 3-hydroxyproline, 4-hydroxyproline, isodesmosine, allo-isoleucine, N-methylalanine, N-methylglycine, N-methylisoleucine, N-methylpentylglycine, N-methylvaline, naphthalanine, norvaline, norleucine, ornithine, pentylglycine, pipecolic acid and thioproline. Amino acid analogs include the natural and unnatural amino acids which are chemically blocked, reversibly or irreversibly, or modified on their N-terminal amino group or their side-chain groups, as for example, methionine sulfoxide, methionine sulfone, S-(carboxymethyl)-cysteine, S-(carboxymethyl)-cysteine sulfoxide and S-(carboxymethyl)-cysteine sulfone.

The term "amino acid analog" refers to an amino acid wherein either the C-terminal carboxy group, the N-terminal amino group or side-chain functional group has been chemically codified to another functional group. For example, aspartic acid-(beta-methyl ester) is an amino acid analog of aspartic acid; N-ethylglycine is an amino acid analog of glycine; or alanine carboxamide is an amino acid analog of alanine.

The term "amino acid residue" refers to radicals having the structure: (1) $-C(O)-R-NH-$, wherein R typically is $-CH(R')$, wherein R' is an amino acid side chain, typically H or a carbon containing substituent; or (2)



5

wherein p is 1, 2 or 3 representing the azetidinecarboxylic acid, proline or pipecolic acid residues, respectively.

10 The term "lower" referred to herein in connection with organic radicals such as alkyl groups defines such groups with up to and including about 6, preferably up to and including 4 and advantageously one or two carbon atoms. Such groups may be straight chain or branched chain.

15 "Pharmaceutically acceptable salt" includes salts of the compounds described herein derived from the combination of such compounds and an organic or inorganic acid. In practice the use of the salt form amounts to use of the base form. The compounds are useful in both free base and salt
20 form.

In addition, the following abbreviations stand for the following:

"ACN" or "CH₃CN" refers to acetonitrile.

"Boc", "tBoc" or "Tboc" refers to t-butoxy carbonyl.

25 "DCC" refers to N,N'-dicyclohexylcarbodiimide.

"Fmoc" refers to fluorenylmethoxycarbonyl.

"HBTU" refers to 2-(1H-benzotriazol-1-yl)-1,1,3,3,-tetramethyluronium hexafluorophosphate.

"HOBt" refers to 1-hydroxybenzotriazole monohydrate.

30 "homoP" or hPro" refers to homoproline.

"MeAla" or "Nme" refers to N-methylalanine.

"naph" refers to naphthylalanine.

"pG" or pGly" refers to pentylglycine.

"tBuG" refers to tertiary-butylglycine.

35 "ThioP" or tPro" refers to thioproline.

"3Hyp" refers to 3-hydroxyproline

"4Hyp" refers to 4-hydroxyproline

"NAG" refers to N-alkylglycine

"NAPG" refers to N-alkylpentylglycine

"Norval" refers to norvaline

5 "Norleu" refers to norleucine

Preparation of Compounds

The exendins and exendin agonists described herein may be prepared using standard solid-phase peptide synthesis techniques and preferably an automated or semiautomated peptide synthesizer. Typically, using such techniques, an α -N-carbamoyl protected amino acid and an amino acid attached to the growing peptide chain on a resin are coupled at room temperature in an inert solvent such as dimethylformamide, N-methylpyrrolidinone or methylene chloride in the presence of coupling agents such as dicyclohexylcarbodiimide and 1-hydroxybenzotriazole in the presence of a base such as diisopropylethylamine. The α -N-carbamoyl protecting group is removed from the resulting peptide-resin using a reagent such as trifluoroacetic acid or piperidine, and the coupling reaction repeated with the next desired N-protected amino acid to be added to the peptide chain. Suitable N-protecting groups are well known in the art, with t-butyloxycarbonyl (tBoc) and fluorenylmethoxycarbonyl (Fmoc) being preferred herein.

25 The solvents, amino acid derivatives and 4-methylbenzhydryl-amine resin used in the peptide synthesizer may be purchased from Applied Biosystems Inc. (Foster City, CA). The following side-chain protected amino acids may be purchased from Applied Biosystems, Inc.: Boc-Arg(Mts), Fmoc-Arg(Pmc), Boc-Thr(Bzl), Fmoc-Thr(t-Bu), Boc-Ser(Bzl), Fmoc-Ser(t-Bu), Boc-Tyr(BrZ), Fmoc-Tyr(t-Bu), Boc-Lys(Cl-Z), Fmoc-Lys(Boc), Boc-Glu(Bzl), Fmoc-Glu(t-Bu), Fmoc-His(Trt), Fmoc-Asn(Trt), and Fmoc-Gln(Trt). Boc-His(BOM) may be purchased from Applied Biosystems, Inc. 35 or Bachem Inc. (Torrance, CA). Anisole, dimethylsulfide,

phenol, ethanedithiol, and thioanisole may be obtained from Aldrich Chemical Company (Milwaukee, WI). Air Products and Chemicals (Allentown, PA) supplies HF. Ethyl ether, acetic acid and methanol may be purchased from Fisher Scientific
5 (Pittsburgh, PA).

Solid phase peptide synthesis may be carried out with an automatic peptide synthesizer (Model 430A, Applied Biosystems Inc., Foster City, CA) using the NMP/HOBt (Option 1) system and tBoc or Fmoc chemistry (see, Applied
10 Biosystems User's Manual for the ABI 430A Peptide Synthesizer, Version 1.3B July 1, 1988, section 6, pp. 49-70, Applied Biosystems, Inc., Foster City, CA) with capping. Boc-peptide-resins may be cleaved with HF (-5° C to 0° C, 1 hour). The peptide may be extracted from the resin with
15 alternating water and acetic acid, and the filtrates lyophilized. The Fmoc-peptide resins may be cleaved according to standard methods (Introduction to Cleavage Techniques, Applied Biosystems, Inc., 1990, pp. 6-12). Peptides may be also be assembled using an Advanced Chem
20 Tech Synthesizer (Model MPS 350, Louisville, Kentucky).

Peptides may be purified by RP-HPLC (preparative and analytical) using a Waters Delta Prep 3000 system. A C4, C8 or C18 preparative column (10 μ , 2.2 x 25 cm; Vydac, Hesperia, CA) may be used to isolate peptides, and purity
25 may be determined using a C4, C8 or C18 analytical column (5 μ , 0.46 x 25 cm; Vydac). Solvents (A=0.1% TFA/water and B=0.1% TFA/CH₃CN) may be delivered to the analytical column at a flowrate of 1.0 ml/min and to the preparative column at 15 ml/min. Amino acid analyses may be performed on the
30 Waters Pico Tag system and processed using the Maxima program. Peptides may be hydrolyzed by vapor-phase acid hydrolysis (115° C, 20-24 h). Hydrolysates may be derivatized and analyzed by standard methods (Cohen, et al., The Pico Tag Method: A Manual of Advanced Techniques for
35 Amino Acid Analysis, pp. 11-52, Millipore Corporation, Milford, MA (1989)). Fast atom bombardment analysis may be

carried out by M-Scan, Incorporated (West Chester, PA). Mass calibration may be performed using cesium iodide or cesium iodide/glycerol. Plasma desorption ionization analysis using time of flight detection may be carried out
5 on an Applied Biosystems Bio-Ion 20 mass spectrometer. Electrospray mass spectroscopy may be carried out on a VG-Trio machine.

Peptide compounds useful in the invention may also be prepared using recombinant DNA techniques, using methods
10 now known in the art. See, e.g., Sambrook et al., Molecular Cloning: A Laboratory Manual, 2d Ed., Cold Spring Harbor (1989). Non-peptide compounds useful in the present invention may be prepared by art-known methods. For example, phosphate-containing amino acids and peptides
15 containing such amino acids, may be prepared using methods known in the art. See, e.g., Bartlett and Landen, Biorg. Chem. 14:356-377 (1986).

Compositions useful in the invention may conveniently be provided in the form of formulations suitable for parenteral
20 (including intravenous, intramuscular and subcutaneous) or nasal or oral administration. In some cases, it will be convenient to provide an exendin or exendin agonist and another blood glucose-controlling, plasma glucose-lowering agent, such as an insulin, an amylin, an amylin agonist, in a
25 single composition or solution for administration together. In other cases, it may be more advantageous to administer the additional agent separately from said exendin or exendin agonist. A suitable administration format may best be determined by a medical practitioner for each patient
30 individually. Suitable pharmaceutically acceptable carriers and their formulation are described in standard formulation treatises, e.g., Remington's Pharmaceutical Sciences by E.W. Martin. See also Wang, Y.J. and Hanson, M.A. "Parenteral Formulations of Proteins and Peptides: Stability and
35 Stabilizers," Journal of Parenteral Science and Technology, Technical Report No. 10, Supp. 42:2S (1988).

Compounds useful in the invention can be provided as parenteral compositions for injection or infusion. Preferred formulations are those described and claimed in United States Application Serial No. 60/116,380, entitled, "Novel
5 Exendin Agonist Formulations and Methods of Administration Thereof," filed January 14, 1999, which enjoys common ownership with the present application and which is incorporated by this reference into the present application as though fully set forth herein. They can, for example, be
10 suspended in an inert oil, suitably a vegetable oil such as sesame, peanut, olive oil, or other acceptable carrier. Preferably, they are suspended in an aqueous carrier, for example, in an isotonic buffer solution at a pH of about 3.0 to 8.0, preferably at a pH of about 3.5 to 5.0. These
15 compositions may be sterilized by conventional sterilization techniques, or may be sterile filtered. The compositions may contain pharmaceutically acceptable auxiliary substances as required to approximate physiological conditions, such as pH buffering agents. Useful buffers include for example,
20 sodium acetate/acetic acid buffers. A form of repository or "depot" slow release preparation may be used so that therapeutically effective amounts of the preparation are delivered into the bloodstream over many hours or days following transdermal injection or delivery.

25 The desired isotonicity may be accomplished using sodium chloride or other pharmaceutically acceptable agents such as dextrose, boric acid, sodium tartrate, propylene glycol, polyols (such as mannitol and sorbitol), or other inorganic or organic solutes. Sodium chloride is preferred
30 particularly for buffers containing sodium ions.

The claimed compositions can also be formulated as pharmaceutically acceptable salts (e.g., acid addition salts) and/or complexes thereof. Pharmaceutically acceptable salts are non-toxic salts at the concentration at which they are
35 administered. The preparation of such salts can facilitate the pharmacological use by altering the physical-chemical

characteristics of the composition without preventing the composition from exerting its physiological effect. Examples of useful alterations in physical properties include lowering the melting point to facilitate transmucosal administration and increasing the solubility to facilitate the administration of higher concentrations of the drug.

Pharmaceutically acceptable salts include acid addition salts such as those containing sulfate, hydrochloride, phosphate, sulfamate, acetate, citrate, lactate, tartrate, methanesulfonate, ethanesulfonate, benzenesulfonate, *p*-toluenesulfonate, cyclohexylsulfamate and quinate. Pharmaceutically acceptable salts can be obtained from acids such as hydrochloric acid, sulfuric acid, phosphoric acid, sulfamic acid, acetic acid, citric acid, lactic acid, tartaric acid, malonic acid, methanesulfonic acid, ethanesulfonic acid, benzenesulfonic acid, *p*-toluenesulfonic acid, cyclohexylsulfamic acid, and quinic acid. Such salts may be prepared by, for example, reacting the free acid or base forms of the product with one or more equivalents of the appropriate base or acid in a solvent or medium in which the salt is insoluble, or in a solvent such as water which is then removed in vacuo or by freeze-drying or by exchanging the ions of an existing salt for another ion on a suitable ion exchange resin.

Carriers or excipients can also be used to facilitate administration of the compound. Examples of carriers and excipients include calcium carbonate, calcium phosphate, various sugars such as lactose, glucose, or sucrose, or types of starch, cellulose derivatives, gelatin, vegetable oils, polyethylene glycols and physiologically compatible solvents. The compositions or pharmaceutical composition can be administered by different routes including intravenously, intraperitoneal, subcutaneous, and intramuscular, orally, topically, transmucosally, or by pulmonary inhalation.

If desired, solutions of the above compositions may be thickened with a thickening agent such as methyl cellulose.

They may be prepared in emulsified form, either water in oil or oil in water. Any of a wide variety of pharmaceutically acceptable emulsifying agents may be employed including, for example, acacia powder, a non-ionic surfactant (such as a Tween), or an ionic surfactant (such as alkali polyether alcohol sulfates or sulfonates, e.g., a Triton).

Compositions useful in the invention are prepared by mixing the ingredients following generally accepted procedures. For example, the selected components may be simply mixed in a blender or other standard device to produce a concentrated mixture which may then be adjusted to the final concentration and viscosity by the addition of water or thickening agent and possibly a buffer to control pH or an additional solute to control tonicity.

For use by the physician, the compositions will be provided in dosage unit form containing an amount of an exendin or exendin agonist, for example, exendin-3, and/or exendin-4, with or without another glucosed-lowering agent. Therapeutically effective amounts of an exendin or exendin agonist for use treating a subject with gestational diabetes mellitus are those that lower blood glucose to a desired level. As will be recognized by those in the field, an effective amount of therapeutic agent will vary with many factors including the age and weight of the patient, the patient's physical condition, the blood glucose level and other factors.

The effective daily blood glucose controlling dose of the compounds will typically be in the range of about 3 to 30 µg to about 1 mg/day, preferably about 1 to 30 µg to about 500 µg/day and more preferably about 1 to 30 µg to about 100 µg/day, most preferably about 3 µg to about 50 µg/day, for a 70 kg patient, administered in a single or divided doses. Preferred dosages are described in United States Application Serial No. 60/116,380, entitled, "Novel Exendin Agonist Formulations and Methods of Administration Thereof," filed January 14, 1999, which has been incorporated by reference

into the present application. A preferred dose for twice daily administration is about 0.05 to about 0.3 μg per kilogram. The exact dose to be administered is determined by the attending clinician and is dependent upon where the particular compound lies within the above quoted range, as well as upon the age, weight and condition of the individual, and the mode of administration. Administration should begin shortly after diagnosis of GDM and continue for the remainder of the gestation (i.e., the third trimester through parturition). Administration may be by injection, preferably subcutaneous or intramuscular. Administration may also be by non-injectable routes, for example, via the respiratory tract, the mouth and the gut. Orally active compounds may be taken orally, however dosages should be increased 5-10 fold. Preferred methods of administration are described in United States Application Serial No. 60/116,380, entitled, "Novel Exendin Agonist Formulations and Methods of Administration Thereof," filed January 14, 1999, which has been incorporated by reference into the present application. Solid dosage forms, such as those useful for oral, buccal, sublingual, intra-tracheal, nasal or pulmonary delivery may be used. Additionally, preserved or unpreserved liquid formulations or dry powder may be used.

The optimal formulation and mode of administration of compounds of the present application to a patient depend on factors known in the art such as the particular disease or disorder, the desired effect, and the type of patient. While the compounds will typically be used to treat human subjects they may also be used to treat similar or identical diseases in other vertebrates such as other primates, farm animals such as swine, cattle and poultry, and sports animals and pets such as horses, dogs and cats.

To assist in understanding the present invention, the following Examples are included. The experiments relating to this invention should not, of course, be construed as specifically limiting the invention and such variations of

the invention, now known or later developed, which would be within the purview of one skilled in the art are considered to fall within the scope of the invention as described herein and hereinafter claimed.

5 Example 1

Preparation of amidated peptide having SEQ. ID. NO. 9

The above-identified peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
10 Fmoc-protected amino acids (Applied Biosystems, Inc.). In general, single-coupling cycles were used throughout the synthesis and Fast Moc (HBTU activation) chemistry was employed. However, at some positions coupling was less efficient than expected and double couplings were required.
15 In particular, residues Asp₉, Thr₇ and Phe₆ all required double coupling. Deprotection (Fmoc group removal) of the growing peptide chain using piperidine was not always efficient. Double deprotection was required at positions Arg₂₀, Val₁₉ and Leu₁₄. Final deprotection of the completed
20 peptide resin was achieved using a mixture of triethylsilane (0.2 mL), ethanedithiol (0.2 mL), anisole (0.2 mL), water (0.2 mL) and trifluoroacetic acid (15 mL) according to standard methods (Introduction to Cleavage Techniques, Applied Biosystems, Inc.) The peptide was precipitated in
25 ether/water (50 mL) and centrifuged. The precipitate was reconstituted in glacial acetic acid and lyophilized. The lyophilized peptide was dissolved in water). Crude purity was about 55%.

Used in purification steps and analysis were Solvent A
30 (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

The solution containing peptide was applied to a preparative C-18 column and purified (10% to 40% Solvent B in Solvent A over 40 minutes). Purity of fractions was determined isocratically using a C-18 analytical column.
35 Pure fractions were pooled furnishing the above-identified

peptide. Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 14.5 minutes. Electrospray Mass Spectrometry (M):
5 calculated 4131.7; found 4129.3.

Example 2

Preparation of Peptide having SEQ. ID. NO. 10

The above-identified peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 5. Used in analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 25% to 75% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 21.5 minutes. Electrospray Mass Spectrometry (M): calculated 4168.6; found 4171.2.

20 Example 3

Preparation of Peptide having SEQ. ID. NO. 11

The above-identified peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 17.9 minutes. Electrospray Mass Spectrometry (M): calculated 4147.6; found 4150.2.

Example 3Preparation of Peptide having SEQ. ID. NO. 12

The above-identified peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 35% to 65% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 19.7 minutes. Electrospray Mass Spectrometry (M): calculated 4212.6; found 4213.2.

15 Example 4Preparation of Peptide having SEQ. ID. NO. 13

The above-identified peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 50% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 16.3 minutes. Electrospray Mass Spectrometry (M): calculated 4262.7; found 4262.4.

Example 530 Preparation of Peptide having SEQ. ID. NO. 14

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),

cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4172.6

Example 6

10 Preparation of Peptide having SEQ. ID. NO. 15

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4224.7.

Example 7

25 Preparation of Peptide having SEQ. ID. NO. 16

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 4172.6

Example 8

Preparation of Peptide having SEQ. ID. NO. 17

5 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
10 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product
15 peptide. Electrospray Mass Spectrometry (M): calculated 4186.6

Example 9

Preparation of Peptide having SEQ. ID. NO. 18

20 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A
25 (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
30 4200.7

cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4145.6.

Example 13

10 Preparation of Peptide having SEQ. ID. NO. 22

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4184.6.

Example 14

25 Preparation of Peptide having SEQ. ID. NO. 23

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product

EXAMPLE 10Preparation of Peptide having SEQ. ID. NO. 19

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4200.7

15 Example 11Preparation of Peptide having SEQ. ID. NO. 20

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4202.7.

Example 1230 Preparation of Peptide having SEQ. ID. NO. 21

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),

peptide. Electrospray Mass Spectrometry (M): calculated 4145.6.

Example 15

Preparation of Peptide having SEQ. ID. NO. 24

5 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
10 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product
15 peptide. Electrospray Mass Spectrometry (M): calculated 4224.7.

Example 16

Preparation of Peptide having SEQ. ID. NO. 25

20 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
25 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product
30 peptide. Electrospray Mass Spectrometry (M): calculated 4172.6.

Example 17Preparation of Peptide having SEQ. ID. NO. 26

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4115.5.

15 Example 18Preparation of Peptide having SEQ. ID. NO. 27

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4188.6.

Example 1930 Preparation of Peptide having SEQ. ID. NO. 28

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),

cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4131.6.

Example 20

10 Preparation of Peptide having SEQ. ID. NO. 29

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4172.6.

Example 21

Preparation of Peptide having SEQ. ID. NO. 30

25 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 4145.6.

Example 22

Preparation of Peptide having SEQ. ID. NO. 31

5 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
10 similar way to Example 1. Additional double couplings are required at the thioproline positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the
15 lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4266.8.

Example 23

Preparation of Peptide having SEQ. ID. NO. 32

20 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
25 similar way to Example 1. Additional double couplings are required at the thioproline positions 38, 37 and 36. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized
30 peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4246.8.

Example 24Preparation of Peptide having SEQ. ID. NO. 33

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are required at the homoproline positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4250.8.

Example 25Preparation of Peptide having SEQ. ID. NO. 34

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are required at the homoproline positions 38, 37, and 36. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4234.8.

Example 26Preparation of Peptide having SEQ. ID. NO. 35

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide

norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are
5 required at the thioproline positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the
10 retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4209.8.

Example 27

Preparation of Peptide having SEQ. ID. NO. 36

The above-identified peptide is assembled on 4-(2'-4'-
15 dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are
20 required at the homoproline positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the
25 retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4193.7.

Example 28

Preparation of Peptide having SEQ. ID. NO. 37

The above-identified peptide is assembled on 4-(2'-4'-
30 dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are

required at the N-methylalanine positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the
5 lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3858.2.

Example 29

Preparation of Peptide having SEQ. ID. NO. 38

10 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are required at the N-methylalanine positions 38, 37 and 36. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the
20 lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3940.3.

Example 30

Preparation of Peptide having SEQ. ID. NO. 39

25 The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
30 cleaved from the resin, deprotected and purified in a similar way to Example 1. Additional double couplings are required at the N-methylalanine positions 38, 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the

lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3801.1.

Example 31

5 Preparation of C-terminal carboxylic acid Peptides corresponding to the above C-terminal amide sequences.

The above peptides of Examples 1-5 to 30 are assembled on the so called Wang resin (p-alkoxybenzylalcohol resin (Bachem, 0.54 mmole/g)) using Fmoc-protected amino acids
10 (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 1. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized
15 peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry provides an experimentally determined (M).

Example 32

Preparation of Peptide having SEQ ID NO. 7

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly-
NH₂ [SEQ. ID. NO. 7]

The above amidated peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.). In general, single-coupling cycles were used throughout the synthesis and Fast Moc (HBTU activation) chemistry was employed. Deprotection (Fmoc group removal) of the growing
30 peptide chain was achieved using piperidine. Final deprotection of the completed peptide resin was achieved using a mixture of triethylsilane (0.2 mL), ethanedithiol (0.2 mL), anisole (0.2 mL), water (0.2 mL) and trifluoroacetic acid (15 mL) according to standard methods

(Introduction to Cleavage Techniques, Applied Biosystems, Inc.) The peptide was precipitated in ether/water (50 mL) and centrifuged. The precipitate was reconstituted in glacial acetic acid and lyophilized. The lyophilized peptide
5 was dissolved in water). Crude purity was about 75%.

Used in purification steps and analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

The solution containing peptide was applied to a preparative C-18 column and purified (10% to 40% Solvent B
10 in Solvent A over 40 minutes). Purity of fractions was determined isocratically using a C-18 analytical column. Pure fractions were pooled furnishing the above-identified peptide. Analytical RP-HPLC (gradient 30% to 50% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide
15 gave product peptide having an observed retention time of 18.9 minutes. Electrospray Mass Spectrometry (M): calculated 3408.0; found 3408.9.

Example 33

Preparation of Peptide having SEQ ID NO. 40

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 40]

The above amidated peptide was assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis were Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 40% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide gave product peptide having an observed retention time of 17.9 minutes. Electrospray Mass Spectrometry (M): calculated 3294.7; found 3294.8.

Example 34Preparation of Peptide having SEQ ID NO. 41

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 41]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 29% to 36% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 20.7 minutes.
Electrospray Mass Spectrometry (M): calculated 3237.6; found
3240.

Example 35Preparation of Peptide having SEQ ID NO. 42

20 His Ala Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 42]

The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 36% to 46% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 15.2 minutes.
Electrospray Mass Spectrometry (M): calculated 3251.6; found
3251.5.

Example 36Preparation of Peptide having SEQ ID NO. 43

His Gly Glu Gly Ala Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 43]

The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 36% to 46% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 13.1 minutes.
Electrospray Mass Spectrometry (M): calculated 3207.6; found
3208.3.

Example 37Preparation of Peptide having SEQ ID NO. 44

20 His Gly Glu Gly Thr Ala Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 44]

The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 35% to 45% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 12.8 minutes.
Electrospray Mass Spectrometry (M): calculated 3161.5; found
3163.

Example 38Preparation of Peptide having SEQ ID NO. 45

His Gly Glu Gly Thr Phe Thr Ala Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 45]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 36% to 46% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 15.2 minutes.
Electrospray Mass Spectrometry (M): calculated 3221.6; found
3222.7.

Example 39Preparation of Peptide having SEQ ID NO. 46

20 His Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 46]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 34% to 44% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.3 minutes.
Electrospray Mass Spectrometry (M): calculated 3195.5; found
3199.4.

Example 40Preparation of Peptide having SEQ ID NO. 47

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ala Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 47]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 38% to 48% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 15.7 minutes.
Electrospray Mass Spectrometry (M): calculated 3221.6; found
3221.6.

Example 41Preparation of Peptide having SEQ ID NO. 48

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Ala Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 48]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 38% to 48% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 18.1 minutes.
Electrospray Mass Spectrometry (M): calculated 3180.5; found
3180.9.

Example 42Preparation of Peptide having SEQ ID NO. 49

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Ala Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 49]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 36% to 46% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 17.0 minutes.
Electrospray Mass Spectrometry (M): calculated 3180.6; found
3182.8.

Example 43Preparation of Peptide having SEQ ID NO. 50

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Ala Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 50]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 32% to 42% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.9 minutes.
Electrospray Mass Spectrometry (M): calculated 3195.5; found
3195.9.

Example 44Preparation of Peptide having SEQ ID NO. 51

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Ala
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 51]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 37% to 47% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 17.9 minutes.
Electrospray Mass Spectrometry (M): calculated 3179.6; found
3179.0.

Example 45Preparation of Peptide having SEQ ID NO. 52

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Ala Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 52]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 37% to 47% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.3 minutes.
Electrospray Mass Spectrometry (M): calculated 3179.6; found
3180.0.

Example 46Preparation of Peptide having SEQ ID NO. 53

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Ala Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 53]

The above-identified peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 37% to 47% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 13.7 minutes.
Electrospray Mass Spectrometry (M): calculated 3179.6; found
3179.0.

Example 47Preparation of Peptide having SEQ ID NO. 54

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Ala Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 54]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 35% to 45% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.0 minutes.
Electrospray Mass Spectrometry (M): calculated 3209.6; found
3212.8.

Example 48Preparation of Peptide having SEQ ID NO. 55

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Ala Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 55]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 38% to 48% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 14.3 minutes.
Electrospray Mass Spectrometry (M): calculated 3152.5; found
3153.5.

Example 49Preparation of Peptide having SEQ ID NO. 56

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Ala Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 56]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 35% to 45% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 12.1 minutes.
Electrospray Mass Spectrometry (M): calculated 3195.5; found
3197.7.

Example 50Preparation of Peptide having SEQ ID NO. 57

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Ala Phe Leu Lys Asn-NH₂ [SEQ.
5 ID. NO. 57]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 38% to 48% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 10.9 minutes.
Electrospray Mass Spectrometry (M): calculated 3179.6; found
3180.5.

Example 51Preparation of Peptide having SEQ ID NO. 58

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Ala Leu Lys Asn-NH₂ [SEQ.
ID. NO. 58]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 32% to 42% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 17.5 minutes.
Electrospray Mass Spectrometry (M): calculated 3161.5; found
3163.0.

Example 52Preparation of Peptide having SEQ ID NO. 59

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Ala Lys Asn-NH₂ [SEQ.
5 ID. NO. 59]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 32% to 42% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 19.5 minutes.
Electrospray Mass Spectrometry (M): calculated 3195.5; found
3199.

Example 53Preparation of Peptide having SEQ ID NO. 60

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Ala Asn-NH₂ [SEQ.
ID. NO. 60]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 38% to 48% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.5 minutes.
Electrospray Mass Spectrometry (M): calculated 3180.5; found
3183.7.

Example 54Preparation of Peptide having SEQ ID NO. 61

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Ala-NH₂ [SEQ.
5 ID. NO. 61]

The above-identified amidated peptide was assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 34% to 44% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
15 peptide having an observed retention time of 22.8 minutes.
Electrospray Mass Spectrometry (M): calculated 3194.6; found
3197.6.

Example 55Preparation of Peptide having SEQ ID NO. 62

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro Pro-NH₂ [SEQ. ID. NO. 62]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4099.6.

Example 56Preparation of Peptide having SEQ ID NO. 63

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser Ser Gly Ala Pro Pro Pro-NH₂ [SEQ. ID. NO. 63]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4042.5.

Example 57Preparation of Peptide having SEQ ID NO. 64

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro-NH₂ [SEQ. ID. NO. 64]

The above-identified peptide is assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4002.4

Example 58Preparation of Peptide having SEQ ID NO. 65

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser Ser Gly Ala Pro Pro-NH₂ [SEQ. ID. NO. 65]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3945.4.

Example 59Preparation of Peptide having SEQ ID NO. 66

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro-NH₂ [SEQ. ID. NO. 66]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3905.3.

Example 60Preparation of Peptide having SEQ ID NO. 67

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser Ser Gly Ala Pro-NH₂ [SEQ. ID. NO. 67]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3848.2.

Example 61Preparation of Peptide having SEQ ID NO. 68

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 68]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3808.2.

Example 62Preparation of Peptide having SEQ ID NO. 69

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 69]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3751.1.

Example 63Preparation of Peptide having SEQ ID NO. 70

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly-NH₂ [SEQ. ID. NO. 70]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3737.1.

Example 64Preparation of Peptide having SEQ ID NO. 71

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser Ser Gly-NH₂ [SEQ. ID. NO. 71]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3680.1.

Example 65Preparation of Peptide having SEQ ID NO. 72

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser-NH₂ [SEQ. ID. NO. 72]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3680.1

Example 66Preparation of Peptide having SEQ ID NO. 73

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu
Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly
5 Gly Pro Ser Ser-NH₂ [SEQ. ID. NO. 73]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3623.0.

Example 67Preparation of Peptide having SEQ ID NO. 74

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser-NH₂ [SEQ. ID. NO. 74]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
25 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
30 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3593.0

Example 68Preparation of Peptide having SEQ ID NO. 75

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
5 Pro Ser-NH₂ [SEQ. ID. NO. 75]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
10 cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
15 carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3535.9

Example 69Preparation of Peptide having SEQ ID NO. 76

20 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro-NH₂ [SEQ. ID. NO. 76]

Example 70Preparation of Peptide having SEQ ID NO. 77

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro-NH₂ [SEQ. ID. NO. 77]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 32. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3448.8.

Example 71

Preparation of Peptide having SEQ ID NO. 78

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly-
10 NH₂ [SEQ. ID. NO. 78]

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3351.7.

Example 72

Preparation of Peptide having SEQ ID NO. 79

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly-NH₂
[SEQ. ID. NO. 79]

The above-identified peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3351.8.

Example 73

Preparation of Peptide having SEQ ID NO. 80

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly-NH₂
10 [SEQ. ID. NO. 80]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3294.7.

Example 74

Preparation of Peptide having SEQ ID NO. 81

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
tPro Ser Ser Gly Ala tPro tPro tPro-NH₂ [SEQ. ID. NO. 81]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Double couplings are required at residues 37,36 and 31. Used in analysis are Solvent A (0.1%

TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide.

5 Electrospray Mass Spectrometry (M): calculated 4197.1.

Example 75

Preparation of Peptide having SEQ ID NO. 82

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
10 Pro Ser Ser Gly Ala tPro tPro tPro-NH₂ [SEQ. ID. NO. 82]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Double couplings are required at residues 37, 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30
20 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 4179.1.

Example 76

Preparation of Peptide having SEQ ID NO. 83

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
NMeala Ser Ser Gly Ala Pro Pro-NH₂ [SEQ. ID. NO. 83]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Double couplings are required at residues 36 and 31. Used in analysis are Solvent A (0.1% TFA

in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide.

5 Electrospray Mass Spectrometry (M): calculated 3948.3.

Example 77

Preparation of Peptide having SEQ ID NO. 84

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
10 NMeala Ser Ser Gly Ala NMeala Nmeala-NH₂ [SEQ. ID. NO. 84]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Double couplings are required at residues 36 and 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30
20 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3840.1.

Example 78

Preparation of Peptide having SEQ ID NO. 85

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
hPro Ser Ser Gly Ala hPro hPro-NH₂ [SEQ. ID. NO. 85]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
30 cleaved from the resin, deprotected and purified in a similar way to Example 32. Double couplings are required at residues 36 and 31. Used in analysis are Solvent A (0.1% TFA

in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide.

5 Electrospray Mass Spectrometry (M): calculated 4050.1.

Example 79

Preparation of Peptide having SEQ ID NO. 86

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
10 hPro Ser Ser Gly Ala hPro-NH₂ [SEQ. ID. NO. 86]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. A double coupling is required at residue 31. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes)
20 of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3937.1

Example 80

Preparation of Peptide having SEQ ID NO. 87

25 Arg Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 87]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
30 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3827.2.

Example 81

Preparation of Peptide having SEQ ID NO. 88

His Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly-
10 NH₂ [SEQ. ID. NO. 88]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3394.8.

Example 82

Preparation of Peptide having SEQ ID NO. 89

25 His Gly Glu Gly Thr Naphthylala Thr Ser Asp Leu Ser Lys Gln
Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-
NH₂ [SEQ. ID. NO. 89]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3289.5.

Example 83

Preparation of Peptide having SEQ ID NO. 90

His Gly Glu Gly Thr Phe Ser Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
10 ID. NO. 90]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3280.7.

Example 84

Preparation of Peptide having SEQ ID NO. 91

25 His Gly Glu Gly Thr Phe Ser Thr Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 91]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3294.7.

Example 85

Preparation of Peptide having SEQ ID NO. 92

His Gly Glu Gly Thr Phe Thr Ser Glu Leu Ser Lys Gln Met Ala
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
10 ID. NO. 92]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3250.7.

Example 86

Preparation of Peptide having SEQ ID NO. 93

25 His Gly Glu Gly Thr Phe Thr Ser Asp pentylgly Ser Lys Gln Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ. ID. NO. 93]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3253.5.

Example 87

Preparation of Peptide having SEQ ID NO. 94

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Naphthylala Ile Glu Phe Leu Lys Asn-
10 NH₂ [SEQ. ID. NO. 94]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3289.5.

Example 88

Preparation of Peptide having SEQ ID NO. 95

25 His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe tButylgly Glu Trp Leu Lys Asn-NH₂
[SEQ. ID. NO. 95]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3183.4.

Example 89

Preparation of Peptide having SEQ ID NO. 96

His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Asp Phe Leu Lys Asn-NH₂ [SEQ.
10 ID. NO. 96]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3237.6.

Example 90

Preparation of Peptide having SEQ ID NO. 97

25 His Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser Ser-NH₂ [SEQ. ID. NO. 97]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated
5 3637.9.

Example 91

Preparation of Peptide having SEQ ID NO. 98

His Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly-NH₂
10 [SEQ. ID. NO. 98]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
15 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then
20 carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3309.7.

Example 92

Preparation of Peptide having SEQ ID NO. 99

25 His Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
hPro Ser Ser Gly Ala hPro hPro-NH₂ [SEQ. ID. NO. 99]

The above-identified amidated peptide is assembled on 4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
30 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a similar way to Example 37. Double couplings are required at residues 36 and 31. Used in analysis are Solvent A (0.1% TFA

in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product peptide.

5 Electrospray Mass Spectrometry (M): calculated 3711.1.

Example 93

Preparation of C-terminal carboxylic acid peptides
corresponding to the above C-terminal amide sequences for
SEQ ID NOS. 7, 40-61, 68-75, 78-80 and 87-96

10 Peptides having the sequences of SEQ ID NOS. 7, 40-61, 68-75, 78-80 and 87-96 are assembled on the so called Wang resin (p-alkoxybenzylalcohol resin (Bachem, 0.54 mmole/g)) using Fmoc-protected amino acids (Applied Biosystems, Inc.), cleaved from the resin, deprotected and purified in a
15 similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then carried out to determine the retention time of the product
20 peptide. Electrospray Mass Spectrometry provides an experimentally determined (M).

Example 94

Preparation of C-terminal carboxylic acid peptides
corresponding to the above C-terminal amide sequences for
25 SEQ ID NOS. 62-67, 76, 77 and 81-86

Peptides having the sequences of SEQ ID NOS. 62-67, 76, 77 and 81-86 are assembled on the 2-chlorotriethylchloride resin (200-400 mesh), 2% DVB (Novabiochem, 0.4-1.0 mmole/g)) using Fmoc-protected amino acids (Applied Biosystems, Inc.),
30 cleaved from the resin, deprotected and purified in a similar way to Example 32. Used in analysis are Solvent A (0.1% TFA in water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30 minutes) of the lyophilized peptide is then

carried out to determine the retention time of the product peptide. Electrospray Mass Spectrometry provides an experimentally determined (M).

Example 95

5 Preparation of Peptide having SEQ ID NO. 100

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 100]

10 The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.). In
general, single-coupling cycles were used throughout the
synthesis and Fast Moc (HBTU activation) chemistry was
15 employed. Deprotection (Fmoc group removal) of the growing
peptide chain was achieved using piperidine. Final
deprotection of the completed peptide resin was achieved
using a mixture of triethylsilane (0.2 mL), ethanedithiol
(0.2 mL), anisole (0.2 mL), water (0.2 mL) and
20 trifluoroacetic acid (15 mL) according to standard methods
(Introduction to Cleavage Techniques, Applied Biosystems,
Inc.) The peptide was precipitated in ether/water (50 mL)
and centrifuged. The precipitate was reconstituted in
glacial acetic acid and lyophilized. The lyophilized peptide
25 was dissolved in water). Crude purity was about 75%.

Used in purification steps and analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).

The solution containing peptide was applied to a
preparative C-18 column and purified (10% to 40% Solvent B
30 in Solvent A over 40 minutes). Purity of fractions was
determined isocratically using a C-18 analytical column.
Pure fractions were pooled furnishing the above-identified
peptide. Analytical RP-HPLC (gradient 30% to 60% Solvent B
in Solvent A over 30 minutes) of the lyophilized peptide
35 gave product peptide having an observed retention time of

19.2 minutes. Electrospray Mass Spectrometry (M): calculated 3171.6; found 3172.

Example 96

Preparation of Peptide having SEQ ID NO. 101

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 101]

The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 36% to 46% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 14.9 minutes.
Electrospray Mass Spectrometry (M): calculated 3179.6; found
3180.

20 Example 97

Preparation of Peptide having SEQ ID NO. 102

His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 102]

25 The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 37% to 47% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 12.2 minutes.

Electrospray Mass Spectrometry (M): calculated 3251.6; found 3253.3.

Example 98

Preparation of Peptide having SEQ ID NO. 103

5 His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 103]

The above amidated peptide was assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis were Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 35% to 45% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide gave product
peptide having an observed retention time of 16.3 minutes.
Electrospray Mass Spectrometry (M): calculated 3193.6; found
3197.

20 Example 99

Preparation of Peptide having SEQ ID NO. 104

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 104]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3228.6.

Example 100

Preparation of Peptide having SEQ ID NO. 105

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 105]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3234.7.

20 Example 101

Preparation of Peptide having SEQ ID NO. 106

His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂
[SEQ. ID. NO. 106]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3308.7.

Example 102

Preparation of Peptide having SEQ ID NO. 107

5 His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 107]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3250.7

20 Example 103

Preparation of Peptide having SEQ ID NO. 108

His Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 108]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3252.6.

Example 104

Preparation of Peptide having SEQ ID NO. 109

5 Ala Ala Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 109]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3200.6.

20 Example 105

Preparation of Peptide having SEQ ID NO. 110

Ala Ala Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 110]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3143.5.

Example 106

Preparation of Peptide having SEQ ID NO. 111

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 111]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3214.6.

20 Example 107

Preparation of Peptide having SEQ ID NO. 112

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 112]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3157.5.

Example 108

Preparation of Peptide having SEQ ID NO. 113

5 Ala Gly Asp Gly Ala Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 113]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3184.6.

20 Example 109

Preparation of Peptide having SEQ ID NO. 114

Ala Gly Asp Gly Ala Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 114]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3127.5.

Example 110

Preparation of Peptide having SEQ ID NO. 115

5 Ala Gly Asp Gly Thr NaphthylAla Thr Ser Asp Leu Ser Lys Gln
Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-
NH₂ [SEQ. ID. NO. 115]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3266.4.

20 EXAMPLE 111

Preparation of Peptide having SEQ ID NO. 116

Ala Gly Asp Gly Thr NaphthylAla Thr Ser Asp Leu Ser Lys Gln
Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-
NH₂ [SEQ. ID. NO. 116]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3209.4.

Example 112

Preparation of Peptide having SEQ ID NO. 117

5 Ala Gly Asp Gly Thr Phe Ser Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 117]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3200.6.

20 Example 113

Preparation of Peptide having SEQ ID NO. 118

Ala Gly Asp Gly Thr Phe Ser Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 118]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3143.5.

Example 114

Preparation of Peptide having SEQ ID NO. 119

5 Ala Gly Asp Gly Thr Phe Thr Ala Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 119]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3198.6.

20 Example 115

Preparation of Peptide having SEQ ID NO. 120

Ala Gly Asp Gly Thr Phe Thr Ala Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 120]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3141.5.

Example 116

Preparation of Peptide having SEQ ID NO. 121

5 Ala Gly Asp Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 121]

The above-identified peptide is assembled on 4-(2'-4'-
dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3170.6.

20 Example 117

Preparation of Peptide having SEQ ID NO. 122

Ala Gly Asp Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 122]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3113.5.

Example 118

Preparation of Peptide having SEQ ID NO. 123

5 Ala Gly Asp Gly Thr Phe Thr Ser Glu Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 123]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3228.6.

20 Example 119

Preparation of Peptide having SEQ ID NO. 124

Ala Gly Asp Gly Thr Phe Thr Ser Glu Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 124]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3171.6.

Example 120

Preparation of Peptide having SEQ ID NO. 125

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 125]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3172.5.

20 Example 121

Preparation of Peptide having SEQ ID NO. 126

Ala Gly Asp Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 126]

25 The above-identified amidated peptiden is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3115.4.

Example 122

Preparation of Peptide having SEQ ID NO. 127

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Pentylgly Ser Lys Gln
Met Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-
NH₂ [SEQ. ID. NO. 127]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3230.4.

20 Example 123

Preparation of Peptide having SEQ ID NO. 128

Ala Gly Asp Gly Thr Phe Thr Ser Asp Pentylgly Ser Lys
Gln Leu Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys
Asn-NH₂ [SEQ. ID. NO. 128]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3198.6.

Example 124

Preparation of Peptide having SEQ ID NO. 129

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ala Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 129]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3141.5.

20 Example 125

Preparation of Peptide having SEQ ID NO. 130

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ala Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 130]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3157.5.

Example 126

Preparation of Peptide having SEQ ID NO. 131

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Ala Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 131]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3100.4.

20 Example 127

Preparation of Peptide having SEQ ID NO. 132

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Ala Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 132]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3157.6.

Example 128

Preparation of Peptide having SEQ ID NO. 133

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Ala Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 133]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3100.5.

20 Example 129

Preparation of Peptide having SEQ ID NO. 134

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Ala Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 134]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3100.5.

Example 130

Preparation of Peptide having SEQ ID NO. 135

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Ala Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 135]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3154.5.

20 Example 131

Preparation of Peptide having SEQ ID NO. 136

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Ala Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 136]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3115.5.

Example 132

Preparation of Peptide having SEQ ID NO. 137

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln
Pentylgly Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu
Lys Asn-NH₂ [SEQ. ID. NO. 137]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3212.4.

20 Example 133

Preparation of Peptide having SEQ ID NO. 138

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln
Pentylgly Glu Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu
Lys Asn-NH₂ [SEQ. ID. NO. 138]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3173.4.

Example 134

Preparation of Peptide having SEQ ID NO. 139

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Ala
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 139]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3156.6.

20 Example 135

Preparation of Peptide having SEQ ID NO. 140

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Ala
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 140]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3099.5.

Example 136

Preparation of Peptide having SEQ ID NO. 141

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Ala Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 141]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3156.6.

20 Example 137

Preparation of Peptide having SEQ ID NO. 142

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Ala Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 142]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3099.5.

Example 138

Preparation of Peptide having SEQ ID NO. 143

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Ala Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 143]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3156.6.

20 Example 139

Preparation of Peptide having SEQ ID NO. 144

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Ala Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 144]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3099.5.

Example 140

Preparation of Peptide having SEQ ID NO. 145

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Ala Arg Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 145]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3186.6.

20 Example 141

Preparation of Peptide having SEQ ID NO. 146

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Ala Arg Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 146]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3129.5.

Example 142

Preparation of Peptide having SEQ ID NO. 147

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Ala Leu Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 147]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3129.5.

20 Example 143

Preparation of Peptide having SEQ ID NO. 148

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Ala Leu Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 148]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3072.4.

Example 144

Preparation of Peptide having SEQ ID NO. 149

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Ala Phe Ile Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 149]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3172.5.

20 Example 145

Preparation of Peptide having SEQ ID NO. 150

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Ala Phe Ile Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 150]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3115.5.

Example 146

Preparation of Peptide having SEQ ID NO. 151

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Naphthylala Ile Glu Trp Leu Lys Asn-
NH₂ [SEQ. ID. NO. 151]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3266.4.

20 Example 147

Preparation of Peptide having SEQ ID NO. 152

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Naphthylala Ile Glu Phe Leu Lys Asn-
NH₂ [SEQ. ID. NO. 152]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3209.4.

Example 148

Preparation of Peptide having SEQ ID NO. 153

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Val Glu Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 153]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3200.6.

20 Example 149

Preparation of Peptide having SEQ ID NO. 154

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Val Glu Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 154]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3143.5.

Example 150

Preparation of Peptide having SEQ ID NO. 155

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe tButylgly Glu Trp Leu Lys Asn-NH₂
[SEQ. ID. NO. 155]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3216.5.

20 Example 151

Preparation of Peptide having SEQ ID NO. 156

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe tButylgly Glu Phe Leu Lys Asn-NH₂
[SEQ. ID. NO. 156]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3159.4.

Example 152

Preparation of Peptide having SEQ ID NO. 157

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Asp Trp Leu Lys Asn-NH₂ [SEQ.
ID. NO. 157]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3200.6.

20 Example 153

Preparation of Peptide having SEQ ID NO. 158

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Asp Phe Leu Lys Asn-NH₂ [SEQ.
ID. NO. 158]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3143.5.

Example 154

Preparation of Peptide having SEQ ID NO. 159

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Ala Leu Lys Asn-NH₂ [SEQ.
ID. NO. 159]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3099.5.

20 Example 155

Preparation of Peptide having SEQ ID NO. 160

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Ala Leu Lys Asn-NH₂ [SEQ.
ID. NO. 160]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3081.4.

Example 156

Preparation of Peptide having SEQ ID NO. 161

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Ala Lys Asn-NH₂ [SEQ.
ID. NO. 161]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3172.5.

20 Example 157

Preparation of Peptide having SEQ ID NO. 162

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Ala Lys Asn-NH₂ [SEQ.
ID. NO. 162]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3115.5.

Example 158

Preparation of Peptide having SEQ ID NO. 163

- 5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Ala Asn-NH₂ [SEQ.
ID. NO. 163]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3157.5.

20 Example 159

Preparation of Peptide having SEQ ID NO. 164

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Ala Asn-NH₂ [SEQ.
ID. NO. 164]

- 25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3100.4.

Example 160

Preparation of Peptide having SEQ ID NO. 165

5 Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Ala-NH₂ [SEQ.
ID. NO. 165]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3171.6.

20 Example 161

Preparation of Peptide having SEQ ID NO. 166

Ala Gly Asp Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Ala-NH₂ [SEQ.
ID. NO. 166]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3114.5.

Example 162

Preparation of Peptide having SEQ ID NO. 167

5 Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro Pro-NH₂ [SEQ. ID. NO. 167]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4033.5.

20 Example 163

Preparation of Peptide having SEQ ID NO. 168

His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro Pro-NH₂ [SEQ. ID. NO. 168]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3984.4.

Example 164

Preparation of Peptide having SEQ ID NO. 169

5 His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro-NH₂ [SEQ. ID. NO. 169]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4016.5.

20 Example 165

Preparation of Peptide having SEQ ID NO. 170

His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro-NH₂ [SEQ. ID. NO. 170]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3861.3.

Example 166

Preparation of Peptide having SEQ ID NO. 171

5 Ala Gly Glu Gly Thr Phe Thr Ser Asp Ala Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro-NH₂ [SEQ. ID. NO. 171]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3746.1.

20 Example 167

Preparation of Peptide having SEQ ID NO. 172

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 172]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3742.1.

Example 168

Preparation of Peptide having SEQ ID NO. 173

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 173]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3693.1.

20 Example 169

Preparation of Peptide having SEQ ID NO. 174

His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly-NH₂ [SEQ. ID. NO. 174]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3751.2.

Example 170

Preparation of Peptide having SEQ ID NO. 175

5 His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser-NH₂ [SEQ. ID. NO. 175]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3634.1.

20 Example 171

Preparation of Peptide having SEQ ID NO. 176

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser-NH₂ [SEQ. ID. NO. 176]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3526.9.

Example 172

Preparation of Peptide having SEQ ID NO. 177

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser-NH₂ [SEQ. ID. NO. 177]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3477.9.

20 Example 173

Preparation of Peptide having SEQ ID NO. 178

His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro-NH₂ [SEQ. ID. NO. 178]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3519.9.

Example 174

Preparation of Peptide having SEQ ID NO. 179

5 His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly-
NH₂ [SEQ. ID. NO. 179]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3307.7.

20 Example 175

Preparation of Peptide having SEQ ID NO. 180

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly-NH₂
[SEQ. ID. NO. 180]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3186.5.

Example 176

Preparation of Peptide having SEQ ID NO. 181

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
tPro Ser Ser Gly Ala tPro tPro tPro-NH₂ [SEQ. ID. NO. 181]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Double couplings are required at
residues 37,36 and 31. Used in analysis are Solvent A (0.1%
15 TFA in water) and Solvent B (0.1% TFA in ACN). Analytical
RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30
minutes) of the lyophilized peptide is then carried out to
determine the retention time of the product peptide.
Electrospray Mass Spectrometry (M): calculated 4121.1.

20 Example 177

Preparation of Peptide having SEQ ID NO. 182

His Gly Glu Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala tPro tPro tPro-NH₂ [SEQ. ID. NO. 182].

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Double couplings are required at
residues 37, 36 and 31. Used in analysis are Solvent A (0.1%
TFA in water) and Solvent B (0.1% TFA in ACN). Analytical
RP-HPLC (gradient 30% to 60% Solvent B in Solvent A over 30
minutes) of the lyophilized peptide is then carried out to

determine the retention time of the product peptide.
Electrospray Mass Spectrometry (M): calculated 4173.2.

Example 178

Preparation of Peptide having SEQ ID NO. 183

5 His Gly Glu Gly Thr Phe Thr Ser Ala Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
NMeala Ser Ser Gly Ala NMeala NMeala-NH₂ [SEQ. ID. NO. 183]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Compound 1. Double couplings are required at
residues 36 and 31. Used in analysis are Solvent A (0.1% TFA
15 in water) and Solvent B (0.1% TFA in ACN). Analytical RP-
HPLC (gradient 30% to 60% Solvent B in Solvent A over 30
minutes) of the lyophilized peptide is then carried out to
determine the retention time of the product peptide.
Electrospray Mass Spectrometry (M): calculated 3796.1.

20 Example 179

Preparation of Peptide having SEQ ID NO. 184

Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
hPro Ser Ser Gly Ala hPro-NH₂ [SEQ. ID. NO. 184]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. A double coupling is required at
residue 31. Used in analysis are Solvent A (0.1% TFA in
water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC
(gradient 30% to 60% Solvent B in Solvent A over 30 minutes)
of the lyophilized peptide is then carried out to determine

the retention time of the product peptide. Electrospray Mass Spectrometry (M): calculated 3871.1.

Example 180

Preparation of Peptide having SEQ ID NO. 185

5 His Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala-NH₂ [SEQ. ID. NO. 185]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
3750.2.

20 Example 181

Preparation of Peptide having SEQ ID NO. 186

His Gly Asp Ala Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly-
NH₂ [SEQ. ID. NO. 186]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 3408.8.

Example 182

Preparation of Peptide having SEQ ID NO. 187

5 Ala Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro Pro Ser-NH₂ [SEQ. ID. NO. 187]

The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
10 norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
15 Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product
peptide. Electrospray Mass Spectrometry (M): calculated
4120.6.

20 Example 183

Preparation of Peptide having SEQ ID NO. 188

Ala Gly Ala Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Leu Glu
Glu Glu Ala Val Arg Leu Phe Ile Glu Phe Leu Lys Asn Gly Gly
Pro Ser Ser Gly Ala Pro Pro Pro Ser-NH₂ [SEQ. ID. NO. 188]

25 The above-identified amidated peptide is assembled on
4-(2'-4'-dimethoxyphenyl)-Fmoc aminomethyl phenoxy acetamide
norleucine MBHA resin (Novabiochem, 0.55 mmole/g) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
30 similar way to Example 95. Used in analysis are Solvent A
(0.1% TFA in water) and Solvent B (0.1% TFA in ACN).
Analytical RP-HPLC (gradient 30% to 60% Solvent B in Solvent
A over 30 minutes) of the lyophilized peptide is then
carried out to determine the retention time of the product

peptide. Electrospray Mass Spectrometry (M): calculated 4005.5.

Example 184

Preparation of C-terminal carboxylic acid peptides

5 corresponding to the above C-terminal amide sequences for
Peptides having SEQ ID NOS. 100-166, 172-177, 179-180 and
185-188.

C-terminal carboxylic acid peptides corresponding to
amidated having SEQ ID NOS. 100-166, 172-177, 179-180 and
10 185-188 are assembled on the so called Wang resin (p-
alkoxybenzylalcohol resin (Bachem, 0.54 mmole/g)) using
Fmoc-protected amino acids (Applied Biosystems, Inc.),
cleaved from the resin, deprotected and purified in a
similar way to that described in Example 95. Used in
15 analysis are Solvent A (0.1% TFA in water) and Solvent B
(0.1% TFA in ACN). Analytical RP-HPLC (gradient 30% to 60%
Solvent B in Solvent A over 30 minutes) of the lyophilized
peptide is then carried out to determine the retention time
of the product peptide. Electrospray Mass Spectrometry
20 provides an experimentally determined (M).

EXAMPLE 185

Preparation of C-terminal carboxylic acid peptides

corresponding to the above C-terminal amide sequences for
Peptides having SEQ ID NOS. 167-171, 178 and 181-184.

25 C-terminal carboxylic acid peptides corresponding to
amidated SEQ ID NOS. 167-171, 178 and 181-184 are assembled
on the 2-chlorotriethylchloride resin (200-400 mesh), 2% DVB
(Novabiochem, 0.4-1.0 mmole/g)) using Fmoc-protected amino
acids (Applied Biosystems, Inc.), cleaved from the resin,
30 deprotected and purified in a similar way to that described
in Example 95. Used in analysis are Solvent A (0.1% TFA in
water) and Solvent B (0.1% TFA in ACN). Analytical RP-HPLC
(gradient 30% to 60% Solvent B in Solvent A over 30 minutes)
of the lyophilized peptide is then carried out to determine

the retention time of the product peptide. Electrospray Mass Spectrometry provides an experimentally determined (M).

Example 186

Evaluation of Ability to Cross Placenta

5 I. Introduction

The purpose of this experiment was to determine whether this exendin-4, when delivered to the maternal circulation, is transported across the placenta and is detectable in amniotic fluid or fetal blood.

10 II. Materials and Methods

Animals:

Female Harlan Sprague Dawley rats (age 12 weeks, 17-21 days pregnant, approximately 300 grams) were housed at 22.8 +/- 0.8 °C in a 12:12 hour light : dark cycle. All
15 experiments were performed during the light cycle. Animals were given free access to food and water until the start of the experiment.

Sample collection:

Rats were anesthetized with 5% halothane and then
20 maintained with 2% halothane during the surgical procedures. Body temperature was measured and controlled using a thermistor probe/controller (Model 73A, YSI, Yellow Springs, OH) and a heated operating table. Blood was collected from the tail vein immediately prior to a subcutaneous injection
25 of exendin-4 (AC2993 Amylin Pharmaceuticals, Inc.) or vehicle (100µl 0.15M NaCl) at t = 0. At t = 30 minutes, when plasma concentrations following a subcutaneous injection have been found to be maximal, another blood sample was taken. Immediately thereafter, a midline
30 laparotomy was made to expose the uterine horns. Fluid was collected from the individual amniotic sacs by aspiration through a 16g needle into a syringe. The amniotic fluids from individual fetuses were pooled from a given rat, but fluids from each rat were kept separate. Fetal blood was

collected by heart puncture with a 28g microfine needle and aspirated into a syringe. Amniotic fluid and fetal blood samples were collected within 10 minutes of when the laparotomy was made ($t = 30-40$ min.). All blood and fluid
5 samples were centrifuged. The plasma or supernatant was stored at -70°C until assayed.

Treatment groups:

There were 2 treatment groups:

Group A: Rats receiving exendin-4 dissolved at
10 $21\mu\text{g}/100\mu\text{l}$ in 0.15M NaCl $n=4$.

Group B: Rats receiving exendin-4 dissolved at
 $210\mu\text{g}/100\mu\text{l}$ in 0.15M NaCl $n=5$.

III. Results

Exendin-4 was not detected in any of the baseline
15 samples, taken at $t = 0$, when measured by a specific IRMA (immuno-radio-metric-assay) which has a LLQ (low limit of quantitation) of 15pM . At $t = 30$ plasma levels of exendin-4 in the mother rats that received $21\mu\text{g}$ exendin-4 were $16.47\text{nM} \pm 2.45$. Values obtained from amniotic fluid ($6.1 \pm 5.3\text{pM}$) and
20 fetal blood ($12.7 \pm 6.5\text{pM}$) were 2700-fold and 1300-fold less than those in plasma and were generally below the lower limit of quantitation of the assay (Figure 2). Similar results were obtained with the rats receiving $210\mu\text{g}$ exendin-4 where plasma levels in the mother rats at $t = 30$ were
25 $232.16\text{nM} \pm 63.45$ (Figure 3). Values obtained from amniotic fluid ($18.3 \pm 9.3\text{pM}$) and fetal blood ($16.9 \pm 13.8\text{pM}$) were 12,680-fold and 13,750-fold less than those in plasma and were undetectable in over half of the samples.

IV. Discussion

30 The placenta is the organ responsible for nutrient and waste exchange between the fetus and the mother. Maternal and fetal circulations are separated by an epithelial layer that allows or denies diffusion or carrier mediated transport of substances across the interface. The risk of

adverse effects on the fetus can be related to the extent to which the drug enters the fetal circulation. The data obtained here indicate that, even with high injected doses, which may exceed the per-kilogram doses administered to humans by up to 3000-fold, little or no exendin-4 appeared in the fetal circulation or amniotic fluid. Six out of 15 measurements were above the lower limit of quantitation, and in 9 of 15, exendin-4 was undetectable. In those samples in which exendin-4 was measurable, its presence may have been due to contamination from maternal blood (which need be present only at 1:1,000-1:10,000 to be measurable). Such contamination is possible following laparotomy of the dam and puncture of the fetus.

Various modifications of the invention in addition to those shown and described herein will become apparent to those skilled in the art from the foregoing description and fall within the scope of the following claims.

Claims

1. A method for treating gestational diabetes mellitus in a subject comprising administering to said subject a therapeutically effective amount of an exendin or
5 an exendin agonist.

2. The method according to claim 1 wherein said exendin or exendin agonist is administered continuously.

3. The method according to claim 1 wherein said administration is by injection.

10 4. The method according to claim 3 wherein the injection is a subcutaneous injection.

5. The method according to claim 1 wherein about 1 μg -30 μg to about 1 mg of the exendin or exendin agonist is administered per day.

15 6. The method according to claim 1 wherein about 1 μg -30 μg to about 500 μg of the exendin or exendin agonist is administered per day.

7. The method according to claim 1 wherein about 1 μg -30 μg to about 100 μg of the exendin or exendin agonist
20 is administered per day.

8. The method according to claim 1, wherein about 3 μg to about 50 μg of the exendin or exendin agonist is administered per day.

9. The method of claim 1 wherein said subject is
25 human.

10. A method for reducing blood glucose level of a subject having gestational diabetes mellitus comprising administering to said subject a therapeutically effective amount of an exendin or an exendin agonist.

5 11. The method according to any of claims 1-10 wherein said exendin is exendin-3.

12. The method according to any of claims 1-10 wherein said exendin is exendin-4.

10 13. The method according to any of claims 1-10 wherein said exendin agonist is selected from the group consisting of exendin-4 acid, exendin-4 (1-30), exendin-4 (1-30) amide, exendin-4 (1-28) amide, ¹⁴Leu,²⁵Phe exendin-4 amide, and ¹⁴Leu,²⁵Phe exendin-4 (1-28) amide.

15 14. The method according to any of claims 1-10, further comprising administering a therapeutically effective amount of one or more compounds selected from the group consisting of an insulin and an amylin agonist.

20 15. The method according to any of claims 1-10 wherein said exendin agonist is an exendin agonist according to Formula I.

16. The method according to any of claims 1-10 wherein said exendin agonist is an exendin agonist according to Formula II.

25 17. The method according to any of claims 1-10 wherein said exendin agonist is an exendin agonist according to Formula III.

¹ Xaa₁ Xaa₂ Xaa₃ Gly ⁵ Thr Xaa₄ Xaa₅ Xaa₆ Xaa₇ Xaa₈ Ser Lys Gln Xaa₉ Glu ¹⁵ Glu Ala Val Arg ²⁰ Leu
²⁵ Xaa₁₀ Xaa₁₁ Xaa₁₂ Xaa₁₃ Leu Lys Asn Gly Gly Xaa₁₄ Ser Ser Gly Ala Xaa₁₅ Xaa₁₆ Xaa₁₇ Xaa₁₈-Z
³⁰ ³⁵

[SEQ.ID.NO.]	Xaa ₁	Xaa ₂	Xaa ₃	Xaa ₄	Xaa ₅	Xaa ₆	Xaa ₇	Xaa ₈	Xaa ₉	Xaa ₁₀	Xaa ₁₁	Xaa ₁₂	Xaa ₁₃	Xaa ₁₄	Xaa ₁₅	Xaa ₁₆	Xaa ₁₇	Xaa ₁₈	Z
9	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Ile	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
10	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
11	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
12	Tyr	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
13	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Tyr	NH ₂
14	His	Gly	Asp	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
15	His	Gly	Glu	Glu	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
16	His	Gly	Glu	Phe	Ser	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
17	His	Gly	Glu	Phe	Ser	Thr	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
18	His	Gly	Glu	Phe	Thr	Thr	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
19	His	Gly	Glu	Phe	Thr	Ser	Glu	Leu	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
20	His	Gly	Glu	Phe	Thr	Ser	Asp	pGly	Met	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
21	His	Gly	Glu	Phe	Thr	Ser	Asp	pGly	Leu	Phe	Ile	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
22	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	pGly	Phe	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂

Fig. 1A

[SEQ.ID.NO.]	Xaa ₁	Xaa ₂	Xaa ₃	Xaa ₄	Xaa ₅	Xaa ₆	Xaa ₇	Xaa ₈	Xaa ₉	Xaa ₁₀	Xaa ₁₁	Xaa ₁₂	Xaa ₁₃	Xaa ₁₄	Xaa ₁₅	Xaa ₁₆	Xaa ₁₇	Xaa ₁₈	Z
23	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	pGly	Phe	Ile	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
24	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	naph	Ile	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
25	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Val	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
26	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Val	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
27	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	tBuG	Glu	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
28	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	tBuG	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
29	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Asp	Trp	Pro	Pro	Pro	Pro	Ser	NH ₂
30	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Phe	Pro	Pro	Pro	Pro	Ser	NH ₂
31	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	tPro	tPro	tPro	tPro	Ser	NH ₂
32	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	tPro	tPro	tPro	Ser	NH ₂
33	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	hPro	hPro	hPro	hPro	Ser	NH ₂
34	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	hPro	hPro	hPro	Ser	NH ₂
35	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Ile	Glu	Phe	tPro	tPro	tPro	tPro	Ser	NH ₂
36	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Ile	Glu	Phe	hPro	hPro	hPro	hPro	Ser	NH ₂
37	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	MeAla	MeAla	MeAla	MeAla	Ser	NH ₂
38	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Met	Phe	Ile	Glu	Trp	Pro	MeAla	MeAla	MeAla	Ser	NH ₂
39	His	Gly	Glu	Phe	Thr	Ser	Asp	Leu	Leu	Phe	Val	Glu	Phe	MeAla	MeAla	MeAla	MeAla	Ser	NH ₂

Fig. 1B

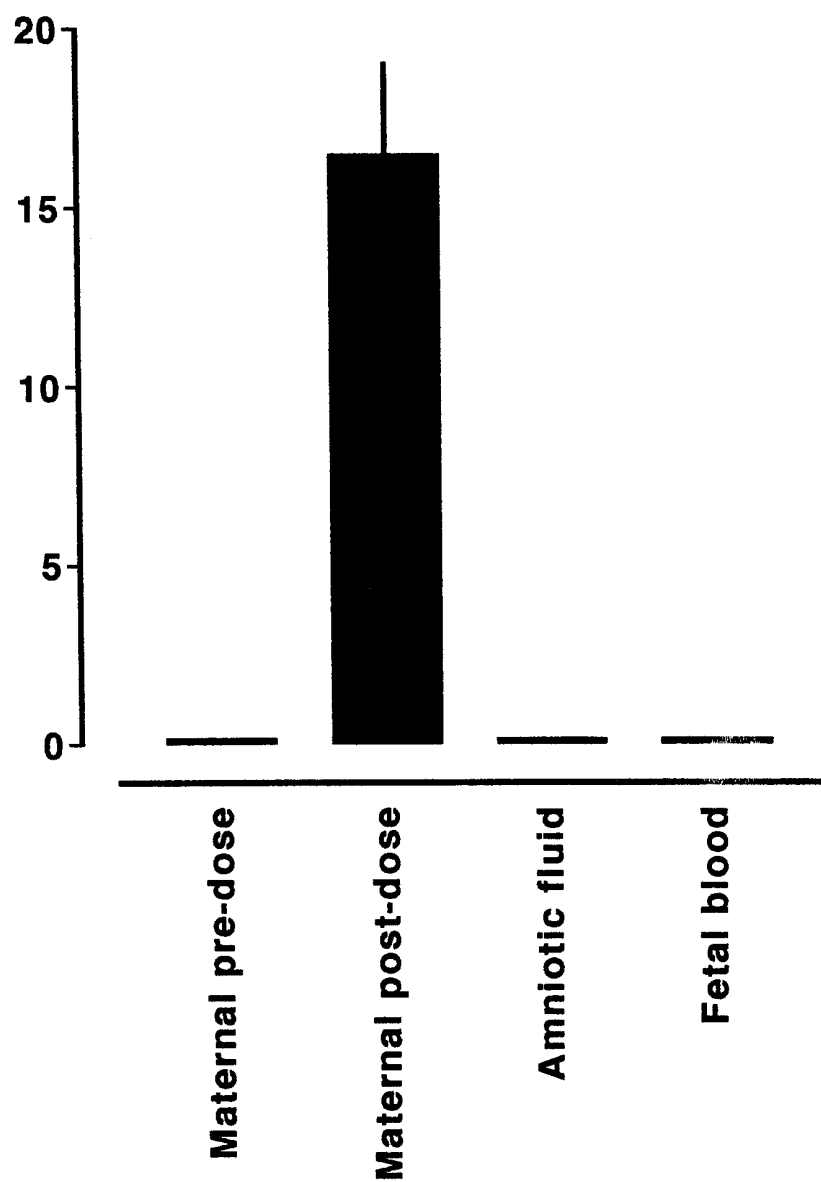
Fig. 2

Fig. 3