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申請實體審查：無 申請專利範圍項數：32 項 圖式數：44 共 513 頁

(54)名稱

新穎哺乳動物表現的人類免疫缺乏病毒外套膜蛋白抗原

NOVEL MAMMALIAN EXPRESSED HUMAN IMMUNODEFICIENCY VIRUS ENVELOPE PROTEIN ANTIGENS

(57)摘要

本發明之各個實施例係關於包含 HIV 外套膜蛋白及融合蛋白之 1 至 10 個或更多個表位之多肽，其中前述多肽缺少 HIVgp41 蛋白之跨膜結構域。前述多肽可在哺乳動物細胞例如人類細胞中表現，產生例如可用於研發新穎抗-HIV 抗體之多肽。本文所述之多肽及自其研發之新穎抗體通常可用於醫學診斷，且其亦可用於 HIV 之預防及治療性治療。

Various embodiments of the invention relate to polypeptides comprising 1-10 or more epitopes of the HIV envelope protein and a fusion protein, wherein the polypeptide lacks the transmembrane domain of the HIV gp41 protein. Such polypeptides may be expressed in mammalian cells, such as human cells, to produce, for example, polypeptides that are useful in developing novel anti-HIV antibodies. Polypeptides described herein and novel antibodies developed therefrom are generally useful for medical diagnostics, and they may also be useful in the prophylactic and therapeutic treatment of HIV.

指定代表圖：

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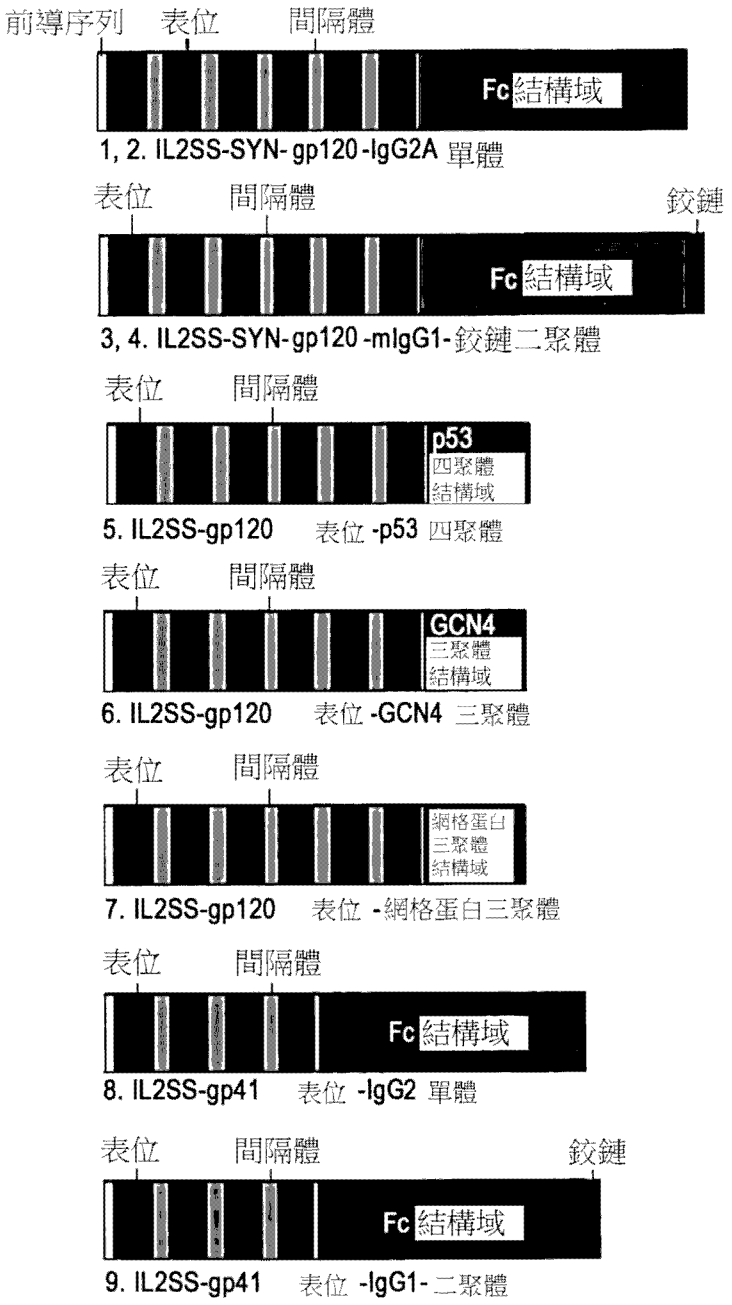


圖 1

發明專利說明書

【發明名稱】(中文/英文)

新穎哺乳動物表現的人類免疫缺乏病毒外套膜蛋白抗原

NOVEL MAMMALIAN EXPRESSED HUMAN IMMUNODEFICIENCY VIRUS ENVELOPE PROTEIN ANTIGENS

【技術領域】

【0001】 本申請案與電子序列表一起藉由EFS-Web作為ASCII文字檔案提交。電子序列表係以創建於2018年11月15日，且最後保存於此之標題為SEQLIST1800393.txt之檔案形式提供，其大小為501,813個位元組。電子序列表中之資訊之全文皆以引用方式併入本文中。

【0002】 本揭示內容係關於重組蛋白之領域。本揭示內容之一些實施例係關於HIV外套膜重組多肽，該等重組多肽包含HIV gp120或HIV gp41蛋白之至少一個表位及融合蛋白。本揭示內容亦係關於用於分析含有HIV抗體之樣品之方法及裝置。

【先前技術】

【0003】 HIV造成了一場全球性流行病，估計有3500萬人死於AIDS相關疾病。據估計，2016年新增180萬HIV病例，全世界約有3670萬人受到感染。HIV係慢病毒亞組中逆轉錄病毒家族之成員，且具有兩種所述類型：HIV-1及HIV-2。HIV-1比HIV-2更具傳染性及毒性，且其引起世界上大多數的HIV感染。

【0004】 每個HIV病毒體含有兩個RNA拷貝(copies)，編碼9個基因及19個蛋白質。完整病毒體表面上之唯一蛋白質係由*env*基因編碼之外套膜糖蛋白。*env*基因之產物係大約850個胺基酸

之前體蛋白，稱為gp160。此蛋白由內質網中之細胞蛋白酶furin裂解成兩種裂解產物gp120及gp41。gp120及gp41皆以三聚體之形式存在於細胞表面上，形成異二聚體「尖峰」。gp41係跨膜糖蛋白，充當細胞外gp120之錨，其與細胞外gp120非共價結合。gp120含有淋巴細胞上細胞受體之結合位點，且對病毒進入細胞至關重要。

【0005】 作為病毒體表面上之唯一蛋白質，gp120及gp41暴露宿主免疫系統所靶向之許多免疫顯性表位。該等蛋白質之形式在歷史上已用於免疫分析，以捕獲及檢測針對該等蛋白質之抗體，作為HIV感染之確認。

【0006】 gp120及gp41可用於疫苗接種、診斷分析及診斷分析之發展。重組gp120及gp41通常在酵母中產生，但在酵母中產生gp120及gp41具有挑戰性，此乃因為蛋白質可能會錯誤折疊、聚集及/或產生異常之轉譯後修飾。此外，自酵母純化gp120及gp41係一個艱難之多步驟過程。因此，業內期望用於生產gp120及gp41抗原之改良組合物及方法。

【發明內容】

【0007】 本發明之多個實施例係關於重組多肽，該重組多肽包含HIV外套膜蛋白之至少一個表位及融合蛋白，其中重組多肽缺少跨膜結構域，且融合蛋白包含並不由HIV編碼之胺基酸序列。

【0008】 本發明之多個實施例係關於重組多肽，該重組多肽包含前導肽、融合蛋白、HIV gp120蛋白之至少一個表位及/或HIV gp41蛋白之至少一個表位；其中融合蛋白包含並不由HIV編碼之區域，該區域選自由以下組成之群：抗體之Fc結構域、p53結構域、GCN4結構域或網格蛋白結構域，且其中重組多肽

缺少跨膜結構域。

【0009】 本發明之重組多肽缺少跨膜結構域，該跨膜結構域具有選自由以下組成之群之胺基酸序列：SEQ ID NO:63、SEQ ID NO:64、SEQ ID NO:65、SEQ ID NO:66、SEQ ID NO:67、SEQ ID NO:68、SEQ ID NO:69、SEQ ID NO:70、SEQ ID NO:71或SEQ ID NO:72。

【0010】 本發明之重組多肽可包含HIV外套膜蛋白之複數個表位。在一些實施例中，重組多肽包含至少4個、5個、6個、7個、8個、9個或10個表位。在一些實施例中，每一表位藉由連接體連接至另一表位，該連接體之胺基酸序列並不由HIV編碼。在一些實施例中，將每一表位連接至另一表位之連接體包含以下中所示之胺基酸序列：SEQ ID NO: 73、SEQ ID NO:74、SEQ ID NO:75、SEQ ID NO:76、SEQ ID NO:109、SEQ ID NO:110或SEQ ID NO:111。

【0011】 多肽可包含HIV外套膜蛋白之複數個表位，其中複數個表位之每一表位藉由並不由HIV編碼之胺基酸序列連接至複數個表位另一表位。舉例而言，複數個表位之每一表位可藉由連接體連接至複數個表位之另一表位。在一些實施例中，複數個表位之每一表位可藉由連接體連接至複數個表位之另一表位，例如，其中每一連接體包含α螺旋或β折疊股。複數個表位可包含至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位。包含複數個表位之多肽可包含SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:20、SEQ ID NO:21或SEQ ID NO:22中所示之胺基酸序列，或與SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID

NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:20、SEQ ID NO:21或SEQ ID NO:22中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0012】 多肽可包含HIV gp120蛋白之一或多個表位、HIV gp41蛋白之一或多個表位或HIV gp120蛋白及HIV gp41蛋白二者之一或多個表位。

【0013】 在一些實施例中，重組多肽包含SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:9、SEQ ID NO:14、SEQ ID NO:15、SEQ ID NO:16、SEQ ID NO:17、SEQ ID NO:18、SEQ ID NO:19、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105或SEQ ID NO:106中所示之胺基酸序列，或與SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:9、SEQ ID NO:14、SEQ ID NO:15、SEQ ID NO:16、SEQ ID NO:17、SEQ ID NO:18、SEQ ID NO:19、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID

NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105或SEQ ID NO:106中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0014】 在一些實施例中，重組多肽之融合蛋白可包含抗體Fc結構域。在一些實施例中，融合蛋白包含抗體Fc結構域，其胺基酸序列係選自由以下組成之群：SEQ ID. NO: 77、SEQ ID. NO: 78、SEQ ID. NO: 80或SEQ ID. NO: 107。

【0015】 在一些實施例中，融合蛋白之抗體Fc結構域缺少寡聚結構域，且重組多肽係單體。該等單體多肽可包含SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:8、SEQ ID NO:10、SEQ ID NO:12、SEQ ID NO:14、SEQ ID NO:16、SEQ ID NO:18、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:86、SEQ ID NO:88、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105或SEQ ID NO:106中所示之胺基酸序列，或與SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:8、SEQ ID NO:10、SEQ ID NO:12、SEQ ID NO:14、SEQ ID NO:16、SEQ ID NO:18、SEQ ID NO:20、SEQ ID NO:21、SEQ ID

NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:86、SEQ ID NO:88、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105或SEQ ID NO:106中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0016】 在一些實施例中，重組多肽之融合蛋白之抗體Fc結構域包含二聚化結構域。該等重組多肽可包含SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17、SEQ ID NO:19、SEQ ID NO:87或SEQ ID NO:89中所示之胺基酸序列，或與SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17、SEQ ID NO:19、SEQ ID NO:87或SEQ ID NO:89中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0017】 在一些實施例中，重組多肽之融合蛋白可包含寡聚結構域。在一些實施例中，重組多肽之融合蛋白包含選自由以下組成之群之寡聚結構域：p53、GCN4、網格蛋白或抗體(例如包含抗體鉸鏈區)之Fc結構域。該等多肽可包含SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17、SEQ ID NO:19、SEQ ID NO:87或SEQ ID NO:89中所

示之胺基酸序列，或與SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17、SEQ ID NO:19、SEQ ID NO:87或SEQ ID NO:89中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0018】 多肽可包含HIV gp120及/或HIV gp41之表位。多肽可包含HIV gp120之1個、2個、3個、4個、5個、6個、7個、8個、9個或10個表位及/或HIV gp41之1個、2個、3個、4個、5個、6個、7個、8個、9個或10個表位。

【0019】 多肽可包含前導肽。在一些實施例中，重組多肽之N末端可由前導肽組成且前導肽能夠在多肽在哺乳動物細胞中轉譯後使重組多肽轉移至哺乳動物細胞(例如人類細胞)之細胞膜表面外。在一些實施例中，前導肽包含SEQ ID NO:84中所示之胺基酸序列。

【0020】 在一些實施例中，重組多肽之融合蛋白係前導肽，但融合蛋白通常不為前導肽。在其中融合蛋白係前導肽之實施例中，重組多肽包含HIV gp120之表位及HIV gp41之表位，且重組多肽缺少gp120/gp41裂解位點。該等多肽可包含SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37或SEQ ID NO:38中所示之胺基酸序列，或與SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37或SEQ ID NO:38中所示之胺基酸序列具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0021】 在一些實施例中，重組多肽進一步包含多組胺酸親和標籤。

【0022】 本發明之一些實施例係關於寡聚多肽，包含至少兩個本文所述多肽(例如2個、3個或4個本文所述多肽)。寡聚多肽之每一多肽亞單位可具有相同的胺基酸序列，或寡聚多肽可包含具有不同胺基酸序列之多肽亞單位。

【0023】 本發明之一些實施例係關於包含如本文所述多肽或寡聚多肽之細胞，其中細胞係哺乳動物細胞，例如人類細胞。細胞可為例如CHO、BHK、NS0、Sp2/0、COS、C127、HEK293、HT-1080、PER.C6、HeLa或Jurkat細胞。

【0024】 本發明之一些實施例係關於核酸，包含編碼任一實施例之多肽或寡聚多肽之核苷酸序列及可操作連接至核苷酸序列之啟動子。核苷酸序列可經密碼子最佳化以在哺乳動物細胞(例如人類細胞)中表現。啟動子能夠驅動哺乳動物細胞(例如人類細胞)中之表現。本發明之一些實施例係關於包含核酸之細胞，該核酸包含編碼本文所述多肽或寡聚多肽之核苷酸序列。細胞可為選殖細胞(例如大腸桿菌(*E. coli*))或表現細胞(例如CHO、BHK、NS0、Sp2/0、COS、C127、HEK293、HT-1080、PER.C6、HeLa或Jurkat細胞)。

【0025】 本發明之一些實施例係關於用於分析含有抗HIV抗體之組合物之裝置，該裝置包含固體支撐件及如本文所述之多肽或寡聚多肽，其中多肽或寡聚多肽共價或非共價結合至固體支撐件。組合物可包含體液，例如血液、血漿、血清或唾液，例如自人類患者獲得。固體支撐件可為珠粒、膜、微量滴定板、多肽晶片或層析管柱之固相。

【0026】 本發明之一些實施例係關於包含如本文所述之多肽或寡聚多肽之免疫分析試劑，其中免疫分析試劑結合至固體支撐件。在一些實施例中，固體支撐件係珠粒、膜、微量滴定

板、多肽晶片或層析管柱之固相。

【0027】 本發明之一些實施例係關於產生抗體之方法，包含向動物投與如本文所述之多肽或寡聚多肽。該方法可進一步包括分離動物之產生抗體之細胞。該方法可進一步包括分離動物之核酸，其中核酸編碼抗體。

【0028】 本發明之一些實施例係關於分析含有抗體之樣品之方法，包含使樣品與如本文所述之多肽或寡聚多肽接觸及測定抗體與多肽或寡聚多肽之間之結合親和力。在一些實施例中，結合親和力可為相對結合親和力，其中結合親和力係相對結合親和力之原因在於其相對於一或多種不同抗體之結合親和力。

【0029】 本發明之一些實施例係關於自複數種抗體選擇抗-HIV抗體之方法，包含使如本文所述之多肽或寡聚多肽與含有複數種抗體之組合物接觸及鑑別相對於組合物中之其他抗體對多肽或寡聚多肽具有高結合親和力之抗體，藉此選擇抗HIV抗體。

【0030】 本發明之一些實施例係關於預防或治療人類患者之HIV感染之方法，包含向患者投與如本文所述之重組多肽或寡聚多肽。

【0031】 本發明之一些實施例係關於自人類生物樣品之供應選擇生物樣品之方法，包含自該供應選擇不包含與如本文所述之重組多肽或寡聚多肽形成抗原-抗體複合物之抗體的彼等樣品。

【圖式簡單說明】

【0032】 圖1含有多肽env_1至env_38、env_39至env_42及

env_43至env_54之示意圖，該等多肽闡述於例示部分中且分別具有SEQ ID NO:1-38、SEQ ID NO:92至94及SEQ ID NO:95至106中所示之胺基酸序列。

【0033】 圖2係具有SEQ ID NO:1中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120之複數個表位。

【0034】 圖3係具有SEQ ID NO:2中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120之複數個表位。

【0035】 圖4係具有SEQ ID NO:5中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為p53四聚化結構域，且亮部分包含HIV gp120之複數個表位。

【0036】 圖5係具有SEQ ID NO:6中所示之胺基酸序列之重組多肽之所預測結構之影像，包含GCN4三聚化結構域及HIV gp120之複數個表位。

【0037】 圖6係具有SEQ ID NO:7中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為網格蛋白三聚化結構域，且亮部分包含HIV gp120之複數個表位。

【0038】 圖7係具有SEQ ID NO:8中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41之複數個表位。

【0039】 圖8係具有SEQ ID NO:9中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41之複數個表位。

【0040】 圖9係具有SEQ ID NO:10中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120表位。

【0041】 圖10係具有SEQ ID NO:13中所示之胺基酸序列之重組多肽二聚體之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120表位。

【0042】 圖11係具有SEQ ID NO:14中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120表位(左)及HIV gp41表位(右)。

【0043】 圖12係具有SEQ ID NO:15中所示之胺基酸序列之重組多肽二聚體之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp120表位(左)及HIV gp41表位(右)。

【0044】 圖13係具有SEQ ID NO:18中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41表位。

【0045】 圖14係具有SEQ ID NO:19中所示之胺基酸序列之重組多肽二聚體之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41表位。

【0046】 圖15係具有SEQ ID NO:21中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41之複數個表位及HIV gp120之複數個表位。

【0047】 圖16係具有SEQ ID NO:22中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合

蛋白作為抗體Fc結構域，且亮部分包含HIV gp120表位及HIV gp41之複數個表位。

【0048】 圖17係具有SEQ ID NO:23中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0049】 圖18係具有SEQ ID NO:24中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0050】 圖19係具有SEQ ID NO:28中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0051】 圖20係具有SEQ ID NO:29中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0052】 圖21係具有SEQ ID NO:30中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0053】 圖22係具有SEQ ID NO:31中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV外套膜蛋白表位。

【0054】 圖23係具有SEQ ID NO:32中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含gp41表位。

【0055】 圖24係具有SEQ ID NO:33中所示之胺基酸序列之重組多肽之所預測結構之影像，其中該結構之暗部分包含融合蛋白作為抗體Fc結構域，且亮部分包含HIV gp41表位。

【0056】 圖25係具有SEQ ID NO:34中所示之胺基酸序列之重組多肽之所預測結構之影像，包含HIV gp41表位及HIV gp120表位。

【0057】 圖26係具有SEQ ID NO: 92中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑色包含連接體。

【0058】 圖27係具有SEQ ID NO: 93中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp41表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0059】 圖28係具有SEQ ID NO: 94中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑色包含連接體。

【0060】 圖29係具有SEQ ID NO: 95中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑色包含連接體。

【0061】 圖30係具有SEQ ID NO: 96中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑色包含連接體。

【0062】 圖31係具有SEQ ID NO: 97中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑

色包含連接體。

【0063】 圖32係具有SEQ ID NO: 98中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV p24表位，且黑色包含連接體。

【0064】 圖33係具有SEQ ID NO: 99中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV p24表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0065】 圖34係具有SEQ ID NO: 100中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV p24表位，且黑色包含連接體。

【0066】 圖35係具有SEQ ID NO: 101中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV p24表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0067】 圖36係具有SEQ ID NO: 102中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV p24表位，且黑色包含連接體。

【0068】 圖37係具有SEQ ID NO: 103中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV p24表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0069】 圖38係具有SEQ ID NO: 104中所示之胺基酸序列

之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV p24表位，且黑色包含連接體。

【0070】 圖39係具有SEQ ID NO: 105中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV p24表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0071】 圖40係具有SEQ ID NO: 106中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp41表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp120表位，且黑色包含連接體。

【0072】 圖41係在還原(頂部影像)及非還原(底部影像)條件下4-20% tris-甘胺酸TGX™十二烷基硫酸鈉聚丙烯醯胺(SDS-PAGE)凝膠運行之影像。用InstantBlue™蛋白染色劑對凝膠染色。將每一凝膠之泳道自左至右編號為1至9。第一泳道含有分子量標記物，且泳道2-9含有多肽env_1、2、3、4、5、8、9及10，該等多肽經選殖且然後表現於真核細胞中。多肽env_1、2、3、5、8、9及10以可檢測量表現。

【0073】 圖42係在還原(頂部影像)及非還原(底部影像)條件下4-20% tris-甘胺酸TGX™ SDS-PAGE凝膠運行之影像。用InstantBlue™蛋白染色劑對凝膠染色。將每一凝膠之泳道自左至右編號為1至9。第一泳道含有分子量標記物，且泳道2-9含有多肽env_11、12、13、14、15、16、17及18，該等多肽經選殖且然後表現於真核細胞中。每一多肽能夠以可檢測量表現。

【0074】 圖43係可在https://www.hiv.lanl.gov/content/immunology/maps/ab/gp160.htm

l獲得之LANL gp160 AB表位圖譜之2017年10月19日形式之一部分的影像。

【0075】 圖44係具有SEQ ID NO: 91中所示之胺基酸序列之重組多肽之所預測結構之影像，其中亮灰部分包含HIV gp120表位，中間灰包含抗體Fc結構域，暗灰包含HIV gp41表位，且黑色包含連接體。

【實施方式】

【0076】 HIV-1使外套膜蛋白(gp120及gp41)表現為三聚體結構，其中gp41嵌入於膜中且gp120位於各別gp41蛋白之頂部。與先前技術蛋白相比，本發明之多個實施例包括用於診斷用途之若干不同優點。實施例之一些態樣係關於寡聚結構域，其重建無法使用單體蛋白產生之表位之實際二級、三級及四級構形。實施例之其他態樣係關於經由使用哺乳動物細胞產生之改良，該等改良允許正確的轉譯後修飾，該修飾對表位，具體而言gp120表位至關重要，但無法在酵母(例如酵母菌屬(*Saccharomyces*)或畢赤酵母菌屬(*Pichia*))或大腸桿菌中再現。所述實施例之各個態樣係關於以下發現：在哺乳動物細胞中產生且缺少跨膜結構域之重組HIV外套膜多肽展示相對於全長重組HIV外套膜蛋白改良之特徵。

【0077】 該等多肽經設計以更佳地模擬天然HIV外套膜結構，並提高重組HIV外套膜多肽之溶解度及產量，此係基於以下事實：許多診斷公司迄今生產及使用之酵母形式需要苛刻之去污劑來溶解它們(例如十二烷基硫酸鈉)，並且包括大的不相關融合蛋白來幫助表達(例如超氧化物歧化酶)。在哺乳動物細胞中產生之HIV多肽採用天然構形。如本文所述，各種融合結構域之使用亦改善HIV外套膜之溶解度及穩定性，並有助於純化。

【0078】 天然HIV gp120/gp41蛋白之結構部分取決於三個gp41亞單位之三個跨膜結構域嵌入脂雙層中，且缺少跨膜結構域之重組HIV gp120或gp41多肽是否可折疊成天然樣狀態係未知且不可預測的。大多數本文所述多肽在不存在去污劑下係可溶的且因此能夠折疊成天然樣三維構形。

【0079】 天然HIV gp120/gp41蛋白形成異寡聚四級結構。各個實施例包括寡聚多肽，該等寡聚多肽包括使天然HIV gp120/gp41之寡聚四級結構複製之亞單位。天然HIV gp120/gp41蛋白之四級結構部分地由其在膜中之取向定義，該膜藉由gp41亞單位之跨膜螺旋固定。缺少跨膜螺旋之重組HIV gp120/gp41多肽缺少使單體定向之組分。一些所揭示多肽含有寡聚結構域，在不存在跨膜結構域下，該等寡聚結構域使多肽亞單位定向以促進天然樣四級結構。

I.多肽

【0080】 本發明之多個實施例包括多肽，其包含HIV外套膜蛋白之至少一個結構域。如本文所揭示之多肽可包括HIV外套膜蛋白之至少兩個結構域。HIV外套膜蛋白較佳係HIV-1外套膜蛋白，其比HIV-2更具感染性及毒性，且其引起世界上大多數之HIV感染。在一些實施例中，HIV外套膜蛋白係HIV-2外套膜蛋白。

【0081】 本文所述實施例中所述之多肽皆為重組多肽，即其包含不共存於天然多肽中之兩個或更多個胺基酸序列。因此，術語「多肽」及「重組多肽」在本文中可互換使用。

【0082】 完整HIV病毒體表面之唯一蛋白質係由*env*基因編碼之外套膜糖蛋白。*env*基因產物係約850個胺基酸之前體蛋白，稱為gp160，在本文中亦稱為HIV外套膜蛋白。HIV外套膜蛋白之實例性胺基酸序列示於SEQ ID NO：39-62中，且其他胺

基酸序列可參見例如https://www.hiv.lanl.gov/components/sequence/HIV/search/search.html 或https://www.hiv.lanl.gov/content/sequence/NEWALIGN/align.html (例如，藉由選擇「比對類型」為「網路(所有完整序列)」，且選擇「年份」為「2016」)。HIV外套膜蛋白之胺基酸序列亦可藉由例如在NCBI之蛋白質數據庫中搜索「gp160」或「HIV外套膜蛋白」(例如，在https://www.ncbi.nlm.nih.gov/protein上)來鑑別。

【0083】 術語「多肽」係指具有任意長度之胺基酸序列之分子，儘管如本文所述申請專利範圍及實施例中所用之術語「多肽」需要足夠長之胺基酸序列以含有HIV外套膜蛋白表位(即至少8個胺基酸)及融合蛋白。如本文所用術語「結構域」類似地指足夠長以獨立折疊之胺基酸序列。結構域可含有表位(即至少8個胺基酸)，但結構域不需要包括表位。跨膜結構域可包括8個或更多個胺基酸，然而跨膜結構域可能不含表位，例如，在該結構域不具抗原性的情況下。

【0084】 本文實施例之多肽通常含有200至1000個胺基酸、例如約200至約400、約300至約500、約400至約600、約500至約700、約600至約800、約700至約900、或約800至約1000個胺基酸。多肽之胺基酸通常藉由肽鍵連接，例如此乃因該等多肽通常係藉由在核糖體上轉譯RNA產生。

【0085】 實施例之多肽通常具有以下分子量：約20,000至約100,000道耳吞(dalton)，例如約20,000至約40,000、約30,000至約50,000、約40,000至約60,000、約50,000至約70,000、約60,000至約80,000、約70,000至約90,000、或約80,000至約100,000道耳

吞。

【0086】 實施例之多肽通常具有以下等電點(pI)：約5至約10、例如約5.5至約8.5、約5.0至約7.0、約6.0至約8.0、約7.0至約9.0、約5.0至約6.0、約5.5至約6.5、約6.0至約7.0、約6.5至約7.5、約7.0至約8.0、約7.5至約8.5、約8.0至約9.0、約8.5至約9.5、或約9.0至約10.0。

【0087】 實施例之多肽缺少gp41跨膜結構域，即每個多肽缺少由SEQ ID NO:63-72中之任一者編碼之胺基酸序列。實施例之多肽可能缺少與藉由SEQ ID NO:63-72編碼之胺基酸序列具有至少60%、67%、75%、80%、85%、90%或95%序列一致性之胺基酸序列。實施例之多肽可能缺少嵌入生物膜(即脂雙層)中之胺基酸序列。胺基酸序列可嵌入生物膜中之機率可使用任一數量之業內已知之不同方法來測定，該等方法包括例如基於E_z深度依賴性電位計算(Senes等人，J. Molecular Biology 366(2):436 (2007))。

【0088】 本發明之多肽可缺少全長HIV外套膜蛋白之gp120/gp41裂解位點。

A. HIV外套膜蛋白之表位

【0089】 實施例包括多肽，該等多肽包含HIV外套膜蛋白之至少一個表位。如本文所揭示之多肽可包括HIV外套膜蛋白之至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位。多肽可包括HIV外套膜蛋白之複數個表位。多肽可包括HIV外套膜蛋白之複數個表位，其中複數個表位包含至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位。

【0090】 如本說明書及申請專利範圍中所用之術語「表位」係指可特異性結合抗體之抗原結合位點之至少8個連續胺基酸

之序列。表位可包含例如至少9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸。

【0091】 表位可由在SEQ ID NO:39-62 (HIV外套膜蛋白之序列)中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸之胺基酸序列組成，只要該序列不包括跨膜結構域之N-或C-末端即可，鑑別為SEQ ID NO:63-72。實施例之多肽可包含複數個表位，其中該複數個之每一表位係由在SEQ ID NO:39-62中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸之胺基酸序列組成，只要該序列不包括跨膜結構域之N-或C-末端即可，鑑別為SEQ ID NO:63-72。複數個表位之每一表位可具有不同之胺基酸序列或每一表位可具有相同之胺基酸序列。實施例之多肽可包含HIV外套膜蛋白之至少1個、2個、3個、4個、5個、6個、7個、8個、9個或10個表位，其中每一表位係由在SEQ ID NO:39-62中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸之胺基酸序列組成，只要該序列不包括跨膜結構域之N-或C-末端即可，鑑別為SEQ ID NO:63-72。

【0092】 已知HIV外套膜蛋白之許多變體。因此，表位可由與在SEQ ID NO:39-62 (HIV外套膜蛋白之序列)中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列組成，只要該序列不包括跨膜結構域之N-或C-末端即可，鑑別為SEQ ID NO:63-72。實施例之多肽可包含複數個表位，其

中該複數個之每一表位係由與SEQ ID NO:39-62中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列組成，只要該序列不包括跨膜結構域之N-或C-末端即可，鑑別為SEQ ID NO:63-72。複數個表位之每一表位可具有不同之胺基酸序列或每一表位可具有相同之胺基酸序列。實施例之多肽可包含HIV外套膜蛋白之至少1個、2個、3個、4個、5個、6個、7個、8個、9個或10個表位，其中每一表位係由與在SEQ ID NO:39-62中之任一者中發現之至少8個、9個、10個、11個、12個、13個、14個、15個、16個、17個、18個、19個或20個連續胺基酸具有至少約80%、85%、90%、95%、96%、97%、98%或99%序列一致性之胺基酸序列組成，只要該序列不包括跨膜結構域之N或C末端即可，鑑別為SEQ ID NO:63-72。

【0093】 在其中多肽包含HIV外套膜蛋白之一個以上之表位之實施例中，HIV外套膜蛋白之表位可為相同表位或不同表位。

【0094】 多肽(或複數個表位)可包括在不同HIV外套膜蛋白中發現之表位(例如選自SEQ ID NO:39-62之不同胺基酸序列)，或多肽(或複數個表位)可包括各自在相同HIV外套膜蛋白中發現之表位。

【0095】 HIV外套膜蛋白之表位為業內所熟知。HIV外套膜蛋白之表位可選自例如可在https://www.hiv.lanl.gov/content/immunology/maps/ab/gp160.htm1上獲得之LANL gp160 AB表位圖譜。LANL gp160 AB表位圖譜之2017年10月19日形式之一部分再現於圖43中，且本發明之多

個實施例之特徵在於LANL gp160 AB表位圖譜中所述之表位。

【0096】 本發明之各個態樣係關於含有HIV外套膜蛋白之新穎表位之多肽。在一些實施例中，多肽包含HIV外套膜蛋白之至少一個表位，其中至少一個表位包括未在LANL gp160 AB表位圖譜中鑑別之表位。多肽可包括例如表位或複數個表位，其中每一表位係在SEQ ID NO:39-62中之任一者發現之至少8個連續胺基酸之經隨機選擇之胺基酸序列。

【0097】 表位可為HIV gp120蛋白或HIV gp41蛋白之表位。多肽可包含HIV gp120蛋白及/或HIV gp41蛋白之表位。複數個表位可包含HIV gp120蛋白及/或HIV gp41蛋白之表位。

【0098】 多肽之表位可側接有天然HIV外套膜蛋白之胺基酸序列。舉例而言，多肽可包含HIV外套膜蛋白之至少兩個表位，其中至少兩個表位之兩個表位藉由HIV外套膜蛋白之天然胺基酸序列連接。

【0099】 多肽可包含HIV外套膜蛋白之至少兩個表位，其中至少兩個表位之兩個表位係藉由未在天然HIV外套膜蛋白中發現之胺基酸序列連接。舉例而言，多肽可包含至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位，其中至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位中之2個、3個、4個、5個、6個、7個、8個、9個或10個係藉由未在天然HIV外套膜蛋白中發現之胺基酸序列連接。多肽可包含至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位，其中至少2個、3個、4個、5個、6個、7個、8個、9個或10個表位之兩個表位係藉由在天然HIV外套膜蛋白中發現之胺基酸序列連接。

【0100】 在一些實施例中，多肽包含複數個 HIV 外套膜蛋白之表位，其中複數個表位之每一表位藉由並不由 HIV 編碼之

胺基酸序列連接至複數個表位之另一表位。術語「連接體」或「間隔體」在本文中可用於指連接本文所述重組多肽之至少兩個表位之該等胺基酸序列。

B. 連接體

【0101】 複數個表位之每一表位可藉由連接體或間隔體連接至複數個表位之另一表位。複數個表位之每一表位可藉由連接體或間隔體連接至複數個表位之一或兩個其他表位。連接體或間隔體係指經設計胺基酸序列，其通常藉由肽鍵連接且具有所定義二級結構或係固有無序的。術語「連接體」及「間隔體」在本文中可互換使用。連接體可包含形成 α 螺旋或 β 折疊股之胺基酸序列(例如，其中 β 折疊股與其他 β 折疊股組合形成 β 褶板)。連接體可包含 α 螺旋或 β 褶板。

【0102】 連接體可由具有形成 α 螺旋高傾向之連續胺基酸(例如丙胺酸)及/或 i 及 i+3/4 位之替代性帶電胺基酸(例如 i 處之麩醯胺酸及 i+3 或 i+4 處之離胺酸)之序列組成，該 α 螺旋可視情況包括 N 末端螺旋封端基序(例如絲胺酸-脯胺酸-麩醯胺酸)。具有形成 α 螺旋高傾向之實例性連接體示於 SEQ ID NO:73 (AEAAAKEAAAKA)中。

【0103】 連接體可由具有形成 β 折疊股高傾向之連續胺基酸(例如「β 分枝」胺基酸，例如纈胺酸、異白胺酸、蘇胺酸)之序列組成，但業內已知具有形成 β 折疊股高傾向之其他連續胺基酸序列，且可經選擇來(例如)設計 β 褶板。具有形成 β 折疊股高傾向之實例性連接體示於 SEQ ID NO:74 (TWIQNPGTKWYQNPGTKIYT)中。在一些實施例中，多肽包含 β 褶板，其中 β 褶板之至少兩個 β 折疊股係藉由包含 HIV 外套膜蛋白之表位之胺基酸序列連接。舉例而言，多肽可包含 β 褶

板，該 β 褶板包含至少三個 β 折疊股，其中第一 β 折疊股藉由包含 HIV 外套膜蛋白之第一表位之胺基酸序列連接至第二 β 折疊股，且第三 β 折疊股藉由 HIV 外套膜蛋白之第二表位連接至第四 β 折疊股(即，其中第一、第二、第三及第四 β 折疊股構成三個或四個 β 折疊股(例如，第三 β 及第一或第二 β 折疊股係相同的 β 折疊股，或第一、第二、第三及第四 β 折疊股中之每一者係不同的 β 折疊股)，且其中第一表位及第二表位可視情況具有相同或不同之胺基酸序列)。

【0104】 固有無序之連接體可由具有高度結構無序之連續胺基酸之序列組成。固有無序之連接體通常包括至少一個甘胺酸及/或至少一個脯胺酸，該甘胺酸缺少 R 基團，因此比所有其他天然胺基酸具有更多之可及構形，該脯胺酸具有 R 基團，該 R 基團與主鏈 N 形成環，因此比所有其他天然胺基酸具有更少之可及構形。甘胺酸藉由在多肽之二級結構中引入熵來增加結構無序，且脯胺酸藉由在多肽之二級結構中引入熵來增加結構無序。固有無序之連接體亦可包括其他小胺基酸(例如絲胺酸、丙胺酸)及親水性胺基酸。固有無序連接體之胺基酸可選自例如甘胺酸、脯胺酸、丙胺酸、絲胺酸、天冬醯胺、天冬胺酸、麩胺醯胺、麩醯胺酸、離胺酸及精胺酸。實例性固有無序連接體包括 SEQ ID NO:75 (SGSGASGS)、SEQ ID NO:76 (PSGP)、SEQ ID NO:109 (GGGGSGGGGSGGGGS) 或 SEQ ID NO:110 (GGGGSGGGGSGGGGSGGGGSGGGGS)中所示之胺基酸序列，但固有無序連接體之精確胺基酸序列不受特定限制。

【0105】 撓性連接體可由連續胺基酸之序列組成，通常包括至少一個甘胺酸、至少一個脯胺酸及至少一個絲胺酸。實例性撓性連接體包括 SEQ ID NO:111 (GGGPS)中所示之胺基酸序

列，但撓性連接體之精確胺基酸序列不受特定限制。

【0106】 複數個表位(或至少 2 個、3 個、4 個、5 個、6 個、7 個、8 個、9 個或 10 個表位)之兩個表位可藉由連接體連接，其中連接體包含 α 螺旋、β 折疊股、固有無序或撓性胺基酸序列。複數個表位(或至少 2 個、3 個、4 個、5 個、6 個、7 個、8 個、9 個或 10 個表位)之每一表位可藉由連接體連接至複數個表位(或至少 2 個、3 個、4 個、5 個、6 個、7 個、8 個、9 個或 10 個表位)之另一表位，其中連接體包含 α 螺旋、β 折疊股、固有無序或撓性胺基酸序列。

【0107】 連接體通常並不發現於天然 HIV 外套膜蛋白中，且連接體通常不發現於自然界中，但一些天然胺基酸序列可用作適當連接體或可用於設計適當連接體。

【0108】 連接體可包括約 1 至 30 個胺基酸，例如約 2 至 25、約 3 至 20、約 4 至 16 或約 1、2、3、4、5、6、7、8、9、10、11、12、13、14、15、16、17、18、19 或 20 個胺基酸。

C. 融合蛋白

【0109】 實施例之多肽通常包含融合蛋白，該融合蛋白包含未在天然 HIV 外套膜蛋白中發現之胺基酸序列。融合蛋白可包含並不由 HIV 編碼之區域，該區域選自由以下組成之群：抗體之 Fc 結構域、p53 結構域、GCN4 結構域或網格蛋白結構域。融合蛋白較佳係至少 20 個胺基酸、例如至少 30、40、50、60、70、80、90、100、110、120、130、140、150、160、170、180、190 或 200 個胺基酸或約 20 至 500、約 50 至約 400 或約 75 至約 250 個胺基酸之序列，但融合蛋白之精確長度不受特定限制。

【0110】 如本文所用術語「融合蛋白」並非指與多肽分離之離散蛋白質。相反，術語「融合蛋白」係指包含通常可用於蛋

白質表現、純化、寡聚及/或穩定性之結構及/或功能特徵之胺基酸序列。編碼多肽之基因通常編碼與多肽之剩餘部分同框之融合蛋白，且在融合蛋白與多肽之其他部分之間無終止密碼子；融合蛋白通常自 mRNA 轉譯為多肽之一部分；且融合蛋白通常藉由一或多個天然肽鍵連接至多肽之其他部分。

【0111】 融合蛋白通常具有功能特性。舉例而言，融合蛋白可用於寡聚多肽與另一多肽。在一些實施例中，融合蛋白僅增加多肽之穩定性，例如多肽可包括抗體 Fc 結構域，其可增加多肽之穩定性。穩定性可指例如多肽之降解、多肽之折疊及/或多肽之聚集，例如融合蛋白可延長多肽相對於降解之半衰期、增加多肽(或寡聚多肽)之天然折疊之穩定性及/或降低多肽形成聚集體之傾向。

【0112】 融合蛋白通常具有所定義二級結構及所定義三級結構及/或四級結構。融合蛋白可包括 GCN4 之一部分。融合蛋白可包括抗體 Fc 結構域之一部分，例如，該部分具有所定義二級結構及三級結構，但缺少四級結構(例如，由於 Fc 結構域片段缺少鉸鏈區及允許抗體形成二聚體或更高級寡聚物之其他元件)。融合蛋白可包括抗體 Fc 結構域之一部分，例如，該部分具有所定義二級結構、三級結構及四級結構。

【0113】 融合蛋白可以單體形式存在，即融合蛋白在折疊成其天然構形時可具有高之自締合解離常數。高解離常數(K_D)可為例如>10 mM、>1 mM 或> 100 μM，如例如在 pH 7 之磷酸鹽緩衝鹽水中所測定。

【0114】 融合蛋白可以寡聚物形式存在，例如，融合蛋白在折疊成其天然構形時可具有低之自締合解離常數。低解離常數(K_D)可為例如< 100 μM、< 10 μM 或< 1 μM，如例如在 pH 7 之

磷酸鹽緩衝鹽水中所測定。融合蛋白可以寡聚物形式存在之原因在於，融合蛋白共價系鏈至一或多種其他融合蛋白，例如直接(例如藉由兩個半胱胺酸之間之二硫鍵)或間接(例如藉由化學交聯劑)。融合蛋白可以寡聚物形式存在之原因在於，融合蛋白非共價系鏈至一或多種其他融合蛋白，例如經由生物素-抗生蛋白鏈菌素相互作用。

【0115】 融合蛋白可包含寡聚結構域。寡聚多肽(例如二聚體多肽)可優異地用於研發針對天然 gp120/gp41 複合物之抗體，此乃因為天然 gp120/gp41 以異二聚體之三聚體形式存在。寡聚結構域亦可用於定向多肽，藉此複製天然樣四級結構。

【0116】 實例性寡聚結構域包括抗體 Fc 結構域之胺基酸序列。抗體 Fc 結構域可增加多肽在表現細胞中之表現及/或分泌。此外，由抗體 Fc 結構域形成之二聚體多肽通常延長活體內多肽之半衰期。Fc 結構域亦可定向寡聚多肽之亞單位，藉此在功能上補償一或多個 gp41 跨膜螺旋之缺乏。使用或忽略鉸鏈區可分別形成二聚體或單體 Fc 融合物。

【0117】 抗體 Fc 結構域之種類可基於多肽或寡聚多肽之期望用途來選擇。舉例而言，抗體 Fc 結構域之種類可經選擇，使得特定試劑在分析中靶向或忽略抗體 Fc 結構域。小鼠 Fc 結構域可用於例如在分析中不使用抗-小鼠二級抗體來檢測其他小鼠抗體時。類似地，小鼠 Fc 結構域可用於檢測使用抗-小鼠「二級」抗體之多肽。對於活體內用途，Fc 結構域之種類可經選擇以匹配宿主，例如以降低宿主引起針對 Fc 結構域之免疫反應的可能性。小鼠 Fc 結構域可用於例如增加小鼠中之小鼠抗-HIV 外套膜蛋白抗體。Fc 結構域之種類可為人類、小鼠、兔、大鼠、倉鼠、天竺鼠、山羊、綿羊、馬、雞或前述物種之嵌合體，但

Fc結構域之種類不受特定限制。抗體Fc結構域之種類可為小鼠IgG Fc結構域。實例性抗體Fc結構域係小鼠IgG1 Fc結構域或小鼠IgG2 Fc結構域。

【0118】 實例性融合蛋白係小鼠IgG1 Fc結構域或小鼠IgG2 Fc結構域，其缺少鉸鏈區且因此不會寡聚。

【0119】 單體小鼠IgG2 Fc結構域可具有SEQ ID NO:77中所示之胺基酸序列(APNLLGGPSVFIFPPKIKDVLMISLSPIVTCVVVDVSEDDPDVQISWFVNNVEVHTAQTQTHREDYNSTLRVVSALPIQHQDWMSGKEFKCKVNNKDLPAPIERTISKPKGSVRAPQVYVLPPPEEEMTKKQVTLTCMVTDFMPEDIYVEWTNNGKTELNYKNTEPVLDSDGSYFMYSKLRVEKKNWVERNSYSCSVVHEGLHNHHTTKSFSRTPGK)或與SEQ ID NO:77中所示之胺基酸序列具有至少約95%、96%、97%、98%或99%序列一致性之胺基酸序列。

【0120】 另一實例性融合蛋白係包含鉸鏈區之小鼠IgG2 Fc結構域，其允許包含融合蛋白之多肽二聚化。二聚體小鼠IgG2 Fc結構域可具有SEQ ID NO:78中所示之胺基酸序列(PRGPTIKPCPPCKCPAPNLLGGPSVFIFPPKIKDVLMISLSPIVTCVVVDVSEDDPDVQISWFVNNVEVHTAQTQTHREDYNSTLRVVSALPIQHQDWMSGKEFKCKVNNKDLPAPIERTISKPKGSVRAPQVYVLPPPEEEMTKKQVTLTCMVTDFMPEDIYVEWTNNGKTELNYKNTEPVLDSDGSYFMYSKLRVEKKNWVERNSYSCSVVHEGLHNHHTTKSFSRTPGK；其係由N末端鉸鏈區PRGPTIKPCPPCKCP (SEQ ID NO:79)及緊隨其後之SEQ ID NO:77中所示之Fc結構域胺基酸序列組成)或與SEQ ID NO:78中所示之胺基酸序列具有至少約95%、96%、97%、98%或99%

序列一致性之胺基酸序列。

【0121】 單體小鼠 IgG1 Fc 結構域可具有 SEQ ID NO:80 中所示之胺基酸序列(VPEVSSVFIFPPKPKDVLTITLTPKVTCVVVDISKDDPEVQFSWFVDDVEVHTAQTQPREEQFNSTFRSVSELPIMHQDWLNGKEFKCRVNSAAFPAPIEKTISKTKGRPKAPQVYTIPPPKEQMAKDKVSLTCMITDFFPEDITVEWQWNGQPAENYKNTQPIMDTDGSYFVYSKLNVQKSNWEAGNTFTCSVLHEGLHNHHTEKSLSHSPG)或與 SEQ ID NO:80 中所示之胺基酸序列具有至少約 95%、96%、97%、98%或 99%序列一致性之胺基酸序列。

【0122】 另一實例性融合蛋白係包含鉸鏈區之小鼠 IgG1 Fc 結構域，其允許包含融合蛋白之多肽二聚化。二聚體小鼠 IgG1 Fc 結構域可具有 SEQ ID NO:107 中所示之胺基酸序列(VPRDCGCKPCICTVPEVSSVFIFPPKPKDVLTITLTPKVTCVVVDISKDDPEVQFSWFVDDVEVHTAQTQPREEQFNSTFRSVSELPIMHQDWLNGKEFKCRVNSAAFPAPIEKTISKTKGRPKAPQVYTIPPPKEQMAKDKVSLTCMITDFFPEDITVEWQWNGQPAENYKNTQPIMDTDGSYFVYSKLNVQKSNWEAGNTFTCSVLHEGLHNHHTEKSLSHSPG；其係由 N 末端鉸鏈區 VPRDCGCKPCICT (SEQ ID NO:108)及緊隨其後之 SEQ ID NO:80 中所示之 Fc 結構域胺基酸序列組成)或與 SEQ ID NO:107 中所示之胺基酸序列具有至少約 95%、96%、97%、98%或 99%序列一致性之胺基酸序列。

【0123】 實例性融合蛋白可包含 Fc 結構域，該等 Fc 結構域缺少具有 SEQ ID NO:77 或 SEQ ID NO:80 中所示之胺基酸序列之寡聚結構域，且因此重組多肽係單體。實例性融合蛋白可包含 Fc 結構域，該等 Fc 結構域包含具有 SEQ ID NO:78 或 SEQ ID

NO:107 中所示之胺基酸序列之二聚化結構域，且因此重組多肽係二聚體。

【0124】 Fc 結構域亦可幫助純化多肽，此乃因為純化包含 Fc 結構域之多肽之方法為業內所熟知。

【0125】 另一實例性融合蛋白係 p53 四聚化結構域。p53 四聚化結構域可具有 SEQ ID NO:81 中所示之胺基酸序列 (KPLDGEYFTLQIRGRERFEMFRELNEALELKDAQAGKEPG) 或與 SEQ ID NO:81 中所示之胺基酸序列具有至少約 95%、96%、97%、98%或 99%序列一致性之胺基酸序列。

【0126】 另一實例性融合蛋白係 GCN4 三聚化結構域。GCN4 三聚化結構域可具有 SEQ ID NO:82 中所示之胺基酸序列 (GYIPEAPRDGQAYVRKDGEWVLLSTFL)或與 SEQ ID NO:82 中所示之胺基酸序列具有至少約 95%、96%、97%、98%或 99%序列一致性之胺基酸序列。包含 GCN4 樣序列之融合蛋白可設計成例如平行三聚體，對應於天然 gp120/gp41 三聚體之拓樸學。交替 GCN4 樣序列可如業內已知來設計以根據業內已知之方法使用平行或抗平行組織化製備二聚體、三聚體及四聚體寡聚物 (例如，參見 Harbury、Zhang、Kim 及 Alber, 「A switch between two-, three-, and four-stranded coiled coils in GCN4 leucine zipper mutants」, Science (1993) 262:1401)。除平行三聚體外之寡聚物可用於研發靶向新穎 HIV 外套膜蛋白抗原之抗體。

【0127】 另一實例性融合蛋白係網格蛋白三聚化結構域。網格蛋白三聚化結構域可具有 SEQ ID NO:83 中所示之胺基酸序列 (GSHMWKQSVELAKKDSLYKDAMQYASESKDTELAEELLQWFLQEEKRECFGACLFTCYDLLRPDVVLELAWRHNIMDFAMPYFIQVMKEYLTKV)或與 SEQ ID NO:83 中所示之胺基酸序列具有

至少約 95%、96%、97%、98%或 99%序列一致性之胺基酸序列。

【0128】 其他寡聚結構域為業內所熟知且寡聚結構域之具體選擇不受特定限制。抗生蛋白鏈菌素例如尤其可用於寡聚結構域，此乃因為其形成四聚體且亦結合生物素，此可幫助純化且亦可用於各種分析。

【0129】 實施例之融合蛋白不包括常用於製備重組 HIV 外套膜蛋白之超氧化物歧化酶，即本發明之多肽缺少對應於超氧化物歧化酶之胺基酸序列。

D. 前導肽序列

【0130】 本文所揭示之多肽通常包含前導肽序列以有利於多肽穿過表現載體(例如哺乳動物細胞，尤其人類細胞)之細胞膜轉移。然而，多肽可能缺少前導肽序列，例如，在前導肽序列藉由酶或化學裂解自多肽裂解時。合成產生之多肽可能類似地缺少前導肽序列。

【0131】 前導肽序列通常包括在多肽之 N 末端。前導肽序列較佳足以在多肽於真核細胞中轉譯後使多肽轉移至真核細胞(例如哺乳動物細胞，例如人類細胞)之細胞膜表面外，但多肽之其他序列基序亦可幫助轉移。

【0132】 實例性前導肽序列具有 SEQ ID NO:84 (MYRMQLLSCIALSLALVTNS)中所示之胺基酸序列，其係人類介白素-2 前導肽序列。此經充分表徵之序列能夠使多肽轉移至人類細胞及其他哺乳動物細胞外。

【0133】 在一些實施例中，本文所揭示多肽之前導肽係多肽之融合蛋白。在一些實施例中，多肽包含 HIV gp120 之表位及 HIV gp41 之表位且多肽缺少 gp120/gp41 裂解位點。

【0134】 前導肽序列通常並非衍生自 HIV 外套膜蛋白，但

在一些實施例中，前導肽序列係 HIV 外套膜蛋白之訊號序列。

E. 親和標籤

【0135】 多肽可視情況包括親和標籤。親和標籤可用於純化，且其亦可用於使用多肽之分析中。實例性親和標籤包括多組胺酸、殼多糖結合蛋白、麥芽糖結合蛋白、Strep 標籤、麩胱甘肽-S-轉移酶、FLAG 標籤、V5 標籤、Myc 標籤、HA 標籤、NE 標籤、AviTag、鈣調蛋白標籤、聚麩醯胺酸、S 標籤、SBP 標籤、Softag 1、Softag 3、TC 標籤、VSV 標籤、Xpress 標籤、Isopeptag、SpyTag、SnoopTag、生物素羧基載體蛋白、綠色螢光蛋白標籤、HaloTag、Nus 標籤及硫氧還蛋白標籤，但親和標籤之選擇不受特定限制。然而，多肽可能缺少親和標籤，例如在使用後移除親和標籤時或在使用無需親和標籤之策略純化多肽時。實例性親和標籤係多組胺酸，其通常包括包含 6 個連續組胺酸(SEQ ID NO:85)之胺基酸序列。另一實例性親和標籤係包含 4 個與 8 個連續組胺酸之間之多組胺酸。

F. 實例性多肽序列

【0136】 本文所述實施例中所述之重組多肽可包含前導肽、融合蛋白、HIV gp120 蛋白之至少一個表位及/或 HIV gp41 蛋白之至少一個表位，其中重組多肽缺少跨膜結構域且其中融合蛋白包含並不由 HIV 編碼之區域。

【0137】 本文所揭示之多肽可具有以下中所示之胺基酸序列：SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:9、SEQ ID NO:10、SEQ ID NO:11、SEQ ID NO:12、SEQ ID NO:13、SEQ ID NO:14、SEQ ID NO:15、SEQ ID NO:16、SEQ ID NO:17、SEQ ID NO:18、SEQ ID NO:19、SEQ ID NO:20、SEQ

ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37、SEQ ID NO:38、SEQ ID NO:86、SEQ ID NO:87、SEQ ID NO:88、SEQ ID NO:89、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105 或 SEQ ID NO:106。多肽可具有一胺基酸序列，該序列與以下中所示之胺基酸序列具有至少約85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或 99.5%序列一致性：SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:9、SEQ ID NO:10、SEQ ID NO:11、SEQ ID NO:12、SEQ ID NO:13、SEQ ID NO:14、SEQ ID NO:15、SEQ ID NO:16、SEQ ID NO:17、SEQ ID NO:18、SEQ ID NO:19、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37、SEQ ID NO:38、SEQ ID NO:86、SEQ ID NO:87、SEQ ID NO:88、SEQ ID NO:89、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ

ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105 或 SEQ ID NO:106，即，其中多肽之完整胺基酸序列不為天然胺基酸序列。

II. 感染HIV-1及HIV-2之免疫學

【0138】 根據宿主之健康狀況及基因構成以多種方式之一作出反應。一般來說，一旦 HIV 經由感染 CD4+ T 細胞進入宿主，其就開始複製並產生新的病毒顆粒，該等顆粒自裂解細胞釋放至血流中。稀疏散佈之三聚體尖峰中之「外套膜相關蛋白」gp120 及 gp41 在此包有外套膜病毒之表面上。然而，位於 gp41 蛋白頂部上之 gp120 蛋白傾向於自病毒脫落(可能為菌株依賴性)，且此領域中之一些人認為此脫落起誘餌蛋白作用。因此，gp41 暴露為宿主抗體反應之第一個初始表面靶。事實上，絕大多數 HIV+患者對 gp41 部分產生強烈的抗體反應，且此係許多診斷公司如 Env13、Env31 及 Env70 過去使用之在酵母中表現之外套膜蛋白基本上由 gp41 序列及僅 gp120 小片段組成之原因。對於大多數感染了 HIV 並且已產生抗體反應之患者來說，此蛋白質在大約 90-98%之時間裡會展示出抗體反應性。一小部分非反應性患者對 gp120 及/或 p24 抗原展示出可量測之抗體反應。

【0139】 在一些態樣中，實施例包含寡聚多肽，該寡聚多肽包含融合至 p24 或 p26 (HIV-2)多肽(亞單位)之相關 gp120 蛋白，如本文所述。在一些實施例中，寡聚多肽係二聚體多肽，即寡聚多肽包含兩個亞單位，其中每一亞單位係本文所述之多肽。在沒有修飾詞「寡聚」、「二聚體」或其他明確提及多亞單位形式之情況下使用之術語「多肽」係指可或可不存在於寡聚物(例如二聚體、三聚體或四聚體)中之單體多肽。該等蛋白質可用於血漿、血清或全血中抗體之前線篩選或用於診斷目的或用

於確認分析。

【0140】 在一些態樣中，實施例包含多肽，該多肽包含 100%之相關 gp120 蛋白(具有任一分枝)或 90%或 80%或 70%或 60%或 50%或最少之融合至 p24 或 p26 (HIV-2)多肽(亞單位)之已知表位，如本文所述。在一些實施例中，gp120 蛋白可直接融合至 p24 蛋白(或 p26)或在其他實施例中由如本文所述之融合蛋白(例如 Fc、網格蛋白、p53 等)分開。該等蛋白質可用於血漿、血清或全血中抗體之前線篩選或用於診斷目的或用於確認分析。

【0141】 在一些態樣中，實施例包含多肽，該多肽包含融合至 100%之相關 p24 蛋白(或 p26)之 gp120 多肽(具有任一相關分枝)，或 90%或 80%或 70%或 60%或 50%或最少之融合至 HIV-1 或 HIV-2 之 gp120 多肽之已知表位。在一些實施例中，gp120 蛋白可直接融合至 p24 蛋白或在其他實施例中由如本文所述之支架(例如 Fc、網格蛋白、p53 等)分開。該等蛋白質可用於血漿、血清或全血中抗體之前線篩選或用於診斷目的或用於確認分析。

【0142】 gp120 結構域(表位)可為本文所列示許多中之一者，其在 C 末端融合至寡聚結構域(例如 Fc 或熟習此項技術者所熟悉之其他結構域，參見下文)，該寡聚結構域融合至 p24 結構域(或 p26) (表位)之 N 末端。或者，p24 結構域可處於 N 末端且寡聚結構域係融合至各別 gp120 蛋白結構域(表位) (SEQ ID NO:86；SEQ ID NO:87、SEQ ID NO:88 或 SEQ ID NO:89)之 N 末端。該等可為單體、二聚體、三聚體或四聚體或五聚體。

【0143】 在一些態樣中，實施例包含多肽，該多肽包含融合至具有或不具撓性鉸鏈區之相關 p24 蛋白(或 p26)之 gp120 多肽(具有任一相關分枝)，該撓性鉸鏈區設計在 p26/26 與 Fc 或其他

寡聚結構域之 C 末端之間。該等蛋白質可用於血漿、血清或全血中抗體之前線篩選或用於診斷目的或用於確認分析。

III. 寡聚多肽

【0144】 在一些態樣中，實施例包含寡聚多肽，該寡聚多肽包含 2 個、3 個、4 個或更多個如本文所述之多肽(亞單位)。在一些實施例中，寡聚多肽係二聚體多肽，即寡聚多肽包含兩個亞單位，其中每一亞單位係本文所述之多肽。在沒有修飾詞「寡聚」、「二聚體」或其他明確提及多亞單位形式之情況下使用之術語「多肽」係指可或可不存在於寡聚物(例如二聚體、三聚體或四聚體)中之單體多肽。

【0145】 寡聚多肽之每一亞單位通常具有相同的胺基酸序列，但寡聚多肽之不同亞單位可具有不同的胺基酸序列。異二聚體多肽可藉由例如以下方式製得：用離去基團(例如用 2-2′二硫基-雙-(5-硝基吡啶))活化第一亞單位之半胱胺酸硫醇，還原第二亞單位之硫醇(例如用 β-巰基乙醇或三(2-羧乙基)膦)且然後使第一亞單位與第二亞單位接觸。或者，可使亞單位隨機交聯且然後純化。使用相似之策略同二聚體多肽製備。可在寡聚後純化寡聚多肽以分離期望寡聚多肽與單體亞單位及其他不期望物質。

【0146】 寡聚多肽可為對稱的或寡聚多肽可能缺少對稱性。舉例而言，寡聚多肽可形成「分子間」二硫鍵結模式，產生缺少對稱性之四級結構。

【0147】 寡聚多肽可藉由非共價或共價相互作用交聯。非共價相互作用之實例係 GCN4 或網格蛋白寡聚結構域之三聚化或 p53 寡聚結構域之四聚化。共價相互作用之實例係二硫鍵介導之抗體 Fc 結構域鉸鏈區二聚化。具有包括抗體 Fc 結構域之亞單

位之二聚體多肽可藉由至少一個二硫鍵，通常 2 個二硫鍵(例如用於 IgG1 及 IgG4 衍生之 Fc 結構域)或 4 個二硫鍵(例如用於 IgG2 衍生之 Fc 結構域)共價交聯，但二硫鍵之數量不受特定限制。IgG3 可用例如 11 個二硫鍵交聯。

【0148】 二聚體多肽可包含兩個亞單位，其中每一亞單位包含抗體 Fc 結構域，且抗體 Fc 結構域交聯二聚體多肽之兩個亞單位。

【0149】 三聚體多肽可包含三個亞單位，其中每一亞單位包含 GCN4 三聚化結構域，且 GCN4 三聚化結構域非共價交聯三聚體多肽之三個亞單位。三聚體多肽可包含三個亞單位，其中每一亞單位包含網格蛋白三聚化結構域，且網格蛋白三聚化結構域非共價交聯三聚體多肽之三個亞單位。

【0150】 四聚體多肽可包含四個亞單位，其中每一亞單位包含 p53 四聚化結構域，且 p53 四聚化結構域非共價交聯四聚體多肽之四個亞單位。

【0151】 實施例亦包括包含二聚體多肽之組合物，其中組合物基本上不含不為二聚體多肽之寡聚多肽。組合物可能缺少不為二聚體多肽之寡聚多肽。

【0152】 各個實施例亦包括包含三聚體多肽之組合物，其中組合物基本上不含不為三聚體多肽之寡聚多肽。組合物可能缺少不為三聚體多肽之寡聚多肽。

【0153】 各個實施例亦包括包含四聚體多肽之組合物，其中組合物基本上不含不為四聚體多肽之寡聚多肽。組合物可能缺少不為四聚體多肽之寡聚多肽。

【0154】 在一些實施例中，組合物包含單體多肽，其中組合物基本上不含寡聚多肽。組合物可能缺少寡聚多肽。

IV. 核酸、選殖細胞及表現細胞

【0155】 本文所述實施例亦包括核酸，該核酸包含編碼本文所述多肽之核苷酸序列。核酸可為 DNA 或 RNA。包含編碼本文所述多肽之核苷酸序列之 DNA 通常包含可操作連接至核苷酸序列之啟動子。啟動子較佳能夠驅動核苷酸序列在所關注表現細胞中之組成型或誘導型表現。核酸之精確核苷酸序列不受特定限制，只要核苷酸序列編碼本文所述之多肽即可。密碼子可經選擇以例如匹配所關注表現細胞(例如哺乳動物細胞，例如人類細胞)之密碼子偏愛及/或為便於選殖。DNA 可為例如可包含複製起點(例如用於質體在原核細胞中複製)之質體。

【0156】 本揭示內容之各個態樣亦係關於包含核酸之細胞，該核酸包含編碼本文所述多肽之核苷酸序列。細胞可為表現細胞或選殖細胞。核酸通常選殖於大腸桿菌中，但可使用其他選殖細胞。若細胞係表現細胞，則核酸視情況係染色體之核酸，即，其中核苷酸序列整合至染色體中，但其後核酸可存在於表現細胞中，例如作為染色體外 DNA。

【0157】 本揭示內容之各個態樣包括包含核酸之細胞，該核酸包含編碼如本文所述之多肽或寡聚多肽(例如二聚體、三聚體或四聚體多肽)之序列。細胞通常係表現細胞。表現細胞之性質不受特定限制。哺乳動物表現細胞可允許多肽或寡聚多肽之有利折疊、轉譯後修飾及/或分泌，但可使用其他真核細胞或原核細胞作為表現細胞。實例性表現細胞包括 CHO、BHK、NS0、Sp2/0、COS、C127、HEK、HT-1080、PER.C6、HeLa 及 Jurkat 細胞。

【0158】 本發明之表現細胞通常不為酵母，酵母常用作表現重組 HIV 外套膜蛋白之表現細胞。HIV 外套膜蛋白在酵母中之

表現可產生錯誤折疊、聚集及/或異常轉譯後修飾之增多，其藉由在哺乳動物表現細胞(尤其人類表現細胞)中表現本文所述多肽來減輕。

V. 分析及試劑

【0159】 實施例包括免疫分析試劑，該分析試劑包含用於分析含有抗 HIV 抗體之組合物之如本文所述之多肽或寡聚多肽(例如二聚體多肽)。免疫分析試劑可結合至固體支撐件。固體支撐件可為例如珠粒、膜、微量滴定板、多肽晶片或層析管柱之固相。

【0160】 各個實施例亦包括用於分析含有抗-HIV 抗體之組合物之裝置。該裝置可為用於確定樣品是否含有抗-HIV 抗體(例如用於確定樣品是否可用於輸注或移植至人類患者中)之裝置。分析為業內所熟知且特徵通常在於固體支撐件，其幫助分離直接或間接結合固體支撐件之組分與未直接或間接結合固體支撐件之組分。固體支撐件可為例如珠粒、膜、微量滴定板、多肽晶片或層析管柱之固相。裝置可包含如本文所述之多肽或寡聚多肽(例如二聚體多肽)。多肽或寡聚多肽通常共價或非共價結合至固體支撐件。

【0161】 如本文所用術語「直接」結合係指分子直接共軛(conjugation)至固體支撐件，例如使多肽之半胱胺酸硫醇結合至金表面之金-硫醇相互作用。如本文所用術語「間接」結合包括多肽與直接結合至表面之另一分子之特異性結合，例如，多肽可結合抗體，該抗體直接結合至固體支撐件，藉此使多肽間接結合至固體支撐件。術語「間接」結合獨立於多肽與固體支撐件之間之分子數，只要分子菊鏈(daisy chain)之間之每一相互作用係特異性或共價相互作用且菊鏈之末端分子直接結合至固體

支撐件即可。

【0162】 如本文所用術語「非共價結合」係指例如抗體與其抗原、配體與其受體或酶與其受質之間之特異性結合，例如藉由生物素-抗生蛋白鏈菌素相互作用所例示。特異性結合通常係指解離常數(K_D)小於約 100 μM、例如小於約 10 μM、約 1 μM、約 100 nM 或約 10 nM 之相互作用。亦可設計其中多肽或寡聚多肽從不結合固體支撐件(例如在競爭分析中)之分析。

【0163】 在實例性分析中，使結合至固體支撐件之多肽(或寡聚多肽)與懷疑含有抗 HIV 抗體之樣品(例如血液、血清、血漿、唾液)或臉頰拭子樣品接觸。然後以不顯著破壞多肽(或寡聚多肽)與任何抗 HIV 抗體之間之結合的嚴格度洗滌固體支撐件(例如磷酸鹽緩衝鹽水或相似洗滌液)。然後使固體支撐件與識別 HIV 抗體之「二級」抗體(例如抗-人類 IgG 抗體)接觸，其中二級抗體包括檢測標記。檢測標記可為染料(例如用於視覺檢測)、螢光團(例如用於螢光檢測)、酶(例如辣根過氧化物酶；用於擴增訊號之視覺或螢光檢測)、放射性標記或常用於分子生物學或醫學診斷之任何其他檢測標記。熟習此項技術者易於明瞭此分析之不同變化形式。舉例而言，可使樣品之抗體固定於固體支撐件上，可使多肽(或寡聚多肽)與抗體接觸，且然後可使用識別多肽(或寡聚多肽)之融合蛋白或親和標籤之抗體或配體來檢測多肽(或寡聚多肽)。

【0164】 實施例亦包括分析樣品之方法，其包含使如本文所述之多肽或寡聚多肽與樣品接觸。其他實施例包括確定樣品是否包含抗 HIV 抗體之方法，其包含使如本文所述之多肽或寡聚多肽與樣品接觸。實施例亦包括分析樣品之方法，其包含使如本文所述之多肽或寡聚多肽與樣品接觸及測定抗體與多肽或寡

聚多肽之間之結合親和力。樣品可為人類樣品，例如自人類獲得之體液。樣品可為例如血液、血漿、血清、唾液或臉頰拭子。樣品可包含血液、血漿、血清、唾液或臉頰細胞。樣品可為精液樣品。

VI. 醫藥組合物

【0165】 本發明之多個實施例係關於包含本文所述多肽或本文所述寡聚多肽之組合物。組合物可包含醫藥上可接受之載體及/或醫藥上可接受之賦形劑。組合物可為例如疫苗。

【0166】 本發明之多個實施例係關於治療或預防人類患者之 HIV 感染之方法，其包含向患者投與包含如本文所述多肽或如本文所述寡聚多肽之組合物。如本文所用術語「預防(preventing)」係指預防(prophylaxis)，其包括向患者投與組合物以減小患者相對於未接受組合物之原本相似之患者感染 HIV 之可能性。術語預防亦包括向一組患者投與組合物以減少組中相對於未接受組合物之原本相似之患者組感染 HIV 之患者數。

【0167】 本發明之多個實施例係關於治療或預防人類患者之 HIV 感染之方法，其包含向患者投與本文所述實施例之疫苗。

【0168】 患者可能感染 HIV，患者可能已暴露於 HIV，或患者可呈現升高之暴露於及/或感染 HIV 之風險。

VII. 選擇抗體之方法

【0169】 實施例進一步包括產生抗體之方法，其包含向動物投與本文所述之多肽或寡聚多肽(例如二聚體多肽)。動物可為例如小鼠、兔、大鼠、倉鼠、天竺鼠、山羊、綿羊、馬或雞。

【0170】 其他實施例包括分析含有抗體之樣品之方法，其包含使樣品與本文所述之多肽或寡聚多肽(例如二聚體、三聚體或四聚體多肽)接觸及測定抗體與多肽或寡聚多肽之間之結合親

和力。結合親和力可為相對結合親和力，例如結合親和力可相對於存在於樣品中之一或多種不同抗體之結合親和力，或使用實質上相同之方法以其他方式分析。類似地，結合親和力可為定量結合親和力，例如該方法可包括在期望確定性範圍內測定解離常數(K_D)，例如±一定數量級、±50%、±10%等。該方法可為抗體親和力成熟之方法。

【0171】 實施例亦包括自複數種抗體選擇抗-HIV 抗體之方法。該方法可包含使如本文所述之多肽或寡聚多肽(例如二聚體多肽)與含有複數種抗體之組合物接觸及鑑別相對於組合物中之其他抗體與多肽或寡聚多肽具有高結合親和力之抗體，藉此選擇抗-HIV 抗體。該方法可為選擇抗-HIV 抗體之方法，該抗-HIV 抗體特異性結合如本文所述之 gp120 胺基酸序列或 gp41 胺基酸序列之抗原決定簇。

VIII. 選擇生物樣品之方法

【0172】 其他實施例亦包括自人類生物樣品之供應選擇生物樣品之方法，其包含自供應選擇包含抗體之彼等樣品，該等抗體與如本文所述之多肽或寡聚多肽(例如二聚體多肽)形成抗原-抗體複合物。此可用於鑑別 HIV 陽性樣品以自供應去除，尤其在供應係血液供應時相關。可使用無法選擇之彼等樣品來製備血液相關產品。藉由鑑別 HIV 陽性樣品，該方法亦可用於富集陽性樣品。

【0173】 實施例亦包括自人類生物樣品之供應選擇生物樣品之方法，其包含自供應選擇不包含抗體之彼等樣品，該等抗體與本發明之免疫分析試劑形成抗原-抗體複合物。此可用於鑑別可用於製備血液相關產品之生物樣品。

例示

【0174】 [實例 1. 包含 HIV 外套膜蛋白之表位之多肽之設計]

【0175】 設計含有 HIV 外套膜蛋白之表位之多種多肽。使用衍生自 LANL HIV-1 gp160 外套膜表位圖譜 (https://www.hiv.lanl.gov/content/immunology/maps/ab/gp160.html)之 gp120 人類 B 細胞表位來設計多肽 env_1 至 env_4，該等 gp120 人類 B 細胞表位係使用 α 螺旋或 β 褶板連接體序列縫合在一起。該等序列亦融合至鼠類 IgG CH2/CH3 區。在一些形式中，包括 IgG 鉸鏈區，藉此允許形成二聚體。使用融合至 p53 之四聚化基序之相同 SYN-gp120 序列來設計多肽 env_5。使用融合至 GCN4 之三聚化基序之 SYN-gp120 序列來設計多肽 env_6。使用融合至網格蛋白之三聚化基序之 SYN-gp120 序列來設計多肽 env_7。使用來自對應於 gp41 之 LANL HIV gp160 表位圖譜之人類 B 細胞表位來設計多肽 env_8 及 env_9，該等人類 B 細胞表位對應於與 α 螺旋連接體縫合在一起(命名為「SYN-gp41」)且融合至具有或不具鉸鏈區之 IgG CH2/CH3 結構域之 gp41。使用衍生自 RCSB 蛋白質數據庫(PDB)入口 5TE4 及 5T33 之胺基酸序列之 HIV-1 gp120 序列來設計多肽 env_10 至 env_17，該等胺基酸序列融合至具或不具鉸鏈區之 IgG CH2/CH3 結構域或 gp120 之 V3 環。多肽 env_14 至 env_17 進一步包含衍生自 RCSB 蛋白質數據庫(PDB)入口 5V8L 之胺基酸序列之 HIV-1 gp41 序列之一部分，該等胺基酸序列在 α 螺旋連接體後融合至 IgG CH2/CH3 結構域之 C 末端。多肽 env_18 及 env_19 係使用衍生自 PDB 入口 5V8L 之 gp41 序列來設計，其分別融合至具有或不具鉸鏈區之 IgG CH2/CH3 結構域。多肽 env_20 係多肽 env_8 之改進形式，其中延長一個表位區域。多

肽 env_21 與多肽 env_20 相同且 SYN-gp120 結構域融合在 C 末端。多肽 env_22 係截短的 gp41 序列，其衍生自 NCBI 參考序列 NP_579895 且融合至 IgG CH2/CH3 結構域在 p41 與 gp120 序列之間的 SYN-gp120 序列。多肽 env_23 及 env_24 衍生自 HIV-1 外套膜蛋白表位且分別在其 C 或 N 末端融合至 IgG CH2/CH3 結構域。多肽 env_25 至 env_27 係分枝 A、分枝 C 及對應於 HIV 外套膜蛋白表位之共有序列。多肽 env_28 及 env_29 分別對應於在其 N-或 C-末端融合至 IgG CH2/CH3 結構域之 HIV-2 外套膜蛋白表位。多肽 env_30 及 env_31 分別對應於在其 N-或 C-末端融合至 IgG CH2/CH3 結構域之 HIV-1 外套膜蛋白表位。多肽 env_32 及 env_33 對應於多肽 env_22 中所用之相同 gp41 序列，其中 IgG CH2/CH3 結構域分別在其 N-或 C-末端融合。多肽 env_34 對應於衍生自美國專利第 6,284,248 號之 SEQ ID NO:10 之 gp160 序列，SEQ ID NO:10 用作多肽 env_35 至 env_38 之對照。此序列不包括外套膜跨膜序列且使 gp120/gp41 裂解位點突變。多肽 env_35 至 env 38 對應於來自分枝 A、分枝 C、分枝 AE 及與多肽 env_34 之序列比對之共有序列的外套膜序列。多肽 env_39 衍生自 HIV-1 gp120 分枝 B 外套膜蛋白表位，該表位融合至截短的 gp41 序列，該截短的 gp41 序列衍生自 NCBI 參考序列 NP_579895 且 IgG CH2/CH3 結構域在 gp120 與 gp41 序列之間。多肽 env_40 對應於 HIV-1 gp120 外套膜之相同序列，其係與 IgG CH2/CH3 結構域融合在一起但具有較長連接體之截短的 gp41。多肽 env_41 對應於衍生自 NCBI 參考序列 NP_579895 之截短的 gp41 序列，其在 C 末端融合至 HIV-1 gp120 外套膜蛋白表位且 IgG CH2/CH3 結構域在 gp41 與 gp120 序列之間。多肽 env_42 至 env_44 類似於多肽 env_40，但分別使用來自分枝 A、

分枝 AE 及分枝 AG 品系之 gp120 序列。多肽 env_45 類似於多肽 env_40，但使用共有 gp120 序列。多肽 env_46 衍生自 HIV-1 gp120 分枝 B 外套膜蛋白表位，其融合至 HIV-1 衣殼蛋白 p24 序列且 IgG CH2/CH3 結構域在 gp120 與 p24 序列之間。多肽 env_47 衍生自 HIV-1 衣殼蛋白 p24 序列，其融合至 HIV-1 gp120 分枝 B 外套膜蛋白表位且 IgG CH2/CH3 結構域在 p24 與 gp120 序列之間。多肽 env_48 類似於移除 p24 蛋白之所選表位之多肽 env_46。多肽 env_49 類似於移除 p24 蛋白之所選表位之多肽 env_47。多肽 env_50 類似於具有所選 p24 突變之多肽 env_46。多肽 env_51 類似於具有所選 p24 突變之多肽 env_47。多肽 env_52 類似於在 p24 序列中具有所選丙胺酸取代之多肽 env_46。多肽 env_53 類似於在 p24 序列中具有所選丙胺酸取代之多肽 env_47。多肽 env_54 對應於 HIV-1 gp41 序列，其在 C 末端融合至 HIV-1 gp120 蛋白且具有 IgG CH2/CH3 結構域。

【0176】 自 env_1 至 env_38 之每一編號之「多肽」對應於 SEQ ID NO:1 至 SEQ ID NO:38。自 env_39 至 env_54 之每一編號之「多肽」對應於 SEQ ID NO:91 至 SEQ ID NO:106。

【0177】 [實例 2. env 重組多肽之模型]

【0178】 使用 Cyrus Biotech 蛋白質建模工具內之 Rosetta 軟體或使用 PyMol 藉由將來自 PDB 之已知結構手動縫合在一起來預測實例 1 中所述且分別具有 SEQ ID NO:1-38 及 SEQ ID NO:91-106 中所示之胺基酸序列之多肽 env_1 至 env_38 及 env_39 至 env_54 之結構。圖 2-40 及圖 44 係用 PyMol 繪製。融合蛋白以暗灰顯示，且 HIV 外套膜蛋白(其包含一或多個表位)之胺基酸序列以亮灰顯示。

【0179】 圖 2 係單體多肽之模型，代表由 SEQ ID NO:1 及

SEQ ID NO:3 中所示之胺基酸序列編碼之單體亞單位。

【0180】 圖 3 係單體多肽之模型，代表由 SEQ ID NO:2 及 SEQ ID NO:4 中所示之胺基酸序列編碼之單體亞單位。

【0181】 圖 4 係單體多肽之模型，代表由 SEQ ID NO:5 中所示之胺基酸序列編碼之單體亞單位。

【0182】 圖 5 係單體多肽之模型，代表由 SEQ ID NO:6 中所示之胺基酸序列編碼之單體亞單位。

【0183】 圖 6 係單體多肽之模型，代表由 SEQ ID NO:7 中所示之胺基酸序列編碼之單體亞單位。

【0184】 圖 7 係單體多肽之模型，代表由 SEQ ID NO:8 及 SEQ ID NO:20 中所示之胺基酸序列編碼之單體亞單位。

【0185】 圖 8 係單體多肽之模型，代表由 SEQ ID NO:9 中所示之胺基酸序列編碼之單體亞單位。

【0186】 圖 9 係單體多肽之模型，代表由 SEQ ID NO:10、SEQ ID NO:11 及 SEQ ID NO:12 中所示之胺基酸序列編碼之單體亞單位。

【0187】 圖 10 係二聚體多肽之模型，代表由 SEQ ID NO:13 或 SEQ ID NO:15 中所示之胺基酸序列編碼之兩個單體多肽形成之二聚體多肽。

【0188】 圖 11 係單體多肽之模型，代表由 SEQ ID NO:14 及 SEQ ID NO:16 中所示之胺基酸序列編碼之單體亞單位。

【0189】 圖 12 係二聚體多肽之模型，代表由 SEQ ID NO:15 或 SEQ ID NO:17 中所示之胺基酸序列編碼之兩個單體多肽形成之二聚體多肽。

【0190】 圖 13 係單體多肽之模型，代表由 SEQ ID NO:18 中所示之胺基酸序列編碼之單體亞單位。

【0191】 圖 14 係二聚體多肽之模型，代表由 SEQ ID NO:19 中所示之胺基酸序列編碼之兩個單體多肽形成之二聚體多肽。

【0192】 圖 15 係單體多肽之模型，代表由 SEQ ID NO:21 中所示之胺基酸序列編碼之單體亞單位。

【0193】 圖 16 係單體多肽之模型，代表由 SEQ ID NO:22 中所示之胺基酸序列編碼之單體亞單位。

【0194】 圖 17 係單體多肽之模型，代表由 SEQ ID NO:23 中所示之胺基酸序列編碼之單體亞單位。

【0195】 圖 18 係單體多肽之模型，代表由 SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26 及 SEQ ID NO:27 中所示之胺基酸序列編碼之單體亞單位。

【0196】 圖 19 係單體多肽之模型，代表由 SEQ ID NO:28 中所示之胺基酸序列編碼之單體亞單位。

【0197】 圖 20 係單體多肽之模型，代表由 SEQ ID NO:29 中所示之胺基酸序列編碼之單體亞單位。

【0198】 圖 21 係單體多肽之模型，代表由 SEQ ID NO:30 中所示之胺基酸序列編碼之單體亞單位。

【0199】 圖 22 係單體多肽之模型，代表由 SEQ ID NO:31 中所示之胺基酸序列編碼之單體亞單位。

【0200】 圖 23 係單體多肽之模型，代表由 SEQ ID NO:32 中所示之胺基酸序列編碼之單體亞單位。

【0201】 圖 24 係單體多肽之模型，代表由 SEQ ID NO:33 中所示之胺基酸序列編碼之單體亞單位。

【0202】 圖 25 係單體多肽之模型，代表由 SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37 及 SEQ ID NO:38 中所示之胺基酸序列編碼之單體亞單位。

【0203】 圖 26 係單體多肽之模型，代表由 SEQ ID NO:92 中所示之胺基酸序列編碼之單體亞單位。

【0204】 圖 27 係單體多肽之模型，代表由 SEQ ID NO:93 中所示之胺基酸序列編碼之單體亞單位。

【0205】 圖 28 係單體多肽之模型，代表由 SEQ ID NO:94 中所示之胺基酸序列編碼之單體亞單位。

【0206】 圖 29 係單體多肽之模型，代表由 SEQ ID NO:95 中所示之胺基酸序列編碼之單體亞單位。

【0207】 圖 30 係單體多肽之模型，代表由 SEQ ID NO:96 中所示之胺基酸序列編碼之單體亞單位。

【0208】 圖 31 係單體多肽之模型，代表由 SEQ ID NO:97 中所示之胺基酸序列編碼之單體亞單位。

【0209】 圖 32 係單體多肽之模型，代表由 SEQ ID NO:98 中所示之胺基酸序列編碼之單體亞單位。

【0210】 圖 33 係單體多肽之模型，代表由 SEQ ID NO:99 中所示之胺基酸序列編碼之單體亞單位。

【0211】 圖 34 係單體多肽之模型，代表由 SEQ ID NO:100 中所示之胺基酸序列編碼之單體亞單位。

【0212】 圖 35 係單體多肽之模型，代表由 SEQ ID NO:101 中所示之胺基酸序列編碼之單體亞單位。

【0213】 圖 36 係單體多肽之模型，代表由 SEQ ID NO:102 中所示之胺基酸序列編碼之單體亞單位。

【0214】 圖 37 係單體多肽之模型，代表由 SEQ ID NO:103 中所示之胺基酸序列編碼之單體亞單位。

【0215】 圖 38 係單體多肽之模型，代表由 SEQ ID NO:104 中所示之胺基酸序列編碼之單體亞單位。

【0216】 圖 39 係單體多肽之模型，代表由 SEQ ID NO:105 中所示之胺基酸序列編碼之單體亞單位。

【0217】 圖 40 係單體多肽之模型，代表由 SEQ ID NO:106 中所示之胺基酸序列編碼之單體亞單位。

【0218】 圖 44 係單體多肽之模型，代表由 SEQ ID NO:91 中所示之胺基酸序列編碼之單體亞單位。

【0219】 [實例 3. 重組多肽之選殖及表現]

【0220】 對多肽 env_1、env_2、env_3、env_4、env_5、env_8、env_9、env_10、env_11、env_12、env_13、env_14、env_15、env_16、env_17 及 env_18 進行選殖，使其在哺乳動物細胞中表現，且分離細胞上清液。在 4-20% tris-甘胺酸 TGXTM 十二烷基硫酸鈉聚丙烯醯胺(SDS-PAGE)凝膠運行上在還原及非還原條件下分析來自細胞上清液之蛋白質。用 InstantBlueTM 蛋白染色劑對凝膠染色。多肽 env_1、env_2、env_3、env_5、env_8、env_9、env_10、env_11、env_12、env_13、env_14、env_15、env_16、env_17 及 env_18 以可檢測量表現(圖 41 及圖 42)。

【0221】 [實例 4. 哺乳動物表現的重組多肽藉由 ELISA 能夠檢測供體樣品中之 HIV 抗體]

【0222】 使用酶結合免疫吸附分析 (Enzyme-linked immunosorbent assay；ELISA)來確定哺乳動物表現的 HIV env 重組多肽能夠檢測來自供體之血漿樣品中之由酵母表現的 HIV 抗原 Env13 (對照)丟失之 HIV 抗體。

【0223】 簡言之，在室溫下用 50 μl 每一抗原以相同之莫耳濃度塗覆多孔板之孔過夜，包括對照抗原 Env13 (酵母)。培育後，用 340 μl 洗滌緩衝液將板洗滌兩次且然後在室溫下用封阻緩衝液封阻 90 分鐘。將板封阻後，將封阻緩衝液吸出孔且將 5 μl

每一供體樣品與 50 µl 樣本稀釋劑一起添加至孔。然後將板覆蓋且在 37℃下培育 45 min。此後，用 340 µl 1×洗滌緩衝液將板洗滌 4 次且將 50 µl 抗 IgG-HRP 共軛物添加至每一孔。將板覆蓋且在 37℃下再培育 45 min 並用 340 µl 1×洗滌緩衝液再洗滌。藉由將 OPD 錠劑(20 mg)溶解於 12ml 受質緩衝液中來製備受質溶液。然後，將 50 µl 受質溶液添加至每一孔且在室溫下在黑暗中將板再培育 30min。最後，將 15 µl 4N H_2SO_4 添加至每一孔以終止反應。根據 490nm 處之吸收光譜藉由監測辣根過氧化物酶受質至產物之轉化來量化所結合抗原。測試最多 337 個樣品。

【0224】 對照抗原 Env13 (酵母)僅在 337 個所測試樣品中之 307 個樣品中檢測到陽性命中。大多數哺乳動物衍生之所測試 env 抗原能夠檢測到由 Env13 丟失之陽性命中。由 Env13 (酵母)丟失之所有樣品似乎為低效價樣品。然而，哺乳動物衍生之 env 多肽能夠覆蓋由 Env13 (酵母表現)丟失之至多 4 種樣品。表 1 之結果展示新哺乳動物衍生之 env 重組多肽允許檢測供體樣品中由先前技術抗原 Env13 (酵母)丟失之 HIV 抗體。

【0225】 表 1. 藉由 HIV env 重組多肽檢測供體樣品中之 HIV 抗體

Env 抗原	所測試樣品之總數	總陽性命中	獨特命中數(由 **Env13** 丟失(酵母))
對照 Env13 (酵母)	337	307	
env_5	337	224	4
env_11	337	288	3
env_20	337	280	4
env_22	154	42	4

env_23	146	109	3
env_32	32	23	4
env_40	31	25	4
env_41	30	28	3
env_43	154	112	4
env_44	32	31	4
env_46	136	101	4
env_48	154	112	4

【符號說明】

無。

序列表

<110> 美商格里佛診斷方法股份有限公司

<120> 新穎哺乳動物表現的人類免疫缺乏病毒外套膜蛋白抗原

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<210> 1
<211> 538
<212> PRT
<213> 合成

<400> 1

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His
20 25 30

Glu Asp Ile Ile Ser Leu Trp Cys Thr Asp Leu Lys Asn Asp Thr Asn
35 40 45

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Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Ala Glu Ala Ala
    50                  55                  60

Ala Lys Glu Ala Ala Ala Lys Ala Thr Ser Ile Arg Gly Lys Val Gln
65                  70                  75                  80

Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro Ile Asp Asn
                85                  90                  95

Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Ala Glu Ala Ala Ala Lys
            100                 105                 110

Glu Ala Ala Ala Lys Ala Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
        115                 120                 125

Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly
    130                 135                 140

Pro Cys Thr Asn Val Ser Thr Val Cys Thr Arg Pro Asn Asn Asn Thr
145                 150                 155                 160

Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe Val Thr
                165                 170                 175

Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Phe Gly Asn
            180                 185                 190

Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Ala Glu Ala
        195                 200                 205
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Ala Ala Lys Glu Ala Ala Ala Lys Ala Ala Glu Ala Ala Ala Lys Glu
210 215 220

Ala Ala Ala Lys Ala Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp
225 230 235 240

Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Gln Ile
245 250 255

Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Leu Thr Arg Asp
260 265 270

Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe Arg Pro Gly Gly Gly
275 280 285

Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ile Glu Pro
290 295 300

Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
305 310 315 320

Lys Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
325 330 335

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
340 345 350

```
Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
        355                 360                 365

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
    370                 375                 380

Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
385                 390                 395                 400

His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
                405                 410                 415

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
            420                 425                 430

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
        435                 440                 445

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
    450                 455                 460

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
465                 470                 475                 480

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
                485                 490                 495

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
            500                 505                 510
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Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
515 520 525

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys
530 535

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<213> 合成

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln
20 25 30

Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Asp Leu Lys Asn Asp Thr
35 40 45

Asn Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Thr Trp Ile
50 55 60

Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr
65 70 75 80

Thr Thr Ser Ile Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr

85 90 95

Lys Leu Asp Ile Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys Leu
100 105 110

Thr Ser Cys Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn
115 120 125

Pro Gly Thr Lys Ile Tyr Thr Pro Ile Pro Ile His Tyr Cys Ala Pro
130 135 140

Ala Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr
145 150 155 160

Gly Pro Cys Thr Asn Val Ser Thr Val Thr Trp Ile Gln Asn Pro Gly
165 170 175

Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Arg
180 185 190

Pro Asn Asn Asn Thr Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly
195 200 205

Arg Ala Phe Val Thr Ile Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp
210 215 220

Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Phe Gly Asn Asn Lys Thr
225 230 235 240

Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Thr Trp Ile Gln Asn Pro
245 250 255

Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Pro Cys
260 265 270

Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala Met
275 280 285

Tyr Ala Pro Pro Ile Ser Gly Gln Ile Ala Glu Ala Ala Ala Lys Glu
290 295 300

Ala Ala Ala Lys Ala Leu Thr Arg Asp Gly Gly Asn Ser Asn Asn Glu
305 310 315 320

Ser Glu Ile Phe Arg Pro Gly Gly Gly Asp Ala Glu Ala Ala Ala Lys
325 330 335

Glu Ala Ala Ala Lys Ala Ile Glu Pro Leu Gly Val Ala Pro Thr Lys
340 345 350

Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Gly Gly Gly Pro Ser
355 360 365

Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His Glu Asp Ile Ile
370 375 380

Ser Leu Trp Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe

385 390 395 400

Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val
405 410 415

Thr Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile
420 425 430

Ser Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr
435 440 445

His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro
450 455 460

Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val
465 470 475 480

Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro
485 490 495

Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu
500 505 510

Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp
515 520 525

Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr
530 535 540

Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser
545 550 555 560

Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu
565 570 575

Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His
580 585 590

His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys
595 600

<210> 3
<211> 535
<212> PRT
<213> 合成

<400> 3

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His
20 25 30

Glu Asp Ile Ile Ser Leu Trp Cys Thr Asp Leu Lys Asn Asp Thr Asn
35 40 45

Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Ala Glu Ala Ala
50 55 60

Ala Lys Glu Ala Ala Ala Lys Ala Thr Ser Ile Arg Gly Lys Val Gln
65 70 75 80

Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro Ile Asp Asn
85 90 95

Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Ala Glu Ala Ala Ala Lys
100 105 110

Glu Ala Ala Ala Lys Ala Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
115 120 125

Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly
130 135 140

Pro Cys Thr Asn Val Ser Thr Val Cys Thr Arg Pro Asn Asn Asn Thr
145 150 155 160

Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe Val Thr
165 170 175

Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Phe Gly Asn
180 185 190

Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Ala Glu Ala
195 200 205

Ala Ala Lys Glu Ala Ala Ala Lys Ala Ala Glu Ala Ala Ala Lys Glu
210 215 220

Ala Ala Ala Lys Ala Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp
225 230 235 240

Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Gln Ile
245 250 255

Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Leu Thr Arg Asp
260 265 270

Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe Arg Pro Gly Gly Gly
275 280 285

Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ile Glu Pro
290 295 300

Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
305 310 315 320

Lys Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys
325 330 335

Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val
340 345 350

Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp
355 360 365

Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe
370 375 380

Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp
385 390 395 400

Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe
405 410 415

Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys
420 425 430

Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys
435 440 445

Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp
450 455 460

Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys
465 470 475 480

Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser
485 490 495

Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr
500 505 510

Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser
515 520 525

Leu Ser His Ser Pro Gly Ile
530 535

<210> 4
<211> 606
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<213> 合成

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln
20 25 30

Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Asp Leu Lys Asn Asp Thr
35 40 45

Asn Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Thr Trp Ile
50 55 60

Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr
65 70 75 80

Thr Thr Ser Ile Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr
85 90 95

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Lys Leu Asp Ile Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys Leu
          100                 105                 110

Thr Ser Cys Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn
        115                 120                 125

Pro Gly Thr Lys Ile Tyr Thr Pro Ile Pro Ile His Tyr Cys Ala Pro
    130                 135                 140

Ala Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr
145                 150                 155                 160

Gly Pro Cys Thr Asn Val Ser Thr Val Thr Trp Ile Gln Asn Pro Gly
                165                 170                 175

Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Arg
            180                 185                 190

Pro Asn Asn Asn Thr Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly
        195                 200                 205

Arg Ala Phe Val Thr Ile Thr Trp Ile Gln Asn Pro Gly Thr Lys Ile
    210                 215                 220

Tyr Thr Phe Gly Asn Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly
225                 230                 235                 240

Gly Asp Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro
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245 250 255

Gly Thr Lys Ile Tyr Thr Pro Cys Arg Ile Lys Gln Ile Ile Asn Met
260 265 270

Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Gln
275 280 285

Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Leu Thr Arg
290 295 300

Asp Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe Arg Pro Gly Gly
305 310 315 320

Gly Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ile Glu
325 330 335

Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg
340 345 350

Glu Lys Arg Gly Gly Gly Pro Ser Asn Met Trp Lys Asn Asp Met Val
355 360 365

Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Val Pro Arg Asp Cys
370 375 380

Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe
385 390 395 400

Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro
405 410 415

Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val
420 425 430

Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr
435 440 445

Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu
450 455 460

Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys
465 470 475 480

Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser
485 490 495

Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro
500 505 510

Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile
515 520 525

Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly
530 535 540

Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp

545 550 555 560

Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp
565 570 575

Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His
580 585 590

Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Ile
595 600 605

<210> 5
<211> 378
<212> PRT
<213> 合成

<400> 5

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His
20 25 30

Glu Asp Ile Ile Ser Leu Trp Cys Thr Asp Leu Lys Asn Asp Thr Asn
35 40 45

Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Ala Glu Ala Ala
50 55 60

Ala Lys Glu Ala Ala Ala Lys Ala Thr Ser Ile Arg Gly Lys Val Gln
65 70 75 80

Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro Ile Asp Asn
85 90 95

Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Ala Glu Ala Ala Ala Lys
100 105 110

Glu Ala Ala Ala Lys Ala Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
115 120 125

Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly
130 135 140

Pro Cys Thr Asn Val Ser Thr Val Cys Thr Arg Pro Asn Asn Asn Thr
145 150 155 160

Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe Val Thr
165 170 175

Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Phe Gly Asn
180 185 190

Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Ala Glu Ala
195 200 205

Ala Ala Lys Glu Ala Ala Ala Lys Ala Ala Glu Ala Ala Ala Lys Glu
210 215 220

Ala Ala Ala Lys Ala Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp
225 230 235 240

Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Gln Ile
245 250 255

Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Leu Thr Arg Asp
260 265 270

Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe Arg Pro Gly Gly Gly
275 280 285

Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ile Glu Pro
290 295 300

Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
305 310 315 320

Lys Gly Gly Gly Pro Ser Gly Gly Gly Pro Ser Lys Pro Leu Asp Gly
325 330 335

Glu Tyr Phe Thr Leu Gln Ile Arg Gly Arg Glu Arg Phe Glu Met Phe
340 345 350

Arg Glu Leu Asn Glu Ala Leu Glu Leu Lys Asp Ala Gln Ala Gly Lys
355 360 365

Glu Pro Gly His His His His His His His
370 375

<210> 6
<211> 405
<212> PRT
<213> 合成

<400> 6

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Cys Thr Asp Leu Lys Asn Asp Thr Asn Thr Asn Ser
20 25 30

Ser Ser Gly Arg Met Ile Met Glu Lys Thr Trp Ile Gln Asn Pro Gly
35 40 45

Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Thr Ser Ile
50 55 60

Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile
65 70 75 80

Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Thr
85 90 95

Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys
100 105 110

Ile Tyr Thr Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr
130 135 140

Asn Val Ser Thr Val Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr
145 150 155 160

Gln Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Arg Pro Asn Asn Asn
165 170 175

Thr Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe Val
180 185 190

Thr Ile Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro
195 200 205

Gly Thr Lys Ile Tyr Thr Phe Gly Asn Asn Lys Thr Ile Ile Phe Lys
210 215 220

Gln Ser Ser Gly Gly Asp Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp
225 230 235 240

Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Pro Cys Arg Ile Lys Gln
245 250 255

Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro

260 265 270

Ile Ser Gly Gln Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
275 280 285

Ala Leu Thr Arg Asp Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe
290 295 300

Arg Pro Gly Gly Gly Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala
305 310 315 320

Lys Ala Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg
325 330 335

Val Val Gln Arg Glu Lys Arg Gly Gly Gly Pro Ser Asn Met Trp Lys
340 345 350

Asn Asp Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Gly
355 360 365

Gly Gly Pro Ser Gly Tyr Ile Pro Glu Ala Pro Arg Asp Gly Gln Ala
370 375 380

Tyr Val Arg Lys Asp Gly Glu Trp Val Leu Leu Ser Thr Phe Leu His
385 390 395 400

His His His His His
405

<210> 7
<211> 477
<212> PRT
<213> 合成

<400> 7

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Cys Thr Asp Leu Lys Asn Asp Thr Asn Thr Asn Ser
20 25 30

Ser Ser Gly Arg Met Ile Met Glu Lys Thr Trp Ile Gln Asn Pro Gly
35 40 45

Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Thr Ser Ile
50 55 60

Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile
65 70 75 80

Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Thr
85 90 95

Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr Lys
100 105 110

Ile Tyr Thr Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr
130 135 140

Asn Val Ser Thr Val Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr
145 150 155 160

Gln Asn Pro Gly Thr Lys Ile Tyr Thr Cys Thr Arg Pro Asn Asn Asn
165 170 175

Thr Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe Val
180 185 190

Thr Ile Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro
195 200 205

Gly Thr Lys Ile Tyr Thr Phe Gly Asn Asn Lys Thr Ile Ile Phe Lys
210 215 220

Gln Ser Ser Gly Gly Asp Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp
225 230 235 240

Tyr Gln Asn Pro Gly Thr Lys Ile Tyr Thr Pro Cys Arg Ile Lys Gln
245 250 255

Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro
260 265 270

Ile Ser Gly Gln Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
275 280 285

Ala Leu Thr Arg Asp Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe
290 295 300

Arg Pro Gly Gly Gly Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala
305 310 315 320

Lys Ala Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg
325 330 335

Val Val Gln Arg Glu Lys Arg Gly Gly Gly Pro Ser Asn Met Trp Lys
340 345 350

Asn Asp Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Gly
355 360 365

Gly Gly Pro Ser Gly Gly Gly Pro Ser Gly Ser His Met Trp Lys Gln
370 375 380

Ser Val Glu Leu Ala Lys Lys Asp Ser Leu Tyr Lys Asp Ala Met Gln
385 390 395 400

Tyr Ala Ser Glu Ser Lys Asp Thr Glu Leu Ala Glu Glu Leu Leu Gln
405 410 415

Trp Phe Leu Gln Glu Glu Lys Arg Glu Cys Phe Gly Ala Cys Leu Phe
420 425 430

Thr Cys Tyr Asp Leu Leu Arg Pro Asp Val Val Leu Glu Leu Ala Trp
435 440 445

Arg His Asn Ile Met Asp Phe Ala Met Pro Tyr Phe Ile Gln Val Met
450 455 460

Lys Glu Tyr Leu Thr Lys Val His His His His His His
465 470 475

<210> 8
<211> 526
<212> PRT
<213> 合成

<400> 8

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Val Gly Ile Ala Val Gly Ile Ala Glu Ala Ala
20 25 30

Ala Lys Glu Ala Ala Ala Lys Ala Gly Ala Leu Phe Leu Gly Phe Leu
35 40 45

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
50 55 60

Gln Ala Arg Gln Leu Leu Ser Ala Glu Ala Ala Ala Lys Glu Ala Ala

65 70 75 80

Ala Lys Ala Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
85 90 95

Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
100 105 110

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
115 120 125

Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Ala Glu Ala Ala Ala
130 135 140

Lys Glu Ala Ala Ala Lys Ala Thr Ser Leu Ile His Ser Leu Ile Glu
145 150 155 160

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
165 170 175

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu
180 185 190

Trp Tyr Ile Lys Leu Phe Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala
195 200 205

Ala Lys Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
210 215 220

Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Ala Glu Ala Ala Ala Lys
225 230 235 240

Glu Ala Ala Ala Lys Ala Tyr His Arg Leu Arg Asp Leu Leu Leu Ile
245 250 255

Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Glu
260 265 270

Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Gly Thr Asp Arg Val Ile
275 280 285

Glu Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg Arg
290 295 300

Ile Arg Gln Gly Leu Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe
305 310 315 320

Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro
325 330 335

Ile Val Thr Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val
340 345 350

Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr
355 360 365

Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala

370 375 380

Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys
385 390 395 400

Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser
405 410 415

Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro
420 425 430

Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val
435 440 445

Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly
450 455 460

Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp
465 470 475 480

Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp
485 490 495

Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His
500 505 510

Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys
515 520 525

<210> 9
<211> 523
<212> PRT
<213> 合成

<400> 9

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Val Gly Ile Ala Val Gly Ile Ala Glu Ala Ala
20 25 30

Ala Lys Glu Ala Ala Ala Lys Ala Gly Ala Leu Phe Leu Gly Phe Leu
35 40 45

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
50 55 60

Gln Ala Arg Gln Leu Leu Ser Ala Glu Ala Ala Ala Lys Glu Ala Ala
65 70 75 80

Ala Lys Ala Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
85 90 95

Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
100 105 110

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
115 120 125

Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Ala Glu Ala Ala Ala
130 135 140

Lys Glu Ala Ala Ala Lys Ala Thr Ser Leu Ile His Ser Leu Ile Glu
145 150 155 160

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
165 170 175

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu
180 185 190

Trp Tyr Ile Lys Leu Phe Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala
195 200 205

Ala Lys Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
210 215 220

Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Ala Glu Ala Ala Ala Lys
225 230 235 240

Glu Ala Ala Ala Lys Ala Tyr His Arg Leu Arg Asp Leu Leu Leu Ile
245 250 255

Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Glu
260 265 270

Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Gly Thr Asp Arg Val Ile
275 280 285

Glu Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg Arg
290 295 300

Ile Arg Gln Gly Leu Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
305 310 315 320

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
325 330 335

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
340 345 350

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
355 360 365

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
370 375 380

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
385 390 395 400

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
405 410 415

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
420 425 430

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
435 440 445

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
450 455 460

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
465 470 475 480

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
485 490 495

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
500 505 510

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Ile
515 520

<210> 10
<211> 624
<212> PRT
<213> 合成

<400> 10

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala

20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Cys Ile Arg Pro Asn Asn Gly Gly Ser
195 200 205

Gly Ser Gly Gly Asp Ile Arg Gln Ala His Cys Asn Val Thr Arg Ser
210 215 220

Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu Trp Lys Ile
225 230 235 240

Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile Phe Asn Ser
245 250 255

Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
260 265 270

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Glu Thr Asn
275 280 285

Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr Leu Gln Cys
290 295 300

Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met
305 310 315 320

Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser Asn Ile Thr

325 330 335

Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His Asp Lys Glu
340 345 350

Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg
355 360 365

Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile Asn Phe Ala
370 375 380

Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Ala
385 390 395 400

Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile
405 410 415

Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val
420 425 430

Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val
435 440 445

Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp
450 455 460

Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln
465 470 475 480

Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp
485 490 495

Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val
500 505 510

Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr
515 520 525

Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu
530 535 540

Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr
545 550 555 560

Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr
565 570 575

Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr
580 585 590

Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr Lys
595 600 605

Ser Phe Ser Arg Thr Pro Gly Lys His His His His His His His His
610 615 620

<210> 11

<211> 639
<212> PRT
<213> 合成

<400> 11

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Cys Ile Arg Pro Asn Asn Gly Gly Ser
195 200 205

Gly Ser Gly Gly Asp Ile Arg Gln Ala His Cys Asn Val Thr Arg Ser
210 215 220

Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu Trp Lys Ile
225 230 235 240

Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile Phe Asn Ser
245 250 255

Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
260 265 270

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Glu Thr Asn
275 280 285

Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr Leu Gln Cys
290 295 300

Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met
305 310 315 320

Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser Asn Ile Thr
325 330 335

Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His Asp Lys Glu
340 345 350

Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg
355 360 365

Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile Asn Phe Ala
370 375 380

Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Pro
385 390 395 400

Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro
405 410 415

Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys
420 425 430

Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val Val
435 440 445

Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn
450 455 460

Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr
465 470 475 480

Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp
485 490 495

Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu
500 505 510

Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val Arg
515 520 525

Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys
530 535 540

Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu Asp
545 550 555 560

Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys
565 570 575

Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser
580 585 590

Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser
595 600 605

Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr Lys Ser
610 615 620

Phe Ser Arg Thr Pro Gly Lys His His His His His His His His
625 630 635

<210> 12
<211> 611
<212> PRT
<213> 合成

<400> 12

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln

65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Asp Ile Arg Gln Ala His Cys Asn Val
195 200 205

Thr Arg Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu
210 215 220

Trp Lys Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile
225 230 235 240

Phe Asn Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
245 250 255

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn
260 265 270

Glu Thr Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr
275 280 285

Leu Gln Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly
290 295 300

Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser
305 310 315 320

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His
325 330 335

Asp Lys Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp
340 345 350

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile
355 360 365

Asn Phe Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser

370 375 380

Phe Asn Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro
385 390 395 400

Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr
405 410 415

Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser
420 425 430

Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His
435 440 445

Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile
450 455 460

Gln His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn
465 470 475 480

Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys
485 490 495

Gly Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu
500 505 510

Glu Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe
515 520 525

Met Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu
530 535 540

Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr
545 550 555 560

Phe Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg
565 570 575

Asn Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His
580 585 590

Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys His His His His His
595 600 605

His His His
610

<210> 13
<211> 626
<212> PRT
<213> 合成

<400> 13

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

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Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
            180                 185                 190

Asn Glu Pro Val Gln Ile Val Asp Ile Arg Gln Ala His Cys Asn Val
        195                 200                 205

Thr Arg Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu
    210                 215                 220

Trp Lys Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile
225                 230                 235                 240

Phe Asn Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
                245                 250                 255

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn
            260                 265                 270

Glu Thr Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr
        275                 280                 285

Leu Gln Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly
    290                 295                 300

Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser
305                 310                 315                 320

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His
                325                 330                 335
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Asp Lys Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp
340 345 350

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile
355 360 365

Asn Phe Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser
370 375 380

Phe Asn Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys
385 390 395 400

Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
405 410 415

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
420 425 430

Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
435 440 445

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
450 455 460

Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
465 470 475 480

```
His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
                485                 490                 495

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
            500                 505                 510

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
        515                 520                 525

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
    530                 535                 540

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
545                 550                 555                 560

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
                565                 570                 575

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
            580                 585                 590

Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
        595                 600                 605

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys His His His His His His
    610                 615                 620

His His
625
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<210> 14
<211> 800
<212> PRT
<213> 合成

<400> 14

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala

115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Cys Ile Arg Pro Asn Asn Gly Gly Ser
195 200 205

Gly Ser Gly Gly Asp Ile Arg Gln Ala His Cys Asn Val Thr Arg Ser
210 215 220

Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu Trp Lys Ile
225 230 235 240

Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile Phe Asn Ser
245 250 255

Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
260 265 270

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Glu Thr Asn
275 280 285

Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr Leu Gln Cys
290 295 300

Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met
305 310 315 320

Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser Asn Ile Thr
325 330 335

Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His Asp Lys Glu
340 345 350

Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg
355 360 365

Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile Asn Phe Ala
370 375 380

Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Ala
385 390 395 400

Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile
405 410 415

Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val

420 425 430

Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val
435 440 445

Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp
450 455 460

Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln
465 470 475 480

Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp
485 490 495

Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val
500 505 510

Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr
515 520 525

Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu
530 535 540

Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr
545 550 555 560

Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr
565 570 575

Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr
580 585 590

Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr Lys
595 600 605

Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys Glu Ala
610 615 620

Ala Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu
625 630 635 640

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
645 650 655

Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu
660 665 670

Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu Thr Val Trp
675 680 685

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu
690 695 700

Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile
705 710 715 720

Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Arg Asn Leu

725 730 735

Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys Glu Ile
740 745 750

Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu Ser Gln Asn
755 760 765

Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala
770 775 780

Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Gln
785 790 795 800

<210> 15
<211> 815
<212> PRT
<213> 合成

<400> 15

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Cys Ile Arg Pro Asn Asn Gly Gly Ser
195 200 205

Gly Ser Gly Gly Asp Ile Arg Gln Ala His Cys Asn Val Thr Arg Ser
210 215 220

Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu Trp Lys Ile
225 230 235 240

Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile Phe Asn Ser
245 250 255

Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
260 265 270

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Glu Thr Asn
275 280 285

Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr Leu Gln Cys
290 295 300

Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met
305 310 315 320

Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser Asn Ile Thr
325 330 335

Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His Asp Lys Glu
340 345 350

Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg
355 360 365

Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile Asn Phe Ala
370 375 380

Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Pro
385 390 395 400

Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro
405 410 415

Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys
420 425 430

Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val Val
435 440 445

Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn
450 455 460

Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr
465 470 475 480

Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp
485 490 495

Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu
500 505 510

Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val Arg
515 520 525

Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys
530 535 540

Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu Asp
545 550 555 560

Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys
565 570 575

Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser
580 585 590

Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser
595 600 605

Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr Lys Ser
610 615 620

Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys Glu Ala Ala
625 630 635 640

Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
645 650 655

Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln
660 665 670

Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu
675 680 685

Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly
690 695 700

Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg
705 710 715 720

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
725 730 735

Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Arg Asn Leu Ser
740 745 750

Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys Glu Ile Ser
755 760 765

Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu Ser Gln Asn Gln
770 775 780

Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser
785 790 795 800

Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Gln
805 810 815

<210> 16
<211> 787
<212> PRT
<213> 合成

<400> 16

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala

115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Asp Ile Arg Gln Ala His Cys Asn Val
195 200 205

Thr Arg Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu
210 215 220

Trp Lys Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile
225 230 235 240

Phe Asn Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
245 250 255

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn
260 265 270

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Glu Thr Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr
        275                 280                 285

Leu Gln Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly
    290                 295                 300

Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser
305                 310                 315                 320

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His
                325                 330                 335

Asp Lys Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp
            340                 345                 350

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile
        355                 360                 365

Asn Phe Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser
    370                 375                 380

Phe Asn Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro
385                 390                 395                 400

Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr
                405                 410                 415

Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser
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420 425 430

Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His
435 440 445

Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile
450 455 460

Gln His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn
465 470 475 480

Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys
485 490 495

Gly Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu
500 505 510

Glu Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe
515 520 525

Met Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu
530 535 540

Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr
545 550 555 560

Phe Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg
565 570 575

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Asn Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His
            580                 585                 590

Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala
        595                 600                 605

Lys Glu Ala Ala Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe Leu
    610                 615                 620

Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr
625                 630                 635                 640

Leu Thr Val Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Gln
                645                 650                 655

Ser Asn Leu Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu
            660                 665                 670

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
        675                 680                 685

Arg Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly
    690                 695                 700

Lys Leu Ile Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn
705                 710                 715                 720

Arg Asn Leu Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp
```

725 730 735

Lys Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu
740 745 750

Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp
755 760 765

Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp
770 775 780

Tyr Ile Gln
785

<210> 17
<211> 802
<212> PRT
<213> 合成

<400> 17

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

```
His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
    50                  55                  60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65                  70                  75                  80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
                85                  90                  95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
            100                 105                 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala
        115                 120                 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
    130                 135                 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145                 150                 155                 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
                165                 170                 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
            180                 185                 190

Asn Glu Pro Val Gln Ile Val Asp Ile Arg Gln Ala His Cys Asn Val
        195                 200                 205
```

Thr Arg Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu
210 215 220

Trp Lys Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile
225 230 235 240

Phe Asn Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
245 250 255

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn
260 265 270

Glu Thr Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr
275 280 285

Leu Gln Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly
290 295 300

Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser
305 310 315 320

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His
325 330 335

Asp Lys Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp
340 345 350

```
Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile
        355                 360                 365

Asn Phe Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser
    370                 375                 380

Phe Asn Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys
385                 390                 395                 400

Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
                405                 410                 415

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
            420                 425                 430

Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
        435                 440                 445

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
    450                 455                 460

Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
465                 470                 475                 480

His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
                485                 490                 495

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
            500                 505                 510
```

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
515 520 525

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
530 535 540

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
545 550 555 560

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
565 570 575

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
580 585 590

Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
595 600 605

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys
610 615 620

Glu Ala Ala Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe Leu Gly
625 630 635 640

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu
645 650 655

Thr Val Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Ser
660 665 670

Asn Leu Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu Thr
675 680 685

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
690 695 700

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
705 710 715 720

Leu Ile Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Arg
725 730 735

Asn Leu Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys
740 745 750

Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu Ser
755 760 765

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys
770 775 780

Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr
785 790 795 800

Ile Gln

<210> 18
<211> 802
<212> PRT
<213> 合成

<400> 18

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys Ala
20 25 30

Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala Thr
35 40 45

His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu Glu
50 55 60

Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln
65 70 75 80

Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro Cys
85 90 95

Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys Val
100 105 110

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala

115 120 125

Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys Lys
130 135 140

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
145 150 155 160

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val Ile
165 170 175

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln Leu
180 185 190

Asn Glu Pro Val Gln Ile Val Asp Ile Arg Gln Ala His Cys Asn Val
195 200 205

Thr Arg Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu
210 215 220

Trp Lys Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile
225 230 235 240

Phe Asn Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
245 250 255

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn
260 265 270

Glu Thr Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr
275 280 285

Leu Gln Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly
290 295 300

Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser
305 310 315 320

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His
325 330 335

Asp Lys Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp
340 345 350

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile
355 360 365

Asn Phe Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser
370 375 380

Phe Asn Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys
385 390 395 400

Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
405 410 415

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys

420 425 430

Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
435 440 445

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
450 455 460

Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
465 470 475 480

His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
485 490 495

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
500 505 510

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
515 520 525

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
530 535 540

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
545 550 555 560

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
565 570 575

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
580 585 590

Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
595 600 605

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys
610 615 620

Glu Ala Ala Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe Leu Gly
625 630 635 640

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu
645 650 655

Thr Val Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
660 665 670

Asn Leu Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu Thr
675 680 685

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
690 695 700

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
705 710 715 720

Leu Ile Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Arg

725 730 735

Asn Leu Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys
740 745 750

Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu Ser
755 760 765

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys
770 775 780

Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr
785 790 795 800

Ile Gln

<210> 19
<211> 436
<212> PRT
<213> 合成

<400> 19

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys
20 25 30

Lys Cys Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe
35 40 45

Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val
50 55 60

Thr Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile
65 70 75 80

Ser Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr
85 90 95

His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro
100 105 110

Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val
115 120 125

Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro
130 135 140

Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu
145 150 155 160

Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp
165 170 175

Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr
180 185 190

Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser
195 200 205

Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu
210 215 220

Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His
225 230 235 240

His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala
245 250 255

Ala Lys Glu Ala Ala Ala Lys Ala Ala Val Gly Ile Gly Ala Val Phe
260 265 270

Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met
275 280 285

Thr Leu Thr Val Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln
290 295 300

Gln Ser Asn Leu Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys
305 310 315 320

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val
325 330 335

Glu Arg Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser
340 345 350

Gly Lys Leu Ile Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser
355 360 365

Asn Arg Asn Leu Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp
370 375 380

Asp Lys Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu
385 390 395 400

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu
405 410 415

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu
420 425 430

Trp Tyr Ile Gln
435

<210> 20
<211> 522
<212> PRT
<213> 合成

<400> 20

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

```
Val Thr Asn Ser Ala Val Gly Ile Gly Ala Leu Phe Leu Gly Phe Leu
            20                  25                  30

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
        35                  40                  45

Gln Ala Arg Gln Leu Leu Ser Ala Glu Ala Ala Ala Lys Glu Ala Ala
    50                  55                  60

Ala Lys Ala Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
65                  70                  75                  80

Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
                85                  90                  95

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
            100                 105                 110

Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Ala Glu Ala Ala Ala
        115                 120                 125

Lys Glu Ala Ala Ala Lys Ala Thr Ser Leu Ile His Ser Leu Ile Glu
    130                 135                 140

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
145                 150                 155                 160

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu
```

165 170 175

Trp Tyr Ile Lys Leu Phe Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala
180 185 190

Ala Lys Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
195 200 205

Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Ala Glu Ala Ala Ala Lys
210 215 220

Glu Ala Ala Ala Lys Ala Tyr His Arg Leu Arg Asp Leu Leu Leu Ile
225 230 235 240

Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Glu
245 250 255

Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Gly Thr Asp Arg Val Ile
260 265 270

Glu Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg Arg
275 280 285

Ile Arg Gln Gly Leu Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
290 295 300

Ala Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
305 310 315 320

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
325 330 335

Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
340 345 350

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
355 360 365

Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
370 375 380

His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
385 390 395 400

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
405 410 415

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
420 425 430

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
435 440 445

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
450 455 460

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe

465 470 475 480

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
485 490 495

Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
500 505 510

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys
515 520

<210> 21
<211> 835
<212> PRT
<213> 合成

<400> 21

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Val Gly Ile Gly Ala Leu Phe Leu Gly Phe Leu
20 25 30

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
35 40 45

Gln Ala Arg Gln Leu Leu Ser Ala Glu Ala Ala Ala Lys Glu Ala Ala
50 55 60

Ala Lys Ala Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
65 70 75 80

Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
85 90 95

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
100 105 110

Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Ala Glu Ala Ala Ala
115 120 125

Lys Glu Ala Ala Ala Lys Ala Thr Ser Leu Ile His Ser Leu Ile Glu
130 135 140

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
145 150 155 160

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu
165 170 175

Trp Tyr Ile Lys Leu Phe Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala
180 185 190

Ala Lys Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
195 200 205

Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Ala Glu Ala Ala Ala Lys
210 215 220

Glu Ala Ala Ala Lys Ala Tyr His Arg Leu Arg Asp Leu Leu Leu Ile
225 230 235 240

Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Glu
245 250 255

Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Gly Thr Asp Arg Val Ile
260 265 270

Glu Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg Arg
275 280 285

Ile Arg Gln Gly Leu Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
290 295 300

Ala Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
305 310 315 320

Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
325 330 335

Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
340 345 350

Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
355 360 365

```
Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
    370                 375                 380

His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
385                 390                 395                 400

Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
                405                 410                 415

Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
            420                 425                 430

Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
        435                 440                 445

Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
    450                 455                 460

Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
465                 470                 475                 480

Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
                485                 490                 495

Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
            500                 505                 510

Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys
        515                 520                 525
```

Glu Ala Ala Ala Lys Ala Asn Met Trp Lys Asn Asp Met Val Glu Gln
530 535 540

Met His Glu Asp Ile Ile Ser Leu Trp Cys Thr Asp Leu Lys Asn Asp
545 550 555 560

Thr Asn Thr Asn Ser Ser Ser Gly Arg Met Ile Met Glu Lys Ala Glu
565 570 575

Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Thr Ser Ile Arg Gly Lys
580 585 590

Val Gln Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro Ile
595 600 605

Asp Asn Asp Thr Thr Ser Tyr Lys Leu Thr Ser Cys Ala Glu Ala Ala
610 615 620

Ala Lys Glu Ala Ala Ala Lys Ala Pro Ile Pro Ile His Tyr Cys Ala
625 630 635 640

Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly
645 650 655

Thr Gly Pro Cys Thr Asn Val Ser Thr Val Cys Thr Arg Pro Asn Asn
660 665 670

```
Asn Thr Arg Lys Arg Ile Arg Ile Gln Arg Gly Pro Gly Arg Ala Phe
        675                 680                 685

Val Thr Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Phe
    690                 695                 700

Gly Asn Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Ala
705                 710                 715                 720

Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ala Glu Ala Ala Ala
                725                 730                 735

Lys Glu Ala Ala Ala Lys Ala Pro Cys Arg Ile Lys Gln Ile Ile Asn
            740                 745                 750

Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly
        755                 760                 765

Gln Ile Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Leu Thr
    770                 775                 780

Arg Asp Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe Arg Pro Gly
785                 790                 795                 800

Gly Gly Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Ile
                805                 810                 815

Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln
            820                 825                 830
```

Arg Glu Lys
835

<210> 22
<211> 714
<212> PRT
<213> 合成

<400> 22

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
20 25 30

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
35 40 45

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
50 55 60

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
65 70 75 80

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
85 90 95

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn

100 105 110

His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
115 120 125

Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
130 135 140

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
145 150 155 160

Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu Ala Glu Ala Ala
165 170 175

Ala Lys Glu Ala Ala Ala Lys Ala Ala Pro Asn Leu Leu Gly Gly Pro
180 185 190

Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser
195 200 205

Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu Asp Asp
210 215 220

Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His Thr
225 230 235 240

Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val
245 250 255

Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu
260 265 270

Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg
275 280 285

Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val
290 295 300

Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr
305 310 315 320

Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr
325 330 335

Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu
340 345 350

Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys
355 360 365

Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu
370 375 380

Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly
385 390 395 400

Lys Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Asn Met Trp

405 410 415

Lys Asn Asp Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp
420 425 430

Cys Thr Asp Leu Lys Asn Asp Thr Asn Thr Asn Ser Ser Ser Gly Arg
435 440 445

Met Ile Met Glu Lys Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
450 455 460

Ala Thr Ser Ile Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr
465 470 475 480

Lys Leu Asp Ile Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys Leu
485 490 495

Thr Ser Cys Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Pro
500 505 510

Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys
515 520 525

Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr
530 535 540

Val Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Arg Ile Arg Ile Gln
545 550 555 560

Arg Gly Pro Gly Arg Ala Phe Val Thr Ile Ala Glu Ala Ala Ala Lys
565 570 575

Glu Ala Ala Ala Lys Ala Phe Gly Asn Asn Lys Thr Ile Ile Phe Lys
580 585 590

Gln Ser Ser Gly Gly Asp Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala
595 600 605

Lys Ala Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala Pro Cys
610 615 620

Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala Met
625 630 635 640

Tyr Ala Pro Pro Ile Ser Gly Gln Ile Ala Glu Ala Ala Ala Lys Glu
645 650 655

Ala Ala Ala Lys Ala Leu Thr Arg Asp Gly Gly Asn Ser Asn Asn Glu
660 665 670

Ser Glu Ile Phe Arg Pro Gly Gly Gly Asp Ala Glu Ala Ala Ala Lys
675 680 685

Glu Ala Ala Ala Lys Ala Ile Glu Pro Leu Gly Val Ala Pro Thr Lys
690 695 700

Ala Lys Arg Arg Val Val Gln Arg Glu Lys

705 710

<210> 23
<211> 416
<212> PRT
<213> 合成

<400> 23

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn
20 25 30

Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro Leu
35 40 45

Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys
50 55 60

Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn
65 70 75 80

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val
85 90 95

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr
100 105 110

Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu
115 120 125

Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser
130 135 140

Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg Glu
145 150 155 160

Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser Gln
165 170 175

Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly Ser
180 185 190

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser
195 200 205

Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu
210 215 220

Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro
225 230 235 240

Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala
245 250 255

Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val
260 265 270

Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe
275 280 285

Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr
290 295 300

Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile
305 310 315 320

Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys
325 330 335

Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp
340 345 350

Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp
355 360 365

Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser
370 375 380

Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly
385 390 395 400

Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
405 410 415

<210> 24
<211> 416
<212> PRT
<213> 合成

<400> 24

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
20 25 30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
35 40 45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
50 55 60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65 70 75 80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
85 90 95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
100 105 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
115 120 125

```
Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145                 150                 155                 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
                165                 170                 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
            180                 185                 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
        195                 200                 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
    210                 215                 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225                 230                 235                 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Phe Arg Pro Gly Gly Gly
                245                 250                 255

Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile
            260                 265                 270

Lys Ile Glu Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val
```

275 280 285

Val Gln Arg Glu Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
290 295 300

Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
305 310 315 320

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu
325 330 335

Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly
340 345 350

Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser
355 360 365

Trp Ser Asn Lys Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met
370 375 380

Gln Trp Glu Arg Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu
385 390 395 400

Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu
405 410 415

<210> 25
<211> 416
<212> PRT

<213> 合成

<400> 25

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                  10                  15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
            20                  25                  30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
        35                  40                  45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
    50                  55                  60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65                  70                  75                  80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
                85                  90                  95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
            100                 105                 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
        115                 120                 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140
```

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145 150 155 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
165 170 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
180 185 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
195 200 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
210 215 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225 230 235 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Ile Phe Arg Pro Gly Gly Gly
245 250 255

Asn Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
260 265 270

Lys Ile Glu Pro Leu Gly Val Ala Pro Ser Arg Ala Lys Arg Arg Val
275 280 285

Val Glu Arg Glu Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
290 295 300

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
305 310 315 320

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu
325 330 335

Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly
340 345 350

Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser
355 360 365

Trp Ser Asn Lys Ser Met Asn Glu Ile Trp Asp Asn Met Thr Trp Leu
370 375 380

Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Asn Leu
385 390 395 400

Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu
405 410 415

<210> 26
<211> 416
<212> PRT
<213> 合成

<400> 26

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                  10                  15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
            20                  25                  30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
        35                  40                  45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
    50                  55                  60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65                  70                  75                  80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
                85                  90                  95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
            100                 105                 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
        115                 120                 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
```

145 150 155 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
165 170 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
180 185 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
195 200 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
210 215 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225 230 235 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr Phe Arg Pro Gly Gly Gly
245 250 255

Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
260 265 270

Glu Ile Lys Pro Leu Gly Ile Ala Pro Thr Gly Ala Lys Arg Arg Val
275 280 285

Val Glu Arg Glu Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
290 295 300

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met
305 310 315 320

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Val Leu
325 330 335

Ala Ile Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Leu Trp Gly
340 345 350

Cys Ser Gly Arg Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser
355 360 365

Trp Ser Asn Lys Thr Ser Ala Asp Ile Trp Asp Asn Met Thr Trp Met
370 375 380

Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu
385 390 395 400

Leu Glu Asp Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu
405 410 415

<210> 27
<211> 416
<212> PRT
<213> 合成

<400> 27

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
20 25 30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
35 40 45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
50 55 60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65 70 75 80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
85 90 95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
100 105 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
115 120 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
130 135 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145 150 155 160

```
Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
                165                 170                 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
            180                 185                 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
        195                 200                 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
    210                 215                 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225                 230                 235                 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Phe Arg Pro Gly Gly Gly
                245                 250                 255

Asn Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
            260                 265                 270

Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val
        275                 280                 285

Val Glu Arg Glu Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
    290                 295                 300

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
305                 310                 315                 320
```

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu
325 330 335

Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly
340 345 350

Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser
355 360 365

Trp Ser Asn Lys Ser Leu Asn Lys Ile Trp Asp Asn Met Thr Trp Met
370 375 380

Glu Trp Asp Arg Glu Ile Ser Asn Tyr Thr Ser Ile Ile Tyr Ser Leu
385 390 395 400

Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu
405 410 415

<210> 28
<211> 425
<212> PRT
<213> 合成

<400> 28

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Thr Asn Ile Thr Phe Ser Ala Glu Val Ala Glu Leu

20 25 30

Tyr Arg Leu Glu Leu Gly Asp Tyr Lys Leu Val Glu Val Thr Pro Ile
35 40 45

Gly Phe Ala Pro Thr Ala Glu Lys Arg Tyr Ser Ser Ala Pro Gly Arg
50 55 60

His Lys Arg Gly Val Leu Val Leu Gln Ser Arg Thr Leu Leu Ala Gly
65 70 75 80

Ile Val Gln Gln Gln Gln Gln Leu Leu Asp Val Val Lys Arg Gln Gln
85 90 95

Glu Met Leu Arg Leu Thr Val Trp Gly Thr Lys Asn Leu Gln Ala Arg
100 105 110

Val Thr Ala Ile Glu Lys Tyr Leu Ala Asp Gln Ala Arg Leu Asn Ser
115 120 125

Trp Gly Cys Ala Phe Arg Gln Val Cys His Thr Thr Val Pro Trp Val
130 135 140

Asn Asp Thr Leu Thr Pro Glu Trp Asn Asn Met Thr Trp Gln Glu Trp
145 150 155 160

Glu His Lys Ile Arg Phe Leu Glu Ala Asn Ile Ser Glu Ser Leu Glu
165 170 175

Gln Ala Gln Ile Gln Gln Glu Lys Asn Met Tyr Glu Leu Gln Lys Leu
180 185 190

Asn Ser Trp Asp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
195 200 205

Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys
210 215 220

Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val
225 230 235 240

Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe
245 250 255

Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu
260 265 270

Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His
275 280 285

Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala
290 295 300

Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg
305 310 315 320

Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met

325 330 335

Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro
340 345 350

Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn
355 360 365

Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val
370 375 380

Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr
385 390 395 400

Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu
405 410 415

Lys Ser Leu Ser His Ser Pro Gly Lys
420 425

<210> 29
<211> 425
<212> PRT
<213> 合成

<400> 29

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

```
Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
            20                  25                  30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
        35                  40                  45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
    50                  55                  60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65                  70                  75                  80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
                85                  90                  95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
            100                 105                 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
        115                 120                 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145                 150                 155                 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
                165                 170                 175
```

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
180 185 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
195 200 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
210 215 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225 230 235 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr Asn Ile Thr Phe Ser Ala
245 250 255

Glu Val Ala Glu Leu Tyr Arg Leu Glu Leu Gly Asp Tyr Lys Leu Val
260 265 270

Glu Val Thr Pro Ile Gly Phe Ala Pro Thr Ala Glu Lys Arg Tyr Ser
275 280 285

Ser Ala Pro Gly Arg His Lys Arg Gly Val Leu Val Leu Gln Ser Arg
290 295 300

Thr Leu Leu Ala Gly Ile Val Gln Gln Gln Gln Gln Leu Leu Asp Val
305 310 315 320

Val Lys Arg Gln Gln Glu Met Leu Arg Leu Thr Val Trp Gly Thr Lys
325 330 335

Asn Leu Gln Ala Arg Val Thr Ala Ile Glu Lys Tyr Leu Ala Asp Gln
340 345 350

Ala Arg Leu Asn Ser Trp Gly Cys Ala Phe Arg Gln Val Cys His Thr
355 360 365

Thr Val Pro Trp Val Asn Asp Thr Leu Thr Pro Glu Trp Asn Asn Met
370 375 380

Thr Trp Gln Glu Trp Glu His Lys Ile Arg Phe Leu Glu Ala Asn Ile
385 390 395 400

Ser Glu Ser Leu Glu Gln Ala Gln Ile Gln Gln Glu Lys Asn Met Tyr
405 410 415

Glu Leu Gln Lys Leu Asn Ser Trp Asp
420 425

<210> 30
<211> 467
<212> PRT
<213> 合成

<400> 30

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Thr His Thr Leu Leu Lys Gly Ile Val Gln Gln Gln
20 25 30

Asp Asn Leu Leu Arg Ala Ile Gln Ala Gln Gln Gln Leu Leu Arg Leu
35 40 45

Ser Val Trp Gly Ile Arg Gln Leu Arg Ala Arg Leu Leu Ala Leu Glu
50 55 60

Thr Leu Leu Gln Asn Gln Gln Leu Leu Ser Leu Trp Gly Cys Lys Gly
65 70 75 80

Lys Leu Val Cys Tyr Thr Ser Val Lys Trp Asn Arg Thr Trp Ile Gly
85 90 95

Asn Glu Ser Ile Trp Asp Thr Leu Thr Trp Gln Glu Trp Asp Arg Gln
100 105 110

Ile Ser Asn Ile Ser Ser Thr Ile Tyr Glu Glu Ile Gln Lys Ala Gln
115 120 125

Val Gln Gln Glu Gln Asn Glu Lys Lys Leu Leu Glu Leu Asp Glu Trp
130 135 140

Ala Ser Ile Trp Asn Trp Leu Asp Ile Thr Lys Trp Leu Trp Tyr Ile
145 150 155 160

Lys Ile Ala Ile Ile Ile Val Gly Ala Leu Val Gly Val Arg Val Ile

165 170 175

Met Ile Val Leu Asn Ile Val Lys Asn Ile Arg Gln Gly Tyr Gln Pro
180 185 190

Leu Ser Leu Gln Ile Pro Asn His His Gln Glu Glu Ala Gly Thr Pro
195 200 205

Gly Arg Thr Gly Gly Gly Gly Gly Glu Glu Gly Arg Pro Arg Trp Ile
210 215 220

Pro Ser Pro Gln Gly Phe Leu Pro Leu Leu Tyr Thr Asp Leu Gly Gly
225 230 235 240

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Pro Glu
245 250 255

Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr
260 265 270

Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys
275 280 285

Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val
290 295 300

His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe
305 310 315 320

Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly
325 330 335

Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile
340 345 350

Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val
355 360 365

Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser
370 375 380

Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu
385 390 395 400

Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro
405 410 415

Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val
420 425 430

Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu
435 440 445

His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser
450 455 460

Pro Gly Lys

465

<210> 31
<211> 467
<212> PRT
<213> 合成

<400> 31

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
20 25 30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
35 40 45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
50 55 60

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65 70 75 80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
85 90 95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
100 105 110

```
Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
        115                 120                 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145                 150                 155                 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
                165                 170                 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
            180                 185                 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
        195                 200                 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
    210                 215                 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225                 230                 235                 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr His Thr Leu Leu Lys Gly
                245                 250                 255

Ile Val Gln Gln Gln Asp Asn Leu Leu Arg Ala Ile Gln Ala Gln Gln
            260                 265                 270
```

Gln Leu Leu Arg Leu Ser Val Trp Gly Ile Arg Gln Leu Arg Ala Arg
275 280 285

Leu Leu Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Ser Leu
290 295 300

Trp Gly Cys Lys Gly Lys Leu Val Cys Tyr Thr Ser Val Lys Trp Asn
305 310 315 320

Arg Thr Trp Ile Gly Asn Glu Ser Ile Trp Asp Thr Leu Thr Trp Gln
325 330 335

Glu Trp Asp Arg Gln Ile Ser Asn Ile Ser Ser Thr Ile Tyr Glu Glu
340 345 350

Ile Gln Lys Ala Gln Val Gln Gln Glu Gln Asn Glu Lys Lys Leu Leu
355 360 365

Glu Leu Asp Glu Trp Ala Ser Ile Trp Asn Trp Leu Asp Ile Thr Lys
370 375 380

Trp Leu Trp Tyr Ile Lys Ile Ala Ile Ile Ile Val Gly Ala Leu Val
385 390 395 400

Gly Val Arg Val Ile Met Ile Val Leu Asn Ile Val Lys Asn Ile Arg
405 410 415

Gln Gly Tyr Gln Pro Leu Ser Leu Gln Ile Pro Asn His His Gln Glu
420 425 430

Glu Ala Gly Thr Pro Gly Arg Thr Gly Gly Gly Gly Gly Glu Glu Gly
435 440 445

Arg Pro Arg Trp Ile Pro Ser Pro Gln Gly Phe Leu Pro Leu Leu Tyr
450 455 460

Thr Asp Leu
465

<210> 32
<211> 401
<212> PRT
<213> 合成

<400> 32

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
20 25 30

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
35 40 45

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
50 55 60

```
Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
65                  70                  75                  80

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
                85                  90                  95

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
            100                 105                 110

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
        115                 120                 125

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
    130                 135                 140

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
145                 150                 155                 160

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu
                165                 170                 175

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
            180                 185                 190

Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
        195                 200                 205

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
```

210 215 220

Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser Gly
225 230 235 240

Gly Gly Gly Ser Gly Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val
245 250 255

Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
260 265 270

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
275 280 285

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
290 295 300

Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile
305 310 315 320

Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu
325 330 335

Glu Gln Ile Trp Asn His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile
340 345 350

Asn Asn Tyr Thr Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn
355 360 365

Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala
370 375 380

Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys
385 390 395 400

Leu

<210> 33
<211> 401
<212> PRT
<213> 合成

<400> 33

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
20 25 30

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
35 40 45

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
50 55 60

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
65 70 75 80

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
85 90 95

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn
100 105 110

His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
115 120 125

Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
130 135 140

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
145 150 155 160

Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu Gly Gly Gly Gly
165 170 175

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Pro Glu Val Ser
180 185 190

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
195 200 205

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
210 215 220

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
225 230 235 240

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
245 250 255

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
260 265 270

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
275 280 285

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
290 295 300

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
305 310 315 320

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
325 330 335

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
340 345 350

Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys
355 360 365

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
370 375 380

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
385 390 395 400

Lys

<210> 34
<211> 865
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<400> 34

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Arg Val Lys Glu Lys Tyr Gln His Leu Trp Arg
20 25 30

Trp Gly Trp Lys Trp Gly Thr Met Leu Leu Gly Ile Leu Met Ile Cys
35 40 45

Ser Ala Thr Glu Lys Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val
50 55 60

Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala
65 70 75 80

Tyr Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro

85 90 95

Thr Asp Pro Asn Pro Gln Glu Val Val Leu Val Asn Val Thr Glu Asn
100 105 110

Phe Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His Glu Asp Ile
115 120 125

Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro
130 135 140

Leu Cys Val Ser Leu Lys Cys Thr Asp Leu Gly Asn Ala Thr Asn Thr
145 150 155 160

Asn Ser Ser Asn Thr Asn Ser Ser Ser Gly Glu Met Met Met Glu Lys
165 170 175

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Ser Thr Ser Ile Arg Gly
180 185 190

Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro
195 200 205

Ile Asp Asn Asp Thr Thr Ser Tyr Thr Leu Thr Ser Cys Asn Thr Ser
210 215 220

Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile
225 230 235 240

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asn Lys
245 250 255

Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys
260 265 270

Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
275 280 285

Ser Leu Ala Glu Glu Glu Val Val Ile Arg Ser Ala Asn Phe Thr Asp
290 295 300

Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Gln Ser Val Glu Ile Asn
305 310 315 320

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gln Arg
325 330 335

Gly Pro Gly Arg Ala Phe Val Thr Ile Gly Lys Ile Gly Asn Met Arg
340 345 350

Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp Asn Ala Thr Leu Lys
355 360 365

Gln Ile Ala Ser Lys Leu Arg Glu Gln Phe Gly Asn Asn Lys Thr Ile
370 375 380

Ile Phe Lys Gln Ser Ser Gly Gly Asp Pro Glu Ile Val Thr His Ser

385 390 395 400

Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Ser Thr Gln Leu Phe
405 410 415

Asn Ser Thr Trp Phe Asn Ser Thr Trp Ser Thr Glu Gly Ser Asn Asn
420 425 430

Thr Glu Gly Ser Asp Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Phe
435 440 445

Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala Pro Pro Ile
450 455 460

Ser Gly Gln Ile Arg Cys Ser Ser Asn Ile Thr Gly Leu Leu Leu Thr
465 470 475 480

Arg Asp Gly Gly Asn Asn Asn Asn Gly Ser Glu Ile Phe Arg Pro Gly
485 490 495

Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys
500 505 510

Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Gln Asn
515 520 525

His Val Val Gln Asn Glu His Gln Ala Val Gly Ile Gly Ala Leu Phe
530 535 540

Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Arg Ser Met
545 550 555 560

Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
565 570 575

Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
580 585 590

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val
595 600 605

Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser
610 615 620

Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser
625 630 635 640

Asn Lys Ser Leu Glu Gln Ile Trp Asn Asn Met Thr Trp Met Glu Trp
645 650 655

Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His Ser Leu Ile Glu
660 665 670

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
675 680 685

Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu

690 695 700

Trp Tyr Ile Lys Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe
705 710 715 720

Gln Thr His Leu Pro Thr Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile
725 730 735

Glu Glu Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Arg Leu Val
740 745 750

Asn Gly Ser Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu
755 760 765

Phe Ser Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile
770 775 780

Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp
785 790 795 800

Asn Leu Leu Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser
805 810 815

Leu Leu Asn Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val
820 825 830

Ile Glu Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg
835 840 845

Arg Ile Arg Gln Gly Leu Glu Arg Ile Leu Leu His His His His His
850 855 860

His
865

<210> 35
<211> 849
<212> PRT
<213> 合成

<400> 35

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Arg Val Arg Gly Ile Gln Arg Asn Trp Pro Gln
20 25 30

Trp Trp Ile Trp Gly Ile Leu Gly Phe Trp Met Val Met Ile Cys Arg
35 40 45

Val Val Val Gly Asn Met Trp Val Thr Val Tyr Tyr Gly Val Pro Val
50 55 60

Trp Lys Glu Ala Lys Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala
65 70 75 80

Tyr Glu Lys Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro
85 90 95

Thr Asp Pro Asn Pro Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn
100 105 110

Phe Asn Met Trp Lys Asn Asp Met Val Asp Gln Met His Glu Asp Ile
115 120 125

Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Ala Pro
130 135 140

Leu Cys Val Thr Leu Asn Cys Thr Asn Ser Asn Ala Thr Tyr Asn Asn
145 150 155 160

Ser Met His Gly Glu Ile Lys Asn Cys Ser Phe Asn Thr Thr Thr Glu
165 170 175

Ile Arg Asp Lys Lys Gln Asn Val Tyr Ala Leu Phe Tyr Lys Ser Asp
180 185 190

Val Val Pro Leu Lys Glu Asp Asn Asp Asn Ser Ser Tyr Ser Ser Tyr
195 200 205

Ile Leu Ile Asn Cys Asn Thr Ser Thr Ile Thr Gln Ala Cys Pro Lys
210 215 220

Val Thr Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr
225 230 235 240

Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys
245 250 255

Ser Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val
260 265 270

Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Gly Glu Ile Ile
275 280 285

Ile Arg Ser Glu Asn Leu Thr Asn Asn Ile Lys Thr Ile Ile Val Gln
290 295 300

Leu Asn Thr Ser Arg Glu Ile Val Cys Thr Arg Pro Asn Asn Asn Thr
305 310 315 320

Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr Asn
325 330 335

Glu Ile Ile Gly Asp Ile Arg Gln Ala Tyr Cys Asn Ile Ser Lys Thr
340 345 350

Glu Trp Ser Thr Thr Leu Asp Glu Val Lys Lys Lys Leu Ala Glu His
355 360 365

Phe Pro Asn Lys Thr Ile Arg Phe Ala Pro Pro Ile Gly Gly Asp Leu
370 375 380

Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys
385 390 395 400

Asn Thr Thr Glu Leu Phe Asn Asp Asn Asn Ser Asp Asp Asn Ala Thr
405 410 415

Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Gly
420 425 430

Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Glu Gly Ser Ile Thr Cys
435 440 445

Asn Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Thr Asn
450 455 460

Asn Thr Asp Glu Thr Phe Arg Pro Gly Gly Gly Asn Met Lys Asp Asn
465 470 475 480

Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys Pro Leu
485 490 495

Gly Ile Ala Pro Thr Lys Ala Gln Asn His Val Val Gln Asn Glu His
500 505 510

Gln Ala Val Gly Leu Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala
515 520 525

Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg
530 535 540

Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala
545 550 555 560

Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys
565 570 575

Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys Asp Gln
580 585 590

Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Arg Leu Ile Cys Thr Thr
595 600 605

Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Thr Ser Ala Asp Ile
610 615 620

Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser Asn Tyr
625 630 635 640

Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln Gln Glu
645 650 655

Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp Lys Asn Leu Trp
660 665 670

Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Lys Arg Val
675 680 685

Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Pro
690 695 700

Arg Glu Leu Asp Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln
705 710 715 720

Asp Lys Asp Arg Ser Ile Arg Leu Val Asn Gly Phe Leu Ser Leu Ala
725 730 735

Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Gln Leu Arg
740 745 750

Asp Phe Ile Leu Ile Val Ala Arg Val Val Glu Leu Leu Gly Arg Ser
755 760 765

Ser Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly
770 775 780

Asn Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser
785 790 795 800

Leu Phe Asp Asn Ile Ala Ile Thr Val Ala Glu Arg Thr Asp Arg Ile
805 810 815

Leu Glu Leu Ile Tyr Arg Ile Tyr Arg Ala Ile Arg Asn Ile Pro Arg
820 825 830

Arg Ile Arg Gln Gly Phe Glu Val Ala Leu Leu His His His His His
835 840 845

His

<210> 36
<211> 850
<212> PRT
<213> 合成

<400> 36

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Arg Val Arg Gly Ile Gln Thr Ser Trp Gln Asn
20 25 30

Leu Trp Arg Trp Gly Thr Met Ile Leu Gly Met Leu Met Ile Tyr Ser
35 40 45

Ala Ala Glu Asn Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp
50 55 60

Lys Asp Ala Glu Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr
65 70 75 80

Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr
85 90 95

Asp Pro Asn Pro Gln Glu Ile His Leu Glu Asn Val Thr Glu Asp Phe
100 105 110

Asn Met Trp Lys Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile
115 120 125

Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu
130 135 140

Cys Val Thr Leu Asp Cys Asn Ala Thr Ala Ser Asn Val Thr Asn Glu
145 150 155 160

Met Arg Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Lys Asp Lys Lys
165 170 175

Gln Gln Val Tyr Ser Leu Phe Tyr Lys Leu Asp Val Val Gln Ile Asn
180 185 190

Glu Lys Asn Glu Thr Asp Lys Tyr Arg Leu Ile Asn Cys Asn Thr Ser
195 200 205

Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile
210 215 220

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys Asp Thr
225 230 235 240

Glu Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys
245 250 255

Thr His Gly Ile Arg Pro Val Ile Ser Thr Gln Leu Leu Leu Asn Gly

260 265 270

Ser Leu Ala Glu Glu Gly Ile Gln Ile Arg Ser Glu Asn Ile Thr Asn
275 280 285

Asn Ala Lys Thr Ile Ile Val Gln Leu Asp Lys Ala Val Lys Ile Asn
290 295 300

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Gly Val Arg Ile Gly Pro
305 310 315 320

Gly Gln Ala Phe Tyr Ala Thr Gly Gly Ile Ile Gly Asp Ile Arg Gln
325 330 335

Ala His Cys Asn Val Ser Arg Ala Lys Trp Asn Asp Thr Leu Arg Gly
340 345 350

Val Ala Lys Lys Leu Arg Glu His Phe Lys Asn Lys Thr Ile Ile Phe
355 360 365

Glu Lys Ser Ser Gly Gly Asp Ile Glu Ile Thr Thr His Ser Phe Asn
370 375 380

Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn Ser
385 390 395 400

Thr Trp Glu Ser Asn Ser Thr Glu Ser Asn Asn Thr Thr Ser Asn Asp
405 410 415

Thr Ile Thr Leu Thr Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln
420 425 430

Lys Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Gln Gly Val Ile Arg
435 440 445

Cys Glu Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn
450 455 460

Asn Ser Thr Asn Glu Ile Phe Arg Pro Gly Gly Gly Asn Met Arg Asp
465 470 475 480

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro
485 490 495

Leu Gly Val Ala Pro Ser Lys Ala Gln Asn His Val Val Gln Asn Glu
500 505 510

His Gln Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala
515 520 525

Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Ala Gln Ala
530 535 540

Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg
545 550 555 560

Ala Ile Glu Ala Gln Gln His Met Leu Lys Leu Thr Val Trp Gly Ile

565 570 575

Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp
580 585 590

Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr
595 600 605

Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Met Asn Glu
610 615 620

Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn
625 630 635 640

Tyr Thr Gln Ile Ile Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln
645 650 655

Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu
660 665 670

Trp Asn Trp Phe Asp Ile Ser Arg Trp Leu Trp Tyr Ile Lys Asn Arg
675 680 685

Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Ile Arg Thr Pro Asn
690 695 700

Pro Lys Glu Pro Asp Arg Leu Gly Arg Ile Asp Gly Glu Gly Gly Glu
705 710 715 720

Gln Asp Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu
725 730 735

Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu
740 745 750

Arg Asp Phe Ile Ser Ile Ala Ala Arg Thr Val Glu Leu Leu Gly His
755 760 765

Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu
770 775 780

Trp Asn Leu Leu Leu Tyr Trp Gly Arg Glu Leu Lys Thr Ser Ala Val
785 790 795 800

Asn Leu Val Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp Arg
805 810 815

Val Ile Glu Val Gly Gln Arg Ile Phe Arg Ala Ile Leu Asn Ile Pro
820 825 830

Arg Arg Ile Arg Gln Gly Leu Glu Arg Gly Leu Leu His His His His
835 840 845

His His
850

<210> 37

<211> 868
<212> PRT
<213> 合成

<400> 37

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Val Lys Glu Thr Gln Met Asn Trp Pro Asn Leu Trp
20 25 30

Lys Trp Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ala
35 40 45

Asp Asn Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp
50 55 60

Ala Asp Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr
65 70 75 80

Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro
85 90 95

Asn Pro Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met
100 105 110

Trp Lys Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu
115 120 125

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Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Phe Cys Val
    130                 135                 140

Thr Leu Asn Cys Thr Asn Ala Thr Leu Thr Asn Val Thr Asn Ile Ala
145                 150                 155                 160

Asn Ala Ser Asn Met Ile Gly Asn Ile Thr Asp Glu Ile Arg Asn Cys
                165                 170                 175

Ser Phe Asn Met Thr Thr Glu Leu Arg Asp Lys Lys Gln Gln Val His
            180                 185                 190

Ala Leu Phe Tyr Lys Leu Asp Ile Val Gln Ile Glu Asp Asn Lys Asn
        195                 200                 205

Ser Ser Asn Asn Ser Ser Asn Ser Ser Lys Tyr Ser Glu Tyr Arg Leu
    210                 215                 220

Ile Asn Cys Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Ile Ser
225                 230                 235                 240

Phe Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala Ile
                245                 250                 255

Leu Lys Cys Asn Asp Lys Asn Phe Asn Gly Thr Gly Pro Cys Lys Asn
            260                 265                 270

Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr
        275                 280                 285
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Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg
290 295 300

Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn
305 310 315 320

Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Phe Tyr Thr Arg Ile Ser
325 330 335

Met Thr Arg Gly Pro Gly His Val Phe Tyr Arg Thr Gly Lys Ile Val
340 345 350

Gly Asp Pro Arg Lys Ala Tyr Cys Glu Ile Asn Gly Thr Lys Trp Asn
355 360 365

Glu Ala Leu Lys Gln Val Thr Glu Lys Leu Lys Glu His Phe Asn Lys
370 375 380

Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Thr Met
385 390 395 400

His His Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr Lys
405 410 415

Leu Phe Asn Ser Thr Gly Ile Gly Asn Glu Thr Met Lys Gly Tyr Asn
420 425 430

Asp Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp
435 440 445

Gln Gly Ala Gly Gln Ala Met Tyr Ala Pro Pro Ile Lys Glu Arg Ile
450 455 460

Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly
465 470 475 480

Ile Asn Ser Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Asn Ile
485 490 495

Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Gln Ile
500 505 510

Glu Pro Leu Gly Ile Ala Pro Thr Lys Ala Gln Asn His Val Val Gln
515 520 525

Asn Glu His Gln Ala Val Gly Ile Gly Ala Val Ile Phe Gly Phe Leu
530 535 540

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val
545 550 555 560

Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu
565 570 575

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
580 585 590

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu
595 600 605

Lys Asp Gln Gln Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys Ile Ile
610 615 620

Cys Thr Thr Ala Val Pro Trp Asn Ser Thr Trp Ser Asn Arg Ser Tyr
625 630 635 640

Glu Glu Ile Trp Asn Asn Met Thr Trp Ile Glu Trp Glu Arg Glu Ile
645 650 655

Ser Asn Tyr Thr Asn Gln Ile Tyr Glu Ile Leu Thr Glu Ser Gln Asp
660 665 670

Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp Ala
675 680 685

Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys
690 695 700

Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Ile Pro Ser
705 710 715 720

His His Gln Arg Glu Pro Asp Arg Pro Glu Gly Ile Glu Glu Gly Gly
725 730 735

Gly Glu Glu Gly Arg Asp Arg Ser Val Arg Leu Val Ser Gly Phe Leu
740 745 750

Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His
755 760 765

Arg Leu Arg Asp Leu Leu Ser Ile Ala Thr Arg Thr Val Glu Leu Leu
770 775 780

Gly His Ser Ser Leu Lys Gly Leu Arg Arg Gly Trp Glu Gly Leu Lys
785 790 795 800

Tyr Leu Gly Asn Leu Leu Leu Tyr Trp Gly Gln Glu Leu Lys Ile Ser
805 810 815

Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Gly Trp Thr
820 825 830

Asp Arg Val Ile Glu Val Ala Gln Arg Ala Trp Arg Ala Ile Leu His
835 840 845

Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ser Leu Leu His His
850 855 860

His His His His
865

<210> 38
<211> 879

<212> PRT
<213> 合成

<400> 38

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Arg Val Lys Glu Lys Tyr Gln His Leu Trp Lys
20 25 30

Trp Gly Trp Arg Trp Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys
35 40 45

Asn Val Ala Glu Glu Asn Leu Trp Val Thr Val Tyr Tyr Gly Val Pro
50 55 60

Val Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys
65 70 75 80

Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val
85 90 95

Pro Thr Asp Pro Asn Pro Gln Glu Ile Glu Leu Glu Asn Val Thr Glu
100 105 110

Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln Met His Glu Asp
115 120 125

Ile Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr

130 135 140

Pro Leu Cys Val Thr Leu Asn Cys Thr Asp Leu Arg Asn Ala Thr Asn
145 150 155 160

Gly Asn Asp Thr Asn Thr Thr Ser Ser Ser Arg Glu Met Met Gly Gly
165 170 175

Gly Glu Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp
180 185 190

Lys Lys Gln Lys Val Tyr Ala Leu Phe Tyr Lys Leu Asp Ile Val Pro
195 200 205

Ile Asp Asn Asn Lys Asn Ser Ser Asn Asn Ser Ser Asn Ser Ser Ser
210 215 220

Asn Asn Arg Tyr Arg Leu Ile Asn Cys Asn Thr Ser Val Ile Thr Gln
225 230 235 240

Ala Cys Pro Lys Ile Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala
245 250 255

Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys Asp Lys Lys Phe Asn Gly
260 265 270

Thr Gly Pro Cys Ser Asn Val Ser Thr Val Gln Cys Thr His Gly Ile
275 280 285

Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu
290 295 300

Glu Glu Ile Val Ile Arg Ser Glu Asn Phe Thr Asn Asn Ala Lys Thr
305 310 315 320

Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg Pro
325 330 335

Asn Asn Asn Thr Arg Lys Ser Ile His Ile Gly Pro Gly Arg Ala Phe
340 345 350

Tyr Thr Thr Gly Glu Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn
355 360 365

Leu Ser Arg Ala Lys Trp Asn Asp Thr Leu Asn Lys Val Val Ile Lys
370 375 380

Leu Arg Glu His Phe Gly Asn Lys Thr Ile Val Phe Lys His Ser Ser
385 390 395 400

Gly Gly Asp Pro Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu
405 410 415

Phe Phe Tyr Cys Asn Thr Thr Gln Leu Phe Asn Ser Thr Trp Glu Ser
420 425 430

Asn Ser Thr Glu Ser Asn Asn Thr Val Glu Asn Asn Thr Ile Thr Leu

435 440 445

Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Arg
450 455 460

Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys Ser Ser Asn
465 470 475 480

Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Pro Asn Ala Asn Thr
485 490 495

Thr Glu Val Phe Arg Pro Gly Gly Gly Asn Met Arg Asp Asn Trp Arg
500 505 510

Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val
515 520 525

Ala Pro Thr Lys Ala Gln Asn His Val Val Gln Asn Glu His Gln Ala
530 535 540

Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser
545 550 555 560

Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu
565 570 575

Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu
580 585 590

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
595 600 605

Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
610 615 620

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
625 630 635 640

Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asn Lys Ile Trp Asp
645 650 655

Asn Met Thr Trp Met Glu Trp Asp Arg Glu Ile Ser Asn Tyr Thr Ser
660 665 670

Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
675 680 685

Glu Gln Asp Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
690 695 700

Phe Asp Ile Thr Glu Trp Leu Trp Tyr Ile Lys Asn Arg Val Arg Gln
705 710 715 720

Gly Tyr Ser Pro Leu Ser Phe Gln Thr His Leu Pro Ala Ser Arg Glu
725 730 735

Pro Asp Arg Pro Gly Gly Ile Glu Glu Glu Gly Gly Glu Arg Asp Arg

740 745 750

Asp Arg Ser Gly Arg Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp
755 760 765

Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu
770 775 780

Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu Gly Arg Ser Ser Leu
785 790 795 800

Arg Gly Leu Gln Arg Gly Trp Glu Phe Leu Lys Tyr Leu Trp Asn Leu
805 810 815

Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu
820 825 830

Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu
835 840 845

Val Leu Gln Arg Ala Val Arg Ala Ile Leu His Ile Pro Arg Arg Ile
850 855 860

Arg Gln Gly Leu Glu Arg Ala Leu Leu His His His His His His
865 870 875

<210> 39
<211> 829
<212> PRT

<213> 人類免疫缺乏病毒

<400> 39

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Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp
1               5                  10                  15

Gly Ile Leu Ile Phe Gly Met Leu Ile Ile Cys Ser Ala Ala Glu Asn
            20                  25                  30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn
        35                  40                  45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
    50                  55                  60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65                  70                  75                  80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
                85                  90                  95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
            100                 105                 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115                 120                 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Thr Thr Asn Asn Glu Glu
    130                 135                 140
```

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys
145 150 155 160

Lys Lys Val Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro Ile Asp
165 170 175

Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr
180 185 190

Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys
195 200 205

Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn
210 215 220

Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly
225 230 235 240

Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala
245 250 255

Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Ile Thr Asn Asn Ala Lys
260 265 270

Thr Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg
275 280 285

```
Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala
    290                 295                 300

Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys
305                 310                 315                 320

Asn Ile Ser Arg Thr Lys Trp Asn Lys Thr Leu Gln Gln Val Ala Lys
                325                 330                 335

Lys Leu Arg Glu His Phe Asn Lys Thr Ile Ile Phe Asn Pro Ser Ser
            340                 345                 350

Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu
        355                 360                 365

Phe Phe Tyr Cys Asn Thr Ser Glu Leu Phe Asn Ser Thr Trp Asn Gly
    370                 375                 380

Thr Asn Asn Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn
385                 390                 395                 400

Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Glu Gly
                405                 410                 415

Lys Ile Arg Cys Thr Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp
            420                 425                 430

Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met
        435                 440                 445
```

Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile
450 455 460

Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu
465 470 475 480

Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu
485 490 495

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val
500 505 510

Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu
515 520 525

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
530 535 540

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu
545 550 555 560

Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile
565 570 575

Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln
580 585 590

Asp Glu Ile Trp Asp Asn Met Thr Trp Met Glu Trp Asp Lys Glu Ile
595 600 605

Asn Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn
610 615 620

Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala
625 630 635 640

Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys
645 650 655

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
660 665 670

Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu
675 680 685

Ser Phe Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg Pro Glu
690 695 700

Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg
705 710 715 720

Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu
725 730 735

Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala
740 745 750

Arg Thr Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr
755 760 765

Leu Trp Asn Leu Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala
770 775 780

Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly Thr Asp
785 790 795 800

Arg Val Ile Glu Val Val Gln Arg Val Cys Arg Ala Ile Leu Asn Ile
805 810 815

Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
820 825

<210> 40
<211> 830
<212> PRT
<213> 人類免疫缺乏病毒

<400> 40

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp
1 5 10 15

Gly Ile Leu Ile Phe Gly Met Leu Met Ile Cys Ser Ala Ala Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn

35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Ser Thr Asn Met Gly Glu
130 135 140

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys
145 150 155 160

Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro Ile Asn
165 170 175

Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr
180 185 190

Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys
195 200 205

Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn
210 215 220

Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly
225 230 235 240

Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala
245 250 255

Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Ile Thr Asp Asn Ala Lys
260 265 270

Thr Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg
275 280 285

Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala
290 295 300

Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys
305 310 315 320

Asn Ile Ser Gly Ala Glu Trp Asn Lys Thr Leu Gln Gln Val Ala Ala
325 330 335

Lys Leu Arg Glu His Phe Asn Asn Lys Thr Ile Ile Phe Lys Pro Ser

340 345 350

Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly
355 360 365

Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Asn
370 375 380

Gly Thr Asn Glu Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Val
385 390 395 400

Asn Met Trp Gln Arg Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala
405 410 415

Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg
420 425 430

Asp Gly Gly Thr Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp
435 440 445

Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys
450 455 460

Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val
465 470 475 480

Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe
485 490 495

Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr
500 505 510

Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn
515 520 525

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val
530 535 540

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr
545 550 555 560

Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu
565 570 575

Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser
580 585 590

Gln Asp Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg Glu
595 600 605

Ile Ser Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln
610 615 620

Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp
625 630 635 640

Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile

645 650 655

Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val
660 665 670

Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro
675 680 685

Leu Ser Phe Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg Pro
690 695 700

Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile
705 710 715 720

Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser
725 730 735

Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala
740 745 750

Ala Arg Thr Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys
755 760 765

Tyr Leu Trp Asn Leu Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser
770 775 780

Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly Thr
785 790 795 800

Asp Arg Val Ile Glu Val Val Gln Arg Ala Cys Arg Ala Ile Leu His
805 810 815

Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
820 825 830

<210> 41
<211> 845
<212> PRT
<213> 人類免疫缺乏病毒

<400> 41

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Leu Arg Trp
1 5 10 15

Gly Thr Met Ile Leu Gly Met Ile Ile Ile Cys Ser Ala Ala Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Glu
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Met
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile His Leu Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Ser Asn Val Asn Val Thr Asn Asn Thr Thr Asn Thr His Glu
130 135 140

Glu Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp
145 150 155 160

Lys Lys Gln Lys Val Tyr Ser Leu Phe Tyr Arg Leu Asp Val Val Gln
165 170 175

Ile Asn Glu Asn Asn Ser Asn Ser Ser Tyr Arg Leu Ile Asn Cys Asn
180 185 190

Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile
195 200 205

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys
210 215 220

Asp Lys Glu Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val
225 230 235 240

Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu
245 250 255

Asn Gly Ser Leu Ala Glu Glu Glu Val Ile Ile Arg Ser Glu Asn Ile
260 265 270

Thr Asn Asn Ala Lys Thr Ile Ile Val Gln Leu Thr Lys Pro Val Lys
275 280 285

Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile
290 295 300

Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile
305 310 315 320

Arg Gln Ala His Cys Asn Val Ser Arg Ser Glu Trp Asn Lys Thr Leu
325 330 335

Gln Lys Val Ala Lys Gln Leu Arg Lys Tyr Phe Lys Asn Lys Thr Ile
340 345 350

Ile Phe Thr Asn Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser
355 360 365

Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe
370 375 380

Asn Ser Thr Trp Asn Asn Gly Thr Met Lys Asn Thr Ile Thr Leu Pro
385 390 395 400

Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Arg Ala Gly Gln Ala
405 410 415

Met Tyr Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile
420 425 430

Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Asn Glu
435 440 445

Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu
450 455 460

Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro
465 470 475 480

Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly
485 490 495

Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met
500 505 510

Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
515 520 525

Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln
530 535 540

Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala
545 550 555 560

Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly
565 570 575

Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp
580 585 590

Asn Ser Ser Trp Ser Asn Lys Ser Gln Asn Glu Ile Trp Asp Asn Met
595 600 605

Thr Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr His Ile Ile
610 615 620

Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln
625 630 635 640

Asp Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp
645 650 655

Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly
660 665 670

Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Val Ile Asn
675 680 685

Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr His Thr Pro
690 695 700

Asn Pro Arg Gly Leu Asp Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly
705 710 715 720

Glu Gln Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala
725 730 735

Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly
755 760 765

His Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr
770 775 780

Leu Trp Asn Leu Leu Leu Tyr Trp Gly Arg Glu Leu Lys Ile Ser Ala
785 790 795 800

Ile Asn Leu Val Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp
805 810 815

Arg Val Ile Glu Ile Gly Gln Arg Ile Gly Arg Ala Ile Leu His Ile
820 825 830

Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840 845

<210> 42
<211> 845
<212> PRT
<213> 人類免疫缺乏病毒

<400> 42

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp
1 5 10 15

Gly Thr Met Ile Phe Gly Met Ile Ile Ile Cys Ser Ala Ala Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Glu
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Asp Leu Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Ala Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Ser Asn Val Asn Val Thr Asn Asn Thr Thr Asn Thr His Glu
130 135 140

Glu Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp
145 150 155 160

Lys Lys Gln Lys Val Tyr Ser Leu Phe Tyr Arg Leu Asp Val Val Pro
165 170 175

Ile Asn Glu Asn Asn Ser Asn Ser Ser Tyr Arg Leu Ile Asn Cys Asn
180 185 190

Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile
195 200 205

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys
210 215 220

Asp Lys Glu Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val
225 230 235 240

Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu
245 250 255

Asn Gly Ser Leu Ala Glu Glu Glu Val Met Ile Arg Ser Glu Asn Ile
260 265 270

Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Thr Glu Pro Val Lys

275 280 285

Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile
290 295 300

Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile
305 310 315 320

Arg Gln Ala His Cys Asn Val Ser Arg Thr Glu Trp Asn Lys Thr Leu
325 330 335

Gln Lys Val Ala Ala Gln Leu Arg Lys His Phe Asn Asn Lys Thr Ile
340 345 350

Ile Phe Asn Ser Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser
355 360 365

Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe
370 375 380

Asn Ser Thr Trp Asn Asn Gly Thr Met Lys Asp Thr Ile Thr Leu Pro
385 390 395 400

Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Arg Val Gly Gln Ala
405 410 415

Met Tyr Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile
420 425 430

Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Asn Glu
435 440 445

Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu
450 455 460

Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro
465 470 475 480

Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly
485 490 495

Leu Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met
500 505 510

Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
515 520 525

Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln
530 535 540

Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala
545 550 555 560

Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly
565 570 575

Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp

580 585 590

Asn Ser Ser Trp Ser Asn Lys Ser Gln Asp Glu Ile Trp Asp Asn Met
595 600 605

Thr Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Asp Ile Ile
610 615 620

Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln
625 630 635 640

Asp Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp
645 650 655

Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly
660 665 670

Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Val Ile Asn
675 680 685

Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro
690 695 700

Asn Pro Glu Gly Pro Asp Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly
705 710 715 720

Glu Gln Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala
725 730 735

Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly
755 760 765

Arg Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr
770 775 780

Leu Trp Asn Leu Leu Leu Tyr Trp Gly Arg Glu Leu Lys Ile Ser Ala
785 790 795 800

Ile Asn Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp
805 810 815

Arg Val Ile Glu Ile Gly Gln Arg Ile Cys Arg Ala Ile Leu Asn Ile
820 825 830

Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840 845

<210> 43
<211> 843
<212> PRT
<213> 人類免疫缺乏病毒

<400> 43

Met Arg Val Met Gly Thr Gln Arg Asn Tyr Gln His Leu Trp Arg Trp
1 5 10 15

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Gly Ile Leu Ile Leu Gly Met Leu Ile Met Cys Lys Ala Thr Asp Leu
            20                  25                  30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Asp Thr
        35                  40                  45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His
    50                  55                  60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65                  70                  75                  80

Glu Val Asn Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys Asn
                85                  90                  95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
            100                 105                 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
        115                 120                 125

Cys Ser Asn Ala Asn Thr Thr Asn Asn Ser Thr Met Glu Glu Ile Lys
    130                 135                 140

Asn Cys Ser Tyr Asn Ile Thr Thr Glu Leu Arg Asp Lys Thr Gln Lys
145                 150                 155                 160
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Val Tyr Ser Leu Phe Tyr Lys Leu Asp Val Val Gln Leu Asp Glu Ser
165 170 175

Asn Lys Ser Glu Tyr Tyr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala
180 185 190

Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His
195 200 205

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys Asp Pro Arg
210 215 220

Phe Asn Gly Thr Gly Ser Cys Asn Asn Val Ser Ser Val Gln Cys Thr
225 230 235 240

His Gly Ile Lys Pro Val Ala Ser Thr Gln Leu Leu Leu Asn Gly Ser
245 250 255

Leu Ala Glu Gly Lys Val Met Ile Arg Ser Glu Asn Ile Thr Asn Asn
260 265 270

Ala Lys Asn Ile Ile Val Gln Phe Asn Lys Pro Val Pro Ile Thr Cys
275 280 285

Ile Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Phe Gly Pro Gly
290 295 300

Gln Ala Phe Tyr Thr Asn Asp Ile Ile Gly Asp Ile Arg Gln Ala His
305 310 315 320

Cys Asn Ile Asn Lys Thr Lys Trp Asn Ala Thr Leu Gln Lys Val Ala
325 330 335

Glu Gln Leu Arg Glu His Phe Pro Asn Lys Thr Ile Ile Phe Thr Asn
340 345 350

Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
355 360 365

Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gly Leu Phe Asn Ser Thr Trp
370 375 380

Lys Asn Gly Thr Thr Asn Asn Thr Glu Gln Met Ile Thr Leu Pro Cys
385 390 395 400

Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Arg Val Gly Arg Ala Met
405 410 415

Tyr Ala Pro Pro Ile Ala Gly Val Ile Lys Cys Thr Ser Asn Ile Thr
420 425 430

Gly Ile Ile Leu Thr Arg Asp Gly Gly Asn Asn Glu Thr Glu Thr Phe
435 440 445

Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr
450 455 460

Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Arg
465 470 475 480

Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Met Gly
485 490 495

Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala
500 505 510

Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile
515 520 525

Val Gln Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln His
530 535 540

Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val
545 550 555 560

Leu Ala Leu Glu Arg Tyr Leu Gln Asp Gln Gln Leu Leu Gly Ile Trp
565 570 575

Gly Cys Ser Gly Lys Leu Ile Cys Ala Thr Thr Val Pro Trp Asn Ser
580 585 590

Ser Trp Ser Asn Lys Thr Gln Glu Glu Ile Trp Asn Asn Met Thr Trp
595 600 605

Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Asn Ile Ile Tyr Lys
610 615 620

Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu
625 630 635 640

Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asn Ile Thr
645 650 655

Asn Trp Leu Trp Tyr Ile Arg Ile Phe Ile Met Ile Val Gly Gly Leu
660 665 670

Ile Gly Leu Arg Ile Val Ile Ala Ile Ile Ser Val Val Asn Arg Val
675 680 685

Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Ile Pro Thr Pro Asn Pro
690 695 700

Glu Gly Leu Asp Arg Pro Gly Arg Ile Glu Glu Gly Gly Gly Glu Gln
705 710 715 720

Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala
725 730 735

Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg
740 745 750

Asp Cys Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly His Ser
755 760 765

Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp
770 775 780

Asn Leu Leu Leu Tyr Trp Gly Arg Glu Leu Lys Asn Ser Ala Ile Ser
785 790 795 800

Leu Leu Asp Thr Ile Ala Val Ala Val Ala Glu Trp Thr Asp Arg Val
805 810 815

Ile Glu Ile Gly Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Arg
820 825 830

Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
835 840

<210> 44
<211> 841
<212> PRT
<213> 人類免疫缺乏病毒
<400> 44

Met Arg Val Lys Gly Ile Arg Lys Asn Tyr Gln His Leu Trp Arg Trp
1 5 10 15

Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Lys
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Leu Met Asn Ala Thr Asn Thr Asn Thr Thr Ile Ile
130 135 140

Tyr Arg Trp Arg Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr
145 150 155 160

Ser Ile Arg Asp Lys Val Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu
165 170 175

Asp Val Val Pro Ile Asp Asn Asp Asn Thr Ser Tyr Arg Leu Ile Ser
180 185 190

Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu
195 200 205

Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys
210 215 220

Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser
225 230 235 240

Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu
245 250 255

Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Val Val Ile Arg Ser Glu
260 265 270

Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser
275 280 285

Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile
290 295 300

His Ile Gly Pro Gly Arg Ala Phe Tyr Thr Thr Gly Glu Ile Ile Gly
305 310 315 320

Asp Ile Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp Asn Asn
325 330 335

Thr Leu Lys Gln Ile Val Lys Lys Leu Arg Glu Gln Phe Gly Asn Lys
340 345 350

Thr Ile Val Phe Asn Gln Ser Ser Gly Gly Asp Pro Glu Ile Val Met
355 360 365

His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln
370 375 380

Leu Phe Asn Ser Thr Trp Asn Gly Thr Trp Asn Asn Thr Glu Gly Asn
385 390 395 400

Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu
405 410 415

Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys
420 425 430

Ser Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn
435 440 445

Glu Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp
450 455 460

Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly
465 470 475 480

Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg
485 490 495

Ala Val Gly Ile Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala Gly
500 505 510

Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln
515 520 525

Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile
530 535 540

Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln
545 550 555 560

Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln
565 570 575

Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala
580 585 590

Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp
595 600 605

Asp Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr
610 615 620

Ser Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys
625 630 635 640

Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn
645 650 655

Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met
660 665 670

Ile Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Ala Val Leu Ser
675 680 685

Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr
690 695 700

Arg Leu Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu
705 710 715 720

Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Gly Arg Leu Val Asp Gly
725 730 735

Phe Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser
740 745 750

Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu
755 760 765

Leu Leu Gly Arg Arg Gly Trp Glu Val Leu Lys Tyr Trp Trp Asn Leu
770 775 780

Leu Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu
785 790 795 800

Asn Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu
805 810 815

Val Val Gln Arg Ala Cys Arg Ala Ile Leu His Ile Pro Arg Arg Ile
820 825 830

Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840

<210> 45
<211> 840
<212> PRT
<213> 人類免疫缺乏病毒

<400> 45

Met Arg Val Lys Gly Ile Arg Lys Asn Cys Gln His Leu Trp Arg Trp
1 5 10 15

Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys

85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Leu Leu Asn Ala Thr Asn Thr Asn Ser Thr Asn Met
130 135 140

Tyr Arg Trp Arg Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr
145 150 155 160

Ser Ile Arg Asp Lys Met Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu
165 170 175

Asp Val Val Pro Ile Asp Asn Asn Thr Ser Tyr Arg Leu Ile Asn Cys
180 185 190

Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro
195 200 205

Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Phe Ala Ile Leu Lys Cys
210 215 220

Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr
225 230 235 240

Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu
245 250 255

Leu Asn Gly Ser Leu Ala Glu Glu Glu Val Val Ile Arg Ser Glu Asn
260 265 270

Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser Val
275 280 285

Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His
290 295 300

Ile Gly Pro Gly Arg Ala Phe Tyr Ala Thr Gly Glu Ile Ile Gly Asp
305 310 315 320

Ile Arg Gln Ala His Cys Asn Leu Ser Arg Ala Lys Trp Asn Asn Thr
325 330 335

Leu Lys Gln Val Val Thr Lys Leu Arg Glu Gln Phe Asp Asn Lys Thr
340 345 350

Ile Val Phe Asn Pro Ser Ser Gly Gly Asp Pro Glu Ile Val Met His
355 360 365

Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln Leu
370 375 380

Phe Asn Ser Thr Trp Asn Gly Thr Trp Asn Asn Thr Glu Gly Asn Ile

385 390 395 400

Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu Val
405 410 415

Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys Ser
420 425 430

Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Glu
435 440 445

Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg
450 455 460

Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val
465 470 475 480

Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala
485 490 495

Val Gly Ile Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser
500 505 510

Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
515 520 525

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
530 535 540

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
545 550 555 560

Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu
565 570 575

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val
580 585 590

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asn
595 600 605

Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly
610 615 620

Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
625 630 635 640

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
645 650 655

Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile
660 665 670

Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile
675 680 685

Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg

690 695 700

Leu Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
705 710 715 720

Gly Gly Glu Arg Asp Arg Asp Arg Ser Gly Arg Leu Val Asn Gly Phe
725 730 735

Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr
740 745 750

His Arg Leu Arg Asp Leu Leu Leu Ile Val Ala Arg Ile Val Glu Leu
755 760 765

Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp Asn Leu Leu
770 775 780

Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu Asn
785 790 795 800

Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu Val
805 810 815

Val Gln Arg Ala Cys Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg
820 825 830

Gln Gly Leu Glu Arg Ala Leu Leu
835 840

<210> 46
<211> 835
<212> PRT
<213> 人類免疫缺乏病毒

<400> 46

Met Arg Val Arg Gly Ile Leu Arg Asn Cys Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Val Gly Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Ile Lys
130 135 140

Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys
145 150 155 160

Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn
165 170 175

Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala
180 185 190

Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro
195 200 205

Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr
210 215 220

Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys
225 230 235 240

Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu
245 250 255

Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile
260 265 270

Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn
275 280 285

Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr
290 295 300

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile
305 310 315 320

Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Lys Val Ser Lys Lys Leu
325 330 335

Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro Ser Ser Gly
340 345 350

Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe
355 360 365

Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr Asn Ser Thr
370 375 380

Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met
385 390 395 400

Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn
405 410 415

Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly
420 425 430

Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg
435 440 445

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys
450 455 460

Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu Arg
465 470 475 480

Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
485 490 495

Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln
500 505 510

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu
515 520 525

Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly
530 535 540

Ile Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys
545 550 555 560

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
565 570 575

Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu
580 585 590

Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser
595 600 605

Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln
610 615 620

Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp Lys Asn
625 630 635 640

Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile
645 650 655

Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala
660 665 670

Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser
675 680 685

Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Pro Asp Arg Leu Gly Arg
690 695 700

Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu
705 710 715 720

Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys
725 730 735

Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg
740 745 750

Ala Val Glu Leu Leu Gly Arg Ser Ser Leu Arg Gly Leu Gln Arg Gly
755 760 765

Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu
770 775 780

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala
785 790 795 800

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Ile Gln Arg Ile Cys
805 810 815

Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala
820 825 830

Ala Leu Gln
835

<210> 47
<211> 835
<212> PRT
<213> 人類免疫缺乏病毒

<400> 47

Met Arg Val Met Gly Ile Leu Arg Asn Cys Gln Gln Trp Trp Ile Trp

1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Val Gly Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Met Lys
130 135 140

Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys
145 150 155 160

Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Asp Asn
165 170 175

Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala
180 185 190

Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro
195 200 205

Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr
210 215 220

Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys
225 230 235 240

Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu
245 250 255

Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asp Asn Ala Lys Thr Ile
260 265 270

Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn
275 280 285

Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr
290 295 300

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile

305 310 315 320

Ser Glu Glu Lys Trp Asn Lys Thr Leu Gln Arg Val Gly Glu Lys Leu
325 330 335

Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Ala Pro Ser Ser Gly
340 345 350

Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe
355 360 365

Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn Ser Thr Tyr Asn Ser Lys
370 375 380

Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met
385 390 395 400

Trp Gln Gly Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn
405 410 415

Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly
420 425 430

Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg
435 440 445

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys
450 455 460

Pro Leu Gly Ile Ala Pro Thr Glu Ala Lys Arg Arg Val Val Glu Arg
465 470 475 480

Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
485 490 495

Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln
500 505 510

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu
515 520 525

Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly
530 535 540

Ile Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys
545 550 555 560

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys
565 570 575

Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu
580 585 590

Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser
595 600 605

Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln

610 615 620

Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Ser Trp Glu Asn
625 630 635 640

Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile
645 650 655

Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala
660 665 670

Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser
675 680 685

Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Pro Asp Arg Leu Gly Arg
690 695 700

Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu
705 710 715 720

Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys
725 730 735

Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg
740 745 750

Ala Val Glu Leu Leu Gly Arg Ser Ser Leu Arg Gly Leu Gln Arg Gly
755 760 765

Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu
770 775 780

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala
785 790 795 800

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Ile Gln Arg Ile Cys
805 810 815

Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala
820 825 830

Ala Leu Leu
835

<210> 48
<211> 840
<212> PRT
<213> 人類免疫缺乏病毒

<400> 48

Met Arg Val Arg Gly Ile Gln Arg Asn Tyr Gln His Leu Trp Arg Trp
1 5 10 15

Gly Ile Met Leu Leu Gly Met Leu Met Ile Cys Ser Val Ala Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser Tyr Lys Thr Glu Ala
50 55 60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Glu Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Val Lys Arg Asn Asn Thr Ser Asn Asp Thr Asn Glu
130 135 140

Gly Glu Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp
145 150 155 160

Lys Lys Lys Gln Val His Ala Leu Phe Tyr Lys Leu Asp Val Val Pro
165 170 175

Ile Asp Asp Asn Asn Ser Asn Thr Ser Tyr Arg Leu Ile Asn Cys Asn
180 185 190

Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile
195 200 205

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys
210 215 220

Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val
225 230 235 240

Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu
245 250 255

Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu
260 265 270

Thr Asn Asn Ala Lys Ile Ile Ile Val Gln Leu Asn Glu Ser Val Thr
275 280 285

Ile Asn Cys Thr Arg Pro Tyr Asn Asn Thr Arg Gln Arg Thr Pro Ile
290 295 300

Gly Pro Gly Gln Ala Leu Tyr Thr Thr Arg Ile Lys Gly Asp Ile Arg
305 310 315 320

Gln Ala His Cys Asn Ile Ser Arg Ala Glu Trp Asn Lys Thr Leu Gln
325 330 335

Gln Val Ala Lys Lys Leu Gly Asp Leu Leu Asn Lys Thr Thr Ile Ile
340 345 350

Phe Lys Pro Ser Ser Gly Gly Asp Pro Glu Ile Thr Thr His Ser Phe
355 360 365

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn
370 375 380

Ser Thr Trp Asn Asn Thr Lys Trp Asn Ser Thr Gly Lys Ile Thr Leu
385 390 395 400

Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Lys
405 410 415

Ala Met Tyr Ala Pro Pro Ile Glu Gly Leu Ile Lys Cys Ser Ser Asn
420 425 430

Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Ala Asn Asn Ser His
435 440 445

Asn Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg
450 455 460

Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val
465 470 475 480

Ala Pro Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala
485 490 495

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Ile Gly Leu Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser
            500                 505                 510

Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
        515                 520                 525

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
    530                 535                 540

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
545                 550                 555                 560

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
                565                 570                 575

Leu Gly Ile Trp Gly Cys Ser Gly Lys His Ile Cys Thr Thr Thr Val
            580                 585                 590

Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asn
        595                 600                 605

Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly
    610                 615                 620

Leu Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
625                 630                 635                 640

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
                645                 650                 655
```

Phe Ser Ile Thr Gln Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile
660 665 670

Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Leu
675 680 685

Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu
690 695 700

Leu Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
705 710 715 720

Gly Gly Glu Gln Gly Arg Gly Arg Ser Ile Arg Leu Val Asn Gly Phe
725 730 735

Ser Ala Leu Ile Trp Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr
740 745 750

His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala Arg Ile Val Glu Leu
755 760 765

Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Leu Trp Asn Leu Leu
770 775 780

Gln Tyr Trp Ile Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Phe Asp
785 790 795 800

```
Thr Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu Ile
                805                 810                 815

Val Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Thr Arg Ile Arg
            820                 825                 830

Gln Gly Leu Glu Arg Ala Leu Leu
        835                 840
```

<210> 49
<211> 832
<212> PRT
<213> 人類免疫缺乏病毒

<400> 49

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Met Arg Val Arg Gly Met Gln Arg Asn Trp Gln His Leu Gly Lys Trp
1               5                   10                  15

Gly Leu Leu Phe Leu Gly Ile Leu Ile Ile Cys Asn Ala Ala Glu Asn
            20                  25                  30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
        35                  40                  45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser Tyr Glu Lys Glu Val
    50                  55                  60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65                  70                  75                  80
```

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asp Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Asp Thr Asn Asp Asn Lys
130 135 140

Thr Gly Ala Ile Gln Asn Cys Ser Phe Asn Met Thr Thr Glu Val Arg
145 150 155 160

Asp Lys Lys Leu Lys Val His Ala Leu Phe Tyr Lys Leu Asp Ile Val
165 170 175

Pro Ile Ser Asn Asn Asn Ser Lys Tyr Arg Leu Ile Asn Cys Asn Thr
180 185 190

Ser Thr Ile Thr Gln Ala Cys Pro Lys Val Ser Trp Asp Pro Ile Pro
195 200 205

Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asp
210 215 220

Lys Arg Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln

225 230 235 240

Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn
245 250 255

Gly Ser Leu Ala Glu Glu Asp Ile Ile Ile Arg Ser Gln Asn Ile Ser
260 265 270

Asp Asn Ala Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Gln Ile
275 280 285

Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His Leu Gly
290 295 300

Pro Gly Gln Ala Phe Tyr Ala Thr Gly Glu Ile Ile Gly Asp Ile Arg
305 310 315 320

Lys Ala His Cys Asn Ile Ser Gly Thr Gln Trp Asn Lys Thr Leu Glu
325 330 335

Gln Val Lys Ala Lys Leu Lys Ser His Phe Pro Asn Lys Thr Ile Lys
340 345 350

Phe Asn Ser Ser Ser Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe
355 360 365

Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn
370 375 380

Asp Thr Gly Ser Asn Gly Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln
385 390 395 400

Ile Val Asn Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Ala Pro
405 410 415

Ile Ala Gly Asn Ile Thr Cys Asn Ser Asn Ile Thr Gly Leu Leu Leu
420 425 430

Thr Arg Asp Gly Gly Gln Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly
435 440 445

Gly Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val
450 455 460

Val Glu Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Gln
465 470 475 480

Val Val Lys Arg Glu Arg Arg Ala Val Gly Ile Gly Ala Val Phe Leu
485 490 495

Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr
500 505 510

Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
515 520 525

Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu

530 535 540

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
545 550 555 560

Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly
565 570 575

Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn
580 585 590

Lys Ser Gln Asp Glu Ile Trp Asn Asn Met Thr Trp Met Glu Trp Glu
595 600 605

Lys Glu Ile Ser Asn Tyr Ser Asn Ile Ile Tyr Arg Leu Ile Glu Glu
610 615 620

Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp
625 630 635 640

Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Leu Trp
645 650 655

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg
660 665 670

Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Lys Gly Tyr
675 680 685

Ser Pro Leu Ser Leu Gln Thr Leu Ile Pro Ser Pro Arg Glu Pro Asp
690 695 700

Arg Pro Glu Gly Ile Glu Glu Gly Gly Gly Glu Gln Gly Lys Asp Arg
705 710 715 720

Ser Val Arg Leu Val Asn Gly Phe Leu Ala Leu Val Trp Asp Asp Leu
725 730 735

Arg Asn Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asp Phe Ile Leu
740 745 750

Ile Ala Ala Arg Ile Val Asp Arg Gly Leu Arg Arg Gly Trp Glu Ala
755 760 765

Leu Lys Tyr Leu Gly Asn Leu Thr Gln Tyr Trp Ser Gln Glu Leu Lys
770 775 780

Asn Ser Ala Ile Ser Leu Leu Asn Thr Thr Ala Ile Val Val Ala Glu
785 790 795 800

Gly Thr Asp Arg Val Ile Glu Ala Leu Gln Arg Ala Gly Arg Ala Val
805 810 815

Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
820 825 830

<210> 50

<211> 831
<212> PRT
<213> 人類免疫缺乏病毒

<400> 50

Met Arg Val Arg Glu Met Gln Arg Asn Trp Gln His Leu Gly Lys Trp
1 5 10 15

Gly Leu Leu Phe Leu Gly Ile Leu Ile Ile Cys Asn Ala Ala Asp Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr Tyr Ala Cys Val Pro Thr Asp Pro Ser Pro
65 70 75 80

Gln Glu Leu Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

```
Asn Cys Thr Asp Val Asn Val Thr Ile Asn Thr Thr Asn Val Thr Leu
    130                 135                 140

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Lys Asp
145                 150                 155                 160

Lys Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro
                165                 170                 175

Ile Asn Asn Ser Ile Val Tyr Arg Leu Ile Ser Cys Asn Thr Ser Thr
            180                 185                 190

Val Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His
        195                 200                 205

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys
    210                 215                 220

Phe Asn Gly Thr Gly Leu Cys Arg Asn Val Ser Thr Val Gln Cys Thr
225                 230                 235                 240

His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser
                245                 250                 255

Leu Ala Glu Glu Asp Ile Ile Ile Arg Ser Glu Asn Ile Ser Asp Asn
            260                 265                 270

Thr Lys Thr Ile Ile Val Gln Phe Asn Arg Ser Val Glu Ile Asn Cys
        275                 280                 285
```

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly
290 295 300

Arg Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Lys Ala
305 310 315 320

Tyr Cys Asn Ile Asn Arg Thr Leu Trp Asn Glu Thr Leu Lys Lys Val
325 330 335

Ala Glu Glu Phe Lys Asn His Phe Asn Ile Thr Val Thr Phe Asn Pro
340 345 350

Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg
355 360 365

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Asn Thr Glu
370 375 380

Val Asn Asn Thr Lys Thr Ile Thr Leu Pro Cys Arg Ile Arg Gln Phe
385 390 395 400

Val Asn Met Trp Gln Arg Val Gly Arg Ala Met Tyr Ala Pro Pro Ile
405 410 415

Ala Gly Gln Ile Gln Cys Asn Ser Asn Ile Thr Gly Leu Leu Leu Thr
420 425 430

```
Arg Asp Gly Gly Lys Asn Gly Ser Glu Thr Leu Arg Pro Gly Gly Gly
        435                 440                 445

Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
    450                 455                 460

Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Gln Val
465                 470                 475                 480

Val Gln Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Leu Leu Gly
                485                 490                 495

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu
            500                 505                 510

Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
        515                 520                 525

Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
    530                 535                 540

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg
545                 550                 555                 560

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
                565                 570                 575

Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys
            580                 585                 590
```

Ser Gln Asp Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Lys
595 600 605

Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Ile Glu Asp Ala
610 615 620

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys
625 630 635 640

Trp Asp Asn Leu Trp Ser Trp Phe Thr Ile Thr Asn Trp Leu Trp Tyr
645 650 655

Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile
660 665 670

Val Phe Ala Val Leu Ser Val Val Asn Arg Val Arg Gln Gly Tyr Ser
675 680 685

Pro Leu Ser Leu Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Glu Arg
690 695 700

Pro Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser
705 710 715 720

Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg
725 730 735

Ser Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asp Phe Ile Leu Ile
740 745 750

Ala Ala Arg Thr Val Asp Met Gly Leu Lys Arg Gly Trp Glu Ala Leu
755 760 765

Lys Tyr Leu Trp Asn Leu Pro Gln Tyr Trp Gly Gln Glu Leu Lys Asn
770 775 780

Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly
785 790 795 800

Thr Asp Arg Ile Ile Glu Val Leu Gln Arg Ala Gly Arg Ala Val Leu
805 810 815

His Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
820 825 830

<210> 51
<211> 842
<212> PRT
<213> 人類免疫缺乏病毒

<400> 51

Met Arg Val Lys Gly Ile Gln Arg Asn Trp Gln His Leu Trp Lys Trp
1 5 10 15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asn Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Glu Asp Ala Asp
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Arg
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Thr Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Val Asn Val Thr Asn Asn Asn Thr Asn Asn Thr Lys
130 135 140

Lys Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp
145 150 155 160

Lys Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro
165 170 175

Ile Asn Asp Asn Gly Asn Ser Ser Ile Tyr Arg Leu Ile Asn Cys Asn

180 185 190

Val Ser Thr Ile Lys Gln Ala Cys Pro Lys Val Thr Phe Asp Pro Ile
195 200 205

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Arg
210 215 220

Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val
225 230 235 240

Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu
245 250 255

Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Ile
260 265 270

Thr Asp Asn Thr Lys Val Ile Ile Val Gln Leu Asn Glu Thr Ile Glu
275 280 285

Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile
290 295 300

Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile
305 310 315 320

Arg Gln Ala His Cys Asn Val Ser Arg Thr Lys Trp Asn Glu Met Leu
325 330 335

Gln Lys Val Lys Ala Gln Leu Lys Lys Ile Phe Asn Lys Ser Ile Thr
340 345 350

Phe Asn Ser Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
355 360 365

Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn
370 375 380

Asn Ser Leu Leu Asn Ser Thr Asn Ser Thr Ile Thr Leu Pro Cys Lys
385 390 395 400

Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met Tyr
405 410 415

Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly
420 425 430

Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg
435 440 445

Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys
450 455 460

Tyr Lys Ile Val Lys Ile Lys Pro Leu Gly Val Ala Pro Thr Arg Ala
465 470 475 480

Arg Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala

485 490 495

Val Leu Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala
500 505 510

Ser Ile Thr Leu Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val
515 520 525

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
530 535 540

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu
545 550 555 560

Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly
565 570 575

Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser
580 585 590

Trp Ser Asn Lys Ser Tyr Asn Glu Ile Trp Asp Asn Met Thr Trp Ile
595 600 605

Glu Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr Ser Leu
610 615 620

Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu
625 630 635 640

Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Lys
645 650 655

Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile
660 665 670

Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg
675 680 685

Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr His His Gln Arg
690 695 700

Glu Pro Asp Arg Pro Glu Arg Ile Glu Glu Gly Gly Gly Glu Gln Asp
705 710 715 720

Lys Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp
725 730 735

Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp
740 745 750

Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser
755 760 765

Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp Asn
770 775 780

Leu Leu Leu Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu

785 790 795 800

Leu Asp Thr Ile Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Val Ile
805 810 815

Glu Val Ala Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Arg Arg
820 825 830

Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840

<210> 52
<211> 839
<212> PRT
<213> 人類免疫缺乏病毒

<400> 52

Thr Arg Val Met Glu Thr Gln Arg Asn Tyr Pro Ser Leu Trp Arg Trp
1 5 10 15

Gly Thr Leu Ile Leu Gly Met Leu Leu Ile Cys Ser Ala Ala Gly Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Lys
50 55 60

```
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65                  70                  75                  80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Glu
                85                  90                  95

Asn Asp Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp
            100                 105                 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115                 120                 125

Asp Cys Ser Asn Val Asn Thr Thr Asn Ala Thr Asn Ser Arg Phe Asn
    130                 135                 140

Met Gln Glu Glu Leu Thr Asn Cys Ser Phe Asn Val Thr Thr Val Ile
145                 150                 155                 160

Arg Asp Lys Gln Gln Lys Val His Ala Leu Phe Tyr Arg Leu Asp Val
                165                 170                 175

Val Pro Ile Asp Asp Asn Asn Ser Tyr Gln Tyr Arg Leu Ile Asn Cys
            180                 185                 190

Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro
        195                 200                 205

Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys
    210                 215                 220
```

Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr
225 230 235 240

Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu
245 250 255

Leu Asn Gly Ser Leu Ala Glu Glu Gln Val Ile Ile Arg Ser Lys Asn
260 265 270

Ile Ser Asp Asn Thr Lys Asn Ile Ile Val Gln Leu Asn Lys Pro Val
275 280 285

Glu Ile Thr Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His
290 295 300

Leu Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp
305 310 315 320

Ile Arg Gln Ala His Cys Asn Ile Ser Gly Lys Lys Trp Asn Lys Thr
325 330 335

Leu His Gln Val Val Thr Gln Leu Gly Lys Tyr Phe Asp Asn Arg Thr
340 345 350

Ile Ile Phe Lys Pro His Ser Gly Gly Asp Met Glu Val Thr Thr His
355 360 365

```
Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu
    370                 375                 380

Phe Asn Ser Ser Trp Thr Asn Ser Thr Asn Asp Thr Lys Asn Ile Ile
385                 390                 395                 400

Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Arg Val
                405                 410                 415

Gly Gln Ala Met Tyr Ala Pro Pro Ile Lys Gly Asn Ile Thr Cys Val
            420                 425                 430

Ser Asn Ile Thr Gly Leu Ile Leu Thr Phe Asp Glu Gly Asn Asn Thr
        435                 440                 445

Val Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser
    450                 455                 460

Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala
465                 470                 475                 480

Pro Thr Glu Ala Arg Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val
                485                 490                 495

Gly Met Gly Ala Phe Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr
            500                 505                 510

Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu
        515                 520                 525
```

Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Gln Ala
530 535 540

Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
545 550 555 560

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu
565 570 575

Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro
580 585 590

Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asp Asn
595 600 605

Met Thr Trp Met Glu Trp Asp Lys Gln Ile Asn Asn Tyr Thr Glu Glu
610 615 620

Ile Tyr Arg Leu Leu Glu Val Ser Gln Thr Gln Gln Glu Lys Asn Glu
625 630 635 640

Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
645 650 655

Ser Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val
660 665 670

```
Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val
        675                 680                 685

Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Ile
    690                 695                 700

Pro Asn Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly
705                 710                 715                 720

Gly Glu Gln Asp Arg Asp Arg Ser Val Arg Leu Val Asn Gly Phe Leu
                725                 730                 735

Pro Leu Val Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr Arg
            740                 745                 750

Leu Leu Arg Asp Leu Leu Leu Ile Val Val Arg Thr Val Glu Leu Leu
        755                 760                 765

Gly Arg Arg Gly Arg Glu Ala Leu Lys Tyr Leu Trp Asn Leu Leu Gln
    770                 775                 780

Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asn Thr
785                 790                 795                 800

Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Ile Val
                805                 810                 815

Gln Arg Ala Trp Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln
            820                 825                 830
```

Gly Phe Glu Arg Thr Leu Leu
835

<210> 53
<211> 854
<212> PRT
<213> 人類免疫缺乏病毒

<400> 53

Met Arg Val Lys Glu Thr Gln Met Asn Trp Pro Asn Leu Trp Lys Trp
1 5 10 15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asp Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp

100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asn Ala Asn Leu Thr Asn Val Asn Asn Ile Thr Asn Val
130 135 140

Ser Asn Ile Ile Gly Asn Ile Thr Asn Glu Val Arg Asn Cys Ser Phe
145 150 155 160

Asn Met Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys Val His Ala Leu
165 170 175

Phe Tyr Lys Leu Asp Ile Val Gln Ile Glu Asp Asn Asn Ser Tyr Arg
180 185 190

Leu Ile Asn Cys Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Ile
195 200 205

Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala
210 215 220

Ile Leu Lys Cys Asn Asp Lys Asn Phe Asn Gly Thr Gly Pro Cys Lys
225 230 235 240

Asn Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser
245 250 255

Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile
260 265 270

Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu
275 280 285

Asn Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg
290 295 300

Thr Ser Ile Thr Ile Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp
305 310 315 320

Ile Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Thr Lys
325 330 335

Trp Asn Glu Val Leu Lys Gln Val Thr Glu Lys Leu Lys Glu His Phe
340 345 350

Asn Asn Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu
355 360 365

Ile Thr Met His His Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn
370 375 380

Thr Thr Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Glu Thr Met Glu
385 390 395 400

Gly Cys Asn Gly Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile

405 410 415

Asn Met Trp Gln Gly Ala Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser
420 425 430

Gly Arg Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg
435 440 445

Asp Gly Gly Ala Asn Asn Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly
450 455 460

Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
465 470 475 480

Gln Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val
485 490 495

Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Met Ile Phe Gly
500 505 510

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu
515 520 525

Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
530 535 540

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
545 550 555 560

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
565 570 575

Tyr Leu Lys Asp Gln Lys Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys
580 585 590

Ile Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Thr Trp Ser Asn Arg
595 600 605

Ser Phe Glu Glu Ile Trp Asn Asn Met Thr Trp Ile Glu Trp Glu Arg
610 615 620

Glu Ile Ser Asn Tyr Thr Asn Gln Ile Tyr Glu Ile Leu Thr Glu Ser
625 630 635 640

Gln Asn Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys
645 650 655

Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr
660 665 670

Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile
675 680 685

Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser
690 695 700

Pro Leu Ser Phe Gln Thr Pro Thr His His Gln Arg Glu Pro Asp Arg

705 710 715 720

Pro Glu Arg Ile Glu Glu Gly Gly Gly Glu Gln Gly Arg Asp Arg Ser
725 730 735

Val Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg
740 745 750

Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile
755 760 765

Ala Ala Arg Thr Val Glu Leu Leu Gly His Ser Ser Leu Lys Gly Leu
770 775 780

Arg Arg Gly Trp Glu Gly Leu Lys Tyr Leu Gly Asn Leu Leu Leu Tyr
785 790 795 800

Trp Gly Gln Glu Leu Lys Ile Ser Ala Ile Ser Leu Leu Asp Ala Thr
805 810 815

Ala Ile Ala Val Ala Gly Trp Thr Asp Arg Val Ile Glu Val Ala Gln
820 825 830

Gly Ala Trp Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln Gly
835 840 845

Leu Glu Arg Ala Leu Leu
850

<210> 54
<211> 844
<212> PRT
<213> 1型人類免疫缺乏病毒

<400> 54

Met Arg Val Met Gly Ile Gln Lys Asn Tyr Pro Leu Leu Trp Arg Trp
1 5 10 15

Gly Met Ile Ile Phe Trp Ile Met Ile Ile Cys Asn Ala Glu Asn Leu
20 25 30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu Thr
35 40 45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His
50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65 70 75 80

Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asp
115 120 125

Cys His Asn Asn Ile Thr Asn Ser Asn Thr Thr Asn Asn Asn Ala Gly
130 135 140

Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp Lys
145 150 155 160

Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Gln Ile
165 170 175

Asn Lys Asn Asn Ser Gln Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala
180 185 190

Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His
195 200 205

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Glu
210 215 220

Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr
225 230 235 240

His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser
245 250 255

Leu Ala Glu Glu Glu Ile Val Ile Arg Ser Glu Asn Ile Thr Asn Asn
260 265 270

Ala Lys Thr Ile Ile Val Gln Leu Val Lys Pro Val Lys Ile Asn Cys
275 280 285

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly
290 295 300

Gln Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala
305 310 315 320

His Cys Asn Val Ser Arg Thr Lys Trp Asn Asn Thr Leu Gln Gln Val
325 330 335

Ala Thr Gln Leu Arg Lys Tyr Phe Asn Lys Thr Ile Ile Phe Ala Asn
340 345 350

Pro Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly
355 360 365

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Glu Leu Phe Asn Ser Thr Trp
370 375 380

Asn Ser Thr Trp Asn Asn Thr Glu Lys Cys Ile Thr Leu Gln Cys Arg
385 390 395 400

Ile Lys Gln Ile Val Asn Met Trp Gln Lys Val Gly Gln Ala Met Tyr
405 410 415

Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile Thr Gly
420 425 430

Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Ser Thr Asn Glu Thr
435 440 445

Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu
450 455 460

Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr
465 470 475 480

Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu
485 490 495

Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly
500 505 510

Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly
515 520 525

Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln
530 535 540

His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
545 550 555 560

Val Leu Ala Leu Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile
565 570 575

Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn
580 585 590

Ser Ser Trp Ser Asn Lys Thr Tyr Asn Asp Ile Trp Asp Asn Met Thr
595 600 605

Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Asp Ile Ile Tyr
610 615 620

Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp
625 630 635 640

Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile
645 650 655

Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly
660 665 670

Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Thr Ile Ile Asn Arg
675 680 685

Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr His His
690 695 700

Gln Arg Glu Pro Asp Arg Pro Glu Arg Ile Glu Glu Gly Gly Gly Glu
705 710 715 720

Gln Asp Arg Asp Arg Ser Val Arg Leu Val Ser Gly Phe Leu Ala Leu
725 730 735

Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu
740 745 750

Arg Asp Phe Val Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly His
755 760 765

Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Ala Leu Lys Tyr Leu
770 775 780

Gly Asn Leu Leu Ser Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile
785 790 795 800

Asn Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Asn Trp Thr Asp Arg
805 810 815

Val Ile Glu Ile Gly Gln Arg Ala Gly Arg Ala Ile Leu Asn Ile Pro
820 825 830

Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840

<210> 55
<211> 840
<212> PRT
<213> 人類免疫缺乏病毒

<400> 55

Met Arg Val Lys Glu Ile Arg Lys His Leu Trp Arg Trp Gly Thr Leu

```
1               5                   10                  15

Phe Leu Gly Met Leu Met Ile Cys Ser Ala Thr Glu Asn Leu Trp Val
            20                  25                  30

Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu
        35                  40                  45

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Lys Glu Val His Asn Val
    50                  55                  60

Trp Ala Thr Tyr Ala Cys Val Pro Thr Asp Pro Ser Pro Gln Glu Ile
65                  70                  75                  80

Pro Leu Glu Asn Val Thr Glu Asn Phe Asn Met Gly Lys Asn Asn Met
                85                  90                  95

Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
            100                 105                 110

Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr
        115                 120                 125

Asp Leu Lys Lys Asn Val Thr Ser Thr Asn Thr Ser Ser Ile Lys Met
    130                 135                 140

Met Glu Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Asp Leu Arg Asp
145                 150                 155                 160
```

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Lys Val Lys Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Gln
                165                 170                 175

Ile Asp Asn Asp Ser Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Val
            180                 185                 190

Thr Gln Ala Cys Pro Lys Ile Ser Phe Glu Pro Ile Pro Ile His Tyr
        195                 200                 205

Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe
    210                 215                 220

Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys Thr His
225                 230                 235                 240

Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu
                245                 250                 255

Ala Glu Glu Glu Val Val Ile Arg Ser Val Asn Phe Thr Asp Asn Thr
            260                 265                 270

Lys Thr Ile Ile Val Gln Leu Lys Glu Pro Val Glu Ile Asn Cys Thr
        275                 280                 285

Arg Pro Asn Asn Asn Thr Arg Lys Gly Ile His Ile Gly Pro Gly Arg
    290                 295                 300

Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His
```

305 310 315 320

Cys Asn Ile Ser Ile Thr Lys Trp Asn Asn Thr Leu Lys Gln Ile Val
325 330 335

Ile Lys Leu Arg Lys Gln Phe Gly Asn Lys Thr Ile Val Phe Asn Gln
340 345 350

Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser Phe Asn Cys Gly
355 360 365

Gly Glu Phe Phe Tyr Cys Asn Thr Thr Lys Leu Phe Asn Ser Thr Trp
370 375 380

Asn Gly Thr Glu Glu Leu Asn Asn Thr Glu Gly Asp Ile Val Thr Leu
385 390 395 400

Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys
405 410 415

Ala Met Tyr Ala Pro Pro Ile Ala Gly Gln Ile Arg Cys Ser Ser Asn
420 425 430

Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Gln Ser Asn Val
435 440 445

Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg
450 455 460

Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val
465 470 475 480

Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala
485 490 495

Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser
500 505 510

Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu
515 520 525

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
530 535 540

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
545 550 555 560

Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
565 570 575

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
580 585 590

Pro Trp Asn Thr Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asn
595 600 605

Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gly

610 615 620

Leu Ile Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
625 630 635 640

Glu Gln Glu Ile Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
645 650 655

Phe Asp Ile Ser Lys Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile
660 665 670

Val Gly Gly Leu Val Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile
675 680 685

Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg
690 695 700

Leu Pro Thr Gln Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu
705 710 715 720

Gly Gly Glu Arg Asp Arg Asp Thr Ser Ile Arg Leu Val Asn Gly Phe
725 730 735

Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ile Tyr
740 745 750

His His Leu Arg Asp Leu Leu Leu Ile Ala Ala Arg Ile Val Glu Leu
755 760 765

```
Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp Asn Leu Leu
    770                 775                 780

Gln Tyr Trp Ile Gln Glu Leu Lys Ser Ser Ala Ile Asn Leu Ile Asp
785                 790                 795                 800

Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp Arg Val Ile Glu Ile
                805                 810                 815

Gly Gln Arg Phe Cys Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg
            820                 825                 830

Gln Gly Ala Glu Lys Ala Leu Gln
        835                 840
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<210> 56
<211> 848
<212> PRT
<213> 人類免疫缺乏病毒

<400> 56

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Met Arg Val Met Gly Ile Gln Arg Asn Tyr Pro His Leu Trp Glu Trp
1               5                   10                  15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Lys Asn
            20                  25                  30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu
        35                  40                  45
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Thr Thr Pro Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Lys Glu Val
50 55 60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Ala Leu Lys Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Glu Gly Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Ala Leu
115 120 125

Asn Cys Ser Asn Ala Thr Ile Asn Asn Ser Thr Lys Thr Asn Ser Thr
130 135 140

Glu Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp
145 150 155 160

Lys Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro
165 170 175

Ile Asn Asp Ser Ala Asn Asn Asn Ser Ile Asn Ser Glu Tyr Met Leu
180 185 190

Ile Asn Cys Asn Ala Ser Thr Ile Lys Gln Ala Cys Pro Lys Val Thr
195 200 205

Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile
210 215 220

Leu Lys Cys Asn Asp Lys Asn Phe Thr Gly Leu Gly Pro Cys Thr Asn
225 230 235 240

Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr
245 250 255

Gln Leu Leu Leu Asn Gly Ser Leu Ala Thr Glu Gly Val Val Ile Arg
260 265 270

Ser Lys Asn Phe Thr Asp Asn Thr Lys Asn Ile Ile Val Gln Leu Ala
275 280 285

Lys Ala Val Lys Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys
290 295 300

Ser Val His Ile Gly Pro Gly Gln Thr Trp Tyr Ala Thr Gly Glu Ile
305 310 315 320

Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Gly Asn Asp Trp
325 330 335

Asn Glu Thr Leu Gln Lys Ile Val Glu Glu Leu Arg Lys His Phe Pro
340 345 350

Asn Lys Thr Ile Ile Phe Ala Pro Ser Ala Gly Gly Asp Leu Glu Ile
355 360 365

Thr Thr His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr
370 375 380

Ser Glu Leu Phe Asn Ser Thr Tyr Met Asn Ser Thr Asn Ser Thr Thr
385 390 395 400

Ile Asn Lys Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Ser
405 410 415

Met Trp Gln Glu Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly
420 425 430

Ser Ile Asn Cys Ser Ser Asp Ile Thr Gly Ile Ile Leu Thr Arg Asp
435 440 445

Gly Gly Asn Asn Asn Thr Asn Asn Glu Thr Phe Arg Pro Gly Gly Gly
450 455 460

Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
465 470 475 480

Lys Ile Glu Pro Val Gly Val Ala Pro Thr Arg Ala Arg Arg Arg Val
485 490 495

Val Gln Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly
500 505 510

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu
515 520 525

Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
530 535 540

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Arg Leu Thr
545 550 555 560

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Ser
565 570 575

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
580 585 590

Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys
595 600 605

Ser Tyr Asn Asp Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys
610 615 620

Glu Ile Asn Asn Tyr Thr Gln Ile Ile Tyr Glu Leu Leu Glu Glu Ser
625 630 635 640

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys
645 650 655

Trp Ala Asn Leu Trp Asn Trp Phe Asn Ile Ser Asn Trp Leu Trp Tyr
660 665 670

Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile
675 680 685

Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser
690 695 700

Pro Leu Ser Leu Gln Thr Leu Ile Pro Thr Thr Gln Arg Gly Pro Asp
705 710 715 720

Arg Pro Glu Gly Thr Glu Glu Glu Gly Gly Glu Gln Asp Arg Ser Arg
725 730 735

Ser Ile Arg Leu Val Asn Gly Phe Leu Pro Leu Ile Trp Asp Asp Leu
740 745 750

Arg Asn Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asn Leu Leu Leu
755 760 765

Ile Val Ala Arg Thr Val Glu Leu Leu Gly Ile Arg Gly Trp Glu Ala
770 775 780

Leu Lys Tyr Leu Trp Asn Leu Leu Leu Tyr Trp Gly Gln Glu Leu Arg
785 790 795 800

Asn Ser Ala Ile Asn Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu
805 810 815

Gly Thr Asp Arg Ile Ile Glu Ala Val Gln Arg Ala Cys Arg Ala Ile
820 825 830

Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
835 840 845

<210> 57
<211> 832
<212> PRT
<213> 人類免疫缺乏病毒

<400> 57

Met Arg Val Lys Gly Ile Gln Lys Asn Trp Gln His Leu Trp Lys Trp
1 5 10 15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asn Asn
20 25 30

Met Trp Val Thr Val Tyr Tyr Gly Val Pro Ala Trp Glu Asp Ala Asp
35 40 45

Thr Ile Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Ala Glu Lys
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Ala Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn His Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asn Val Thr Lys Asn Asn Asn Thr Lys Ile Met Gly Arg
130 135 140

Glu Glu Ile Lys Asn Cys Ser Phe Asn Val Thr Thr Glu Ile Arg Asp
145 150 155 160

Lys Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro
165 170 175

Ile Asp Asp Asn Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Ala Ser
180 185 190

Thr Ile Lys Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile
195 200 205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Arg Asp Lys
210 215 220

Asn Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys

225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
245 250 255

Ser Leu Ala Glu Glu Glu Ile Ile Ile Lys Ser Glu Asn Leu Thr Asp
260 265 270

Asn Thr Lys Thr Ile Ile Val Gln Leu Asn Lys Ser Val Glu Ile Arg
275 280 285

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Ser Phe Gly Pro
290 295 300

Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
305 310 315 320

Ala His Cys Asn Val Ser Arg Thr Asp Trp Asn Asn Met Leu Gln Asn
325 330 335

Val Thr Ala Lys Leu Lys Glu Leu Phe Asn Lys Asn Ile Thr Phe Asn
340 345 350

Ser Ser Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys
355 360 365

Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gln Leu Phe Asn Ser Thr
370 375 380

Arg Pro Asn Glu Thr Asn Thr Ile Thr Leu Pro Cys Lys Ile Lys Gln
385 390 395 400

Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met Tyr Ala Pro Pro
405 410 415

Ile Ala Gly Asn Ile Thr Cys Thr Ser Asn Ile Thr Gly Leu Leu Leu
420 425 430

Thr Arg Asp Gly Asn Asn Asn Asp Ser Glu Thr Phe Arg Pro Gly Gly
435 440 445

Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val
450 455 460

Val Lys Ile Lys Pro Leu Gly Ile Ala Pro Thr Arg Ala Arg Arg Arg
465 470 475 480

Val Val Gly Arg Glu Lys Arg Ala Val Gly Leu Gly Ala Val Phe Leu
485 490 495

Gly Phe Leu Gly Thr Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr
500 505 510

Leu Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
515 520 525

Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu

530 535 540

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
545 550 555 560

Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly
565 570 575

Lys Leu Ile Cys Pro Thr Asn Val Pro Trp Asn Ala Ser Trp Ser Asn
580 585 590

Lys Thr Tyr Asn Glu Ile Trp Asp Asn Met Thr Trp Ile Glu Trp Asp
595 600 605

Arg Glu Ile Asn Asn Tyr Thr Gln Gln Ile Tyr Ser Leu Ile Glu Glu
610 615 620

Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp
625 630 635 640

Lys Trp Ala Ser Leu Trp Ser Trp Phe Asp Ile Ser Asn Trp Leu Trp
645 650 655

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg
660 665 670

Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr
675 680 685

Ser Pro Leu Ser Leu Gln Thr Leu Ile Pro Asn Pro Thr Gly Ala Asp
690 695 700

Arg Pro Gly Glu Ile Glu Glu Gly Gly Gly Glu Gln Gly Arg Thr Arg
705 710 715 720

Ser Ile Arg Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu
725 730 735

Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Val Leu
740 745 750

Ile Ala Ala Arg Thr Val Glu Thr Leu Gly His Arg Gly Trp Glu Ile
755 760 765

Leu Lys Tyr Leu Gly Asn Leu Val Cys Tyr Trp Gly Gln Glu Leu Lys
770 775 780

Asn Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Asn
785 790 795 800

Trp Thr Asp Arg Val Ile Glu Val Val Gln Arg Val Phe Arg Ala Phe
805 810 815

Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
820 825 830

<210> 58

<211> 858
<212> PRT
<213> 人類免疫缺乏病毒

<400> 58

Met Arg Val Arg Gly Thr Arg Arg Asn Tyr Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Val Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Glu Gly Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Ile Val Met Glu Asn Val Thr Glu Asn Phe Asn Met Trp Asn
85 90 95

Asn Asp Met Val Asn Gln Met His Glu Asp Val Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

```
Glu Cys Thr Asn Val Ser Ser Asn Gly Asn Gly Thr Tyr Asn Glu Thr
    130                 135                 140

Tyr Asn Glu Ser Val Lys Glu Ile Lys Asn Cys Ser Phe Asn Ala Thr
145                 150                 155                 160

Thr Leu Leu Arg Asp Arg Lys Lys Thr Val Tyr Ala Leu Phe Tyr Arg
                165                 170                 175

Leu Asp Ile Val Pro Leu Asn Asp Glu Asn Ser Gly Lys Asn Ser Ser
            180                 185                 190

Glu Tyr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala
        195                 200                 205

Cys Pro Lys Val Thr Phe Asp Pro Ile Pro Ile His Tyr Cys Thr Pro
    210                 215                 220

Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Thr
225                 230                 235                 240

Gly Gln Cys His Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys
                245                 250                 255

Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Arg
            260                 265                 270

Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Val Lys Thr Ile
        275                 280                 285
```

Ile Val His Leu Asn Gln Ser Val Glu Ile Val Cys Thr Arg Pro Asn
290 295 300

Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr
305 310 315 320

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile
325 330 335

Ser Lys Asp Lys Trp Tyr Glu Thr Leu Gln Arg Val Ser Lys Lys Leu
340 345 350

Ala Glu His Phe Pro Asn Lys Thr Ile Lys Phe Ala Ser Ser Ser Gly
355 360 365

Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe
370 375 380

Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn Gly Thr Tyr Met Asn Gly
385 390 395 400

Thr Asn Asn Ser Ser Ser Ile Ile Thr Ile Pro Cys Arg Ile Lys Gln
405 410 415

Ile Ile Asn Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro
420 425 430

Ile Glu Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu
435 440 445

Val Arg Asp Gly Gly Arg Thr Glu Ser Asn Asn Thr Glu Ile Phe Arg
450 455 460

Pro Gly Gly Gly Asp Met Arg Asn Asn Trp Arg Asn Glu Leu Tyr Lys
465 470 475 480

Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Ala Ala
485 490 495

Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala
500 505 510

Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala
515 520 525

Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
530 535 540

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met
545 550 555 560

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Val Leu
565 570 575

Ala Ile Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly
580 585 590

Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser
595 600 605

Trp Ser Asn Lys Ser Gln Gln Glu Ile Trp Asp Asn Met Thr Trp Met
610 615 620

Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Asn Thr Ile Tyr Arg Leu
625 630 635 640

Leu Glu Asp Ser Gln Asn Gln Gln Glu Arg Asn Glu Lys Asp Leu Leu
645 650 655

Ala Leu Asp Ser Trp Lys Asn Leu Trp Ser Trp Phe Asp Ile Thr Asn
660 665 670

Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile
675 680 685

Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg
690 695 700

Gln Gly Tyr Ser Pro Leu Ser Phe Gln Ile Leu Thr Pro Asn Pro Gly
705 710 715 720

Gly Pro Gly Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp
725 730 735

```
Lys Thr Arg Ser Ile Arg Leu Val Asn Gly Phe Leu Ala Leu Ala Trp
            740                 745                 750

Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp
        755                 760                 765

Phe Ile Leu Leu Thr Ala Arg Gly Val Glu Leu Leu Gly Arg Asn Ser
    770                 775                 780

Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser
785                 790                 795                 800

Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Thr Ile Ser Leu
                805                 810                 815

Val Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile
            820                 825                 830

Asn Ile Val Gln Gly Ile Cys Arg Ala Ile His Asn Ile Pro Arg Arg
        835                 840                 845

Ile Arg Gln Gly Phe Glu Ala Ala Leu Gln
    850                 855
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<210> 59
<211> 837
<212> PRT
<213> 人類免疫缺乏病毒

<400> 59

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Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln Gln Trp Trp Ile Trp
1               5                  10                  15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Ala Thr Gly Asn
            20                  25                  30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Thr Thr
        35                  40                  45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Lys Ala Glu Ala
    50                  55                  60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65                  70                  75                  80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
                85                  90                  95

Asn Gly Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
            100                 105                 110

Gln Gly Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115                 120                 125

Asn Cys Ser Asp Val Asn Ala Thr Asn Ser Ala Thr Asn Thr Val Val
    130                 135                 140

Ala Gly Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp
```

145 150 155 160

Lys Lys Lys Gln Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Gln
165 170 175

Ile Asp Gly Ser Asn Thr Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser
180 185 190

Ala Ile Thr Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile Pro Ile
195 200 205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys
210 215 220

Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys
225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
245 250 255

Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asp
260 265 270

Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser Val Thr Ile Asn
275 280 285

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro
290 295 300

Gly Gln Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asn Ile Arg Gln
305 310 315 320

Ala Tyr Cys Asn Ile Ser Gly Thr Glu Trp Asn Lys Thr Leu Gln Gln
325 330 335

Val Ala Lys Lys Leu Gly Asp Leu Leu Asn Lys Thr Thr Ile Ile Phe
340 345 350

Lys Pro Ser Ser Gly Gly Asp Pro Glu Ile Thr Thr His Thr Phe Asn
355 360 365

Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser
370 375 380

Ser Trp Thr Ser Asn Asn Thr Gly Asn Thr Ser Thr Ile Thr Leu Pro
385 390 395 400

Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Lys Ala
405 410 415

Ile Tyr Ala Pro Pro Ile Ala Gly Leu Ile Asn Cys Ser Ser Asn Ile
420 425 430

Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Ala Asn Asn Ser Glu Thr
435 440 445

Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu

450 455 460

Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Leu Ala Pro Thr
465 470 475 480

Lys Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Ile Gly Leu
485 490 495

Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly
500 505 510

Ala Ala Ser Leu Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly
515 520 525

Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln
530 535 540

His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
545 550 555 560

Val Leu Ala Val Glu Ser Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile
565 570 575

Trp Gly Cys Ser Gly Lys His Ile Cys Thr Thr Asn Val Pro Trp Asn
580 585 590

Ser Ser Trp Ser Asn Lys Ser Leu Glu Glu Ile Trp Asp Asn Met Thr
595 600 605

Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly Leu Ile Tyr
610 615 620

Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
625 630 635 640

Leu Leu Gln Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Ser Ile
645 650 655

Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly
660 665 670

Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Leu Val Asn Arg
675 680 685

Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Leu Pro Ala
690 695 700

Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Glu
705 710 715 720

Gln Gly Arg Gly Arg Ser Ile Arg Leu Val Asn Gly Phe Ser Ala Leu
725 730 735

Ile Trp Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr His Arg Leu
740 745 750

Arg Asp Leu Ile Leu Ile Ala Thr Arg Ile Val Glu Leu Leu Gly Arg

755 760 765

Arg Gly Trp Glu Ala Ile Lys Tyr Leu Trp Asn Leu Leu Gln Tyr Trp
770 775 780

Ile Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala
785 790 795 800

Ile Ala Val Ala Glu Gly Thr Asp Arg Ala Ile Glu Ile Val Gln Arg
805 810 815

Ala Val Arg Ala Val Leu Asn Ile Pro Thr Arg Ile Arg Gln Gly Leu
820 825 830

Glu Arg Ala Leu Leu
835

<210> 60
<211> 839
<212> PRT
<213> 人類免疫缺乏病毒

<400> 60

Met Arg Val Lys Glu Thr Gln Arg Asn Trp His Asn Leu Trp Arg Trp
1 5 10 15

Gly Leu Met Ile Phe Gly Met Leu Met Ile Cys Asn Ala Thr Glu Asn
20 25 30

```
Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Asp
        35                  40                  45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys
    50                  55                  60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65                  70                  75                  80

Gln Glu Ile Pro Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
                85                  90                  95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
            100                 105                 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115                 120                 125

Asn Cys Thr Asp Val Lys Asn Ala Thr Asn Thr Thr Val Glu Ala Ala
    130                 135                 140

Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Lys Asp Lys
145                 150                 155                 160

Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro Ile
                165                 170                 175

Asn Asp Asn Asn Asn Ser Ile Tyr Arg Leu Ile Asn Cys Asn Val Ser
            180                 185                 190
```

Thr Val Lys Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile Pro Ile
195 200 205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys
210 215 220

Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys
225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
245 250 255

Ser Leu Ala Glu Gly Glu Val Arg Ile Arg Ser Glu Asn Phe Thr Asn
260 265 270

Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Ser Ser Val Arg Ile Asn
275 280 285

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His Ile Gly Pro
290 295 300

Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
305 310 315 320

Ala His Cys Asn Ile Ser Arg Ala Glu Trp Asn Asn Thr Leu Gln Gln
325 330 335

Val Ala Lys Gln Leu Arg Glu Asn Phe Asn Lys Thr Ile Ile Phe Asn
340 345 350

Asn Pro Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys
355 360 365

Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn Ser Thr
370 375 380

Trp Asn Asn Asp Thr Arg Asn Asp Thr Lys Gln Met His Ile Thr Leu
385 390 395 400

Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Arg Val Gly Gln
405 410 415

Ala Met Tyr Ala Pro Pro Ile Gln Gly Lys Ile Arg Cys Asn Ser Asn
420 425 430

Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Asn
435 440 445

Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg Ser
450 455 460

Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Val Ala
465 470 475 480

Pro Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val
485 490 495

Gly Ile Gly Ala Val Leu Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr
500 505 510

Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu
515 520 525

Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala
530 535 540

Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
545 550 555 560

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu
565 570 575

Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro
580 585 590

Trp Asn Phe Ser Trp Ser Asn Lys Ser Tyr Asp Glu Ile Trp Asp Asn
595 600 605

Met Thr Trp Ile Glu Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gln Thr
610 615 620

Ile Tyr Thr Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu
625 630 635 640

```
Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
                645                 650                 655

Asp Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val
            660                 665                 670

Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val
        675                 680                 685

Asn Arg Cys Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr
    690                 695                 700

Pro Asn His Lys Glu Ala Asp Arg Pro Gly Gly Ile Glu Glu Gly Gly
705                 710                 715                 720

Gly Glu Gln Asp Arg Thr Arg Ser Ile Arg Leu Val Ser Gly Phe Leu
                725                 730                 735

Ala Leu Ala Trp Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr His
            740                 745                 750

Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Ile Val Glu Thr Leu
        755                 760                 765

Gly Arg Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly Asn Leu Ala Gln
    770                 775                 780

Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asn Ala
785                 790                 795                 800
```

Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Val Val
805 810 815

His Arg Val Leu Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln
820 825 830

Gly Phe Glu Arg Ala Leu Leu
835

<210> 61
<211> 838
<212> PRT
<213> 人類免疫缺乏病毒

<400> 61

Met Arg Val Arg Gly Met Gln Arg Asn Trp Gln His Leu Gly Lys Trp
1 5 10 15

Gly Leu Leu Phe Leu Gly Ile Leu Ile Ile Cys Asn Ala Thr Glu Asn
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro

65 70 75 80

Gln Glu Val Asp Leu Glu Asn Val Thr Glu Asn Phe Asp Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Ala Asn Ala Thr Ala Asn Ala Thr Lys Glu His Pro
130 135 140

Glu Gly Arg Ala Gly Ala Ile Gln Asn Cys Ser Phe Asn Met Thr Thr
145 150 155 160

Glu Val Arg Asp Lys Gln Met Lys Val Gln Ala Leu Phe Tyr Arg Leu
165 170 175

Asp Ile Val Pro Ile Ser Asp Asn Asn Ser Asn Glu Tyr Arg Leu Ile
180 185 190

Asn Cys Asn Thr Ser Thr Ile Thr Gln Ala Cys Pro Lys Val Ser Trp
195 200 205

Asp Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu
210 215 220

Lys Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val
225 230 235 240

Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln
245 250 255

Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser
260 265 270

Gln Asn Ile Ser Asp Asn Ala Lys Thr Ile Ile Val His Leu Asn Glu
275 280 285

Ser Val Gln Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser
290 295 300

Ile His Ile Gly Pro Gly Arg Ala Phe Tyr Ala Thr Gly Asp Ile Ile
305 310 315 320

Gly Asp Ile Arg Lys Ala His Cys Asn Val Ser Gly Thr Gln Trp Asn
325 330 335

Lys Thr Leu Glu Gln Val Lys Lys Lys Leu Arg Ser Tyr Phe Asn Thr
340 345 350

Thr Ile Lys Phe Asn Ser Ser Ser Gly Gly Asp Pro Glu Ile Thr Met
355 360 365

His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Lys

370 375 380

Leu Phe Asn Asp Thr Val Ser Asn Asp Thr Ile Ile Leu Pro Cys Arg
385 390 395 400

Ile Lys Gln Ile Val Asn Met Trp Gln Glu Val Gly Arg Ala Met Tyr
405 410 415

Ala Ala Pro Ile Ala Gly Asn Ile Thr Cys Thr Ser Asn Ile Thr Gly
420 425 430

Leu Leu Leu Thr Arg Asp Gly Gly His Asn Glu Thr Asn Lys Thr Glu
435 440 445

Thr Phe Arg Pro Gly Gly Gly Asn Met Lys Asp Asn Trp Arg Ser Glu
450 455 460

Leu Tyr Lys Tyr Lys Val Val Glu Ile Glu Pro Leu Gly Val Ala Pro
465 470 475 480

Thr Arg Ala Lys Arg Gln Val Val Lys Arg Glu Lys Arg Ala Val Gly
485 490 495

Ile Gly Ala Leu Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met
500 505 510

Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
515 520 525

Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln
530 535 540

Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala
545 550 555 560

Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly
565 570 575

Leu Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp
580 585 590

Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu Glu Ile Trp Glu Asn Met
595 600 605

Thr Trp Met Glu Trp Glu Lys Glu Ile Asn Asn Tyr Ser Asn Glu Ile
610 615 620

Tyr Arg Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln
625 630 635 640

Glu Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp
645 650 655

Ile Ser Asn Trp Leu Trp Tyr Ile Arg Ile Phe Ile Met Ile Val Gly
660 665 670

Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile Val Asn

675 680 685

Arg Val Arg Lys Gly Tyr Ser Pro Leu Ser Leu Gln Thr His Ile Pro
690 695 700

Ser Pro Arg Glu Pro Asp Arg Pro Glu Gly Ile Glu Glu Gly Gly Gly
705 710 715 720

Glu Gln Gly Lys Asp Arg Ser Val Arg Leu Val Asn Gly Phe Leu Ala
725 730 735

Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu Gly
755 760 765

Arg Arg Gly Trp Glu Val Leu Lys Tyr Trp Trp Asn Leu Leu Gln Tyr
770 775 780

Trp Ser Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asn Thr Thr
785 790 795 800

Ala Ile Val Val Ala Glu Gly Thr Asp Arg Val Ile Glu Ala Leu Gln
805 810 815

Arg Val Gly Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly
820 825 830

Leu Glu Arg Ala Leu Leu
835

<210> 62
<211> 855
<212> PRT
<213> 人類免疫缺乏病毒

<400> 62

Met Lys Ala Lys Gly Thr Gln Arg Asn Trp Gln Ser Leu Trp Lys Trp
1 5 10 15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asn Asp
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Ala Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65 70 75 80

Gln Glu Val Ala Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Glu
85 90 95

Asn Asn Met Val Asp Gln Met Gln Glu Asp Ile Ile Ser Leu Trp Asp
100 105 110

Gln Ser Leu Lys Pro Cys Val Glu Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Asp Phe Asn Asn Thr Thr Asn Asn Thr Thr Asn Thr Arg
130 135 140

Asn Asp Gly Glu Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr
145 150 155 160

Ser Leu Arg Asp Lys Ile Lys Lys Glu Tyr Ala Leu Phe Tyr Asn Leu
165 170 175

Asp Val Val Gln Met Asp Asn Asp Asn Ser Ser Tyr Arg Leu Thr Ser
180 185 190

Cys Asn Thr Ser Ile Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Thr
195 200 205

Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Val Ile Leu Lys
210 215 220

Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser
225 230 235 240

Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu
245 250 255

Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Val Ile Arg Ser Lys
260 265 270

Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Lys Asp Pro
275 280 285

Ile Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Arg Ile
290 295 300

Thr Met Gly Pro Gly Arg Val Leu Tyr Thr Thr Gly Gln Ile Ile Gly
305 310 315 320

Asp Ile Arg Lys Ala His Cys Asn Ile Ser Lys Thr Lys Trp Asn Asn
325 330 335

Thr Leu Gly Gln Ile Val Lys Lys Leu Arg Glu Gln Phe Met Asn Lys
340 345 350

Thr Ile Val Phe Gln Arg Ser Ser Gly Gly Asp Pro Glu Ile Val Met
355 360 365

His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln
370 375 380

Leu Phe Asn Ser Thr Trp Arg Ser Asn Ser Thr Trp Asn Asp Thr Thr
385 390 395 400

Glu Thr Asn Asn Thr Asp Leu Ile Thr Leu Pro Cys Arg Ile Lys Gln
405 410 415

Ile Val Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro
420 425 430

Ile Ser Gly Gln Ile Arg Cys Ser Ser Asn Ile Thr Gly Leu Leu Leu
435 440 445

Ile Arg Asp Gly Gly Ser Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly
450 455 460

Gly Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val
465 470 475 480

Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Arg Ala Lys Arg Arg
485 490 495

Val Val Gln Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Leu Leu Phe
500 505 510

Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr
515 520 525

Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
530 535 540

Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu
545 550 555 560

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
565 570 575

Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly
580 585 590

Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn Ala Ser Trp Ser Asn
595 600 605

Lys Ser Leu Asp Asp Ile Trp Asn Asn Met Thr Trp Met Glu Trp Glu
610 615 620

Arg Glu Ile Asp Asn Tyr Thr Gly Leu Ile Tyr Thr Leu Ile Glu Gln
625 630 635 640

Ser Gln Asn Gln Gln Glu Arg Asn Glu Gln Glu Leu Leu Glu Leu Asp
645 650 655

Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp
660 665 670

Tyr Ile Lys Ile Phe Ile Met Ile Ile Gly Gly Leu Ile Gly Leu Arg
675 680 685

Ile Val Phe Ala Val Leu Ser Ile Ile Asn Arg Val Arg Lys Gly Tyr
690 695 700

Ser Pro Leu Ser Phe Gln Thr Leu Thr His His Gln Arg Glu Pro Asp
705 710 715 720

Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Lys Asp Arg
725 730 735

Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu
740 745 750

Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu
755 760 765

Ile Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser Leu Lys Gly
770 775 780

Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp Asn Leu Leu Leu
785 790 795 800

Tyr Trp Gly Arg Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asp Thr
805 810 815

Val Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Ala Ile Glu Val Val
820 825 830

Gln Arg Val Gly Arg Ala Val Leu Asn Ile Pro Val Arg Ile Arg Gln
835 840 845

Gly Leu Glu Arg Ala Leu Leu
850 855

<210> 63
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 63

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Ile Val
20

<210> 64
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 64

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Val Ile
20

<210> 65
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 65

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Ile

1 5 10 15

Ala Ile Ile Ser Val Val
20

<210> 66
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 66

Ile Phe Ile Met Ile Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Ile Val
20

<210> 67
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 67

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe
1 5 10 15

Ala Val Leu Ser Ile Val
20

<210> 68

<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 68

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Leu Val
20

<210> 69
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 69

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Val Val
20

<210> 70
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 70

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Thr Ile Ile
20

<210> 71
<211> 22
<212> PRT
<213> 2型人類免疫缺乏病毒

<400> 71

Ile Phe Ile Met Ile Val Gly Gly Leu Val Gly Leu Arg Ile Ile Phe
1 5 10 15

Ala Val Leu Ser Ile Val
20

<210> 72
<211> 22
<212> PRT
<213> 人類免疫缺乏病毒

<400> 72

Ile Phe Ile Met Ile Ile Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
1 5 10 15

Ala Val Leu Ser Ile Ile
20

<210> 73
<211> 12

<212> PRT
<213> 合成

<400> 73

Ala Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Ala
1 5 10

<210> 74
<211> 20
<212> PRT
<213> 合成

<400> 74

Thr Trp Ile Gln Asn Pro Gly Thr Lys Trp Tyr Gln Asn Pro Gly Thr
1 5 10 15

Lys Ile Tyr Thr
20

<210> 75
<211> 8
<212> PRT
<213> 合成

<400> 75

Ser Gly Ser Gly Ala Ser Gly Ser
1 5

<210> 76
<211> 4
<212> PRT

<213> 合成

<400> 76

Pro Ser Gly Pro
1

<210> 77
<211> 216
<212> PRT
<213> 合成

<400> 77

Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys
1 5 10 15

Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val
20 25 30

Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe
35 40 45

Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu
50 55 60

Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His
65 70 75 80

Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys
85 90 95

```
Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser
            100                 105                 110

Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met
        115                 120                 125

Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro
    130                 135                 140

Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn
145                 150                 155                 160

Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met
                165                 170                 175

Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser
            180                 185                 190

Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr
        195                 200                 205

Lys Ser Phe Ser Arg Thr Pro Gly
    210                 215
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<210> 78
<211> 231
<212> PRT
<213> 合成

<400> 78

Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala
1 5 10 15

Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile
20 25 30

Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val
35 40 45

Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val
50 55 60

Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp
65 70 75 80

Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln
85 90 95

Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp
100 105 110

Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val
115 120 125

Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr
130 135 140

Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu
145 150 155 160

Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr
165 170 175

Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr
180 185 190

Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr
195 200 205

Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr Lys
210 215 220

Ser Phe Ser Arg Thr Pro Gly
225 230

<210> 79
<211> 15
<212> PRT
<213> 合成

<400> 79

Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro
1 5 10 15

<210> 80
<211> 213
<212> PRT

<213> 合成

<400> 80

Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp
1 5 10 15

Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp
20 25 30

Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp
35 40 45

Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn
50 55 60

Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp
65 70 75 80

Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro
85 90 95

Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala
100 105 110

Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp
115 120 125

Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile
130 135 140

Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn
145 150 155 160

Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys
165 170 175

Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys
180 185 190

Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu
195 200 205

Ser His Ser Pro Gly
210

<210> 81
<211> 40
<212> PRT
<213> 合成

<400> 81

Lys Pro Leu Asp Gly Glu Tyr Phe Thr Leu Gln Ile Arg Gly Arg Glu
1 5 10 15

Arg Phe Glu Met Phe Arg Glu Leu Asn Glu Ala Leu Glu Leu Lys Asp
20 25 30

Ala Gln Ala Gly Lys Glu Pro Gly

35 40

<210> 82
<211> 27
<212> PRT
<213> 合成

<400> 82

Gly Tyr Ile Pro Glu Ala Pro Arg Asp Gly Gln Ala Tyr Val Arg Lys
1 5 10 15

Asp Gly Glu Trp Val Leu Leu Ser Thr Phe Leu
20 25

<210> 83
<211> 94
<212> PRT
<213> 合成

<400> 83

Gly Ser His Met Trp Lys Gln Ser Val Glu Leu Ala Lys Lys Asp Ser
1 5 10 15

Leu Tyr Lys Asp Ala Met Gln Tyr Ala Ser Glu Ser Lys Asp Thr Glu
20 25 30

Leu Ala Glu Glu Leu Leu Gln Trp Phe Leu Gln Glu Glu Lys Arg Glu
35 40 45

Cys Phe Gly Ala Cys Leu Phe Thr Cys Tyr Asp Leu Leu Arg Pro Asp

50 55 60

Val Val Leu Glu Leu Ala Trp Arg His Asn Ile Met Asp Phe Ala Met
65 70 75 80

Pro Tyr Phe Ile Gln Val Met Lys Glu Tyr Leu Thr Lys Val
85 90

<210> 84
<211> 20
<212> PRT
<213> 合成

<400> 84

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser
20

<210> 85
<211> 6
<212> PRT
<213> 合成

<400> 85

His His His His His His
1 5

<210> 86

<211> 905
<212> PRT
<213> 合成

<400> 86

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Gly Val Pro Val Trp Lys Asp Ala Glu Thr Thr Leu
20 25 30

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val
35 40 45

Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile
50 55 60

His Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys Asn Asn Met
65 70 75 80

Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
85 90 95

Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asp Cys Asn
100 105 110

Ala Thr Ala Ser Asn Val Thr Asn Glu Met Arg Asn Cys Ser Phe Asn
115 120 125

```
Ile Thr Thr Glu Leu Lys Asp Lys Lys Gln Gln Val Tyr Ser Leu Phe
    130                 135                 140

Tyr Lys Leu Asp Val Val Gln Ile Asn Glu Lys Asn Glu Thr Asp Lys
145                 150                 155                 160

Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro
                165                 170                 175

Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly
            180                 185                 190

Phe Ala Ile Leu Lys Cys Lys Asp Thr Glu Phe Asn Gly Thr Gly Pro
        195                 200                 205

Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val
    210                 215                 220

Ile Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Gly Ile
225                 230                 235                 240

Gln Ile Arg Ser Glu Asn Ile Thr Asn Asn Ala Lys Thr Ile Ile Val
                245                 250                 255

Gln Leu Asp Lys Ala Val Lys Ile Asn Cys Thr Arg Pro Asn Asn Asn
            260                 265                 270

Thr Arg Lys Gly Val Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr
        275                 280                 285
```

Gly Gly Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Val Ser Arg
290 295 300

Ala Lys Trp Asn Asp Thr Leu Arg Gly Val Ala Lys Lys Leu Arg Glu
305 310 315 320

His Phe Lys Asn Lys Thr Ile Ile Phe Glu Lys Ser Ser Gly Gly Asp
325 330 335

Ile Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr
340 345 350

Cys Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Glu Ser Asn Ser Thr
355 360 365

Glu Ser Asn Asn Thr Thr Ser Asn Asp Thr Ile Thr Leu Thr Cys Arg
370 375 380

Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Gln Ala Met Tyr
385 390 395 400

Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile Thr Gly
405 410 415

Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Ser Thr Asn Glu Ile Phe
420 425 430

Arg Pro Gly Gly Gly Asn Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr
435 440 445

Lys Tyr Lys Val Val Lys Ile Glu Pro Ser Gly Pro Val Pro Glu Val
450 455 460

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
465 470 475 480

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
485 490 495

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
500 505 510

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
515 520 525

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
530 535 540

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
545 550 555 560

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
565 570 575

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
580 585 590

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
595 600 605

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
610 615 620

Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln
625 630 635 640

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
645 650 655

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
660 665 670

Gly Ile Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala
675 680 685

Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu Glu Lys
690 695 700

Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly
705 710 715 720

Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
725 730 735

Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu Ala Ala
740 745 750

Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Ala Pro Gly
755 760 765

Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr
770 775 780

Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro Ile Pro Val
785 790 795 800

Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val
805 810 815

Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys
820 825 830

Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu Arg Ala
835 840 845

Glu Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Glu Thr Leu Leu
850 855 860

Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Gly
865 870 875 880

Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly
885 890 895

Gly Pro Gly His Lys Ala Arg Val Leu
900 905

<210> 87
<211> 914
<212> PRT
<213> 合成

<400> 87

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Gly Val Pro Val Trp Lys Asp Ala Glu Thr Thr Leu
20 25 30

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val
35 40 45

Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile
50 55 60

His Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys Asn Asn Met
65 70 75 80

Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
85 90 95

Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asp Cys Asn

100 105 110

Ala Thr Ala Ser Asn Val Thr Asn Glu Met Arg Asn Cys Ser Phe Asn
115 120 125

Ile Thr Thr Glu Leu Lys Asp Lys Lys Gln Gln Val Tyr Ser Leu Phe
130 135 140

Tyr Lys Leu Asp Val Val Gln Ile Asn Glu Lys Asn Glu Thr Asp Lys
145 150 155 160

Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro
165 170 175

Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly
180 185 190

Phe Ala Ile Leu Lys Cys Lys Asp Thr Glu Phe Asn Gly Thr Gly Pro
195 200 205

Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val
210 215 220

Ile Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Gly Ile
225 230 235 240

Gln Ile Arg Ser Glu Asn Ile Thr Asn Asn Ala Lys Thr Ile Ile Val
245 250 255

```
Gln Leu Asp Lys Ala Val Lys Ile Asn Cys Thr Arg Pro Asn Asn Asn
            260                 265                 270

Thr Arg Lys Gly Val Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr
        275                 280                 285

Gly Gly Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Val Ser Arg
    290                 295                 300

Ala Lys Trp Asn Asp Thr Leu Arg Gly Val Ala Lys Lys Leu Arg Glu
305                 310                 315                 320

His Phe Lys Asn Lys Thr Ile Ile Phe Glu Lys Ser Ser Gly Gly Asp
                325                 330                 335

Ile Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr
            340                 345                 350

Cys Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Glu Ser Asn Ser Thr
        355                 360                 365

Glu Ser Asn Asn Thr Thr Ser Asn Asp Thr Ile Thr Leu Thr Cys Arg
    370                 375                 380

Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Gln Ala Met Tyr
385                 390                 395                 400

Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile Thr Gly
```

405 410 415

Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Ser Thr Asn Glu Ile Phe
420 425 430

Arg Pro Gly Gly Gly Asn Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr
435 440 445

Lys Tyr Lys Val Val Lys Ile Glu Val Pro Arg Asp Cys Gly Cys Lys
450 455 460

Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
465 470 475 480

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
485 490 495

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
500 505 510

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
515 520 525

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
530 535 540

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
545 550 555 560

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
565 570 575

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
580 585 590

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
595 600 605

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
610 615 620

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
625 630 635 640

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
645 650 655

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
660 665 670

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Ile Pro Ile Val Gln Asn
675 680 685

Leu Gln Gly Gln Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn
690 695 700

Ala Trp Val Lys Val Val Glu Glu Lys Ala Phe Ser Pro Glu Val Ile

705 710 715 720

Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn
725 730 735

Thr Met Leu Asn Thr Val Gly Gly His Gln Ala Ala Met Gln Met Leu
740 745 750

Lys Glu Thr Ile Asn Glu Glu Ala Ala Glu Trp Asp Arg Val His Pro
755 760 765

Val His Ala Gly Pro Ile Ala Pro Gly Gln Met Arg Glu Pro Arg Gly
770 775 780

Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp
785 790 795 800

Met Thr Asn Asn Pro Pro Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp
805 810 815

Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser
820 825 830

Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val
835 840 845

Asp Arg Phe Tyr Lys Thr Leu Arg Ala Glu Gln Ala Ser Gln Asp Val
850 855 860

Lys Asn Trp Met Thr Glu Thr Leu Leu Val Gln Asn Ala Asn Pro Asp
865 870 875 880

Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu
885 890 895

Met Met Thr Ala Cys Gln Gly Val Gly Gly Pro Gly His Lys Ala Arg
900 905 910

Val Leu

<210> 88
<211> 894
<212> PRT
<213> 合成

<400> 88

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Gly Val Pro Val Trp Arg Asn Ala Ser Ile Pro Leu
20 25 30

Phe Cys Ala Thr Lys Asn Arg Asp Thr Trp Gly Thr Ile Gln Cys Leu
35 40 45

Pro Asp Asn Asp Asp Tyr Gln Glu Ile Ala Leu Asn Val Thr Glu Ala
50 55 60

Phe Asp Ala Trp Asn Asn Thr Val Thr Glu Gln Ala Val Glu Asp Val
65 70 75 80

Trp Ser Leu Phe Glu Thr Ser Ile Lys Pro Cys Val Lys Leu Thr Pro
85 90 95

Leu Cys Val Ala Met Ser Cys Asn Ser Thr Thr Ile Pro Pro Ser Glu
100 105 110

Glu Met Val Asp Cys Gln Phe Asn Met Thr Gly Leu Asp Arg Asp Lys
115 120 125

Lys Lys Gln Tyr Asn Glu Thr Trp Tyr Ser Lys Asp Val Val Cys Glu
130 135 140

Leu Asn Lys Thr Asp Gly Gly Arg Gly Arg Cys Tyr Met Asn His Cys
145 150 155 160

Asn Thr Ser Val Ile Thr Glu Ser Cys Asp Lys His Tyr Trp Asp Ala
165 170 175

Ile Arg Phe Arg Tyr Cys Ala Pro Pro Gly Phe Ala Leu Leu Arg Cys
180 185 190

Asn Asp Thr Asn Tyr Ser Gly Phe Met Pro Asn Cys Ser Lys Val Val
195 200 205

```
Val Ser Ser Cys Thr Arg Met Met Glu Thr Gln Thr Ser Thr Trp Leu
    210                 215                 220

Gly Phe Asn Gly Thr Arg Ala Glu Asn Arg Thr Tyr Met Tyr Trp His
225                 230                 235                 240

Ser Lys Asp Asn Arg Thr Ile Ile Ser Leu Asn Lys Tyr Tyr Asn Leu
                245                 250                 255

Thr Met His Cys Lys Arg Pro Gly Asn Lys Thr Val Ala Pro Ile Thr
            260                 265                 270

Leu Met Ser Gly Leu Val Phe His Ser Gln Pro Ile Asn Arg Arg Pro
        275                 280                 285

Arg Gln Ala Trp Cys Trp Phe Lys Gly Gln Trp Arg Glu Ala Met Gln
    290                 295                 300

Glu Val Lys Arg Thr Leu Ile Lys His Pro Arg Tyr Lys Gly Thr Asn
305                 310                 315                 320

Asp Thr Arg Asn Ile Thr Phe Thr Lys Pro Gly Glu Gly Ser Asp Pro
                325                 330                 335

Glu Val Ala Tyr Met Trp Thr Asn Cys Arg Gly Glu Phe Leu Tyr Cys
            340                 345                 350

Asn Met Thr Trp Phe Leu Asn Trp Val Glu Asn Arg Thr Gly Gln Thr
        355                 360                 365
```

Gln Arg Asn Tyr Ala Pro Cys His Ile Lys Gln Ile Ile Asn Thr Trp
370 375 380

His Lys Val Gly Lys Asn Val Tyr Leu Pro Pro Arg Glu Gly Glu Leu
385 390 395 400

Thr Cys Asn Ser Thr Val Thr Ser Ile Ile Ala Asn Ile Asp Val Asp
405 410 415

Ser Asn Asn Asn Arg Thr Asn Ile Thr Phe Ser Ala Glu Val Ala Glu
420 425 430

Leu Tyr Arg Leu Glu Leu Gly Asp Tyr Lys Leu Ile Glu Val Thr Pro
435 440 445

Ser Gly Pro Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys
450 455 460

Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val
465 470 475 480

Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe
485 490 495

Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu
500 505 510

Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His
515 520 525

Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala
530 535 540

Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg
545 550 555 560

Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met
565 570 575

Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro
580 585 590

Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn
595 600 605

Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val
610 615 620

Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr
625 630 635 640

Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu
645 650 655

Lys Ser Leu Ser His Ser Pro Gly Ile Val Gln Gln Ile Ala Gly Asn
660 665 670

Tyr Val His Met Pro Leu Ser Pro Arg Thr Leu Asn Ala Trp Val Lys
675 680 685

Leu Val Glu Glu Lys Lys Phe Gly Ala Glu Val Val Pro Gly Phe Gln
690 695 700

Ala Leu Ser Glu Gly Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Asn
705 710 715 720

Cys Val Gly Asp His Gln Ala Ala Met Gln Ile Ile Arg Glu Ile Ile
725 730 735

Asn Glu Glu Ala Ala Asp Trp Asp Gln Gln His Pro Ile Pro Gly Pro
740 745 750

Leu Pro Ala Gly Gln Leu Arg Asp Pro Arg Gly Ser Asp Ile Ala Gly
755 760 765

Thr Thr Ser Thr Val Glu Glu Gln Ile Gln Trp Met Tyr Arg Ala Gln
770 775 780

Asn Pro Val Pro Val Gly Asn Ile Tyr Arg Arg Trp Ile Gln Ile Gly
785 790 795 800

Leu Gln Lys Cys Val Arg Met Tyr Asn Pro Thr Asn Ile Leu Asp Ile
805 810 815

Lys Gln Gly Pro Lys Glu Pro Phe Gln Ser Tyr Val Asp Arg Phe Tyr
820 825 830

Lys Ser Leu Arg Ala Glu Gln Thr Asp Pro Ala Val Lys Asn Trp Met
835 840 845

Thr Gln Thr Leu Leu Ile Gln Asn Ala Asn Pro Asp Cys Lys Leu Val
850 855 860

Leu Lys Gly Leu Gly Met Asn Pro Thr Leu Glu Glu Met Leu Thr Ala
865 870 875 880

Cys Gln Gly Ile Gly Gly Pro Gly Gln Lys Ala Arg Leu Met
885 890

<210> 89
<211> 903
<212> PRT
<213> 合成

<400> 89

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Gly Val Pro Val Trp Arg Asn Ala Ser Ile Pro Leu
20 25 30

Phe Cys Ala Thr Lys Asn Arg Asp Thr Trp Gly Thr Ile Gln Cys Leu
35 40 45

Pro Asp Asn Asp Asp Tyr Gln Glu Ile Ala Leu Asn Val Thr Glu Ala
50 55 60

Phe Asp Ala Trp Asn Asn Thr Val Thr Glu Gln Ala Val Glu Asp Val
65 70 75 80

Trp Ser Leu Phe Glu Thr Ser Ile Lys Pro Cys Val Lys Leu Thr Pro
85 90 95

Leu Cys Val Ala Met Ser Cys Asn Ser Thr Thr Ile Pro Pro Ser Glu
100 105 110

Glu Met Val Asp Cys Gln Phe Asn Met Thr Gly Leu Asp Arg Asp Lys
115 120 125

Lys Lys Gln Tyr Asn Glu Thr Trp Tyr Ser Lys Asp Val Val Cys Glu
130 135 140

Leu Asn Lys Thr Asp Gly Gly Arg Gly Arg Cys Tyr Met Asn His Cys
145 150 155 160

Asn Thr Ser Val Ile Thr Glu Ser Cys Asp Lys His Tyr Trp Asp Ala
165 170 175

Ile Arg Phe Arg Tyr Cys Ala Pro Pro Gly Phe Ala Leu Leu Arg Cys
180 185 190

Asn Asp Thr Asn Tyr Ser Gly Phe Met Pro Asn Cys Ser Lys Val Val

195 200 205

Val Ser Ser Cys Thr Arg Met Met Glu Thr Gln Thr Ser Thr Trp Leu
210 215 220

Gly Phe Asn Gly Thr Arg Ala Glu Asn Arg Thr Tyr Met Tyr Trp His
225 230 235 240

Ser Lys Asp Asn Arg Thr Ile Ile Ser Leu Asn Lys Tyr Tyr Asn Leu
245 250 255

Thr Met His Cys Lys Arg Pro Gly Asn Lys Thr Val Ala Pro Ile Thr
260 265 270

Leu Met Ser Gly Leu Val Phe His Ser Gln Pro Ile Asn Arg Arg Pro
275 280 285

Arg Gln Ala Trp Cys Trp Phe Lys Gly Gln Trp Arg Glu Ala Met Gln
290 295 300

Glu Val Lys Arg Thr Leu Ile Lys His Pro Arg Tyr Lys Gly Thr Asn
305 310 315 320

Asp Thr Arg Asn Ile Thr Phe Thr Lys Pro Gly Glu Gly Ser Asp Pro
325 330 335

Glu Val Ala Tyr Met Trp Thr Asn Cys Arg Gly Glu Phe Leu Tyr Cys
340 345 350

Asn Met Thr Trp Phe Leu Asn Trp Val Glu Asn Arg Thr Gly Gln Thr
355 360 365

Gln Arg Asn Tyr Ala Pro Cys His Ile Lys Gln Ile Ile Asn Thr Trp
370 375 380

His Lys Val Gly Lys Asn Val Tyr Leu Pro Pro Arg Glu Gly Glu Leu
385 390 395 400

Thr Cys Asn Ser Thr Val Thr Ser Ile Ile Ala Asn Ile Asp Val Asp
405 410 415

Ser Asn Asn Asn Arg Thr Asn Ile Thr Phe Ser Ala Glu Val Ala Glu
420 425 430

Leu Tyr Arg Leu Glu Leu Gly Asp Tyr Lys Leu Ile Glu Val Thr Val
435 440 445

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
450 455 460

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
465 470 475 480

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
485 490 495

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His

500 505 510

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
515 520 525

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
530 535 540

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
545 550 555 560

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
565 570 575

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
580 585 590

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
595 600 605

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
610 615 620

Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln
625 630 635 640

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
645 650 655

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
660 665 670

Gly Ile Val Gln Gln Ile Ala Gly Asn Tyr Val His Met Pro Leu Ser
675 680 685

Pro Arg Thr Leu Asn Ala Trp Val Lys Leu Val Glu Glu Lys Lys Phe
690 695 700

Gly Ala Glu Val Val Pro Gly Phe Gln Ala Leu Ser Glu Gly Cys Thr
705 710 715 720

Pro Tyr Asp Ile Asn Gln Met Leu Asn Cys Val Gly Asp His Gln Ala
725 730 735

Ala Met Gln Ile Ile Arg Glu Ile Ile Asn Glu Glu Ala Ala Asp Trp
740 745 750

Asp Gln Gln His Pro Ile Pro Gly Pro Leu Pro Ala Gly Gln Leu Arg
755 760 765

Asp Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Val Glu Glu
770 775 780

Gln Ile Gln Trp Met Tyr Arg Ala Gln Asn Pro Val Pro Val Gly Asn
785 790 795 800

Ile Tyr Arg Arg Trp Ile Gln Ile Gly Leu Gln Lys Cys Val Arg Met

805 810 815

Tyr Asn Pro Thr Asn Ile Leu Asp Ile Lys Gln Gly Pro Lys Glu Pro
820 825 830

Phe Gln Ser Tyr Val Asp Arg Phe Tyr Lys Ser Leu Arg Ala Glu Gln
835 840 845

Thr Asp Pro Ala Val Lys Asn Trp Met Thr Gln Thr Leu Leu Ile Gln
850 855 860

Asn Ala Asn Pro Asp Cys Lys Leu Val Leu Lys Gly Leu Gly Met Asn
865 870 875 880

Pro Thr Leu Glu Glu Met Leu Thr Ala Cys Gln Gly Ile Gly Gly Pro
885 890 895

Gly Gln Lys Ala Arg Leu Met
900

<210> 90
<211> 10
<212> PRT
<213> 合成

<400> 90

Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys
1 5 10

<210> 91
<211> 584
<212> PRT
<213> 合成

<400> 91

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
115 120 125

```
Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
    130                 135                 140

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145                 150                 155                 160

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
                165                 170                 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Pro Glu Val Ser
        195                 200                 205

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
    210                 215                 220

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
225                 230                 235                 240

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
                245                 250                 255

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
            260                 265                 270

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
```

275 280 285

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
290 295 300

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
305 310 315 320

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
325 330 335

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
340 345 350

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
355 360 365

Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys
370 375 380

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
385 390 395 400

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
405 410 415

Lys Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
420 425 430

Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile
435 440 445

Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His
450 455 460

Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile
465 470 475 480

Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp
485 490 495

Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala
500 505 510

Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn His Thr Thr Trp
515 520 525

Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His Ser
530 535 540

Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu
545 550 555 560

Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr
565 570 575

Asn Trp Leu Trp Tyr Ile Lys Leu

580

<210> 92
<211> 507
<212> PRT
<213> 合成

<400> 92

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

```
Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
        115                 120                 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
    130                 135                 140

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145                 150                 155                 160

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
                165                 170                 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        195                 200                 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
    210                 215                 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225                 230                 235                 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
                245                 250                 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
            260                 265                 270
```

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

```
Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
            420                 425                 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
        435                 440                 445

Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
    450                 455                 460

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
465                 470                 475                 480

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
                485                 490                 495

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
            500                 505
```

<210> 93
<211> 604
<212> PRT
<213> 合成

<400> 93

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                   10                  15

Val Thr Asn Ser Met Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln
            20                  25                  30
```

Leu Leu Ser Gly Ile Val Gln Gln Asn Asn Leu Leu Arg Ala Ile
35 40 45

Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln
50 55 60

Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln
65 70 75 80

Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala
85 90 95

Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp
100 105 110

Asn His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr
115 120 125

Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys
130 135 140

Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn
145 150 155 160

Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu Gly Gly Gly
165 170 175

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly

180 185 190

Ser Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe
195 200 205

Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val
210 215 220

Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe
225 230 235 240

Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro
245 250 255

Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro
260 265 270

Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val
275 280 285

Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr
290 295 300

Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys
305 310 315 320

Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp
325 330 335

Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro
340 345 350

Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser
355 360 365

Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala
370 375 380

Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His
385 390 395 400

His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly
405 410 415

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
435 440 445

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
450 455 460

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
465 470 475 480

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn

485 490 495

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
500 505 510

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
515 520 525

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
530 535 540

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
545 550 555 560

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
565 570 575

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
580 585 590

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu
595 600

<210> 94
<211> 604
<212> PRT
<213> 合成

<400> 94

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                  10                  15

Val Thr Asn Ser Met Ile Phe Arg Pro Gly Gly Gly Asn Met Arg Asp
            20                  25                  30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro
        35                  40                  45

Leu Gly Val Ala Pro Ser Arg Ala Lys Arg Arg Val Val Glu Arg Glu
    50                  55                  60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
65                  70                  75                  80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Lys Leu Thr
                85                  90                  95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
            100                 105                 110

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
        115                 120                 125

Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys
    130                 135                 140

Ser Met Asn Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys
145                 150                 155                 160
```

Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Asn Leu Ile Glu Glu Ser
165 170 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Gly Gly Gly Gly
180 185 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
195 200 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
210 215 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225 230 235 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
245 250 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
260 265 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
450 455 460

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
465 470 475 480

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
485 490 495

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
500 505 510

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
515 520 525

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn
530 535 540

His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
545 550 555 560

Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
565 570 575

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
580 585 590

Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu
595 600

<210> 95
<211> 604
<212> PRT
<213> 合成

<400> 95

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Thr Phe Arg Pro Gly Gly Gly Asn Ile Lys Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Gln Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Lys Asp Gln Gln Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys
115 120 125

```
Ile Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Thr Trp Ser Asn Arg
    130                 135                 140

Ser Tyr Glu Glu Ile Trp Asn Asn Met Thr Trp Ile Glu Trp Glu Arg
145                 150                 155                 160

Glu Ile Ser Asn Tyr Thr Asn Gln Ile Tyr Glu Ile Leu Thr Glu Ser
                165                 170                 175

Gln Asp Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        195                 200                 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
    210                 215                 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225                 230                 235                 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
                245                 250                 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
            260                 265                 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
```

275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
450 455 460

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
465 470 475 480

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
485 490 495

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
500 505 510

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
515 520 525

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn
530 535 540

His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
545 550 555 560

Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
565 570 575

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp

580 585 590

Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu
595 600

<210> 96
<211> 604
<212> PRT
<213> 合成

<400> 96

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro
35 40 45

Leu Gly Val Ala Pro Thr His Ala Lys Arg Arg Val Val Glu Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
65 70 75 80

Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln His Leu Leu Lys Leu Thr
85 90 95

```
Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg
            100                 105                 110

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
        115                 120                 125

Leu Ile Cys Thr Thr Thr Val Pro Trp Asn Ser Ser Trp Ser Asn Lys
    130                 135                 140

Thr Tyr Asn Asp Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys
145                 150                 155                 160

Glu Ile Ser Asn Tyr Thr Asn Ile Ile Tyr Asn Leu Ile Glu Glu Ser
                165                 170                 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        195                 200                 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
    210                 215                 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225                 230                 235                 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
                245                 250                 255
```

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
260 265 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
450 455 460

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
465 470 475 480

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
485 490 495

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu
500 505 510

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val
515 520 525

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn
530 535 540

His Thr Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
545 550 555 560

Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
565 570 575

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
580 585 590

Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Leu
595 600

<210> 97
<211> 507
<212> PRT
<213> 合成

<400> 97

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro
35 40 45

Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn

65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Lys
115 120 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys
130 135 140

Ser Met Glu Asp Ile Trp Asp Asn Met Thr Trp Leu Glu Trp Asp Arg
145 150 155 160

Glu Ile Ser Asn Tyr Thr Gln Ile Ile Tyr Asn Leu Ile Glu Glu Ser
165 170 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Gly Gly Gly Gly
180 185 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
195 200 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
210 215 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225 230 235 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
245 250 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
260 265 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr

370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu
450 455 460

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu
465 470 475 480

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
485 490 495

Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
500 505

<210> 98
<211> 684
<212> PRT

<213> 合成

<400> 98

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                  10                  15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
            20                  25                  30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
        35                  40                  45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
    50                  55                  60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65                  70                  75                  80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
                85                  90                  95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
            100                 105                 110

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
        115                 120                 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
    130                 135                 140
```

```
Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145                 150                 155                 160

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
                165                 170                 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        195                 200                 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
    210                 215                 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225                 230                 235                 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
                245                 250                 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
            260                 265                 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
        275                 280                 285
```

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
450 455 460

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
465 470 475 480

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
485 490 495

Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val
500 505 510

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
515 520 525

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile
530 535 540

Ala Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr
545 550 555 560

Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro
565 570 575

Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn
580 585 590

Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln
595 600 605

Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr
610 615 620

Leu Arg Ala Glu Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Glu
625 630 635 640

Thr Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys
645 650 655

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
660 665 670

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu
675 680

<210> 99
<211> 684
<212> PRT
<213> 合成

<400> 99

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
20 25 30

```
His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
        35                  40                  45

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
    50                  55                  60

Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val
65                  70                  75                  80

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
                85                  90                  95

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile
            100                 105                 110

Ala Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr
        115                 120                 125

Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro
    130                 135                 140

Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn
145                 150                 155                 160

Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln
                165                 170                 175

Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr
```

180 185 190

Leu Arg Ala Glu Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Glu
195 200 205

Thr Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys
210 215 220

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
225 230 235 240

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Gly Gly Gly Gly
245 250 255

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
260 265 270

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
275 280 285

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
290 295 300

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
305 310 315 320

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
325 330 335

```
Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
            340                 345                 350

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
        355                 360                 365

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
    370                 375                 380

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
385                 390                 395                 400

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
                405                 410                 415

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
            420                 425                 430

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
        435                 440                 445

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
    450                 455                 460

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
465                 470                 475                 480

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
```

485 490 495

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
500 505 510

Gly Gly Gly Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
515 520 525

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
530 535 540

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
545 550 555 560

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
565 570 575

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
580 585 590

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
595 600 605

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
610 615 620

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
625 630 635 640

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
645 650 655

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
660 665 670

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu
675 680

<210> 100
<211> 642
<212> PRT
<213> 合成

<400> 100

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
115 120 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
130 135 140

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145 150 155 160

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
165 170 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
180 185 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
195 200 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
210 215 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225 230 235 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
245 250 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
260 265 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
450 455 460

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
465 470 475 480

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
485 490 495

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
500 505 510

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Met Gln Met Leu Lys Glu
515 520 525

```
Thr Ile Asn Glu Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His
    530                 535                 540

Ala Gly Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
545                 550                 555                 560

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gln Ala Ser Gln
                565                 570                 575

Asp Val Lys Asn Trp Met Thr Gly Gly Gly Gly Ser Gly Gly Gly Gly
            580                 585                 590

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        595                 600                 605

Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu
    610                 615                 620

Met Met Thr Ala Cys Gln Gly Val Gly Gly Pro Gly His Lys Ala Arg
625                 630                 635                 640

Val Leu
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<210> 101
<211> 642
<212> PRT
<213> 合成

<400> 101

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Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1               5                  10                  15

Val Thr Asn Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
            20                  25                  30

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
        35                  40                  45

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
    50                  55                  60

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65                  70                  75                  80

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Met Gln Met Leu Lys Glu
                85                  90                  95

Thr Ile Asn Glu Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His
            100                 105                 110

Ala Gly Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
        115                 120                 125

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gln Ala Ser Gln
    130                 135                 140

Asp Val Lys Asn Trp Met Thr Gly Gly Gly Gly Ser Gly Gly Gly Gly
```

145 150 155 160

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
165 170 175

Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu
180 185 190

Met Met Thr Ala Cys Gln Gly Val Gly Gly Pro Gly His Lys Ala Arg
195 200 205

Val Leu Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
210 215 220

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Pro Glu Val Ser
225 230 235 240

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
245 250 255

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
260 265 270

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
275 280 285

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
290 295 300

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
340 345 350

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
355 360 365

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
370 375 380

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
385 390 395 400

Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys
405 410 415

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
420 425 430

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
435 440 445

Lys Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser

450 455 460

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Met Val Phe Arg Pro Gly
465 470 475 480

Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys
485 490 495

Val Ile Lys Ile Glu Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg
500 505 510

Arg Val Val Gln Arg Glu Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly
515 520 525

Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln
530 535 540

His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
545 550 555 560

Val Leu Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile
565 570 575

Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn
580 585 590

Ala Ser Trp Ser Asn Lys Ser Leu Glu Asp Ile Trp Asp Asn Met Thr
595 600 605

Trp Met Gln Trp Glu Arg Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr
610 615 620

Thr Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
625 630 635 640

Leu Leu

<210> 102
<211> 684
<212> PRT
<213> 合成

<400> 102

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
115 120 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
130 135 140

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145 150 155 160

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
165 170 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
180 185 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
195 200 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
210 215 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225 230 235 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
245 250 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
260 265 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
275 280 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
290 295 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305 310 315 320

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
450 455 460

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
465 470 475 480

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
485 490 495

Ser Gln Gly Ala Thr Pro Gln Glu Val Asn Thr Val Leu Asn Thr Gln
500 505 510

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
515 520 525

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Val
530 535 540

Ala Pro Gly Gln Val Lys Asp Pro Lys Gly Ser Glu Val Ala Gly Thr
545 550 555 560

Thr Ser Thr Val Gln Asp Gln Met Gly Trp Ile Thr Asn Asn Pro Pro
565 570 575

Val Pro Ile Gly Asn Val Gln Arg Lys Trp Ile Val Val Gly Val Asn
580 585 590

Arg Val Val Lys Val Tyr Ser Pro Thr Ser Val Leu Asp Val Lys Gln
595 600 605

Gly Pro Arg Asp Pro Phe Arg Glu Tyr Ile Glu Lys Phe Tyr Arg Thr
610 615 620

Leu Lys Ala Ser Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Asp
625 630 635 640

Thr Val Val Ile Gln Asn Ala Asn Pro Glu Cys Lys Thr Ile Leu Lys
645 650 655

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
660 665 670

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu
675 680

<210> 103
<211> 684
<212> PRT
<213> 合成

<400> 103

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
20 25 30

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
35 40 45

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
50 55 60

Ser Gln Gly Ala Thr Pro Gln Glu Val Asn Thr Val Leu Asn Thr Gln
65 70 75 80

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
85 90 95

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Val
100 105 110

Ala Pro Gly Gln Val Lys Asp Pro Lys Gly Ser Glu Val Ala Gly Thr

115 120 125

Thr Ser Thr Val Gln Asp Gln Met Gly Trp Ile Thr Asn Asn Pro Pro
130 135 140

Val Pro Ile Gly Asn Val Gln Arg Lys Trp Ile Val Val Gly Val Asn
145 150 155 160

Arg Val Val Lys Val Tyr Ser Pro Thr Ser Val Leu Asp Val Lys Gln
165 170 175

Gly Pro Arg Asp Pro Phe Arg Glu Tyr Ile Glu Lys Phe Tyr Arg Thr
180 185 190

Leu Lys Ala Ser Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Asp
195 200 205

Thr Val Val Ile Gln Asn Ala Asn Pro Glu Cys Lys Thr Ile Leu Lys
210 215 220

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
225 230 235 240

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Gly Gly Gly Gly
245 250 255

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
260 265 270

```
Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
        275                 280                 285

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
    290                 295                 300

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
305                 310                 315                 320

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
                325                 330                 335

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
            340                 345                 350

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
        355                 360                 365

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
    370                 375                 380

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
385                 390                 395                 400

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
                405                 410                 415

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
```

420 425 430

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
435 440 445

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
450 455 460

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
465 470 475 480

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
485 490 495

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
500 505 510

Gly Gly Gly Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
515 520 525

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
530 535 540

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
545 550 555 560

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
565 570 575

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
580 585 590

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
595 600 605

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
610 615 620

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
625 630 635 640

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
645 650 655

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
660 665 670

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu
675 680

<210> 104
<211> 684
<212> PRT
<213> 合成

<400> 104

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
20 25 30

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
35 40 45

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
50 55 60

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
65 70 75 80

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
85 90 95

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
100 105 110

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
115 120 125

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
130 135 140

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
145 150 155 160

```
Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser
                165                 170                 175

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        195                 200                 205

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
    210                 215                 220

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
225                 230                 235                 240

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
                245                 250                 255

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
            260                 265                 270

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
        275                 280                 285

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
    290                 295                 300

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
305                 310                 315                 320
```

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
325 330 335

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
340 345 350

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
355 360 365

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
370 375 380

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
385 390 395 400

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
405 410 415

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
420 425 430

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
435 440 445

Gly Gly Gly Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
450 455 460

```
His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
465                 470                 475                 480

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu
                485                 490                 495

Ser Ala Gly Ala Thr Pro Ala Ala Ala Asn Thr Ala Leu Asn Thr Ala
            500                 505                 510

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
        515                 520                 525

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ala
    530                 535                 540

Ala Pro Gly Ala Ala Ala Ala Pro Ala Gly Ser Ala Ala Ala Gly Thr
545                 550                 555                 560

Thr Ser Thr Ala Gln Ala Gln Ala Gly Trp Ala Thr Asn Asn Pro Pro
                565                 570                 575

Ala Pro Ala Gly Ala Ala Ala Ala Ala Trp Ile Ala Ala Gly Ala Asn
            580                 585                 590

Ala Ala Val Ala Ala Tyr Ser Pro Thr Ser Ala Leu Asp Ala Ala Ala
        595                 600                 605

Gly Pro Ala Ala Pro Phe Arg Ala Ala Ala Ala Ala Phe Tyr Ala Thr
    610                 615                 620
```

Leu Ala Ala Ala Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Ala
625 630 635 640

Thr Ala Ala Ala Ala Asn Ala Asn Pro Ala Cys Lys Thr Ile Leu Lys
645 650 655

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
660 665 670

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu
675 680

<210> 105
<211> 684
<212> PRT
<213> 合成

<400> 105

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Met Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val
20 25 30

His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val
35 40 45

Glu Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu

50 55 60

Ser Ala Gly Ala Thr Pro Ala Ala Ala Asn Thr Ala Leu Asn Thr Ala
65 70 75 80

Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu
85 90 95

Glu Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ala
100 105 110

Ala Pro Gly Ala Ala Ala Ala Pro Ala Gly Ser Ala Ala Ala Gly Thr
115 120 125

Thr Ser Thr Ala Gln Ala Gln Ala Gly Trp Ala Thr Asn Asn Pro Pro
130 135 140

Ala Pro Ala Gly Ala Ala Ala Ala Ala Trp Ile Ala Ala Gly Ala Asn
145 150 155 160

Ala Ala Val Ala Ala Tyr Ser Pro Thr Ser Ala Leu Asp Ala Ala Ala
165 170 175

Gly Pro Ala Ala Pro Phe Arg Ala Ala Ala Ala Ala Phe Tyr Ala Thr
180 185 190

Leu Ala Ala Ala Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Ala
195 200 205

Thr Ala Ala Ala Ala Asn Ala Asn Pro Ala Cys Lys Thr Ile Leu Lys
210 215 220

Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln
225 230 235 240

Gly Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Gly Gly Gly Gly
245 250 255

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
260 265 270

Gly Gly Gly Gly Ser Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
275 280 285

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
290 295 300

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
305 310 315 320

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
325 330 335

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
340 345 350

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn

355 360 365

Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys
370 375 380

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
385 390 395 400

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
405 410 415

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
420 425 430

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
435 440 445

Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
450 455 460

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
465 470 475 480

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys Gly Gly Gly Gly Ser
485 490 495

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
500 505 510

Gly Gly Gly Ser Met Val Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
515 520 525

Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Ile Lys Ile Glu Pro
530 535 540

Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu
545 550 555 560

Lys Arg Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn
565 570 575

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
580 585 590

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg
595 600 605

Tyr Leu Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys
610 615 620

Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys
625 630 635 640

Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg
645 650 655

Glu Ile Asp Asn Tyr Thr Asn Thr Ile Tyr Thr Leu Leu Glu Glu Ser

660 665 670

Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu
675 680

<210> 106
<211> 800
<212> PRT
<213> 合成

<400> 106

Met Tyr Arg Met Gln Leu Leu Ser Cys Ile Ala Leu Ser Leu Ala Leu
1 5 10 15

Val Thr Asn Ser Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu
20 25 30

Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val
35 40 45

Gln Ala Arg Asn Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu
50 55 60

Leu Arg Ala Pro Glu Ala Gln Gln His Leu Leu Lys Leu Thr Val Trp
65 70 75 80

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu
85 90 95

Arg Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile
100 105 110

Cys Cys Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Arg Asn Leu
115 120 125

Ser Glu Ile Trp Asp Asn Met Thr Trp Leu Gln Trp Asp Lys Glu Ile
130 135 140

Ser Asn Tyr Thr Gln Ile Ile Tyr Gly Leu Leu Glu Glu Ser Gln Asn
145 150 155 160

Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala
165 170 175

Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Gln
180 185 190

Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys
195 200 205

Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val
210 215 220

Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe
225 230 235 240

Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu
245 250 255

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Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln His
            260                 265                 270

Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys
        275                 280                 285

Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser
    290                 295                 300

Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met
305                 310                 315                 320

Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro
                325                 330                 335

Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn
            340                 345                 350

Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met
        355                 360                 365

Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser
    370                 375                 380

Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr Thr
385                 390                 395                 400
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Lys Ser Phe Ser Arg Thr Pro Gly Lys Ala Glu Ala Ala Ala Lys Glu
405 410 415

Ala Ala Ala Lys Ala Ala Trp Glu Asp Ala Asp Thr Thr Leu Phe Cys
420 425 430

Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys His Asn Val Trp Ala
435 440 445

Thr His Ala Cys Val Pro Thr Asp Pro Asp Pro Gln Glu Ile Pro Leu
450 455 460

Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu
465 470 475 480

Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser Leu Lys Pro
485 490 495

Cys Val Met Leu Thr Gly Gly Ser Thr Ile Lys Gln Ala Cys Pro Lys
500 505 510

Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe
515 520 525

Ala Ile Leu Lys Cys Arg Asp Glu Asp Phe Asn Gly Thr Gly Pro Cys
530 535 540

Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val
545 550 555 560

Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Asp Ile Val
565 570 575

Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Val Ile Ile Val Gln
580 585 590

Leu Asn Glu Pro Val Gln Ile Val Cys Ile Arg Pro Asn Asn Gly Gly
595 600 605

Ser Gly Ser Gly Gly Asp Ile Arg Gln Ala His Cys Asn Val Thr Arg
610 615 620

Ser Arg Trp Asn Lys Thr Leu Gln Glu Val Lys Glu Gln Leu Trp Lys
625 630 635 640

Ile Phe Asn Lys Thr Thr Asn Ile Thr Phe Asn Asn Thr Ile Phe Asn
645 650 655

Ser Pro Ala Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys
660 665 670

Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asp Leu Phe Asn Glu Thr
675 680 685

Asn Leu Ser Ala Asn His Thr Asp Thr Asn Glu Asn Ile Thr Leu Gln
690 695 700

Cys Arg Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala
705 710 715 720

Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Ile Ser Asn Ile
725 730 735

Thr Gly Leu Leu Leu Thr Arg Asp Gly Val Asn Asp Thr His Asp Lys
740 745 750

Glu Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp
755 760 765

Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu Ile Asn Phe
770 775 780

Ala Asn Ser Thr Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn
785 790 795 800

<210> 107
<211> 226
<212> PRT
<213> 合成

<400> 107

Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu
1 5 10 15

Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr
20 25 30

```
Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys
        35                  40                  45

Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val
    50                  55                  60

His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe
65                  70                  75                  80

Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly
                85                  90                  95

Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile
            100                 105                 110

Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val
        115                 120                 125

Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser
    130                 135                 140

Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu
145                 150                 155                 160

Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro
                165                 170                 175

Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val
```

180 185 190

Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu
195 200 205

His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser
210 215 220

Pro Gly
225

<210> 108
<211> 13
<212> PRT
<213> 合成

<400> 108

Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr
1 5 10

<210> 109
<211> 15
<212> PRT
<213> 合成

<400> 109

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1 5 10 15

<210> 110

<211> 25
<212> PRT
<213> 合成

<400> 110

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Gly Ser
20 25

<210> 111
<211> 5
<212> PRT
<213> 合成

<400> 111

Gly Gly Gly Pro Ser
1 5

201922800

發明摘要

【發明名稱】(中文/英文)

新穎哺乳動物表現的人類免疫缺乏病毒外套膜蛋白抗原

NOVEL MAMMALIAN EXPRESSED HUMAN IMMUNODEFICIENCY VIRUS ENVELOPE PROTEIN ANTIGENS

【中文】

本發明之各個實施例係關於包含 HIV 外套膜蛋白及融合蛋白之 1 至 10 個或更多個表位之多肽，其中前述多肽缺少 HIV gp41 蛋白之跨膜結構域。前述多肽可在哺乳動物細胞例如人類細胞中表現，產生例如可用於研發新穎抗-HIV 抗體之多肽。本文所述之多肽及自其研發之新穎抗體通常可用於醫學診斷，且其亦可用於 HIV 之預防及治療性治療。

【英文】

Various embodiments of the invention relate to polypeptides comprising 1-10 or more epitopes of the HIV envelope protein and a fusion protein, wherein the polypeptide lacks the transmembrane domain of the HIV gp41 protein. Such polypeptides may be expressed in mammalian cells, such as human cells, to produce, for example, polypeptides that are useful in developing novel anti-HIV antibodies. Polypeptides described herein and novel antibodies developed therefrom are generally useful for medical diagnostics, and they may also be useful in the prophylactic and therapeutic treatment of HIV.

【代表圖】

【本案指定代表圖】：圖1。

【本代表圖之符號簡單說明】：

無。

【本案若有化學式時，請揭示最能顯示發明特徵的化學式】：

無。

申請專利範圍

1. 一種重組多肽，其包含：

前導肽；

融合蛋白；

HIV gp120 蛋白之至少一個表位；及/或

HIV gp41 蛋白之至少一個表位；

其中前述融合蛋白包含並不由 HIV 編碼之區域，前述區域選自由以下組成之群：抗體之 Fc 結構域、p53 結構域、GCN4 結構域及網格蛋白結構域；且

其中前述重組多肽缺少跨膜結構域。

2. 如請求項 1 所記載之重組多肽，其中前述跨膜結構域之胺基酸序列係選自由以下組成之群：SEQ ID NO:63、SEQ ID NO:64、SEQ ID NO:65、SEQ ID NO:66、SEQ ID NO:67、SEQ ID NO:68、SEQ ID NO:69、SEQ ID NO:70、SEQ ID NO:71 及 SEQ ID NO:72。

3. 如請求項 1 或 2 所記載之重組多肽，其中前述重組多肽包含至少 4 個、5 個、6 個、7 個、8 個、9 個或 10 個表位。

4. 如請求項 3 所記載之重組多肽，其中每一表位係藉由連接體連接至另一表位，前述連接體之胺基酸序列並不由 HIV 編碼。

5. 如請求項 4 所記載之重組多肽，其中將每一表位連接至另一表位之前述連接體包含 SEQ ID NO: 73、SEQ ID NO:74、SEQ ID NO:75、SEQ ID NO:76、SEQ ID NO:109、SEQ ID NO:110 或 SEQ ID NO:111 中所示之胺基酸序列。

6. 如前述請求項中任一項所記載之重組多肽，其中前述重組多肽包含以下中所示之胺基酸序列：SEQ ID NO:1、SEQ ID

NO:2、SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:8、SEQ ID NO:9、SEQ ID NO:14、SEQ ID NO:15、SEQ ID NO:16、SEQ ID NO:17、SEQ ID NO:18、SEQ ID NO:19、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105 或 SEQ ID NO:106。

7. 如請求項 1 至 5 中任一項所記載之重組多肽，其中前述融合蛋白包含抗體 Fc 結構域，其胺基酸序列係選自由以下組成之群：SEQ ID. NO: 77、SEQ ID. NO: 78、SEQ ID. NO: 80 及 SEQ ID. NO: 107。

8. 如請求項 7 所記載之重組多肽，其中前述抗體 Fc 結構域缺少寡聚結構域；且

前述重組多肽係單體。

9. 如請求項 8 所記載之重組多肽，其中前述重組多肽包含以下中所示之胺基酸序列：SEQ ID NO:1、SEQ ID NO:2、SEQ ID NO:8、SEQ ID NO:10、SEQ ID NO:12、SEQ ID NO:14、SEQ ID NO:16、SEQ ID NO:18、SEQ ID NO:20、SEQ ID NO:21、SEQ ID NO:22、SEQ ID NO:23、SEQ ID NO:24、SEQ ID NO:25、SEQ ID NO:26、SEQ ID NO:27、SEQ ID

NO:28、SEQ ID NO:29、SEQ ID NO:30、SEQ ID NO:31、SEQ ID NO:32、SEQ ID NO:33、SEQ ID NO:91、SEQ ID NO:92、SEQ ID NO:93、SEQ ID NO:94、SEQ ID NO:95、SEQ ID NO:96、SEQ ID NO:97、SEQ ID NO:98、SEQ ID NO:99、SEQ ID NO:100、SEQ ID NO:101、SEQ ID NO:102、SEQ ID NO:103、SEQ ID NO:104、SEQ ID NO:105 或 SEQ ID NO:106。

10. 如請求項 7 所記載之重組多肽，其中前述抗體 Fc 結構域包含二聚化結構域。

11. 如請求項 10 所記載之重組多肽，其中前述重組多肽包含以下中所示之胺基酸序列：SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17 或 SEQ ID NO:19。

12. 如請求項 1 至 5 或 10 至 11 中任一項所記載之重組多肽，其中前述融合蛋白包含選自由以下組成之群之寡聚結構域：p53、GCN4、網格蛋白及抗體之 Fc 結構域。

13. 如請求項 12 所記載之重組多肽，其中前述重組多肽包含以下中所示之胺基酸序列：SEQ ID NO:3、SEQ ID NO:4、SEQ ID NO:5、SEQ ID NO:6、SEQ ID NO:7、SEQ ID NO:9、SEQ ID NO:11、SEQ ID NO:13、SEQ ID NO:15、SEQ ID NO:17 或 SEQ ID NO:19。

14. 如前述請求項中任一項所記載之重組多肽，其中前述重組多肽之 N 末端係由前述前導肽組成；且

前述前導肽能夠在前述重組多肽於哺乳動物細胞中轉譯後使前述重組多肽轉移至前述哺乳動物細胞之細胞膜表面。

15. 如前述請求項中任一項所記載之重組多肽，其中前述前導肽包含 SEQ ID NO:84 中所示之胺基酸序列。

16. 如請求項 14 或 15 所記載之重組多肽，其中前述融合蛋白係前述前導肽；

前述重組多肽包含 HIV gp120 之表位及 HIV gp41 之表位；且

前述重組多肽缺少 gp120/gp41 裂解位點。

17. 如請求項 16 所記載之重組多肽，其中前述重組多肽包含以下中所示之胺基酸序列：SEQ ID NO:34、SEQ ID NO:35、SEQ ID NO:36、SEQ ID NO:37 或 SEQ ID NO:38。

18. 如前述請求項中任一項所記載之重組多肽，其中前述重組多肽進一步包含多組胺酸親和標籤。

19. 一種寡聚多肽，其包含如請求項 1 至 7 及 10 至 18 中任一項所記載之重組多肽中之至少兩者。

20. 一種核酸，其包含：

核苷酸序列，其編碼如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽；及

啟動子，其可操作連接至前述核苷酸序列。

21. 一種細胞，其包含核酸，前述核酸包含編碼如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽之核苷酸序列，其中前述細胞係哺乳動物細胞。

22. 如請求項 21 所記載之細胞，其中前述細胞係 CHO、BHK、NS0、Sp2/0、COS、C127、HEK293、HT-1080、PER.C6、HeLa 或 Jurkat 細胞。

23. 一種免疫分析試劑，其包含如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽，其中前述

免疫分析試劑結合至固體支撐件。

24. 如請求項 23 所記載之免疫分析試劑，其中前述固體支撐件係珠粒、膜、微量滴定板、多肽晶片或層析管柱之固相。

25. 一種用於分析含有 HIV 抗體之組合物之裝置，其包含固體支撐件及如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽，其中前述寡聚多肽共價或非共價結合至前述固體支撐件。

26. 如請求項 25 所記載之裝置，其中前述固體支撐件係珠粒、膜、微量滴定板、多肽晶片或層析管柱之固相。

27. 一種分析含有抗體之樣品之方法，其包含以下步驟：

使前述樣品與如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽接觸；及

測定前述抗體與前述重組多肽或前述寡聚多肽之間之結合親和力。

28. 如請求項 27 所記載之方法，其中前述結合親和力係相對結合親和力；且

前述結合親和力係相對結合親和力之原因在於其相對於一或多種不同抗體之結合親和力。

29. 一種產生抗體之方法，其包含向動物投與如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽。

30. 一種自複數種抗體選擇抗 HIV 抗體之方法，其包含以下步驟：

使(a)如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽與(b)含有前述複數種抗體之組合物接觸；及

鑑別相對於前述組合物中之其他抗體對前述重組多肽或前述寡聚多肽具有高結合親和力之抗體，藉此選擇前述抗 HIV 抗體。

31. 一種預防或治療人類患者之 HIV 感染之方法，其包含向前述患者投與如請求項 1 至 18 中任一項所記載之重組多肽或如請求項 19 所記載之寡聚多肽。

32. 一種自人類生物樣品之供應選擇生物樣品之方法，其包含自前述供應選擇不包含與如請求項1至18中任一項所記載之重組多肽或如請求項19所記載之寡聚多肽形成抗原-抗體複合物之抗體的樣品。