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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCIÓN DE NUEVAS CREACIONES

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REFERENCIA : SOLICITUD DE REGISTRO DE LA PATENTE
“**PROTEÍNA Y MÉTODO PARA IDENTIFICAR
UNA POBLACIÓN DE CÉLULAS DE ESPERMA DE
MAMÍFERO QUE CONTIENE CROMOSOMAS X**”.

EXPEDIENTE No. : NC2016/0001017

FERNANDO TRIANA SOTO mayor de edad, domiciliado en la ciudad de Bogotá D.C., República de Colombia, abogado titulado e identificado como aparece al pie de mi firma, en mi calidad de apoderado de **UNIVERSITY OF TENNESSEE RESEARCH FOUNDATION**, con domicilio en la ciudad de Knoxville, Tennessee, Estados Unidos de América, de acuerdo con la solicitud de prórroga presentada el 24 de enero de 2019, por medio del presente escrito doy respuesta al oficio No. 12876, para lo cual me permito manifestar y anexar lo siguiente:

1. MANIFIESTO

1.1 Modificación de las reivindicaciones

El solicitante ha modificado la reivindicación 2, para hacer énfasis en que el objeto reivindicado no es el gen, como inicialmente se mencionaba, sino **la proteína de célula de esperma de mamífero que contiene cromosomas X de conformidad con la reivindicación 1**, codificada por un gen que comprende una secuencia de nucleótido seleccionada del grupo que consiste de SEC ID NOs: 5 y 17-24, o una secuencia complementaria de la misma, o una secuencia de nucleótido que tiene al menos 85% de homología a una secuencia de nucleótido seleccionada del grupo que consiste de SEC ID NOs: 5 y 17-24, o una secuencia complementaria de la misma. Con esta eliminación queda claro que la materia reclamada de ninguna manera cubre secuencias existentes o aisladas de la naturaleza.

Adicionalmente, se eliminó el término “humanos” en la reivindicación 11, se descartó la mención de los términos “natural o nativo” en las reivindicaciones 5, 7, 10 y 14, para evitar errores de interpretación y se corrigieron algunas dependencias.

Así las cosas, el solicitante subraya el hecho que las modificaciones no amplían el objeto divulgado originalmente y cumplen a cabalidad con las disposiciones del artículo 34 de la Decisión 486 de la Comunidad Andina.

1.2. Materia no considerada una invención

- El objeto de las reivindicaciones 1 a 9 y 13 a 16 no se considera una invención de acuerdo con el artículo 15, toda vez que corresponde a material biológico existente en la naturaleza o aquel que puede ser aislado y a un proceso biológico natural. Las reivindicaciones 1, 3 y 4 reclaman una proteína que comprende una secuencia seleccionada del grupo que consiste en las SEQ ID NO: 4 y 9 a 16, las cuales corresponden a proteínas aisladas de la naturaleza pertenecientes a las especies *Bos*



indicus, *Bos taurus* y *Pantholops hodgsonii*. Como evidencia de lo anterior, se presentan a modo de ejemplo los alineamientos de las Figuras 1 a 3. Así mismo, el gen reclamado en la reivindicación 2 que codifica dicha proteína, también corresponde a material biológico existente en la naturaleza.

En primer lugar, el solicitante hace énfasis en el hecho que los ejemplos de alineamientos que el examinador presenta como evidencia se basan en la comparación entre la secuencia SEC ID NO: 4 de la presente solicitud y la secuencia de una proteína **predicha** del LOC109554999 de *Bos indicus*, que no existe en la naturaleza, o la secuencia SEC ID NO: 14 de la presente solicitud y la secuencia de una proteína **predicha** del LOC102328632 de *Pantholops hodgsonii*, que tampoco existe en la naturaleza. Adicionalmente, compara la secuencia d SEC ID NO: 5 con un RNAm **construido por el solicitante para que codifique dicha proteína predicha**. A partir de esta alineación, el examinador concluye equivocadamente que la proteína para la cual se solicita protección es una proteína existente en la naturaleza.

Respetuosamente, el solicitan manifiesta su total desacuerdo con la posición adoptada por ese Despacho, **pues parte de un principio errado**, ya que el examinador considera que una proteína **predicha** del LOC109554999 de *Bos indicus* o del LOC102328632 de *Pantholops hodgsonii* y el RNAm que la codifica **tienen la misma secuencia que la proteína y el RNAm nativos**, lo cual no es cierto, puesto que la proteína que el examinador está considerando como nativa no corresponde a la secuenciación de una secuencia de aminoácidos o de una proteína producida en *Bos indicus* o en *Pantholops hodgsonii*.

Siendo así, aunque el grado de homología entre las secuencias reivindicadas y las secuencias sea alto, esto de ninguna manera prueba o evidencia que la proteína reivindicada sea producida en la naturaleza, pues ni la secuencia **predicha** del LOC109554999 de *Bos indicus* ni la secuencia **predicha** del LOC102328632 de *Pantholops hodgsonii*, en las cuales se basó el examinador para la comparación, existen en la naturaleza. Con todo respeto, el examinador está partiendo de una suposición errada, pues al no haber sido caracterizada la proteína de *Bos indicus* ni la de *Pantholops hodgsonii* toma la proteína **predicha** como nativa lo cual no corresponde a la realidad, pues como se explica en los ejemplos 7 a 10 de la presente solicitud, las secuencias aquí reivindicadas son proteínas **predichas que corresponden a una proteína recombinante**, la cual ha sido **expresada en E. coli**, que es un organismo procariota, cuyo ADN no presenta exones e intrones y por ende, carente de un sistema de corte y empalme, por lo que el ARNm y la secuencia de la proteína predicha, así como su estructura secundaria, terciaria y cuaternaria, no pueden ser iguales a las que se produce de forma natural en *Bos indicus* o en *Pantholops hodgsonii*.

Como fue mencionado en nuestra respuesta a la anterior acción oficial, la SEQ ID No: 4 reclamada en las reivindicaciones independientes **no es** una secuencia de aminoácidos real obtenida de la secuenciación de una proteína nativa aislada, sino una secuencia de aminoácidos **predicha** a partir de una proteína LOC Taurus no clasificada LOC781191. Es decir, la SEQ ID NO: 4 es una secuencia de aminoácidos predicha por análisis computacional automatizado de una **proteína hipotética** que no ha sido secuenciada. SEQ ID NO: 4 es derivada a partir de una secuencia genómica obtenida utilizando un método de predicción de genes: Gnomon, respaldado por evidencia de EST. Ver la información adjunta para la identificación del gen 781191; NCBI, Biblioteca Nacional de Medicina de los EE. UU., 8600 Rockville Pike, Bethesda, MD 20894.



Además, el ejemplo 7, que se refiere a la síntesis y purificación de proteína GX1 usando *E. coli* es claro en establecer que el primer paso para la producción de las secuencias predichas fue generar un clon de mRNA de GX1 mediante la amplificación PCR de un ADNc derivado de ARN de testículos bovino. Esto de por sí implica una serie de **etapas no desarrolladas en la naturaleza**, y adicionalmente, significa que el ARN de testículos bovinos, que es **ARN de células eucariotas** fue transcrito mediante la **ADN polimerasa inversa para generar una hebra de ADNc**. Como el examinador habrá de reconocer, la molécula de ADN de un organismo eucariota es absolutamente distinta de la molécula de ADNc, puesto que esta última **carece de intrones y exones**. En consecuencia, estas las moléculas de ADNnativo y ADNc no solo difieren en su longitud, sino en la secuencia de nucleótidos que poseen.

Ahora bien, según el ejemplo 7, el ARNm copiado a partir del ADNc dio lugar a un amplicón de 439 pb, el cual fue ligado a un vector de clonación TA, nuevamente, el proceso contempla una **etapa no natural**, como es la introducción del amplicón en un vector donde no se encuentra de forma natural. Seguido, el plásmido que contiene el ADNc de GX1 fue sujeto a un PCR para generar una secuencia de nucleótidos que codifica GX1 **flanqueada por fragmentos que incluyen sitios de clivaje para enzimas de restricción**, con el fin de lograr su subsecuente clonación en un vector para la expresión de proteínas en *E. coli*. Específicamente, el PCR usó una secuencia primer o cebador de inicio (SEC ID No: 25) que incluye un **sitio de clivaje Nde** seguido del codón de inicio de la región que codifica la proteína GX1, mientras que el primer o cebador inverso (SEC ID No: 26) comprende una secuencia en la cual se **reemplaza el codón de parada** de la región codificadora de GX1 **por secuencias para un aminoácido de glicina, una etiqueta de dominio que une inteína-quitina y un sitio de clivaje para la enzima de restricción Spe I**.

Nuevamente, el solicitante hace énfasis en que en la naturaleza no existe una secuencia de ADNc con una **glicina seguida por una etiquetada con inteína** y menos, una **flanqueada por sitios de clivaje reconocidos por las enzimas de restricción Nde y Spe I**, que permitan la inserción de dicho ADNc en un vector de expresión de proteínas en *E. coli*, como es el **vector pTXB1**. En el paso siguiente, el vector pTXB1 con el ADNc de GX1 fue empleado para la transformación de células de *E. coli* JM109 (NEB). Los plásmidos fueron aislados de los transformantes y después fueron cribados para determinar la inserción de ADNc de GX1. Los clones positivos fueron secuenciados para asegurar que el ADNc de GX1 estaba en la orientación apropiada y el vector fue transformado en células T7 Express de *E. coli*, cultivadas en LB e inducida con isopropil-beta-D-tiogalactosido (IPTG). En este orden de ideas es evidente que la proteína de la presente invención, que contiene **la SEC ID No: 4 o las secuencias SEC ID No: 9 -16 no existen en la naturaleza**.

Además, para generar proteínas de longitud completa utilizando *Escherichia coli* (ver Ejemplo 7, páginas 29 a 32 de la descripción de la presente solicitud) o sistemas biológicos artificiales (ver Ejemplo 9, páginas 33 a 36 de la descripción de la presente solicitud), la secuencia de nucleótidos **predicha a partir de la proteína hipotética** (SEQ ID NO: 5) **fue modificada para incluir secuencias de nucleótidos adicionales con el fin de fabricar un clon de cDNA** (véanse último párrafo de la página 34). Estos clones de DNAc, que incluyen las secuencias de nucleótidos adicionales que los distinguen aún más de cualquier secuencia de nucleótidos nativa, fueron entonces usados para **sintetizar por traducción in vitro** una proteína que sería estructuralmente distinta de cualquier proteína encontrada en la



naturaleza, incluso si hubiera sido generada a partir de una secuencia de la proteína nativa. Por lo tanto, la secuencia de aminoácidos de la SEQ ID NO: 4 no es de hecho la secuencia de una proteína nativa, sino una secuencia artificial extrapolada de una secuencia de nucleótidos de una proteína hipotética y adicionalmente altera por el proceso de expresión a partir de un clon de ADNc.

Como se mencionó en la respuesta anterior, el solicitante hace énfasis en que las SEQ ID Nos: 9-16 **son alternativas predichas a SEQ ID NO: 4**, seleccionadas de la base de datos NCBI por su homología con SEQ ID NO: 4. Vea el Ejemplo 10, páginas 36 -37 de la descripción. Es decir, las secuencias variantes (a SEQ ID NO: 4) se identificaron por el software BLASTNP (NCBI) como que tenían al menos 79% de homología con SEQ ID NO: 4. Se encontró que las secuencias derivadas de *Pantholops hodsonnii* (SEQ ID Nos: 13 y 14) tenían 81% y 79% de identidad, respectivamente con SEQ ID NO: 4. Se encontró que las secuencias derivadas de Bos Taurus (SEQ ID Nos: 9, 10, 11, 12, 15 y 16) tenían un 98%, 92%, 99%, 90%, 85% y 82% de homología con SEQ ID NO. : 4. Por lo tanto, las SEQ ID Nos: 9-16 **son asimismo secuencias artificiales** que tienen diversos grados de homología **con la secuencia de aminoácidos artificial expuesta en SEQ ID NO: 4**.

Por lo tanto, se insiste en el hecho que las secuencias de aminoácidos definidas en las reivindicaciones 1 a 4 son secuencias predichas, que por definición son secuencias artificiales, es decir, no son derivadas de la secuenciación de ninguna proteína nativa aislada, y por tanto deben ser consideradas una invención a la luz de la Decisión 486. Complementando lo dicho, el solicitante hace énfasis en el hecho que las comparaciones que efectuó el examinador tienen como secuencia base secuencias predichas, que al no ser el resultado de las secuencias de proteínas nativas, tampoco corresponden a materia existente en la naturaleza. Por consiguiente, no es posible concluir que las proteínas o secuencias de aminoácidos aquí reivindicados sean materia existente en la naturaleza.

- Por su parte, las reivindicaciones 5 a 9 reclaman un método para proporcionar un anticuerpo que comprende inmunizar un huésped con una proteína que comprende una secuencia seleccionada del grupo que consiste en las SEQ ID NO: 4 y 9 a 16. Teniendo en cuenta que no se menciona el huésped a inmunizar, el cual podría corresponder a un bovino y que las secuencias 4 y 9 a 16 corresponden a proteínas naturales de dichos organismos, el proceso de generación de un anticuerpo contra tales secuencias por parte de esos huéspedes corresponde a un proceso biológico natural asociado con una respuesta inmunológica innata. De la misma manera, los anticuerpos reclamados en las reivindicaciones 13, 15 y 16 corresponden a anticuerpos tal y como se encuentran en la naturaleza generados por el huésped en su respuesta inmune a dichas proteínas. Adicionalmente, el anticuerpo reclamado en la reivindicación 14 cuando se refiere a la inmunización de un huésped con péptidos naturales, tampoco es patentable, de acuerdo con el artículo citado.

Para comenzar, el solicitante hace énfasis en el hecho que las reivindicaciones 5 a 9 se refieren a *“un método para proporcionar un anticuerpo capaz de identificar una población de células de esperma de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos”*. Como el examinador habrá de reconocer, en la naturaleza no existe un método para proporcionar un anticuerpo específico para identificar una población de células de espermatozoides con un cromosoma X, este es un método diseñado por el hombre para seleccionar y/o alterar una población particular de esperma de mamíferos para subsecuentemente sesgar la proporción de sexo de mamíferos.



Adicionalmente, no existe en la naturaleza un método que comprenda un **paso de inmunización de un huésped con una proteína**. Este es un paso que sólo puede ocurrir mediante la intervención humana, independiente de si la proteína es o no una proteína nativa. Por tanto, de ninguna manera es factible afirmar que el método de las reivindicaciones 5 a 9 pueda ser un método biológico o existente en la naturaleza, pues incluso en el caso que el huésped empleado para producir los anticuerpos fueran bovino, lo cual nunca ocurre ya que lo usual es emplear ratones o conejos para obtener anticuerpos mono o policlonales, y la inmunización se efectuara con proteínas naturales, las cuales tampoco son empleadas en la presente invención, no se daría *“un proceso de generación de un anticuerpo contra tales secuencias por parte de esos huéspedes”*, pues dichos organismos reconocerían las proteínas naturales como propias y por ende, no activarían una respuesta inmunológica innata, como incorrectamente afirma el examinador.

Complementando los argumentos expuestos y habiendo evidenciado en el punto anterior que **las SEQ ID Nos: 4 y 9-16 no corresponden a proteínas encontradas en la naturaleza**, sino que ellas son proteínas predichas obtenidas a partir de ADNc y producidas en *E. coli* (Ejemplo 7) o en sistemas de expresión de proteínas de mamíferos In Vitro (Ejemplo 9), es imposible considerar que el proceso de las reivindicaciones 5 a 9 sea un proceso biológico existente en la naturaleza, toda vez que los procesos existentes en la naturaleza **no incluyen etapas de inmunización** de animales con proteínas predichas **obtenidas a partir de transgenes insertados en *E. coli***, las cuales por ser generadas a partir de ADNc y ser sintetizadas en dicha bacteria presentan **secuencias de aminoácidos y estructuras secundarias, terciarias y cuaternarias distintas a las que debe tener la proteína natural**. En consecuencia, es incorrecto afirmar que el método de las reivindicaciones 5 a 9 pueda ser considerado un proceso biológico natural, y por ende, materia no considerada invención.

- De la misma manera, los anticuerpos reclamados en las reivindicaciones 13, 15 y 16 corresponden a anticuerpos tal y como se encuentran en la naturaleza generados por el huésped en su respuesta inmune a dichas proteínas. Adicionalmente, el anticuerpo reclamado en la reivindicación 14 cuando se refiere a la inmunización de un huésped con péptidos naturales, tampoco es patentable, de acuerdo con el artículo citado.

Respetuosamente, el solicitante dirige la atención del examinador sobre el hecho que las reivindicaciones 13 a 16 se refieren a “un anticuerpo **monoclonal o policlonal**”. Por definición, un anticuerpo **monoclonal** es un anticuerpo producido a partir de células B del bazo de un animal que ha sido expuesto al antígeno. Estas **células B son fusionadas** en presencia de PEG (polietilenglicol) **con células tumorales de mieloma múltiple** (un tipo de cáncer) que pueden crecer indefinidamente en cultivo celular. Esta fusión hace a las membranas celulares más permeables. Estas células fusionadas híbridas, llamadas **hibridomas pueden multiplicarse rápida e indefinidamente** (ya que son células tumorales después de todo) **y pueden producir gran cantidad de anticuerpos**. Los hibridomas son suficientemente diluidos y cultivados para obtener un número diferente de determinadas colonias, las cuales **producen sólo un tipo de anticuerpo**.

Por su parte, los anticuerpos policlonales son anticuerpos derivados de diferentes líneas de células B. Los anticuerpos policlonales son una mezcla de inmunoglobulinas, secretados en contra de un antígeno específico, cada una reconociendo diferentes epítomos, son obtenidos mediante la **inyección reiterada** de un antígeno en un animal, con el fin de generar una respuesta inmune. De este animal se toma una muestra de sangre y de esta muestra es



obtenido el suero que finalmente es **purificado** para obtener la variedad de anticuerpos policlonales de interés.

Como el examinador habrá de reconocer en la naturaleza no existen anticuerpo monoclonales ni policlonales. Ellos son el resultado de la intervención humana, pues requieren de la **inyección reiterada de un antígeno en un animal**, lo cual constituye una etapa que no ocurre de forma espontánea en la naturaleza. Este hecho, sumado a los argumentos expuestos en los puntos anteriores, que evidencian que el antígeno usado es una proteína predicha, no existente en la naturaleza, permiten afirmar que en la naturaleza no existen anticuerpos monoclonales o policlonales generados contra una proteína predicha producida en *E. coli* que tiene la SEQ ID NO.: 4 o contra secuencias variantes de la SEQ ID NO.: 4 fabricadas en un equipo de translación In Vitro.

Además, el solicitante le recuerda a ese Despacho que las reivindicaciones deben ser interpretadas a la luz de los parámetros establecidos en la descripción. En este caso, los anticuerpos policlonales se generaron en un huésped de **conejo o ratón** (véanse la línea 10 de la página 15 a la línea 4 de la página 16, líneas 4 – 20 de la página 17 de la descripción, líneas 12 – 25 de la página 32 de la descripción) y **por ninguna razón los conejos o los ratones son inoculados en la naturaleza con la proteína GX1**. Así que no existe la más remota posibilidad que tales animales generen de forma espontánea antisueros que comprendan anticuerpos contra la proteína GX1, pues la proteína GX1 con la secuencia de aminoácidos **SEQ ID Nos: 4 y 9-16 no existen en la naturaleza y son el resultado de un desarrollo humano efectuado In Vitro**. Como se mencionó anteriormente, en la naturaleza **los animales no se inyectan de forma natural** con una proteína específica y porque, por definición, un anticuerpo monoclonal no es materia producida en la naturaleza sino el resultado de un complejo procedimiento efectuado en un laboratorio.

1.3 Excepción de Patentabilidad (**Art. 20 D 486 literal (a)**)

- El objeto de la reivindicación 11 no es patentable de acuerdo con el art. 20 literal a) en lo referente a sesgar la proporción de sexos en humanos, puesto que es contrario a la moral y llevaría a un desbalance de género debido a las preferencias para escoger uno u otro sexo. En este sentido, el artículo citado establece que no serán patentables: *"a) las invenciones cuya explotación comercial en el territorio del País Miembro respectivo deba impedirse necesariamente para proteger el orden público o la moral. A estos efectos la explotación comercial de una invención no se considerará contraria al orden público o a la moral solo debido a la existencia de una disposición legal o administrativa que prohíba o que regule dicha explotación"*. Se sugiere eliminar la referencia a humanos y restringir el método a mamíferos no humanos.

El solicitante ha modificado la reivindicación 11 para eliminar el término “humano”, tal como sugiere el examinador.

1.4 Claridad de la descripción.

- La reivindicación 14 no es clara porque caracteriza el anticuerpo mediante su proceso de obtención. Se le recuerda al solicitante que las reivindicaciones de producto y de procedimiento son diferentes y, por ello, deben redactarse de manera independiente en el pliego reivindicatorio, las reivindicaciones de producto deben caracterizar un producto por la forma o constitución del mismo, mientras que las reivindicaciones de procedimiento se



deben caracterizar por la secuencia lógica de etapas técnicas. Se sugiere definir el anticuerpo funcionalmente, es decir, indicando la secuencia a la cual se une, así como su origen, esto es, si se trata de un anticuerpo de conejo y/o de ratón.

El solicitante ha modificado la antigua reivindicación 14, para eliminar su dependencia de la reivindicación 10 que hace alusión al proceso y ahora dicha reivindicación establece que su objeto es un anticuerpo monoclonal o policlonal obtenido por la inmunización de un huésped con la composición de péptido antigénico que comprende péptidos seleccionados del grupo que consiste de SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3.

1.5 Falta de nivel inventivo

- Según la acción oficial, el documento US2009/208977, en adelante documento D1, y el documento WO2010/150013 afecta el nivel inventivo de las reivindicaciones 10 a 12 y 14.

Para exponer sus argumentos, el examinador señala que la reivindicación 10 consiste en: *"Un método para proporcionar un anticuerpo capaz de identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos, que comprende inmunizar un huésped con una composición de péptido antigénico que comprende péptidos naturales o sintéticos seleccionados del grupo que consiste de SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3"* (Radicado N° NC2016/0001017 del 06 de julio de 2018).

Con base en esta información efectuó la comparación de la invención con los documentos D1 y D2 y concluyó que el documento D1 se considera el estado de la técnica cercano al método definido en la reivindicación 10, porque este divulga un método para proporcionar anticuerpos que se unen a proteínas expresadas en células de esperma que contienen el cromosoma X (Pág. 9, párr. [0073]), el método comprende inmunizar conejos con los péptidos conjugados a la **proteína portadora KLH**. Dichos péptidos son derivados de los antígenos de SEQ ID NO: 1-9, 11-14 y 17-21 (Pág. 10, párr. [0079]), los cuales corresponden a proteínas codificadas por genes que se encuentran en el cromosoma X de bovinos (Págs. 7 y 8, Tabla 1, pág. 9, párr. [0073]). El documento también se refiere a proteínas de células de esperma que contienen el cromosoma X de humanos y equinos (Pág. 8, Tablas 5 y 6).

La **diferencia** entre el método definido en la reivindicación 10 y el método divulgado en D1 consiste en que en el método divulgado en la solicitud la **inmunización** del huésped se realiza específicamente con una composición de péptido antigénico que comprende péptidos seleccionados del grupo que consiste en las **SEQ ID NO: 1, SEQ ID NO: 2 y SEQ ID NO: 3**.

No se evidencia un efecto técnico asociado a dicha diferencia, puesto que, tanto el método del documento D1 como el método reclamado en la solicitud permiten obtener anticuerpos capaces de identificar células de esperma que contienen el cromosoma X, tal como se evidencia en el ejemplo 4, tabla 8 y ejemplo 5, tablas 9 a 11 del documento D1.

Por lo tanto, el problema técnico objetivo que pretende resolver esta invención se puede formular así: *"cómo modificar el método conocido en D1 para obtener un método*



alternativo para proporcionar un anticuerpo capaz de identificar células de esperma de mamífero que contienen cromosomas X”.

Sin embargo, métodos alternativos para obtener anticuerpos capaces de identificar células de esperma de mamífero que contienen cromosomas X ya están divulgados en el documento D2, que se refiere a un método que comprende inmunizar ovejas con 5 péptidos derivados de la proteína 1 (Pág. 31, líneas 21 a 30, pág. 32, líneas 1 a 11). La proteína 1 se encuentra definida por la SEQ ID NO: 1, se produce exclusivamente en células de esperma que contienen el cromosoma X (Pág. 8, líneas 10 a 13, figura 9) y es de utilidad para diferenciar dichas células de las que contienen el cromosoma Y (Pág. 37, líneas 15 a 24, figura 11). Adicionalmente, el documento D2 demuestra que las células de esperma que contienen el cromosoma X muestran niveles de fluorescencia mayores que las que contienen el cromosoma Y cuando se incuban con anticuerpos de unión a la proteína 1 y proteína 2 marcados (Pág. 38, líneas 14 a 19), lo que permite una determinación eficiente del porcentaje de enriquecimiento de una muestra de esperma (Pág. 39, Tabla, columnas J y K). Así mismo, el documento D2 divulga un método para identificar proteínas ligadas al sexo en células de esperma mediante la evaluación de la expresión selectiva de proteínas ligadas al cromosoma X o Y (Pág. 19, ejemplo 2, pág. 44, reiv. 1).

En consecuencia, la persona del oficio normalmente versada en la materia, interesada en conseguir un método alternativo para obtener un anticuerpo capaz de identificar células de esperma que contienen el cromosoma X, habría llevado a cabo la identificación de proteínas ligadas al sexo y la selección de péptidos derivados de las mismas como lo sugiere el documento D2 en el método divulgado en el documento D1 para llegar así al objeto de la reivindicación 10 de la solicitud. Por lo cual se considera obvia.

Las reivindicaciones dependientes 11, cuando hace referencia a que el mamífero es seleccionado del grupo que consiste de bovinos, equinos, ovinos, cervidae, camélidos y porcinos, las reivindicaciones 12 y 14, esta última al referirse a la inmunización de un huésped con péptidos sintéticos, no mencionan alguna característica que, junto con las características de la reivindicación independiente, aporte nivel inventivo al método de la reivindicación 10, por lo cual se considera que no tienen nivel inventivo.

Con todo respeto, el solicitante manifiesta su total inconformidad con el análisis realizado en relación con el nivel inventivo, pues la única característica común es que las referencias D1 y D2 es que los péptidos antigénicos utilizados para inmunizar el huésped pertenecen a proteínas unidas a células portadoras de cromosomas X. Sin embargo, D1 y D2 no suministran ninguna información que lleve a una persona versada en la materia a experimentar o predecir que justo las secuencias SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3 de la presente invención podría conducir a la producción de anticuerpos capaces de identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos.

Si bien es cierto que D1 reporta un método para proporcionar anticuerpos que se unen a proteínas expresadas en células de esperma que contienen el cromosoma X basado en la inmunización de conejos con péptidos conjugados a la proteína portadora KLH, este concepto no guarda ninguna similitud con un método que se basa en unas secuencias absolutamente distintas a las secuencias SEQ ID NO: 1-9, 11-14 y 17-21 de D1, como son las secuencias SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3, derivadas de la proteína GX1. En este contexto, el solicitante ha obtenido el listado de secuencia de la solicitud de



patente WO2009014456, la cual corresponde a la solicitud US2009/208977, presentada en Estados Unidos, por favor encuentre adjunto dicho listado, y ha establecido que no existe ninguna similitud entre las proteínas que allí se divulgan y las proteínas de la presente invención. Como el examinador habrá de reconocer D1 no enseña ninguna secuencia derivada o relacionada con el gen GX1 y las secuencias que allí se reportan no corresponden con ninguna de las secuencias divulgadas en la presente solicitud, en especial, con las secuencias SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3.

Siendo así, D1 no parece enseñar ninguna secuencia de nucleótidos o aminoácidos similar o idéntica a las SEC ID Nos: 1, 2 o 3 de la presente solicitud. Por lo tanto, ninguna explicación de la referencia sugiere que se esperaría que cualquier anticuerpo generado por D1 sea estructuralmente o funcionalmente similar al anticuerpo reivindicado por el solicitante, o que se esperaría que se uniera a un epítopo o epítomos de proteínas similares.

Del mismo modo, D2 no parece enseñar ninguna secuencia de nucleótidos o aminoácidos similar o idéntica a las SEC ID Nos: 1, 2 o 3 o a las secuencias SEC ID Nos: 4 y 9-16 de la presente solicitud. Por lo tanto, ninguna enseñanza de D2 sugiere que un anticuerpo generado por D2 sea estructuralmente o funcionalmente similar al anticuerpo reivindicado por el solicitante, o que se esperaría que se uniera a un epítopo o epítomos de proteínas similares.

En vista que las secuencias reportadas en la presente solicitud son nuevas e inventivas, no existe ninguna posibilidad de que una persona versada en la materia pensara en desarrollar un método para producir anticuerpos a partir de la inmunización de huésped con unas secuencias no conocidas, y menos aún, se podría considerar obvio desarrollar anticuerpos contra un epítopo que no había sido reportado.

El hecho que D1 y D2 hubieran reportado otras secuencias de aminoácidos que permiten la producción de anticuerpos capaces de identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos, no hace que sea obvio un método para producir **unos anticuerpos distintos a partir de unos epítopes diferentes de los reportados en D1 o en D2**, aun cuando los anticuerpos reivindicados y los divulgados en D1 y D2 tena la misma finalidad.

Respetuosamente se hace énfasis en que el objeto de las reivindicaciones 10 a 12 y 14 no es un método para identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos, como mal ha interpretado el examinador, sino un método para **producir un anticuerpo** capaz de identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos. Siendo así, ni el epítopo, ni el anticuerpo, ni el método para producirlo mediante la inmunización de un huésped con dicho epítopo novedoso e inventivo, de ninguna manera es obvio para ningún técnico versado en la materia.

2. Anexo

Conforme con lo anterior, anexo los siguientes documentos:

2.1 Nuevo capítulo reivindicatorio, por medio del cual se evidencian los ajustes realizados, conforme a los argumentos expuestos en la actual respuesta.



2.2 Listado de secuencia de la solicitud de patente WO2009014456, la cual corresponde a la solicitud US2009/208977, citada como documento D1.

3. Petición

De acuerdo a lo manifestado en el numeral 1 del presente escrito, así como el nuevo capítulo reivindicatorio que se anuncia en el numeral 2, hemos cumplido con los requerimientos exigidos por su Despacho, por lo que me permito elevar mi respetuosa petición de reconocer el cumplimiento de la totalidad de los requisitos de patentabilidad y en consecuencia, otorgar el privilegio de patentes de invención para la presente solicitud, de acuerdo al nuevo capítulo reivindicatorio.

Del Señor Jefe,

FERNANDO TRIANA SOTO
C.C. No. 79.154.056 de Bogotá
T.P.A. 45.265 del C. S. de la J.

REIVINDICACIONES

1. Una proteína de célula de esperma de mamífero que contiene cromosomas X caracterizada porque comprende una secuencia seleccionada del grupo que consiste de SEC ID Nos: 4 y 9-16, o una secuencia que tiene al menos 85% de homología en la misma.
2. La proteína de célula de esperma de mamífero que contiene cromosomas X de conformidad con la reivindicación 1, codificada por un gen que comprende una secuencia de nucleótido seleccionada del grupo que consiste de SEC ID NOs: 5 y 17-24, o una secuencia complementaria de la misma, o una secuencia de nucleótido que tiene al menos 85% de homología a una secuencia de nucleótido seleccionada del grupo que consiste de SEC ID NOs: 5 y 17-24, o una secuencia complementaria de la misma.
3. La proteína de célula de esperma de mamífero que contiene cromosomas X de conformidad con la reivindicación 1, caracterizada porque el mamífero es seleccionado del grupo que consiste de humanos, bovinos, equinos, ovinos, Cervidae, camélidos y porcinos.
4. La proteína de célula de esperma de mamífero que contiene cromosomas X de conformidad con la reivindicación 3, caracterizada porque el mamífero es uno de *Bos Taurus* y

Bos indicus, o una cruce de razas de las mismas.

5. Un método para proporcionar un anticuerpo capaz de identificar una población de células de esperma de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos, que comprende inmunizar un huésped con una proteína de célula de esperma de mamífero que contiene cromosomas X que comprende una o más secuencias seleccionadas del grupo que consiste de SEC ID Nos: 4 y 9-16, o una secuencia que tiene al menos 85% de homología en la misma.
6. El método de la reivindicación 5, donde el anticuerpo obtenido es un anticuerpo monoclonal o policlonal.
7. El método de la reivindicación 5, donde la proteína de célula de esperma de mamífero que contiene cromosomas X es un péptido codificado por un gen que comprende una secuencia de nucleótidos seleccionadas del grupo que consiste de SEC ID NOS: 5 y 17-24, o una secuencia complementaria de la misma, o una secuencia de nucleótido que tiene al menos 85% de homología a una secuencia de nucleótido seleccionada del grupo que consiste de SEC ID NOS: 5 y 17-24, o una secuencia complementaria de la misma.

8. El método de la reivindicación 5, donde el mamífero es seleccionado del grupo que consiste de humanos, bovinos, equinos, ovinos, Cervidae, camélidos y porcinos.
9. El método de la reivindicación 5, donde el mamífero es uno de *Bos Taurus* y *Bos indicus*, o una craza de razas de las mismas.
10. Un método para proporcionar un anticuerpo capaz de identificar una población de células de espermatozoides de mamífero que contiene cromosomas X y/o sesgar la proporción de sexo de mamíferos, que comprende inmunizar un huésped con una composición de péptido antigénico que comprende péptidos seleccionados del grupo que consiste de SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3.
11. El método de la reivindicación 10, donde el mamífero es seleccionado del grupo que consiste de bovinos, equinos, ovinos, Cervidae, camélidos y porcinos.
12. El método de la reivindicación 10, donde el mamífero es uno de *Bos Taurus* y *Bos indicus*, o una craza de razas de las mismas.
13. Un anticuerpo monoclonal o policlonal obtenido por la inmunización de un huésped con la proteína de célula de

esperma de mamífero que contiene cromosomas X de acuerdo a la reivindicación 1.

14. Un anticuerpo monoclonal o policlonal obtenido por la inmunización de un huésped con la composición de péptido antigénico que comprende péptidos seleccionados del grupo que consiste de SEC ID Nos: 1, SEC ID Nos: 2 y SEC ID Nos: 3.
15. Un anticuerpo monoclonal o policlonal obtenido por la inmunización de un huésped de acuerdo con el método de la reivindicación 5.
16. Un anticuerpo monoclonal o policlonal obtenido por la inmunización de un huésped de acuerdo con el método de la reivindicación 8.

SEQUENCE LISTING

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 HUDSON, KEITH R.
 RAVELICH, SUSAN

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	Ser	Asn	Ser	Cys	Val	Asn	Pro	Phe	Ala	Leu	Tyr	Trp	Leu	Ser	Asn	Thr
				325						330				335		
	Phe	Gln	Gln	His	Phe	Lys	Ala	Gln	Leu	Phe	Cys	Cys	Lys	Ala	Gly	Val
			340					345						350		
50	Pro	Asp	Ala	Ser	Ala	Ala	Asn	Thr	Pro	Leu	Asp	Asn	Leu	Ala	Val	Met
		355					360						365			
	Gly	Arg	Val	Pro	Gly	Ala	Ala	Ser	Thr	Gln	Met	Ser	Glu	Ile	Ser	Val
	370					375						380				
	Ser	Leu	Phe	Thr	Gly	Cys	Ser	Val	Lys	Lys	Glu	Asp	Asp	Arg	Val	
55	385					390					395					

<210> 3
 <211> 150
 <212> PRT
 <213> Bovine

60

<400> 3
 Pro Gln Ile Gly Gly Arg Gly Arg Asn Gly Asp Glu Ser Cys Ser Arg
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 5 Ala Leu Arg Gly Arg Pro Gln His Arg Pro Pro Arg Arg Thr Met Leu
 20 25 30
 Arg Gly Lys Ser Arg Leu Asn Val Glu Trp Leu Gly Tyr Ser Pro Gly
 35 40 45
 Leu Leu Leu Glu Arg Arg Pro Leu Leu Ala Gly Arg Thr Pro Arg Ser
 50 55 60
 10 Pro Gly Arg Asn Glu Ser Ser Leu Ala Ser Thr Leu Lys Thr Leu Leu
 65 70 75 80
 Phe Phe Thr Ala Leu Met Ile Thr Val Pro Ile Gly Leu Tyr Phe Thr
 85 90 95
 Thr Lys Ser Tyr Val Phe Glu Gly Ala Phe Gly Met Ser Asn Arg Asp
 100 105 110
 15 Ser Tyr Phe Tyr Ala Ala Ile Val Ala Val Val Ala Val His Val Val
 115 120 125
 Leu Ala Leu Phe Val Tyr Val Ala Trp Asn Glu Gly Ser Arg Gln Trp
 130 135 140
 20 Arg Glu Gly Lys Gln Asp
 145 150

<210> 4
 <211> 346
 25 <212> PRT
 <213> Bovine

<400> 4
 Gly Leu Phe Gln Asp Phe Asn Pro Ser Lys Phe Leu Ile Tyr Ala Cys
 1 5 10 15
 30 Leu Leu Leu Phe Ser Val Leu Leu Ala Leu Arg Leu Asp Gly Ile Ile
 20 25 30
 Gln Trp Ser Tyr Trp Ala Val Phe Ala Pro Ile Trp Leu Trp Lys Leu
 35 35 40 45
 Met Val Ile Val Gly Ala Ser Val Gly Thr Gly Val Trp Ala Arg Asn
 50 55 60
 Pro Gln Tyr Arg Ala Glu Gly Glu Thr Cys Val Glu Phe Lys Ala Met
 65 70 75 80
 Leu Ile Ala Val Gly Ile His Leu Leu Leu Leu Met Phe Glu Val Leu
 40 85 90 95
 Val Cys Asp Arg Ile Glu Arg Gly Ser His Phe Trp Leu Leu Val Phe
 100 105 110
 Met Pro Leu Phe Phe Val Ser Pro Val Ser Val Ala Ala Cys Val Trp
 115 120 125
 45 Gly Phe Arg His Asp Arg Ser Leu Glu Leu Glu Ile Leu Cys Ser Val
 130 135 140
 Asn Ile Leu Gln Phe Ile Phe Ile Ala Leu Arg Leu Asp Lys Ile Ile
 145 150 155 160
 His Trp Pro Trp Leu Val Val Cys Val Pro Leu Trp Ile Leu Met Ser
 50 165 170 175
 Phe Leu Cys Leu Val Val Leu Tyr Tyr Ile Val Trp Ser Val Leu Phe
 180 185 190
 Leu Arg Ser Met Asp Val Ile Ala Glu Gln Arg Arg Thr His Ile Thr
 195 200 205
 55 Met Ala Leu Ser Trp Met Thr Ile Val Val Pro Leu Leu Thr Phe Glu
 210 215 220
 Ile Leu Leu Val His Lys Leu Asp Gly His Asn Ala Phe Ser Cys Ile
 225 230 235 240
 Pro Ile Phe Val Pro Leu Trp Leu Ser Leu Ile Thr Leu Met Ala Thr
 245 250 255
 60 Thr Phe Gly Gln Lys Gly Gly Asn His Trp Trp Phe Gly Ile Arg Lys

260 265 270
 Asp Phe Cys Gln Phe Leu Leu Glu Ile Cys Pro Phe Leu Arg Glu Tyr
 275 280 285
 Gly Asn Ile Ser Tyr Asp Leu His His Glu Gly Ser Glu Glu Thr Glu
 290 295 300
 5 Glu Thr Pro Val Pro Glu Pro Pro Lys Ile Ala Pro Met Phe Arg Lys
 305 310 315 320
 Lys Thr Arg Val Val Ile Thr Gln Ser Pro Gly Lys Tyr Val Leu Pro
 325 330 335
 10 Pro Pro Lys Leu Asn Ile Glu Met Pro Asp
 340 345

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 <211> 382
 15 <212> PRT
 <213> Bovine

 <400> 5
 20 Met Gly Leu Thr Phe Trp Lys Val Phe Leu Ile Leu Asn Cys Leu Ala
 1 5 10 15
 Gly Gln Val Asn Gly Val Gln Val Thr Ile Pro Asp Ser Phe Val Asn
 20 25 30
 Val Thr Val Gly Ser Asp Val Thr Leu Ile Cys Thr Tyr Ala Thr Thr
 35 40 45
 25 Val Ala Ser Leu Asn Lys Leu Ser Ile Gln Trp Thr Phe Phe His Lys
 50 55 60
 Glu Ala Ser Gln Pro Val Ser Ile Tyr Tyr Ser Glu Gly Gly Gln Ala
 65 70 75 80
 Thr Ala Ile Gly Lys Phe Lys Asp Arg Ile Val Gly Ser Asn Thr Ser
 85 90 95
 30 Gly Asn Ala Ser Ile Thr Ile Ser His Met Gln Pro Glu Asp Ser Gly
 100 105 110
 Ile Tyr Ile Cys Asp Val Asn Asn Pro Pro Asp Phe Phe Gly Lys Asn
 115 120 125
 35 Gln Gly Thr Ile Ser Val Ser Val Leu Val Lys Pro Ser Lys Pro Phe
 130 135 140
 Cys Ser Ile Gln Gly Ile Ala Glu Thr Gly His Pro Ile Ser Leu Thr
 145 150 155 160
 Cys Leu Ser Val Leu Gly Thr Pro Ser Pro Val Tyr Tyr Trp Tyr Lys
 165 170 175
 40 Leu Glu Gly Arg Asn Ile Val Pro Val Lys Glu Asn Phe Asn Pro Ala
 180 185 190
 Thr Gly Ile Leu Phe Ile Gly Asn Leu Thr Thr Phe Glu Gln Gly Tyr
 195 200 205
 45 Tyr Gln Cys Thr Ala Ile Asn Ile Leu Gly Asn Ser Ser Cys Glu Ile
 210 215 220
 Asp Leu Thr Thr Pro Tyr Pro Gly Ile Gly Ile Val Gly Ala Phe
 225 230 235 240
 Val Gly Thr Leu Ile Gly Val Ile Ile Ile Ser Val Val Trp Phe
 245 250 255
 50 Val Arg Arg Lys Val Lys Ala Lys Gly Lys Glu Arg Lys Arg Asn Ser
 260 265 270
 Lys Thr Thr Thr Glu Leu Glu Pro Met Thr Lys Ile Asn Gln Arg Thr
 275 280 285
 55 Glu Gly Glu Thr Met Pro Arg Glu Asp Ala Ile Gln Leu Glu Ala Thr
 290 295 300
 Leu Pro Ser Ser Thr His Glu Thr Glu Pro Asn Ala Thr Leu Gly Pro
 305 310 315 320
 Asp His Glu Pro Ile Pro Glu Pro Glu Pro Ala Leu Gln Pro Thr Val
 325 330 335
 60 Glu Pro Pro Ser Gly Pro Glu Leu Val Pro Met Ser Glu Leu Glu Ile

340 345 350
 Gln Leu Glu Pro Glu Pro Ala Pro Gln Gln Glu Pro Glu Pro Leu Ile
 355 360 365
 Val Asp Glu Pro Phe Cys Asp Glu Glu Lys Val Ile Lys Pro
 370 375 380
 5
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 <211> 548
 <212> PRT
 10 <213> Bovine
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 15 Pro Ile Phe Phe Leu Glu Ile Ser Leu Gly Gln Phe Met Lys Ala Gly
 20 25 30
 Ser Ile Asn Val Trp Asn Ile Cys Pro Leu Phe Lys Gly Leu Gly Tyr
 35 40 45
 Ala Ser Met Val Ile Val Phe Tyr Cys Asn Thr Tyr Tyr Ile Met Val
 50 55 60
 20 Leu Ala Trp Gly Phe Tyr Tyr Leu Val Lys Ser Phe Thr Thr Thr Leu
 65 70 75 80
 Pro Trp Ala Thr Cys Gly His Thr Trp Asn Thr Pro Asp Cys Val Glu
 85 90 95
 25 Ile Phe Arg His Glu Asp Cys Ala Asn Ala Thr Met Ala Asn Leu Thr
 100 105 110
 Cys Asp Gln Leu Ala Asp Arg Arg Ser Pro Val Ile Glu Phe Trp Glu
 115 120 125
 Asn Lys Val Leu Arg Leu Ser Glu Gly Leu Glu Val Pro Gly Ala Leu
 130 135 140
 30 Asn Trp Glu Val Thr Leu Cys Leu Leu Thr Cys Trp Val Leu Val Tyr
 145 150 155 160
 Phe Cys Val Trp Lys Gly Val Lys Ser Thr Gly Lys Ile Val Tyr Phe
 165 170 175
 35 Thr Ala Thr Phe Pro Tyr Val Val Leu Val Val Leu Leu Val Arg Gly
 180 185 190
 Val Leu Leu Pro Gly Ala Leu Asp Gly Ile Ile Tyr Tyr Leu Lys Pro
 195 200 205
 Asp Trp Ser Lys Leu Ala Ser Pro Gln Val Trp Ile Asp Ala Gly Thr
 210 215 220
 40 Gln Ile Phe Phe Ser Tyr Ala Ile Gly Leu Gly Ala Leu Thr Ala Leu
 225 230 235 240
 Gly Ser Tyr Asn Arg Phe Asn Asn Asn Cys Tyr Lys Asp Ala Ile Ile
 245 250 255
 45 Leu Ala Leu Ile Asn Ser Gly Thr Ser Phe Phe Ala Gly Phe Val Val
 260 265 270
 Phe Ser Ile Leu Gly Phe Met Ala Thr Glu Gln Gly Val His Ile Ser
 275 280 285
 Lys Val Ala Glu Ser Gly Pro Gly Leu Ala Phe Ile Ala Tyr Pro Arg
 290 295 300
 50 Ala Val Thr Leu Met Pro Val Ala Pro Leu Trp Ala Ala Leu Phe Phe
 305 310 315 320
 Phe Met Leu Leu Leu Leu Gly Leu Asp Ser Gln Phe Val Gly Val Glu
 325 330 335
 55 Gly Phe Ile Thr Gly Leu Leu Asp Leu Leu Pro Ala Ser Tyr Tyr Phe
 340 345 350
 Arg Phe Gln Arg Glu Ile Ser Val Ala Leu Cys Cys Thr Ile Cys Phe
 355 360 365
 Val Ile Asp Leu Ser Met Val Thr Asp Gly Gly Met Tyr Val Phe Gln
 370 375 380
 60 Leu Phe Asp Tyr Tyr Ser Ala Ser Gly Thr Thr Leu Leu Trp Gln Ala

385 390 395 400
 Phe Trp Glu Cys Val Val Val Ala Trp Val Tyr Gly Ala Asp Arg Phe
 405 410 415
 Met Asp Asp Val Ala Cys Met Ile Gly Tyr Arg Pro Cys Pro Trp Met
 420 425 430
 5 Lys Trp Cys Trp Ser Phe Phe Thr Pro Leu Val Cys Met Gly Ile Phe
 435 440 445
 Ile Phe Asn Val Val Tyr His Glu Pro Leu Val Tyr Asn Asn Thr Tyr
 450 455 460
 10 Val Tyr Pro Trp Trp Gly Glu Ala Val Gly Trp Ala Phe Ala Leu Ser
 465 470 475 480
 Ser Met Leu Cys Val Pro Leu His Leu Leu Gly Cys Leu Leu Arg Ala
 485 490 495
 15 Lys Gly Thr Met Ala Glu Arg Trp Gln His Leu Thr Gln Pro Ile Trp
 500 505 510
 Gly Leu His His Leu Glu Tyr Arg Ala Gln Asp Ser Asp Val Arg Gly
 515 520 525
 Leu Thr Thr Leu Thr Pro Val Ser Glu Ser Ser Lys Val Val Val Val
 530 535 540
 20 Glu Ser Val Met
 545

 <210> 7
 <211> 1504
 25 <212> PRT
 <213> Bovine

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 30 Glu Glu Ile Lys Met Asp Leu Ser Val Ser Val Asn Ser Val Thr Ile
 1 5 10 15
 Ser Val Glu Gly Met Thr Cys Ser Ser Cys Val Trp Thr Ile Glu Gln
 20 25 30
 Gln Ile Gly Lys Leu Asn Gly Val His His Ile Lys Val Ser Leu Glu
 35 35 40 45
 Glu Lys Asn Ala Thr Val Ile Tyr Asp Pro Lys Leu Gln Thr Pro Lys
 50 55 60
 Thr Leu Gln Glu Ala Ile Asp Asp Met Gly Phe Asp Ala Ile Leu His
 65 70 75 80
 Asn Pro Lys Pro Leu Pro Val Leu Thr Glu Thr Val Phe Leu Thr Val
 85 90 95
 40 Thr Ala Ser Leu Val Pro Pro Trp Asp His Ile Gln Ser Thr Leu Leu
 100 105 110
 Lys Thr Lys Gly Val Thr Asp Ile Lys Ile Ser Pro Gln Gln Arg Thr
 115 120 125
 45 Ala Val Val Thr Ile Ile Pro Ser Ile Val Asn Ala Asn Gln Ile Val
 130 135 140
 Glu Leu Val Pro Asp Leu Ser Leu Asp Thr Gly Thr Leu Glu Lys Lys
 145 150 155 160
 Ser Gly Thr Cys Glu Asp Tyr Ser Met Ala Gln Pro Gly Glu Val Met
 165 170 175
 50 Leu Lys Met Lys Val Glu Gly Met Thr Cys His Ser Cys Thr Ser Thr
 180 185 190
 Ile Glu Gly Lys Ile Gly Lys Leu Gln Gly Val Gln Arg Ile Lys Val
 195 200 205
 55 Ser Leu Asp Asn Gln Glu Ala Thr Val Val Tyr Gln Pro His Leu Ile
 210 215 220
 Thr Ala Glu Glu Ile Lys Lys Gln Ile Glu Val Val Gly Phe Thr Ala
 225 230 235 240
 Phe Ile Lys Lys Gln Pro Lys Tyr Leu Lys Leu Gly Ala Ile Asp Ile
 245 250 255
 60 Glu Arg Leu Lys Asn Thr Pro Val Lys Ser Ser Glu Gly Ser Gln Gln

			260					265					270				
	Lys	Ser	Pro	Ser	Tyr	Thr	Ser	Asn	Ser	Thr	Val	Ile	Phe	Thr	Ile	Asp	
			275					280					285				
5	Gly	Met	His	Cys	Lys	Ser	Cys	Val	Ser	Asn	Ile	Glu	Ser	Ala	Leu	Ser	
		290					295					300					
	Thr	Leu	Gln	His	Ile	Ser	Ser	Val	Val	Val	Ser	Leu	Glu	Asn	Lys	Ser	
	305					310					315				320		
	Ala	Ile	Val	Lys	Tyr	Asn	Ala	Ser	Leu	Val	Thr	Pro	Glu	Thr	Leu	Arg	
				325						330					335		
10	Lys	Ala	Ile	Glu	Ala	Ile	Ser	Gln	Gly	Gln	Tyr	Arg	Val	Ser	Ser	Ala	
			340						345					350			
	Ser	Glu	Ile	Glu	Ser	Thr	Ser	Asn	Ser	Pro	Ser	Ser	Ser	Ser	Leu	Gln	
		355						360						365			
	Lys	Ser	Pro	Leu	Asn	Ile	Val	Ser	Gln	Pro	Leu	Thr	Gln	Glu	Thr	Val	
15		370					375					380					
	Ile	Asn	Ile	Asp	Gly	Met	Thr	Cys	Asn	Ser	Cys	Val	Gln	Ser	Ile	Glu	
	385					390					395				400		
	Gly	Val	Ile	Ser	Lys	Lys	Ala	Gly	Val	Lys	Ser	Ile	Gln	Val	Ser	Leu	
				405					410						415		
20	Ala	Asn	Gly	Lys	Gly	Thr	Val	Glu	Tyr	Asp	Pro	Leu	Leu	Thr	Ser	Pro	
			420					425						430			
	Glu	Thr	Leu	Arg	Glu	Ala	Ile	Glu	Asn	Met	Gly	Phe	Asp	Ala	Ser	Leu	
		435						440					445				
	Ser	Asp	Thr	Asn	Glu	Pro	Leu	Val	Val	Ile	Ala	Gln	Pro	Ser	Ser	Glu	
25		450					455					460					
	Met	Pro	Leu	Leu	Thr	Ser	Thr	Asn	Glu	Phe	His	Thr	Lys	Met	Met	Thr	
	465					470					475					480	
	Pro	Ile	His	Asp	Lys	Glu	Glu	Pro	Lys	Thr	Ser	Ser	Lys	Cys	Tyr	Ile	
				485						490					495		
30	Gln	Val	Thr	Gly	Met	Thr	Cys	Ala	Ser	Cys	Val	Ala	Asn	Ile	Glu	Arg	
			500						505					510			
	Asn	Leu	Arg	Arg	Glu	Glu	Gly	Ile	Tyr	Ser	Ile	Leu	Val	Ala	Leu	Met	
		515						520					525				
	Ala	Gly	Lys	Ala	Glu	Val	Arg	Tyr	Asn	Pro	Ala	Leu	Ile	Gln	Pro	Pro	
35		530					535					540					
	Val	Ile	Ala	Glu	Leu	Ile	Arg	Glu	Leu	Gly	Phe	Gly	Ser	Thr	Val	Ile	
	545					550					555				560		
	Glu	Asn	Ala	Asp	Glu	Gly	Asp	Gly	Val	Leu	Glu	Leu	Val	Val	Arg	Gly	
				565					570					575			
40	Met	Thr	Cys	Ala	Ser	Cys	Val	His	Lys	Ile	Glu	Ser	Thr	Leu	Thr	Lys	
			580						585					590			
	His	Arg	Gly	Ile	Phe	Tyr	Cys	Ser	Val	Ala	Leu	Ala	Thr	Asn	Lys	Ala	
		595						600					605				
	His	Ile	Lys	Tyr	Asp	Pro	Glu	Ile	Ile	Gly	Pro	Arg	Asp	Ile	Ile	His	
45		610					615					620					
	Thr	Ile	Glu	Ser	Leu	Gly	Phe	Glu	Ala	Ser	Leu	Val	Lys	Lys	Asp	Arg	
	625					630					635				640		
	Ser	Ala	Ser	His	Leu	Asp	His	Lys	Arg	Glu	Ile	Arg	Gln	Trp	Arg	Arg	
				645						650					655		
50	Ala	Phe	Leu	Val	Ser	Leu	Phe	Phe	Cys	Ile	Pro	Val	Met	Gly	Leu	Met	
			660						665					670			
	Ile	Tyr	Met	Met	Val	Met	Asp	His	His	Leu	Ala	Ser	Leu	Gln	His	Asn	
		675						680					685				
	Gln	Asn	Met	Ser	Gln	Glu	Glu	Met	Ile	Asn	Ile	His	Ser	Ser	Met	Phe	
55		690						695				700					
	Leu	Glu	Arg	Gln	Ile	Leu	Pro	Gly	Leu	Ser	Ile	Met	Asn	Leu	Leu	Ser	
	705					710					715				720		
	Phe	Leu	Leu	Cys	Val	Pro	Val	Gln	Phe	Phe	Gly	Gly	Trp	His	Phe	Tyr	
				725					730					735			
60	Ile	Gln	Ala	Tyr	Lys	Ala	Leu	Lys	His	Lys	Thr	Ala	Asn	Met	Asp	Val	
			740						745					750			

Leu Ile Val Leu Ala Thr Thr Ile Ala Phe Ala Tyr Ser Leu Val Ile
 755 760 765
 Leu Leu Val Ala Met Tyr Glu Arg Ala Lys Val Asn Pro Val Thr Phe
 770 775 780
 5 Phe Asp Thr Pro Pro Met Leu Phe Val Phe Ile Ala Leu Gly Arg Trp
 785 790 795 800
 Leu Glu His Val Ala Lys Gly Lys Thr Ser Glu Ala Leu Ala Lys Leu
 805 810 815
 10 Ile Ser Leu Gln Ala Thr Glu Ala Thr Ile Val Thr Leu Asp Ser Asp
 820 825 830
 Asn Ile Leu Leu Ser Glu Glu Gln Val Asp Val Glu Leu Val Gln Arg
 835 840 845
 Gly Asp Ile Ile Lys Val Val Pro Gly Gly Lys Phe Pro Val Asp Gly
 850 855 860
 15 Arg Val Ile Glu Gly His Ser Met Val Asp Glu Ser Leu Ile Thr Gly
 865 870 875 880
 Glu Ala Met Pro Val Ala Lys Lys Ser Gly Ser Thr Val Ile Ala Gly
 885 890 895
 20 Ser Ile Asn Gln Asn Gly Ser Leu Leu Ile Arg Ala Thr His Val Gly
 900 905 910
 Ala Asp Thr Thr Leu Ser Gln Ile Val Lys Leu Val Glu Glu Ala Gln
 915 920 925
 Thr Ser Lys Ala Pro Ile Gln Gln Phe Ala Asp Lys Leu Ser Gly Tyr
 930 935 940
 25 Phe Val Pro Phe Ile Val Ile Val Ser Ile Ala Thr Leu Leu Val Trp
 945 950 955 960
 Ile Ile Ile Gly Phe Leu Asn Phe Glu Ile Val Glu Thr Tyr Phe Pro
 965 970 975
 Gly Tyr Asn Arg Ser Ile Ser Arg Thr Glu Thr Ile Ile Arg Phe Ala
 980 985 990
 30 Phe Gln Ala Ser Ile Thr Val Leu Cys Ile Ala Cys Pro Cys Ser Leu
 995 1000 1005
 Gly Leu Ala Thr Pro Thr Ala Val Met Val Gly Thr Gly Val Gly Ala
 1010 1015 1020
 35 Gln Asn Gly Ile Leu Ile Lys Gly Gly Glu Pro Leu Glu Met Ala His
 1025 1030 1035 1040
 Lys Val Lys Val Val Val Phe Asp Lys Thr Gly Thr Ile Thr His Gly
 1045 1050 1055
 Thr Pro Val Val Asn Gln Val Lys Val Leu Val Glu Ser Asn Arg Ile
 1060 1065 1070
 40 Ser Arg Asn Lys Ile Leu Ala Ile Val Gly Thr Ala Glu Ser Asn Ser
 1075 1080 1085
 Glu His Pro Leu Gly Ala Ala Ile Thr Lys Tyr Cys Lys Gln Glu Leu
 1090 1095 1100
 45 Asp Thr Glu Thr Leu Gly Thr Cys Ile Asp Phe Gln Val Val Pro Gly
 1105 1110 1115 1120
 Cys Gly Ile Asn Cys Lys Val Thr Asn Ile Glu Ala Leu Leu His Lys
 1125 1130 1135
 Asn Asn Trp Lys Ile Glu Glu Asn Asn Ile Lys Asn Ala Ser Leu Val
 1140 1145 1150
 50 Gln Ile Asp Glu Ser Asn Glu Gln Ser Ser Thr Ser Ser Ser Met Ile
 1155 1160 1165
 Ile Asp Ala Gln Phe Ser Asn Ala Leu Asn Ala Gln Gln Tyr Lys Val
 1170 1175 1180
 55 Leu Ile Gly Asn Arg Glu Trp Met Ile Arg Asn Gly Leu Ala Ile Asn
 1185 1190 1195 1200
 Asn Ser Val Asn Asp Ser Met Thr Glu His Glu Arg Arg Gly Arg Thr
 1205 1210 1215
 Ala Val Leu Val Ala Val Asp Asp Glu Leu Cys Gly Leu Ile Ala Ile
 1220 1225 1230
 60 Ala Asp Thr Val Lys Pro Glu Ala Glu Leu Ala Val His Ile Leu Lys

1235 1240 1245
 Ser Met Gly Leu Glu Val Val Leu Met Thr Gly Asp Asn Ser Lys Thr
 1250 1255 1260
 Ala Arg Ser Ile Ala Ser Gln Val Gly Ile Thr Lys Val Phe Ala Glu
 5 1265 1270 1275 1280
 Val Leu Pro Ser His Lys Val Ala Lys Val Lys Gln Leu Gln Glu Glu
 1285 1290 1295
 Gly Lys Arg Val Ala Met Val Gly Asp Gly Ile Asn Asp Ser Pro Ala
 1300 1305 1310
 10 Leu Ala Met Ala Asn Val Gly Ile Ala Ile Gly Thr Gly Thr Asp Val
 1315 1320 1325
 Ala Ile Glu Ala Ala Asp Val Val Leu Ile Arg Asn Asp Leu Leu Asp
 1330 1335 1340
 Val Val Ala Ser Ile Asp Leu Ser Arg Lys Thr Val Lys Arg Ile Arg
 15 1345 1350 1355 1360
 Ile Asn Phe Val Phe Ala Leu Ile Tyr Asn Leu Ile Gly Ile Pro Ile
 1365 1370 1375
 Ala Ala Gly Val Phe Met Pro Ile Gly Leu Val Leu Gln Pro Trp Met
 1380 1385 1390
 20 Gly Ser Ala Ala Met Ala Ala Ser Ser Val Ser Val Val Leu Ser Ser
 1395 1400 1405
 Leu Phe Leu Lys Leu Tyr Arg Lys Pro Thr Tyr Glu Asn Tyr Glu Leu
 1410 1415 1420
 His Ala Arg Asn Gln Met Gly Gln Lys Ser Pro Ser Glu Ile Ser Val
 25 1425 1430 1435 1440
 His Val Gly Ile Asp Asp Thr Ser Arg Asn Ser Pro Lys Leu Gly Leu
 1445 1450 1455
 Leu Asp Arg Ile Val Asn Tyr Ser Arg Ala Ser Ile Asn Ser Leu Leu
 1460 1465 1470
 30 Ser Asp Lys Arg Ser Leu Asn Ser Val Gly Thr Ser Glu Pro Asp Lys
 1475 1480 1485
 His Ser Leu Leu Val Gly Asp Cys Arg Glu Asp Asp Asp Ser Ala Leu
 1490 1495 1500

 35 <210> 8
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 <212> PRT
 <213> Bovine

 40 <400> 8
 Met Lys Phe Pro Gly Ser Val Leu Ala Ser Val Phe Leu Phe Val Ala
 1 5 10 15
 Glu Thr Ser Ala Ala Leu Tyr Asn Met Val Ile His Asn Phe Lys Gly
 20 25 30
 45 Asn Ala Pro Phe Ile Val Ile Thr Lys Leu Phe Met Leu Thr Pro Thr
 35 40 45
 Cys Met Val Ser Gly Thr Leu Ile Lys Leu Val Asn His Glu Pro Ser
 50 55 60
 Arg Gly Arg Gly Leu Cys Asn Leu Glu His Leu Leu Asp Leu Lys Phe
 65 70 75 80
 50 Val Ser Arg Cys Phe Glu Val Phe Cys Ile Tyr Cys Gln Ser Asn His
 85 90 95
 Ile Glu Glu Pro Tyr Val Ser Ile Thr Lys Lys Arg Gln Ile Pro Lys
 100 105 110
 55 Asn Gly His Ser Glu Glu Ile Glu Lys Glu Val Gly Gln Ala Glu Gly
 115 120 125
 Lys Leu Phe Thr His Arg Ser Ala Phe Ser Arg Ala Ser Val Ile Gln
 130 135 140
 Ala Phe Leu Gly Ser Ala Pro Gln Leu Thr Leu Gln Leu Tyr Ile Ser
 60 145 150 155 160
 Val Leu Gln Gln Asp Val Ser Ile Gly Arg Cys Leu Phe Met Val Leu

165 170 175
 Ser Leu Leu Ser Ile Val Tyr Gly Ala Leu Arg Cys Asn Ile Leu Ala
 180 185 190
 5 Ile Lys Ile Lys Tyr Asp Glu Tyr Asp Val Lys Val Lys Pro Leu Ala
 195 200 205
 Tyr Val Cys Ile Phe Leu Trp Arg Ser Phe Glu Ile Val Thr Arg Val
 210 215 220
 Ile Val Leu Val Leu Phe Thr Ser Val Leu Lys Ala Trp Val Val Ile
 225 230 235 240
 10 Asp Ile Leu Ile Asn Phe Leu Gly Phe Leu Phe Tyr Pro Trp Ile Leu
 245 250 255
 Phe Trp Cys Ser Gly Ser Pro Phe Pro Glu Asn Phe Glu Lys Ala Phe
 260 265 270
 Ser Arg Leu Gly Thr Thr Ile Val Leu Cys Phe Leu Thr Leu Leu Tyr
 275 280 285
 15 Ala Gly Ile Asn Met Phe Cys Trp Ser Ala Val Gln Leu Lys Ile Asn
 290 295 300
 Asn Pro Asp Leu Ile Ser Lys Ser Gln Asn Trp Tyr Arg Leu Leu Val
 305 310 315 320
 20 Tyr Tyr Met Val Arg Phe Ile Glu Asn Ala Phe Leu Leu Leu Met Trp
 325 330 335
 Tyr Leu Tyr Lys Thr Asp Ile Tyr Met Tyr Val Cys Ala Pro Leu Leu
 340 345 350
 Met Leu Gln Leu Leu Ile Gly Tyr Cys Thr Ala Ile Leu Phe Met Val
 355 360 365
 25 Val Phe Tyr Gln Phe Phe His Pro Cys Lys Lys Leu Phe Ser Pro Asn
 370 375 380
 Ala Ser Glu Ser Phe Gln Glu Trp Leu Lys Cys Ala Cys Cys Asn Arg
 385 390 395 400
 30 Arg Arg Arg Glu Ser Cys Glu Ser Ala Glu Asn Thr Asp Leu Arg Ser
 405 410 415
 Pro Thr Asp Arg Glu Glu Thr Pro Ser Ser Ser Lys Ile Ser Ser Met
 420 425 430
 Pro Ser Gln Ile Leu Asn Thr Asp Glu Leu Ser Ser Ala
 435 440 445
 35
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 <211> 1257
 <212> PRT
 40 <213> Bovine
 <400> 9
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 45 Cys Val Leu Ile Gln Ile Pro Glu Glu Tyr Glu Gly His His Val Met
 20 25 30
 Glu Pro Pro Ile Ile Thr Glu Gln Ser Pro Arg Arg Val Val Phe
 35 40 45
 Pro Thr Asp Asp Val Ser Leu Lys Cys Glu Ala Ser Gly Lys Pro Glu
 50 55 60
 Val Gln Phe Arg Trp Thr Arg Asp Gly Ile Leu Phe Lys Pro Arg Glu
 65 70 75 80
 Glu Leu Gly Met Ile Val Asn Gln Val Pro His Ser Gly Ser Phe Ser
 85 90 95
 55 Ile Thr Gly Asn Ser Ser Asn Phe Ala Gln Ser Phe Gln Gly Thr Tyr
 100 105 110
 Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr Ala Met Ser His Glu Ile
 115 120 125
 Gln Leu Met Ala Glu Gly Thr Pro Lys Trp Pro Lys Glu Thr Val Lys
 130 135 140
 60 Pro Val Glu Val Glu Glu Gly Glu Ser Val Ile Leu Pro Cys His Pro

	145		150		155		160									
	Pro	Pro	Ser	Ala	Glu	Pro	Leu	Arg	Ile	Tyr	Trp	Met	Asn	Ser	Lys	Ile
				165						170						175
5	Leu	His	Ile	Lys	Gln	Asp	Glu	Arg	Val	Thr	Met	Gly	Gln	Asn	Gly	Asn
				180					185							190
	Leu	Tyr	Phe	Ala	Asn	Val	Leu	Thr	Ser	Asp	Asn	His	Ser	Asp	Tyr	Ile
			195					200					205			
	Cys	His	Ala	His	Phe	Pro	Gly	Thr	Arg	Thr	Ile	Ile	Gln	Lys	Glu	Pro
		210					215					220				
10	Ile	Asp	Leu	Arg	Val	Lys	Ala	Thr	Asn	Ser	Met	Met	Asp	Arg	Lys	Pro
	225					230					235					240
	His	Leu	Leu	Phe	Pro	Thr	Asn	Ser	Ser	Ser	His	Leu	Val	Ala	Leu	Gln
				245					250							255
	Gly	Gln	Pro	Leu	Ile	Leu	Glu	Cys	Ile	Ala	Glu	Gly	Phe	Pro	Thr	Pro
15				260					265						270	
	Thr	Ile	Lys	Trp	Leu	Arg	Pro	Ser	Gly	Pro	Met	Pro	Ala	Asp	Arg	Val
			275					280					285			
	Thr	Tyr	Gln	Asn	His	Asn	Lys	Thr	Leu	Gln	Leu	Leu	Asn	Val	Gly	Glu
		290				295						300				
20	Glu	Asp	Asp	Gly	Glu	Tyr	Arg	Cys	Leu	Ala	Glu	Asn	Ser	Leu	Gly	Ser
	305					310					315					320
	Asp	Arg	His	Ala	Tyr	Tyr	Val	Thr	Val	Glu	Ala	Ala	Pro	Tyr	Trp	Leu
				325						330						335
	His	Lys	Pro	Gln	Ser	His	Leu	Tyr	Gly	Pro	Gly	Glu	Thr	Ala	Arg	Leu
25				340					345					350		
	Asp	Cys	Gln	Val	Gln	Gly	Arg	Pro	Gln	Pro	Glu	Val	Thr	Trp	Arg	Ile
			355					360					365			
	Asn	Gly	Ile	Pro	Val	Glu	Glu	Leu	Gly	Lys	Asp	Gln	Lys	Tyr	Arg	Ile
		370				375						380				
30	His	His	Gly	Ala	Leu	Val	Leu	Ser	Asn	Leu	Gln	Pro	Ser	Asp	Thr	Met
	385					390					395					400
	Val	Thr	Gln	Cys	Glu	Ala	Arg	Asn	Arg	His	Gly	Leu	Leu	Leu	Ala	Asn
				405						410						415
	Ala	Tyr	Ile	Tyr	Val	Val	Glu	Leu	Pro	Ala	Lys	Ile	Leu	Thr	Pro	Asp
35				420					425					430		
	Asn	Glu	Thr	Tyr	Met	Ala	Val	Gln	Gly	Ser	Thr	Ala	Tyr	Leu	Leu	Cys
			435					440					445			
	Lys	Ala	Phe	Gly	Ala	Pro	Val	Pro	Ser	Val	Gln	Trp	Leu	Asp	Arg	Glu
		450					455					460				
40	Gly	Lys	Thr	Val	Leu	Gln	Asp	Glu	Arg	Phe	Phe	Pro	Tyr	Thr	Asn	Gly
	465					470					475					480
	Thr	Leu	Gly	Ile	Arg	Asp	Leu	Gln	Thr	Asn	Asp	Thr	Gly	His	Tyr	Phe
				485					490							495
	Cys	Gln	Ala	Ala	Asn	Asp	Gln	Ser	Asn	Val	Thr	Ile	Val	Ala	Asn	Leu
45				500					505							510
	Gln	Val	Lys	Asp	Ala	Thr	Arg	Ile	Met	Gln	Gly	Pro	Arg	Ser	Ala	Ile
			515				520						525			
	Glu	Lys	Arg	Gly	Ser	Arg	Val	Met	Phe	Thr	Cys	Gln	Ala	Ser	Phe	Asp
		530					535					540				
50	Pro	Ser	Leu	Gln	His	Ser	Thr	Thr	Trp	Arg	Arg	Asp	Ala	Leu	Asp	Leu
	545					550					555					560
	Gln	Glu	Leu	Gly	Asp	Ser	Asp	Lys	Tyr	Phe	Ile	Glu	Asp	Glu	Arg	Leu
				565						570						575
	Val	Ile	His	Ser	Leu	Asp	Tyr	Ser	Asp	Gln	Gly	Asn	Tyr	Ser	Cys	Val
55				580					585							590
	Ala	Ser	Thr	Lys	Leu	Asp	Val	Val	Glu	Ser	Arg	Ala	Glu	Leu	Leu	Val
			595					600					605			
	Val	Gly	Ser	Pro	Gly	Pro	Val	Pro	Gln	Leu	Glu	Leu	Ser	Asp	His	His
		610					615					620				
60	Leu	Leu	Lys	Gln	Ser	Gln	Val	Arg	Leu	Ser	Trp	Ser	Pro	Ala	Asp	Asp
	625					630					635					640

His Asn Ala Pro Ile Glu Lys Tyr Asp Ile Glu Phe Glu Asp Lys Glu
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 Met Ala Pro Glu Lys Trp Tyr Ser Leu Gly Lys Val Pro Gly Asn Gln
 660 665 670
 5 Thr Ser Thr Thr Leu Lys Leu Ser Pro Tyr Val His Tyr Thr Phe Arg
 675 680 685
 Val Thr Ala Ile Asn Lys Tyr Gly Pro Gly Glu Pro Ser Pro Asp Ser
 690 695 700
 10 Glu Thr Val Val Thr Pro Glu Ala Ala Pro Glu Lys Asn Pro Val Asp
 705 710 715 720
 Val Lys Gly Glu Gly Asn Glu Thr Asn Asn Met Val Ile Thr Trp Lys
 725 730 735
 Pro Leu Arg Trp Met Asp Trp Asn Ala Pro Gln Val Gln Tyr Arg Val
 740 745 750
 15 Gln Trp Arg Pro Gln Lys Met Gln Gly Ala Trp Gln Glu Gln Ile Val
 755 760 765
 Ser Asp Pro Phe Leu Val Val Ser Asn Thr Ser Thr Phe Val Pro Tyr
 770 775 780
 20 Glu Ile Lys Val Gln Thr Val Asn Ser Gln Gly Lys Gly Pro Glu Pro
 785 790 795 800
 Gln Ile Thr Ile Gly Tyr Ser Gly Glu Asp Tyr Pro Gln Ala Ser Pro
 805 810 815
 Leu Leu Glu Pro Val Lys Ala Leu Asn Ser Ser Thr Val Leu Val Arg
 820 825 830
 25 Trp Gln Ser Val Asp Pro Ala Gln Val Lys Gly His Leu Arg Gly Tyr
 835 840 845
 Asn Val Thr Tyr Trp Trp Glu Gly Ser Gln Arg Lys His Asn Lys Arg
 850 855 860
 30 His Val His Lys Gly His Val Val Val Pro Ala Asn Ala Thr Ser Thr
 865 870 875 880
 Ile Leu Gly Gly Leu Arg Pro Tyr Ser Ser Tyr Trp Val Glu Val Gln
 885 890 895
 Ala Phe Asn Gly Arg Gly Leu Gly Pro Ala Ser Gly Met Thr Phe Asn
 900 905 910
 35 Thr Pro Glu Gly Val Pro Gly His Pro Glu Ala Leu His Leu Glu Cys
 915 920 925
 Gln Ser Asp Thr Ser Leu Leu Leu His Trp Gln Pro Pro Leu Ser His
 930 935 940
 40 Asn Gly Val Leu Thr Gly Tyr Val Leu Ser Tyr Gln Pro Leu Asn Asp
 945 950 955 960
 Gly Ser Lys Glu Gln Leu Ser Phe Asp Leu Pro Asp Pro Glu Leu Arg
 965 970 975
 Thr His Asn Leu Thr Asn Leu Ser Pro Arg Leu Arg Tyr Arg Phe Gln
 980 985 990
 45 Leu Gln Ala Thr Thr Arg Glu Gly Pro Gly Glu Ala Ile Val Arg Glu
 995 1000 1005
 Gly Gly Thr Met Ala Leu Ser Gly Met Pro Asp Phe Gly Asn Ile Ser
 1010 1015 1020
 Ala Met Ala Gly Glu Asn Tyr Ser Val Val Ser Trp Val Pro Lys Glu
 1025 1030 1035 1040
 50 Gly Gln Cys Asn Phe Gly Phe Gln Ile Trp Phe Lys Ala Leu Gly Asp
 1045 1050 1055
 Glu Lys Leu Val Ala Arg Leu Pro Pro Gln Tyr Val Ser Tyr Asn Gln
 1060 1065 1070
 55 Ser Ser Tyr Thr Gln Trp Asp Leu Gln Pro Asp Thr Asp Tyr Glu Ile
 1075 1080 1085
 Gln Leu Leu Lys Glu Gln Val Leu Leu His Gln Met Ala Val Lys Thr
 1090 1095 1100
 Asn Gly Thr Gly Arg Val Arg Leu Pro Pro Ala Gly Phe Ala Thr Glu
 1105 1110 1115 1120
 60 Gly Trp Phe Ile Gly Phe Ile Ser Ala Ile Val Val Leu Leu Leu Val

1125 1130 1135
 Leu Leu Ile Leu Cys Phe Ile Lys Arg Ser Lys Gly Gly Lys Tyr Ser
 1140 1145 1150
 5 Val Lys Asp Lys Glu Asp Thr Gln Val Asp Ser Glu Ala Arg Pro Met
 1155 1160 1165
 Lys Asp Glu Thr Phe Gly Glu Tyr Arg Ser Leu Glu Ser Asp Asn Glu
 1170 1175 1180
 Glu Lys Ala Phe Gly Ser Ser Gln Pro Ser Leu Asn Gly Asp Ile Lys
 1185 1190 1195 1200
 10 Pro Leu Gly Ser Asp Asp Ser Leu Ala Asp Tyr Gly Gly Ser Val Asp
 1205 1210 1215
 Val Gln Phe Asn Glu Asp Gly Ser Phe Ile Gly Gln Tyr Ser Gly Lys
 1220 1225 1230
 Lys Glu Lys Glu Val Ala Gly Gly Asn Asp Ser Ser Gly Ala Thr Ser
 1235 1240 1245
 15 Pro Ile Asn Pro Ala Gly Thr Leu Glu
 1250 1255

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 20 <211> 366
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 <213> Bovine

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 Tyr Phe Cys Cys Thr Ser Pro Pro Cys Pro Gln Asp Phe Ser Leu Asn
 35 35 40 45
 Phe Asp Arg Thr Phe Leu Pro Val Leu Tyr Ser Leu Leu Phe Val Leu
 50 55 60
 Gly Leu Leu Gly Asn Gly Ile Val Ala Val Val Leu Leu Ser Gln Arg
 65 70 75 80
 35 Ala Ala Leu Ser Ser Thr Asp Thr Phe Leu His Leu Ala Val Ala
 85 90 95
 Asp Ala Leu Leu Val Leu Thr Leu Pro Leu Trp Ala Val Asp Ala Ala
 100 105 110
 Ile Gln Trp Val Phe Gly Ser Gly Leu Cys Lys Val Ala Gly Ala Leu
 115 120 125
 40 Phe Asn Ile Asn Phe Tyr Ala Gly Ala Leu Leu Leu Ala Cys Ile Ser
 130 135 140
 Phe Asp Arg Tyr Leu Ser Ile Val His Ala Thr Gln Leu Tyr Arg Arg
 145 150 155 160
 45 Gly Pro Pro Thr Arg Val Ala Leu Thr Cys Val Ala Val Trp Gly Leu
 165 170 175
 Cys Leu Leu Phe Ala Leu Pro Asp Phe Ile Phe Leu Ser Ser His His
 180 185 190
 Asp Asn Arg Leu Asn Ala Thr His Cys Gln Tyr Asn Phe Pro Gln Glu
 195 200 205
 50 Gly His Thr Ala Leu Arg Ile Leu Gln Leu Val Ala Gly Phe Leu Leu
 210 215 220
 Pro Leu Leu Val Met Ala Tyr Cys Tyr Ala Arg Ile Leu Ala Val Leu
 225 230 235 240
 55 Leu Val Ser Arg Gly Gln Arg Arg Leu Arg Ala Met Arg Leu Val Val
 245 250 255
 Val Val Val Val Ala Phe Ala Leu Cys Trp Thr Pro Tyr His Leu Val
 260 265 270
 Val Leu Val Asp Thr Leu Met Asp Leu Gly Ala Leu Ala Arg Asn Cys
 275 280 285
 60 Gly Arg Glu Ser Ser Val Asp Ile Ala Lys Ser Val Thr Ser Gly Met

290 295 300
 Gly Tyr Met His Cys Cys Leu Asn Pro Leu Leu Tyr Ala Phe Val Gly
 305 310 315 320
 Val Lys Phe Arg Glu Arg Met Trp Val Leu Val Arg Leu Gly Cys
 325 330 335
 5 Pro Asp Gln Arg Cys His Gln Arg Gln Pro Ser Ala Ser Arg Arg Glu
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 Ser Ser Trp Ser Glu Thr Thr Glu Ala Ser Tyr Ser Gly Leu
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 Ser Glu Thr Glu Ala Tyr Ile Ala Gln Lys Phe Cys Asp Asn Arg Ile
 35 40 45
 Ile Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
 50 55 60
 25 Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
 65 70 75 80
 Ile Gln Val Thr Val Asp Thr Pro Thr Ser Pro Ile Thr Ser Gly Leu
 85 90 95
 Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
 100 105 110
 30 Asp Trp Leu Arg His Arg Ala Asp Asn Glu Val Asn Lys Ser Thr Val
 115 120 125
 Tyr Ile Ile Glu Asn Ala Lys Arg Val Lys Lys Glu Ser Glu Lys Ile
 130 135 140
 35 Lys Val Gly Asp Ile Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
 145 150 155 160
 Asp Leu Ile Leu Leu Ser Ser Cys Thr Val Asp Gly Thr Cys Tyr Val
 165 170 175
 Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
 180 185 190
 40 Val Arg Asp Thr Ile Glu Leu Arg Thr Val Glu Ser Ile Asp Asn Leu
 195 200 205
 Arg Ala Ala Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe
 210 215 220
 45 Val Gly Arg Ile Asn Ile Tyr Ser Asn Ser Ile Glu Ala Val Ala Arg
 225 230 235 240
 Ser Leu Gly Pro Glu Asn Leu Leu Leu Lys Gly Ala Thr Leu Lys Asn
 245 250 255
 Thr Lys Lys Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys
 260 265 270
 50 Met Ala Leu Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu
 275 280 285
 Lys Ser Ile Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr
 290 295 300
 55 Lys Ala Ala Ile Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro
 305 310 315 320
 His Asn Asp Glu Pro Trp Tyr Asn Gln Lys Thr Gln Lys Glu Arg Glu
 325 330 335
 Thr Trp Lys Val Leu Lys Met Phe Thr Asp Phe Leu Ser Phe Met Val
 340 345 350
 60 Leu Phe Asn Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met

355 360 365
 Gln Lys Phe Leu Gly Ser Phe Phe Ile Ser Trp Asp Asn Asp Phe Tyr
 370 375 380
 5 Asp Glu Glu Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn
 385 390 395 400
 Glu Glu Leu Gly Gln Val Asp Tyr Val Phe Thr Asp Lys Thr Gly Thr
 405 410 415
 Leu Thr Glu Asn Thr Met Glu Phe Ile Glu Cys Cys Ile Asp Gly His
 420 425 430
 10 Lys Tyr Lys Gly Val Ala Gln Glu Thr Asp Gly Leu Ser Gln Thr Asp
 435 440 445
 Gly Pro Leu Pro Tyr Leu Asp Arg Ala Asp Lys Asn Arg Glu Glu Leu
 450 455 460
 15 Phe Leu Arg Ala Leu Cys Leu Cys His Thr Val Glu Val Lys Pro Asn
 465 470 475 480
 Asp Thr Val Asp Gly Val Thr Glu Ser Ser Glu Leu Thr Tyr Met Ser
 485 490 495
 Ser Ser Pro Asp Glu Ile Glu Ser Glu Ile Thr Gly Gly Gln Arg Tyr
 500 505 510
 20 Gly Phe Thr Phe Val Gly Val Gln Asn Gly Tyr Met Arg Val Glu Asn
 515 520 525
 Gln Arg Lys Glu Ile Glu Glu Tyr Glu Leu Leu His Thr Leu Asn Phe
 530 535 540
 25 Asp Ala Val Arg Arg Arg Met Ser Val Ile Val Lys Thr Gln Thr Gly
 545 550 555 560
 Asp Ile Leu Leu Phe Cys Lys Gly Ala Asp Ser Ala Val Phe Pro Arg
 565 570 575
 Val Gln Asn His Glu Ile Asp Leu Ile Lys Val His Val Glu His Asn
 580 585 590
 30 Ala Met Glu Gly Tyr Arg Thr Leu Cys Ile Ala Phe Lys Glu Ile Ala
 595 600 605
 Pro Asp Asp Tyr Glu Arg Val Asn Arg Gln Leu Ile Glu Ala Lys Met
 610 615 620
 35 Ala Leu Gln Asp Arg Glu Glu Lys Met Glu Lys Val Phe Asp Glu Ile
 625 630 635 640
 Glu Thr Asp Met His Leu Ile Gly Ala Thr Ala Val Glu Asp Lys Leu
 645 650 655
 Gln Asp Gln Ala Ala Glu Thr Ile Glu Ala Leu His Ala Ala Gly Leu
 660 665 670
 40 Lys Val Trp Val Leu Thr Gly Asp Lys Met Glu Thr Ala Lys Ser Thr
 675 680 685
 Cys Tyr Ala Cys Arg Leu Phe Gln Thr Asn Thr Glu Leu Leu Glu Leu
 690 695 700
 45 Thr Thr Lys Thr Ile Glu Glu Ser Glu Arg Lys Glu Asp Arg Leu His
 705 710 715 720
 Glu Leu Leu Thr Glu Tyr Arg Lys Lys Leu Leu His Glu Phe Pro Lys
 725 730 735
 Ser Thr Arg Ser Leu Lys Lys Ala Trp Thr Glu His Gln Glu Tyr Gly
 740 745 750
 50 Leu Ile Ile Asp Gly Ser Thr Leu Ser Leu Ile Leu Asn Ser Ser Gln
 755 760 765
 Asp Ser Gly Ser Asn Asn Tyr Lys Ser Ile Phe Leu Gln Ile Cys Met
 770 775 780
 55 Lys Cys Thr Ala Val Leu Cys Cys Arg Met Ala Pro Leu Gln Lys Ala
 785 790 795 800
 Gln Val

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 <211> 339
 <212> PRT

<213> Bovine

<400> 12

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 Asp Val Ala Ala Leu Ser Met Gly Phe Ser Val Lys Glu Asp Leu Ser
 35 40 45
 10 Trp Pro Gly Leu Ala Val Gly Asn Leu Phe His Arg Pro Arg Ala Thr
 50 55 60
 Val Met Val Met Val Lys Gly Val Asp Lys Leu Ala Leu Pro Pro Gly
 65 70 75 80
 Ser Val Ile Ser Tyr Pro Leu Glu Asn Ala Val Pro Phe Ser Leu Asp
 85 90 95
 15 Ser Val Ala Asn Ser Ile His Ser Leu Phe Ser Glu Glu Thr Pro Val
 100 105 110
 Val Leu Gln Leu Ala Pro Ser Glu Glu Arg Val Tyr Met Val Gly Lys
 115 120 125
 20 Ala Asn Ser Val Phe Glu Asp Leu Ser Val Thr Leu Arg Gln Leu Arg
 130 135 140
 Asn Arg Leu Phe Gln Glu Asn Ser Val Leu Thr Ser Leu Pro Leu Asn
 145 150 155 160
 Ser Leu Ser Arg Asn Asn Glu Val Asp Leu Leu Phe Leu Ser Glu Leu
 165 170 175
 25 Gln Val Leu Arg Asp Ile Ser Ser Leu Leu Ser Arg His Lys His Leu
 180 185 190
 Ala Lys Asp His Ser Pro Asp Leu Tyr Ser Leu Glu Leu Ala Gly Leu
 195 200 205
 30 Asp Glu Ile Gly Lys His Tyr Gly Glu Asp Ser Glu Gln Phe Arg Asp
 210 215 220
 Ala Ser Lys Ile Leu Ile Asp Ala Leu Gln Lys Phe Ala Asp Asp Met
 225 230 235 240
 Tyr Asn Leu Tyr Gly Gly Asn Ala Val Val Glu Leu Val Thr Val Arg
 245 250 255
 35 Ser Phe Asp Thr Ser Leu Val Arg Lys Thr Arg Asn Ile Leu Glu Thr
 260 265 270
 Lys Gln Val Lys Asp Pro Ser Thr Thr Tyr Asn Leu Ala Tyr Lys Tyr
 275 280 285
 40 Asn Phe Glu Tyr Pro Val Val Phe Asn Leu Val Leu Trp Ile Met Ile
 290 295 300
 Gly Leu Ala Leu Thr Leu Ile Val Thr Cys Tyr Asn Ile Trp Asn Met
 305 310 315 320
 Asp Pro Gly Tyr Asp Ser Ile Ile Tyr Arg Met Thr Asn Gln Lys Ile
 325 330 335
 45 Arg Met Asp

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50 <211> 194

<212> PRT

<213> Bovine

<400> 13

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 Glu Ser Gly Gly Leu Leu Gln Glu Ile Phe Thr Ser Pro Leu Asn Leu
 20 25 30
 Leu Leu Leu Gly Leu Cys Ile Phe Leu Leu Tyr Lys Ile Val Arg Gly
 35 40 45
 60 Asp Gln Pro Ala Ala Ser Asp Ser Asp Asp Asp Glu Pro Pro Pro Leu

50 55 60
 Pro Arg Leu Lys Arg Arg Asp Phe Thr Pro Ala Glu Leu Arg Arg Phe
 65 70 75 80
 5 Asp Gly Val Gln Asp Pro Arg Ile Leu Met Ala Ile Asn Gly Lys Val
 85 90 95
 Phe Asp Val Thr Lys Gly Arg Lys Phe Tyr Gly Pro Glu Gly Pro Tyr
 100 105 110
 Gly Val Phe Ala Gly Arg Asp Ala Ser Arg Gly Leu Ala Thr Phe Cys
 115 120 125
 10 Leu Asp Lys Glu Ala Leu Lys Asp Glu Tyr Asp Asp Leu Ser Asp Leu
 130 135 140
 Thr Pro Ala Gln Gln Glu Thr Leu Ser Asp Trp Asp Ser Gln Phe Thr
 145 150 155 160
 Phe Lys Tyr His His Val Gly Lys Leu Leu Lys Asp Gly Glu Glu Pro
 15 165 170 175
 Thr Val Tyr Ser Asp Glu Glu Glu Pro Lys Asp Glu Ser Thr Arg Lys
 180 185 190
 Asn Asp
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 <212> PRT
 <213> Bovine
 25
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 Val Gly Phe Ala Val Ala Thr Ile Gly Trp Ile Leu Gly Thr Thr Ala
 20 25 30
 30 Met Gly Phe Val Glu Trp Arg Val Trp Tyr Leu Asp Asn Ala Ser Gln
 35 40 45
 Phe Ser Gly Leu Ala Cys Met Gly Met Trp Arg Val Cys Val Phe Arg
 50 55 60
 35 Gln Thr Asn Ile Thr Thr Ala Thr Ser Cys His Ser Tyr Ser Tyr His
 65 70 75 80
 Asp Thr Tyr Leu Pro Leu Asp Ile Arg Val Ser Gln His Leu Leu Leu
 85 90 95
 Met Ala Ser Ile Leu Gly Leu Leu Gly Lys Ala Ser Val Thr Phe Ala
 100 105 110
 40 Leu Lys Asn Val Ser Met Gly Ile Leu Glu Asn Thr Thr Thr Tyr Lys
 115 120 125
 Ala Phe Val Ile Ser Gly Ile Leu His Ile Ala Ala Gly Ile Cys Ile
 130 135 140
 45 Ser Val Ala Val Ile Trp Asn Tyr His Ser Val Met Thr Glu Glu Gly
 145 150 155 160
 Ile Val Phe Pro Pro Ser Phe Asn Ile Pro Phe Lys Pro Tyr Ala Gln
 165 170 175
 Lys Ile Gly Asn Thr Val Ile Val Ala Cys Leu Ala Ala Phe Ala Leu
 180 185 190
 50 Phe Leu Gly Gly Trp Phe Phe Leu Ser Tyr Lys Leu Pro Leu Asp Asn
 195 200 205
 Gln Val His Pro Glu Val
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 <400> 15

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 Thr Thr Pro Tyr Asp Tyr Glu Ala Ala Leu Pro Cys Glu Lys Ser Asn
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 5 Val Lys Glu Leu Ala Ala Gln Phe Leu Pro Pro Leu Tyr Ser Leu Val
 35 40 45
 Phe Val Thr Gly Leu Leu Gly Asn Val Val Val Val Val Ile Leu Thr
 50 55 60
 Lys Tyr Lys Arg Leu Arg Ile Met Thr Asn Ile Tyr Leu Leu Asn Leu
 65 70 75 80
 10 Ala Ile Ser Asp Val Leu Phe Leu Phe Thr Leu Pro Phe Trp Ile His
 85 90 95
 Tyr Val Arg Trp Asn Glu Trp Val Phe Gly His Arg Met Cys Lys Leu
 100 105 110
 15 Leu Ser Gly Leu Tyr Tyr Met Gly Leu Tyr Ser Glu Ile Phe Phe Ile
 115 120 125
 Ile Leu Leu Thr Ile Asp Arg Tyr Leu Ala Ile Val His Ala Val Phe
 130 135 140
 Ala Leu Arg Ala Arg Thr Val Thr Phe Gly Ile Val Thr Ser Ile Phe
 145 150 155 160
 20 Thr Trp Val Leu Ala Gly Leu Ala Ala Leu Pro Glu Phe Phe Phe His
 165 170 175
 Glu Thr Gln Glu Ala Gly Gln Thr Phe Cys Ser Pro Leu Tyr Pro
 180 185 190
 25 Glu Asp Asn Glu Asn Ala Trp Lys Arg Phe His Ala Leu Arg Met Asn
 195 200 205
 Ile Leu Gly Leu Ala Leu Pro Leu Leu Val Met Ala Ile Cys Tyr Ser
 210 215 220
 Gly Ile Ile Lys Thr Leu Leu Arg Cys Pro Ser Lys Lys Lys Tyr Lys
 225 230 235 240
 30 Ala Ile Arg Leu Ile Phe Val Ile Met Val Val Phe Phe Ile Phe Trp
 245 250 255
 Thr Pro Tyr Asn Leu Val Val Leu Leu Phe Ala Phe Gln Met His Leu
 260 265 270
 35 Lys Ala Asp Cys Glu Gln Ser Arg Gln Leu Asp Leu Ala Met Leu Val
 275 280 285
 Thr Glu Val Ile Ala Tyr Thr His Cys Cys Val Asn Pro Val Ile Tyr
 290 295 300
 Ala Phe Val Gly Glu Arg Phe Arg Lys His Leu Arg His Phe Phe His
 305 310 315 320
 40 Arg Tyr Met Ala Thr Tyr Leu Gly Lys Phe Met Pro Phe Leu Pro Ser
 325 330 335
 Glu Lys Leu Glu Arg Thr Ser Ser Val Ser Pro Ser Thr Gly Glu Gln
 340 345 350
 45 Glu Leu Ser Ala Val Phe
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 <213> Bovine
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 Tyr Tyr Asp Leu Ala Glu Ala Cys Asp Met Gly Asp Ile Val Ala Leu
 20 25 30
 Gly Thr Val Phe Val Val Ile Leu Tyr Ser Leu Val Phe Ala Phe Gly
 35 40 45
 60 Leu Val Gly Asn Leu Leu Val Val Phe Ala Leu Ile Asn Ser Gln Arg
 50 55 60

Ser Lys Ser Ile Thr Asp Ile Tyr Leu Leu Asn Leu Ala Leu Ser Asp
 65 70 75 80
 Leu Leu Phe Val Ala Thr Leu Pro Phe Trp Thr His Tyr Val Ile Asn
 85 90 95
 5 Glu Gln Gly Leu His His Ala Thr Cys Lys Leu Ile Thr Ala Phe Phe
 100 105 110
 Phe Ile Gly Phe Phe Gly Gly Ile Phe Phe Ile Thr Val Ile Ser Val
 115 120 125
 10 Asp Arg Phe Leu Ala Ile Val Leu Ala Ala Asn Ser Met Ser Asn Arg
 130 135 140
 Thr Val Gln His Gly Val Thr Thr Ser Leu Gly Val Trp Ala Ala Ala
 145 150 155 160
 Ile Leu Val Ala Thr Pro Gln Phe Met Phe Thr Arg Glu Lys Glu Asn
 165 170 175
 15 Glu Cys Phe Gly Asp Tyr Pro Glu Ile Leu Gln Glu Ile Trp Pro Val
 180 185 190
 Ile Leu Asn Thr Glu Ile Asn Phe Leu Gly Phe Leu Leu Pro Leu Leu
 195 200 205
 20 Ile Met Ser Tyr Cys Tyr Phe Arg Ile Met Gln Thr Leu Phe Ser Cys
 210 215 220
 Lys Asn His Lys Lys Ala Lys Ala Ile Arg Leu Ile Phe Leu Val Val
 225 230 235 240
 Val Val Phe Phe Leu Phe Trp Thr Pro Tyr Asn Val Met Ile Phe Leu
 245 250 255
 25 Gln Thr Leu Asn Leu Tyr Asp Phe Phe Pro Lys Cys Asp Val Lys Arg
 260 265 270
 Asp Leu Lys Leu Ala Ile Ser Val Thr Glu Thr Ile Ala Phe Ser His
 275 280 285
 Cys Cys Leu Asn Pro Leu Ile Tyr Ala Phe Ala Gly Glu Lys Phe Arg
 290 295 300
 30 Arg Tyr Leu Tyr Arg Leu Tyr Arg Lys Cys Leu Ala Val Leu Cys Cys
 305 310 315 320
 His Pro Asp His Leu Ser Phe Ser Ser Ser Leu Ser Glu Ser Gln Arg
 325 330 335
 35 Ser Arg Arg Glu Ser Val Leu Ser Ser Asn Phe Thr His Tyr Thr Ser
 340 345 350
 Asp Gly Asp Ala Ser Ile Leu Leu
 355 360
 40 <210> 17
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 45 <400> 17
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 20 25 30
 50 Gln Trp Lys Val Leu Cys Arg Gly His Phe Leu Ile Gln Gln Asn Leu
 35 40 45
 Gln Glu Gln Ala Gln Asp Trp Leu Glu Ile Thr Leu Leu Trp Leu Phe
 50 55 60
 Phe Ile Val Leu Met Tyr Val Thr Val Lys Leu Ala Gly Glu Asn Gly
 65 70 75 80
 55 Glu Ser Arg Val Gln Thr Ser His Ala Leu Gln Gly Arg Ser Phe Gly
 85 90 95
 Phe Leu Gly Asn Lys Lys Val Lys Thr Ser Ser Lys Glu Val Tyr Met
 100 105 110
 60 Phe His Thr Leu Thr Leu Leu Glu Met Asp Leu Val Lys Phe Val Cys
 115 120 125

Arg Val Gln Asn Leu Lys Leu Ala Thr Ser Thr Ser Gly Asn Ile Asn
 130 135 140
 Pro Leu Asn Val Lys Val Pro Ala Asp
 145 150

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 <211> 346
 <212> PRT
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10

<400> 18
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 Val Val Leu Ala Leu Cys Arg Leu Ala Thr Pro Leu Ala Lys Asn Leu
 20 25 30

15

Glu Pro Val Ser Trp Ser Ser Leu Asn Pro Lys Phe Leu Ser Gly Lys
 35 40 45
 Gly Leu Val Ile Tyr Pro Lys Ile Gly Asp Lys Leu Asp Ile Ile Cys
 50 55 60

20

Pro Arg Ala Glu Ala Gly Arg Pro Tyr Glu Tyr Tyr Lys Leu Tyr Leu
 65 70 75 80
 Val Arg Pro Glu Gln Ala Ala Ala Cys Ser Thr Val Leu Asp Pro Asn
 85 90 95

25

Val Leu Val Thr Cys Asn Arg Pro Glu Gln Glu Ile Arg Phe Thr Ile
 100 105 110
 Lys Phe Gln Glu Phe Ser Pro Asn Tyr Met Gly Leu Glu Phe Lys Lys
 115 120 125

30

His His Asp Tyr Tyr Ile Thr Ser Thr Ser Asn Gly Ser Leu Glu Gly
 130 135 140
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Thr Gln Ala Pro Gly Gly Arg Ser Ser Met Gly Asp Ser Asp Gly Lys
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Lys Gly Gly Ser Gly Thr Ala Gly Thr Glu Pro Ser Asp Ile Ile Ile
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Pro Leu Arg Thr Thr Glu Asn Asn Tyr Cys Pro His Tyr Glu Lys Val
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5

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 Lys Glu Met Glu Pro Ile Ser Ile Tyr Phe Ser Gln Gly Gly Gln Ala
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 Gly Asn Ala Ser Ile Thr Ile Ser His Met Gln Pro Ala Asp Ser Gly
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 Lys Asn Lys Glu Gln Ser Pro Pro Gly Leu Arg Gly Phe Pro Phe Arg
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 15 Thr Pro Leu Lys Lys Asn Gln Asn Ala Ser Leu Tyr Lys Asp Cys Val
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 Lys Gly Val Thr Asp Ile Lys Ile Tyr Pro Gln Lys Arg Thr Val Ala
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 Glu Glu Met Lys Lys Gln Ile Glu Ala Met Gly Phe Pro Ala Phe Val
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Leu Lys Asn Thr Pro Val Lys Ser Ser Glu Gly Ser Gln Gln Arg Ser
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 Pro Ser Tyr Thr Asn Asp Ser Thr Ala Thr Phe Ile Ile Asp Gly Met
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 Gln Tyr Val Ser Ser Ile Val Val Ser Leu Glu Asn Arg Ser Ala Ile
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 580 585 590
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 Ala Asp Glu Gly Asp Gly Val Leu Glu Leu Val Val Arg Gly Met Thr
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 45 Lys Tyr Asp Pro Glu Ile Ile Gly Pro Arg Asp Ile Ile His Thr Ile
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260 265 270
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 Thr Ser Val Gly Val Ser Val Phe Thr Leu Thr Ile Leu Ser Ala Asp
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 Asp Pro Asn Lys Asn Met Thr Phe Glu Ser Cys Thr Ser Tyr Pro Val
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 Ser Lys Lys Leu Leu Gln Glu Ile His Ser Leu Leu Cys Phe Leu Val
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 Lys Val Arg Asn Leu Lys Arg Ala Met Ala Thr Gly Ser Gly Ser Asn
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 Pro Val Leu Val Arg Gly Ala Gly His Ile Thr Val Phe Gly Leu Ser
 85 90 95
 Asn Lys Phe Asp Thr Glu Phe Pro Ser Val Leu Thr Gly Lys Val Ala
 100 105 110
 40 Pro Glu Glu Phe Lys Thr Ser Ile Gly Arg Val Asn Ala Cys Leu Lys
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 Lys Ala Leu Pro Val Asn Val Lys Trp Leu Leu Cys Gly Cys Leu Cys
 130 135 140
 45 Cys Cys Cys Thr Leu Gly Cys Ser Leu Trp Pro Val Ile Cys Leu Asn
 145 150 155 160
 Lys Arg Thr Arg Arg Ser Ile Gln Lys Leu Ile Glu Trp Glu Asn Asn
 165 170 175
 Arg Leu Tyr His Lys Leu Ala Leu His Trp Lys Leu Thr Lys Arg Lys
 180 185 190
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 Pro Lys Tyr Pro Ile Phe Arg Pro Asp
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 5 Gly Pro Asp Asp Asp Glu Glu Asp Glu Glu Glu Glu Glu Glu Glu
 35 40 45
 Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Ala Pro Pro
 50 55 60
 Pro Pro Arg Val Val Ser Glu Glu His Leu Arg Arg Tyr Ala Pro Asp
 65 70 75 80
 10 Pro Val Leu Val Arg Gly Ala Gly His Ile Thr Val Phe Gly Leu Ser
 85 90 95
 Asn Lys Phe Asp Thr Glu Phe Pro Ser Val Leu Thr Gly Lys Val Ala
 100 105 110
 15 Pro Glu Glu Phe Lys Thr Ser Ile Gly Arg Val Asn Ala Cys Leu Lys
 115 120 125
 Lys Ala Leu Pro Val Asn Val Lys Trp Leu Leu Cys Gly Cys Leu Cys
 130 135 140
 20 Cys Cys Cys Thr Leu Gly Cys Ser Leu Trp Pro Val Ile Cys Leu Asn
 145 150 155 160
 Lys Arg Thr Arg Arg Ser Ile Gln Lys Leu Ile Glu Trp Glu Asn Asn
 165 170 175
 Arg Leu Tyr His Lys Leu Ala Leu His Trp Lys Leu Thr Lys Arg Lys
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 35 40 45
 Thr Ile Ile Tyr Asp Pro Lys Leu Gln Thr Pro Lys Thr Leu Gln Glu
 50 55 60
 Ala Ile Asp Asp Met Gly Phe Asp Ala Val Ile His Asn Pro Asp Pro
 65 70 75 80
 45 Leu Pro Val Leu Thr Asp Thr Leu Phe Leu Thr Val Thr Ala Ser Leu
 85 90 95
 Thr Leu Pro Trp Asp His Ile Gln Ser Thr Leu Leu Lys Thr Lys Gly
 100 105 110
 50 Val Thr Asp Ile Lys Ile Tyr Pro Gln Lys Arg Thr Val Ala Val Thr
 115 120 125
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 Glu Leu Ser Leu Asp Thr Gly Thr Leu Glu Lys Lys Ser Gly Ala Cys
 145 150 155 160
 55 Glu Asp His Ser Met Ala Gln Ala Gly Glu Val Val Leu Lys Met Lys
 165 170 175
 Val Glu Gly Met Thr Cys His Ser Cys Thr Ser Thr Ile Glu Gly Lys
 180 185 190
 60 Ile Gly Lys Leu Gln Gly Val Gln Arg Ile Lys Val Ser Leu Asp Asn
 195 200 205

Gln Glu Ala Thr Ile Val Tyr Gln Pro His Leu Ile Ser Val Glu Glu
 210 215 220
 Met Lys Lys Gln Ile Glu Ala Met Gly Phe Pro Ala Phe Val Lys Lys
 225 230 235 240
 5 Gln Pro Lys Tyr Leu Lys Leu Gly Ala Ile Asp Val Glu Arg Leu Lys
 245 250 255
 Asn Thr Pro Val Lys Ser Ser Glu Gly Ser Gln Gln Arg Ser Pro Ser
 260 265 270
 10 Tyr Thr Asn Asp Ser Thr Ala Thr Phe Ile Ile Asp Gly Met His Cys
 275 280 285
 Lys Ser Cys Val Ser Asn Ile Glu Ser Thr Leu Ser Ala Leu Gln Tyr
 290 295 300
 Val Ser Ser Ile Val Val Ser Leu Glu Asn Arg Ser Ala Ile Val Lys
 305 310 315 320
 15 Tyr Asn Ala Ser Ser Val Thr Pro Glu Ser Leu Arg Lys Ala Ile Glu
 325 330 335
 Ala Val Ser Pro Gly Leu Tyr Arg Val Ser Ile Thr Ser Glu Val Glu
 340 345 350
 Ser Thr Ser Asn Ser Pro Ser Ser Ser Ser Leu Gln Lys Ile Pro Leu
 355 360 365
 20 Asn Val Val Ser Gln Pro Leu Thr Gln Glu Thr Val Ile Asn Ile Asp
 370 375 380
 Gly Met Thr Cys Asn Ser Cys Val Gln Ser Ile Glu Gly Val Ile Ser
 385 390 395 400
 25 Lys Lys Pro Gly Val Lys Ser Ile Arg Val Ser Leu Ala Asn Ser Asn
 405 410 415
 Gly Thr Val Glu Tyr Asp Pro Leu Leu Thr Ser Pro Glu Thr Leu Arg
 420 425 430
 Gly Ala Ile Glu Asp Met Gly Phe Asp Ala Thr Leu Ser Asp Thr Asn
 435 440 445
 30 Glu Pro Leu Val Val Ile Ala Gln Pro Ser Ser Glu Met Pro Leu Leu
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 Thr Ser Thr Asn Glu Phe Tyr Thr Lys Gly Met Thr Pro Val Gln Asp
 465 470 475 480
 35 Lys Glu Glu Gly Lys Asn Ser Ser Lys Cys Tyr Ile Gln Val Thr Gly
 485 490 495
 Met Thr Cys Ala Ser Cys Val Ala Asn Ile Glu Arg Asn Leu Arg Arg
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 Glu Glu Gly Ile Tyr Ser Ile Leu Val Ala Leu Met Ala Gly Lys Ala
 515 520 525
 40 Glu Val Arg Tyr Asn Pro Ala Val Ile Gln Pro Pro Met Ile Ala Glu
 530 535 540
 Phe Ile Arg Glu Leu Gly Phe Gly Ala Thr Val Ile Glu Asn Ala Asp
 545 550 555 560
 45 Glu Gly Asp Gly Val Leu Glu Leu Val Val Arg Gly Met Thr Cys Ala
 565 570 575
 Ser Cys Val His Lys Ile Glu Ser Ser Leu Thr Lys His Arg Gly Ile
 580 585 590
 Leu Tyr Cys Ser Val Ala Leu Ala Thr Asn Lys Ala His Ile Lys Tyr
 595 600 605
 50 Asp Pro Glu Ile Ile Gly Pro Arg Asp Ile Ile His Thr Ile Glu Ser
 610 615 620
 Leu Gly Phe Glu Ala Ser Leu Val Lys Lys Asp Arg Ser Ala Ser His
 625 630 635 640
 55 Leu Asp His Lys Arg Glu Ile Arg Gln Trp Arg Arg Ser Phe Leu Val
 645 650 655
 Ser Leu Phe Phe Cys Ile Pro Val Met Gly Leu Met Ile Tyr Met Met
 660 665 670
 Val Met Asp His His Phe Ala Thr Leu His His Asn Gln Asn Met Ser
 675 680 685
 60 Lys Glu Glu Met Ile Asn Leu His Ser Ser Met Phe Leu Glu Arg Gln

	690		695		700	
	Ile Leu Pro Gly Leu Ser Val Met Asn Leu Leu Ser Phe Leu Leu Cys					
	705		710		715	720
5	Val Pro Leu Glu Gly Lys Thr Ser Glu Ala Leu Ala Lys Leu Ile Ser					
		725		730		735
	Leu Gln Ala Thr Glu Ala Thr Ile Val Thr Leu Asp Ser Asp Asn Ile					
		740		745		750
	Leu Leu Ser Glu Glu Gln Val Asp Val Glu Leu Val Gln Arg Gly Asp					
		755		760		765
10	Ile Ile Lys Val Val Pro Gly Gly Lys Phe Pro Val Asp Gly Arg Val					
		770		775		780
	Ile Glu Gly His Ser Met Val Asp Glu Ser Leu Ile Thr Gly Glu Ala					
		785		790		795
	Met Pro Val Ala Lys Lys Pro Gly Ser Thr Val Ile Ala Gly Ser Ile					
		805		810		815
15	Asn Gln Asn Gly Ser Leu Leu Ile Cys Ala Thr His Val Gly Ala Asp					
		820		825		830
	Thr Thr Leu Ser Gln Ile Val Lys Leu Val Glu Glu Ala Gln Thr Ser					
		835		840		845
20	Lys Ala Pro Ile Gln Gln Phe Ala Asp Lys Leu Ser Gly Tyr Phe Val					
		850		855		860
	Pro Phe Ile Val Phe Val Ser Ile Ala Thr Leu Leu Val Trp Ile Val					
		865		870		875
	Ile Gly Phe Leu Asn Phe Glu Ile Val Glu Thr Tyr Phe Pro Gly Tyr					
		885		890		895
25	Asn Arg Ser Ile Ser Arg Thr Glu Thr Ile Ile Arg Phe Ala Phe Gln					
		900		905		910
	Ala Ser Ile Thr Val Leu Cys Ile Ala Cys Pro Cys Ser Leu Gly Leu					
		915		920		925
30	Ala Thr Pro Thr Ala Val Met Val Gly Thr Gly Val Gly Ala Gln Asn					
		930		935		940
	Gly Ile Leu Ile Lys Gly Glu Pro Leu Glu Met Ala His Lys Val					
		945		950		955
	Lys Val Val Val Phe Asp Lys Thr Gly Thr Ile Thr His Gly Thr Pro					
		965		970		975
35	Val Val Asn Gln Val Lys Val Leu Thr Glu Ser Asn Arg Ile Ser His					
		980		985		990
	His Lys Ile Leu Ala Ile Val Gly Thr Ala Glu Ser Asn Ser Glu His					
		995		1000		1005
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		1010		1015		1020
	Glu Thr Leu Gly Thr Cys Ile Asp Phe Gln Val Val Pro Gly Cys Gly					
		1025		1030		1035
	Ile Ser Cys Lys Val Thr Asn Ile Glu Gly Leu Leu His Lys Asn Asn					
		1045		1050		1055
45	Trp Asn Ile Glu Asp Asn Asn Ile Lys Asn Ala Ser Leu Val Gln Ile					
		1060		1065		1070
	Asp Ala Ser Asn Glu Gln Ser Ser Thr Ser Ser Ser Met Ile Ile Asp					
		1075		1080		1085
50	Ala Gln Ile Ser Asn Ala Leu Asn Ala Gln Gln Tyr Lys Val Leu Ile					
		1090		1095		1100
	Gly Asn Arg Glu Trp Met Ile Arg Asn Gly Leu Val Ile Asn Asn Asp					
		1105		1110		1115
	Val Asn Asp Phe Met Thr Glu His Glu Arg Lys Gly Arg Thr Ala Val					
		1125		1130		1135
55	Leu Val Ala Val Asp Asp Glu Leu Cys Gly Leu Ile Ala Ile Ala Asp					
		1140		1145		1150
	Thr Val Lys Pro Glu Ala Glu Leu Ala Ile His Ile Leu Lys Ser Met					
		1155		1160		1165
60	Gly Leu Glu Val Val Leu Met Thr Gly Asp Asn Ser Lys Thr Ala Arg					
		1170		1175		1180

Ser Ile Ala Ser Gln Val Gly Ile Thr Lys Val Phe Ala Glu Val Leu
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 Pro Ser His Lys Val Ala Lys Val Lys Gln Leu Gln Glu Glu Gly Lys
 1205 1210 1215
 5 Arg Val Ala Met Val Gly Asp Gly Ile Asn Asp Ser Pro Ala Leu Ala
 1220 1225 1230
 Met Ala Asn Val Gly Ile Ala Ile Gly Thr Gly Thr Asp Val Ala Ile
 1235 1240 1245
 10 Glu Ala Ala Asp Val Val Leu Ile Arg Asn Asp Leu Leu Asp Val Val
 1250 1255 1260
 Ala Ser Ile Asp Leu Ser Arg Glu Thr Val Lys Arg Ile Arg Ile Asn
 1265 1270 1275 1280
 Phe Val Phe Ala Leu Ile Tyr Asn Leu Val Gly Ile Pro Ile Ala Ala
 1285 1290 1295
 15 Gly Val Phe Met Pro Ile Gly Leu Val Leu Gln Pro Trp Met Gly Ser
 1300 1305 1310
 Ala Ala Met Ala Ala Ser Ser Val Ser Val Val Leu Ser Ser Leu Phe
 1315 1320 1325
 20 Leu Lys Leu Tyr Arg Lys Pro Thr Tyr Glu Ser Tyr Glu Leu Pro Ala
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 Arg Ser Gln Ile Gly Gln Lys Ser Pro Ser Glu Ile Ser Val His Val
 1345 1350 1355 1360
 Gly Ile Asp Asp Thr Ser Arg Asn Ser Pro Lys Leu Gly Leu Leu Asp
 1365 1370 1375
 25 Arg Ile Val Asn Tyr Ser Arg Ala Ser Ile Asn Ser Leu Leu Ser Asp
 1380 1385 1390
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 35 40 45
 Thr Gly Thr Ile Thr His Gly Thr Pro Val Val Asn Gln Val Lys Val
 50 55 60
 45 Leu Thr Glu Ser Asn Arg Ile Ser His His Lys Ile Leu Ala Ile Val
 65 70 75 80
 Gly Thr Ala Glu Ser Asn Ser Glu His Pro Leu Gly Thr Ala Ile Thr
 85 90 95
 50 Lys Tyr Cys Lys Gln Glu Leu Asp Thr Glu Thr Leu Gly Thr Cys Ile
 100 105 110
 Asp Phe Gln Val Val Pro Gly Cys Gly Ile Ser Cys Lys Val Thr Asn
 115 120 125
 Ile Glu Gly Leu Leu His Lys Asn Asn Trp Asn Ile Glu Asp Asn Asn
 130 135 140
 55 Ile Lys Asn Ala Ser Leu Val Gln Ile Asp Ala Ser Asn Glu Gln Ser
 145 150 155 160
 Ser Thr Ser Ser Ser Met Ile Ile Asp Ala Gln Ile Ser Asn Ala Leu
 165 170 175
 60 Asn Ala Gln Gln Tyr Lys Val Leu Ile Gly Asn Arg Glu Trp Met Ile
 180 185 190

Arg Asn Gly Leu Val Ile Asn Asn Asp Val Asn Asp Phe Met Thr Glu
 195 200 205
 His Glu Arg Lys Gly Arg Thr Ala Val Leu Val Ala Val Asp Asp Glu
 210 215 220
 5 Leu Cys Gly Leu Ile Ala Ile Ala Asp Thr Val Lys Pro Glu Ala Glu
 225 230 235 240
 Leu Ala Ile His Ile Leu Lys Ser Met Gly Leu Glu Val Val Leu Met
 245 250 255
 10 Thr Gly Asp Asn Ser Lys Thr Ala Arg Ser Ile Ala Ser Gln Val Gly
 260 265 270
 Ile Thr Lys Val Phe Ala Glu Val Leu Pro Ser His Lys Val Ala Lys
 275 280 285
 Val Lys Gln Leu Gln Glu Glu Gly Lys Arg Val Ala Met Val Gly Asp
 290 295 300
 15 Gly Ile Asn Asp Ser Pro Ala Leu Ala Met Ala Asn Val Gly Ile Ala
 305 310 315 320
 Ile Gly Thr Gly Thr Asp Val Ala Ile Glu Ala Ala Asp Val Val Leu
 325 330 335
 20 Ile Arg Asn Asp Leu Leu Asp Val Val Ala Ser Ile Asp Leu Ser Arg
 340 345 350
 Glu Thr Val Lys Arg Ile Arg Ile Asn Phe Val Phe Ala Leu Ile Tyr
 355 360 365
 Asn Leu Val Gly Ile Pro Ile Ala Ala Gly Val Phe Met Pro Ile Gly
 370 375 380
 25 Leu Val Leu Gln Pro Trp Met Gly Ser Ala Ala Met Ala Ala Ser Ser
 385 390 395 400
 Val Ser Val Val Leu Ser Ser Leu Phe Leu Lys Leu Tyr Arg Lys Pro
 405 410 415
 30 Thr Tyr Glu Ser Tyr Glu Leu Pro Ala Arg Ser Gln Ile Gly Gln Lys
 420 425 430
 Ser Pro Ser Glu Ile Ser Val His Val Gly Ile Asp Asp Thr Ser Arg
 435 440 445
 Asn Ser Pro Lys Leu Gly Leu Leu Asp Arg Ile Val Asn Tyr Ser Arg
 450 455 460
 35 Ala Ser Ile Asn Ser Leu Leu Ser Asp Lys Arg Ser Leu Asn Ser Val
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 40 Glu Asp Asp Asp Thr Ala Leu
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 35 40 45
 Ser Met Gly Phe Ser Val Lys Glu Asp Leu Ser Trp Pro Gly Leu Ala
 50 55 60
 55 Val Gly Asn Leu Phe His Arg Pro Arg Ala Thr Val Met Val Met Val
 65 70 75 80
 Lys Gly Val Asn Lys Leu Ala Leu Pro Pro Gly Ser Val Ile Ser Tyr
 85 90 95
 60 Pro Leu Glu Asn Ala Val Pro Phe Ser Leu Asp Ser Val Ala Asn Ser
 100 105 110

Ile His Ser Leu Phe Ser Glu Glu Thr Pro Val Val Leu Gln Leu Ala
 115 120 125
 Pro Ser Glu Glu Arg Val Tyr Met Val Gly Lys Ala Asn Ser Val Phe
 130 135 140
 5 Glu Asp Leu Ser Val Thr Leu Arg Gln Leu Arg Asn Arg Leu Phe Gln
 145 150 155 160
 Glu Asn Ser Val Leu Ser Ser Leu Pro Leu Asn Ser Leu Ser Arg Asn
 165 170 175
 10 Asn Glu Val Asp Leu Leu Phe Leu Ser Glu Leu Gln Val Leu His Asp
 180 185 190
 Ile Ser Ser Leu Leu Ser Arg His Lys His Leu Ala Lys Asp His Ser
 195 200 205
 Pro Asp Leu Tyr Ser Leu Glu Leu Ala Gly Leu Asp Glu Ile Gly Lys
 210 215 220
 15 Arg Tyr Gly Glu Asp Ser Glu Gln Phe Arg Asp Ala Ser Lys Ile Leu
 225 230 235 240
 Val Asp Ala Leu Gln Lys Phe Ala Asp Asp Met Tyr Ser Leu Tyr Gly
 245 250 255
 20 Gly Asn Ala Val Val Glu Leu Val Thr Val Lys Ser Phe Asp Thr Ser
 260 265 270
 Leu Ile Arg Lys Thr Arg Thr Ile Leu Glu Ala Lys Gln Ala Lys Asn
 275 280 285
 Pro Ala Ser Pro Tyr Asn Leu Ala Tyr Lys Tyr Asn Phe Glu Tyr Ser
 290 295 300
 25 Val Val Phe Asn Met Val Leu Trp Ile Met Ile Ala Leu Ala Leu Ala
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 30 Ser Ile Ile Tyr Arg Met Thr Asn Gln Lys Ile Arg Met Asp
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 35 40 45
 45 Ala Leu Val Gln Leu Thr Leu Leu Phe Val His Arg Asp Leu Ser Arg
 50 55 60
 Asp Arg Pro Leu Val Leu Leu Leu His Leu Leu Gln Leu Gly Pro Leu
 65 70 75 80
 Phe Arg Cys Phe Glu Val Phe Cys Ile Tyr Phe Gln Ser Gly Asn Asn
 85 90 95
 50 Glu Glu Pro Tyr Val Ser Ile Thr Lys Lys Arg Gln Met Pro Lys Asn
 100 105 110
 Gly Leu Ser Glu Glu Ile Glu Lys Glu Val Gly Gln Ala Glu Gly Lys
 115 120 125
 Leu Ile Thr His Arg Ser Ala Phe Ser Arg Ala Ser Val Ile Gln Ala
 130 135 140
 55 Phe Leu Gly Ser Ala Pro Gln Leu Thr Leu Gln Leu Tyr Ile Ser Val
 145 150 155 160
 Met Gln Gln Asp Val Thr Val Gly Arg Ser Leu Leu Met Thr Ile Ser
 165 170 175
 60 Leu Leu Ser Ile Val Tyr Gly Ala Leu Arg Cys Asn Ile Leu Ala Ile
 180 185 190

Lys Ile Lys Tyr Asp Glu Tyr Glu Val Lys Val Lys Pro Leu Ala Tyr
 195 200 205
 Val Cys Ile Phe Leu Trp Arg Ser Phe Glu Ile Ala Thr Arg Val Val
 210 215 220
 5 Val Leu Val Leu Phe Thr Ser Val Leu Lys Thr Trp Val Val Val Ile
 225 230 235 240
 Ile Leu Ile Asn Phe Phe Ser Phe Phe Leu Tyr Pro Trp Ile Leu Phe
 245 250 255
 10 Trp Cys Ser Gly Ser Pro Phe Pro Glu Asn Ile Glu Lys Ala Leu Ser
 260 265 270
 Arg Val Gly Thr Thr Ile Val Leu Cys Phe Leu Thr Leu Leu Tyr Thr
 275 280 285
 Gly Ile Asn Met Phe Cys Trp Ser Ala Val Gln Leu Lys Ile Asp Ser
 290 295 300
 15 Pro Asp Leu Ile Ser Lys Ser His Asn Trp Tyr Gln Leu Leu Val Tyr
 305 310 315 320
 Tyr Met Ile Arg Phe Ile Glu Asn Ala Ile Leu Leu Leu Leu Trp Tyr
 325 330 335
 20 Leu Phe Lys Thr Asp Ile Tyr Met Tyr Val Cys Ala Pro Leu Leu Val
 340 345 350
 Leu Gln Leu Leu Ile Gly Tyr Cys Thr Ala Ile Leu Phe Met Leu Val
 355 360 365
 Phe Tyr Gln Phe Phe His Pro Cys Lys Lys Leu Phe Ser Ser Ser Val
 370 375 380
 25 Ser Glu Gly Phe Gln Arg Trp Leu Arg Cys Phe Cys Trp Ala Cys Arg
 385 390 395 400
 Gln Gln Lys Pro Cys Glu Pro Ile Gly Lys Glu Asp Leu Gln Ser Ser
 405 410 415
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 Gly Gln Phe Leu Asn Ala Glu Asp Leu Cys Ser Ala
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 35 40 45
 45 Pro Gly Ile Ala Cys Val Gly Ile Phe Arg Val Cys Ile Tyr Arg Arg
 50 55 60
 Arg Thr Asn Ser Thr Thr Thr Lys Phe Cys Tyr Arg Tyr Ser Tyr Gln
 65 70 75 80
 50 Asp Thr Phe Leu Pro Phe Glu Ile Ser Met Ala Gln Arg Phe Leu Leu
 85 90 95
 Thr Ala Ser Ile Phe Gly Phe Phe Gly Arg Ala Phe Asn Met Phe Ala
 100 105 110
 Leu Arg Asn Met Ser Met Arg Met Phe Glu Glu Asp Thr Tyr Asn Ser
 115 120 125
 55 Phe Val Val Ser Gly Ile Leu Asn Ile Ala Ala Gly Val Phe Asn Leu
 130 135 140
 Ile Ala Val Leu Gln Asn Tyr Asp Ala Val Ile Asn Ser Gln Gly Ile
 145 150 155 160
 60 Thr Phe Leu Pro Ser Leu Gln Met Pro Phe Lys Pro Asp Val Gln Glu
 165 170 175

Val Gly Thr Ala Ile Gln Val Ala Gly Ile Gly Val Leu Pro Met Leu
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 5 Gln Ile Phe Pro Thr Thr
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 35 40 45
 20 Asp Gln Pro Ala Ala Ser Gly Asp Ser Asp Asp Asp Glu Pro Pro Pro
 50 55 60
 Leu Pro Arg Leu Lys Arg Arg Asp Phe Thr Pro Ala Glu Leu Arg Arg
 65 70 75 80
 Phe Asp Gly Val Gln Asp Pro Arg Ile Leu Met Ala Ile Asn Gly Lys
 25 85 90 95
 Val Phe Asp Val Thr Lys Gly Arg Lys Phe Tyr Gly Pro Glu Gly Pro
 100 105 110
 Tyr Gly Val Phe Ala Gly Arg Asp Ala Ser Arg Gly Leu Ala Thr Phe
 115 120 125
 30 Cys Leu Asp Lys Glu Ala Leu Lys Asp Glu Tyr Asp Asp Leu Ser Asp
 130 135 140
 Leu Thr Ala Ala Gln Gln Glu Thr Leu Ser Asp Trp Glu Ser Gln Phe
 145 150 155 160
 Thr Phe Lys Tyr His His Val Gly Lys Leu Leu Lys Glu Gly Glu Glu
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 Pro Thr Val Tyr Ser Asp Glu Glu Glu Pro Lys Asp Glu Ser Ala Arg
 180 185 190
 Lys Asn Asp
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 35 40 45
 Val Ile Ser Leu Glu Asn Arg Ser Ala Ile Val Asn Phe Tyr Ala His
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35 40 45
Leu Ala Glu Ala Cys Tyr Ile Gly Asp Ile Val Val Phe Gly Thr Val
50 55 60
Phe Leu Ser Ile Phe Tyr Ser Val Ile Phe Ala Ile Gly Leu Val Gly
65 70 75 80
15 Asn Leu Leu Val Val Phe Ala Leu Thr Asn Ser Lys Lys Pro Lys Ser
85 90 95
Val Thr Asp Ile Tyr Leu Leu Asn Leu Ala Leu Ser Asp Leu Leu Phe
100 105 110
20 Val Ala Thr Leu Pro Phe Trp Thr His Tyr Leu Ile Asn Glu Lys Gly
115 120 125
Leu His Asn Ala Met Cys Lys Phe Thr Thr Ala Phe Phe Phe Ile Gly
130 135 140
Phe Phe Gly Ser Ile Phe Phe Ile Thr Val Ile Ser Ile Asp Arg Tyr
145 150 155 160
25 Leu Ala Ile Val Leu Ala Ala Asn Ser Met Asn Asn Arg Thr Val Gln
165 170 175
His Gly Val Thr Ile Ser Leu Gly Val Trp Ala Ala Ala Ile Leu Val
180 185 190
30 Ala Ala Pro Gln Phe Met Phe Thr Lys Gln Lys Glu Asn Glu Cys Leu
195 200 205
Gly Asp Tyr Pro Glu Val Leu Gln Glu Ile Trp Pro Val Leu Arg Asn
210 215 220
Val Glu Thr Asn Phe Leu Gly Phe Leu Leu Pro Leu Leu Ile Met Ser
225 230 235 240
35 Tyr Cys Tyr Phe Arg Ile Ile Gln Thr Leu Phe Ser Cys Lys Asn His
245 250 255
Lys Lys Ala Lys Ala Ile Lys Leu Ile Leu Leu Val Val Ile Val Phe
260 265 270
Phe Leu Phe Trp Thr Pro Tyr Asn Val Met Ile Phe Leu Glu Thr Leu
275 280 285
40 Lys Leu Tyr Asp Phe Phe Pro Ser Cys Asp Met Arg Lys Asp Leu Arg
290 295 300
Leu Ala Leu Ser Val Thr Glu Thr Val Ala Phe Ser His Cys Cys Leu
305 310 315 320
45 Asn Pro Leu Ile Tyr Ala Phe Ala Gly Glu Lys Phe Arg Arg Tyr Leu
325 330 335
Tyr His Leu Tyr Gly Lys Cys Leu Ala Val Leu Cys Gly Arg Ser Val
340 345 350
50 His Val Asp Phe Ser Ser Ser Glu Ser Gln Arg Ser Arg His Gly Ser
355 360 365
Val Leu Ser Ser Asn Phe Thr Tyr His Thr Ser Asp Gly Asp Ala Leu
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Leu Leu Leu
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55 <210> 61
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 Ala Ala Leu Leu Glu Asn Phe Ser Ser Ser Tyr Asp Tyr Gly Glu Asn
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 35 40 45
 Leu Asn Phe Asp Arg Ala Phe Leu Pro Ala Leu Tyr Ser Leu Leu Phe
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 10 Leu Leu Gly Leu Leu Gly Asn Gly Ala Val Ala Ala Val Leu Leu Ser
 65 70 75 80
 Arg Arg Thr Ala Leu Ser Ser Thr Asp Thr Phe Leu Leu His Leu Ala
 85 90 95
 Val Ala Asp Thr Leu Leu Val Leu Thr Leu Pro Leu Trp Ala Val Asp
 100 105 110
 15 Ala Ala Val Gln Trp Val Phe Gly Ser Gly Leu Cys Lys Val Ala Gly
 115 120 125
 Ala Leu Phe Asn Ile Asn Phe Tyr Ala Gly Ala Leu Leu Ala Cys
 130 135 140
 20 Ile Ser Phe Asp Arg Tyr Leu Asn Ile Val His Ala Thr Gln Leu Tyr
 145 150 155 160
 Arg Arg Gly Pro Pro Ala Arg Val Thr Leu Thr Cys Leu Ala Val Trp
 165 170 175
 Gly Leu Cys Leu Leu Phe Ala Leu Pro Asp Phe Ile Phe Leu Ser Ala
 180 185 190
 25 His His Asp Glu Arg Leu Asn Ala Thr His Cys Gln Tyr Asn Phe Pro
 195 200 205
 Gln Val Gly Arg Thr Ala Leu Arg Val Leu Gln Leu Val Ala Gly Phe
 210 215 220
 Leu Leu Pro Leu Leu Val Met Ala Tyr Cys Tyr Ala His Ile Leu Ala
 225 230 235 240
 30 Val Leu Leu Val Ser Arg Gly Gln Arg Arg Leu Arg Ala Met Arg Leu
 245 250 255
 Val Val Val Val Val Val Ala Phe Ala Leu Cys Trp Thr Pro Tyr His
 260 265 270
 35 Leu Val Val Leu Val Asp Ile Leu Met Asp Leu Gly Ala Leu Ala Arg
 275 280 285
 Asn Cys Gly Arg Glu Ser Arg Val Asp Val Ala Lys Ser Val Thr Ser
 290 295 300
 Gly Leu Gly Tyr Met His Cys Cys Leu Asn Pro Leu Leu Tyr Ala Phe
 305 310 315 320
 40 Val Gly Val Lys Phe Arg Glu Arg Met Trp Met Leu Leu Leu Arg Leu
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 35 40 45
 60 Leu Asn Phe Asp Arg Ala Phe Leu Pro Ala Leu Tyr Ser Leu Leu Phe
 50 55 60

Leu Leu Gly Leu Leu Gly Asn Gly Ala Val Ala Ala Val Leu Leu Ser
 65 70 75 80
 Arg Arg Thr Ala Leu Ser Ser Thr Asp Thr Phe Leu Leu His Leu Ala
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 5 Val Ala Asp Thr Leu Leu Val Leu Thr Leu Pro Leu Trp Ala Val Asp
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 Ala Ala Val Gln Trp Val Phe Gly Ser Gly Leu Cys Lys Val Ala Gly
 115 120 125
 10 Ala Leu Phe Asn Ile Asn Phe Tyr Ala Gly Ala Leu Leu Leu Ala Cys
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 Ile Ser Phe Asp Arg Tyr Leu Asn Ile Val His Ala Thr Gln Leu Tyr
 145 150 155 160
 Arg Arg Gly Pro Pro Ala Arg Val Thr Leu Thr Cys Leu Ala Val Trp
 165 170 175
 15 Gly Leu Cys Leu Leu Phe Ala Leu Pro Asp Phe Ile Phe Leu Ser Ala
 180 185 190
 His His Asp Glu Arg Leu Asn Ala Thr His Cys Gln Tyr Asn Phe Pro
 195 200 205
 20 Gln Gly Ser Ser Ser Gly Ser Gly Cys Gly Cys Cys Ser Cys Ala Trp
 210 215 220
 Ala Ala Pro Thr Arg Glu Gly Ser Arg Gly Ser His Arg Leu Pro Ala
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 35 40 45
 40 Thr Ile Ile Tyr Asp Pro Lys Leu Gln Thr Pro Lys Thr Leu Gln Glu
 50 55 60
 Ala Ile Asp Asp Met Gly Phe Asp Ala Val Ile His Asn Pro Asp Pro
 65 70 75 80
 Leu Pro Val Leu Thr Asp Thr Leu Phe Leu Thr Val Thr Ala Ser Leu
 85 90 95
 45 Thr Leu Pro Trp Asp His Ile Gln Ser Thr Leu Leu Lys Thr Lys Gly
 100 105 110
 Val Thr Asp Ile Lys Ile Tyr Pro Gln Lys Arg Thr Val Ala Val Thr
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 50 Ile Ile Pro Ser Ile Val Asn Ala Asn Gln Ile Lys Glu Leu Val Pro
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 145 150 155 160
 Glu Asp His Ser Met Ala Gln Ala Gly Glu Val Val Leu Lys Met Lys
 165 170 175
 55 Val Glu Gly Met Thr Cys His Ser Cys Thr Ser Thr Ile Glu Gly Lys
 180 185 190
 Ile Gly Lys Leu Gln Gly Val Gln Arg Ile Lys Val Ser Leu Asp Asn
 195 200 205
 60 Gln Glu Ala Thr Ile Val Tyr Gln Pro His Leu Ile Ser Val Glu Glu
 210 215 220

Met Lys Lys Gln Ile Glu Ala Met Gly Phe Pro Ala Phe Val Lys Lys
 225 230 235 240
 Gln Pro Lys Tyr Leu Lys Leu Gly Ala Ile Asp Val Glu Arg Leu Lys
 245 250 255
 5 Asn Thr Pro Val Lys Ser Ser Glu Gly Ser Gln Gln Arg Ser Pro Ser
 260 265 270
 Tyr Thr Asn Asp Ser Thr Ala Thr Phe Ile Ile Asp Gly Met His Cys
 275 280 285
 10 Lys Ser Cys Val Ser Asn Ile Glu Ser Thr Leu Ser Ala Leu Gln Tyr
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 Val Ser Ser Ile Val Val Ser Leu Glu Asn Arg Ser Ala Ile Val Lys
 305 310 315 320
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 325 330 335
 15 Ala Val Ser Pro Gly Leu Tyr Arg Val Ser Ile Thr Ser Glu Val Glu
 340 345 350
 Ser Thr Ser Asn Ser Pro Ser Ser Ser Ser Leu Gln Lys Ile Pro Leu
 355 360 365
 20 Asn Val Val Ser Gln Pro Leu Thr Gln Glu Thr Val Ile Asn Ile Asp
 370 375 380
 Gly Met Thr Cys Asn Ser Cys Val Gln Ser Ile Glu Gly Val Ile Ser
 385 390 395 400
 Lys Lys Pro Gly Val Lys Ser Ile Arg Val Ser Leu Ala Asn Ser Asn
 405 410 415
 25 Gly Thr Val Glu Tyr Asp Pro Leu Leu Thr Ser Pro Glu Thr Leu Arg
 420 425 430
 Gly Ala Ile Glu Asp Met Gly Phe Asp Ala Thr Leu Ser Asp Thr Asn
 435 440 445
 30 Glu Pro Leu Val Val Ile Ala Gln Pro Ser Ser Glu Met Pro Leu Leu
 450 455 460
 Thr Ser Thr Asn Glu Phe Tyr Thr Lys Gly Met Thr Pro Val Gln Asp
 465 470 475 480
 Lys Glu Glu Gly Lys Asn Ser Ser Lys Cys Tyr Ile Gln Val Thr Gly
 485 490 495
 35 Met Thr Cys Ala Ser Cys Val Ala Asn Ile Glu Arg Asn Leu Arg Arg
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 Glu Glu Gly Ile Tyr Ser Ile Leu Val Ala Leu Met Ala Gly Lys Ala
 515 520 525
 40 Glu Val Arg Tyr Asn Pro Ala Val Ile Gln Pro Pro Met Ile Ala Glu
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 545 550 555 560
 Glu Gly Asp Gly Val Leu Glu Leu Val Val Arg Gly Met Thr Cys Ala
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 45 Ser Cys Val His Lys Ile Glu Ser Ser Leu Thr Lys His Arg Gly Ile
 580 585 590
 Leu Tyr Cys Ser Val Ala Leu Ala Thr Asn Lys Ala His Ile Lys Tyr
 595 600 605
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 625 630 635 640
 Leu Asp His Lys Arg Glu Ile Arg Gln Trp Arg Arg Ser Phe Leu Val
 645 650 655
 55 Ser Leu Phe Phe Cys Ile Pro Val Met Gly Leu Met Ile Tyr Met Met
 660 665 670
 Val Met Asp His His Phe Ala Thr Leu His His Asn Gln Asn Met Ser
 675 680 685
 60 Lys Glu Glu Met Ile Asn Leu His Ser Ser Met Phe Leu Glu Arg Gln
 690 695 700
 Ile Leu Pro Gly Leu Ser Val Met Asn Leu Leu Ser Phe Leu Leu Cys

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	Ala	Thr	Thr	Ile	Ala	Phe	Ala	Tyr	Ser	Leu	Ile	Ile	Leu	Leu	Val
					755					760					765
	Met	Tyr	Glu	Arg	Ala	Lys	Val	Asn	Pro	Ile	Thr	Phe	Phe	Asp	Thr
					770					775					780
10	Pro	Met	Leu	Phe	Val	Phe	Ile	Ala	Leu	Gly	Arg	Trp	Leu	Glu	His
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	Ala	Lys	Gly	Lys	Thr	Ser	Glu	Ala	Leu	Ala	Lys	Leu	Ile	Ser	Leu
					805						810				815
	Ala	Thr	Glu	Ala	Thr	Ile	Val	Thr	Leu	Asp	Ser	Asp	Asn	Ile	Leu
					820					825					830
15	Ser	Glu	Glu	Gln	Val	Asp	Val	Glu	Leu	Val	Gln	Arg	Gly	Asp	Ile
					835					840					845
	Lys	Val	Val	Pro	Gly	Gly	Lys	Phe	Pro	Val	Asp	Gly	Arg	Val	Ile
					850						855				860
20	Gly	His	Ser	Met	Val	Asp	Glu	Ser	Leu	Ile	Thr	Gly	Glu	Ala	Met
					865						875				880
	Val	Ala	Lys	Lys	Pro	Gly	Ser	Thr	Val	Ile	Ala	Gly	Ser	Ile	Asn
					885						890				895
	Asn	Gly	Ser	Leu	Leu	Ile	Cys	Ala	Thr	His	Val	Gly	Ala	Asp	Thr
					900					905					910
25	Leu	Ser	Gln	Ile	Val	Lys	Leu	Val	Glu	Glu	Ala	Gln	Thr	Ser	Lys
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	Pro	Ile	Gln	Gln	Phe	Ala	Asp	Lys	Leu	Ser	Gly	Tyr	Phe	Val	Pro
					930						935				940
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	Phe	Leu	Asn	Phe	Glu	Ile	Val	Glu	Thr	Tyr	Phe	Pro	Gly	Tyr	Asn
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	Ser	Ile	Ser	Arg	Thr	Glu	Thr	Ile	Ile	Arg	Phe	Ala	Phe	Gln	Ala
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35	Ile	Thr	Val	Leu	Cys	Ile	Ala	Cys	Pro	Cys	Ser	Leu	Gly	Leu	Ala
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	Pro	Thr	Ala	Val	Met	Val	Gly	Thr	Gly	Val	Gly	Ala	Gln	Asn	Gly
					1010						1015				1020
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	Val	Val	Phe	Asp	Lys	Thr	Gly	Thr	Ile	Thr	His	Gly	Thr	Pro	Val
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	Asn	Gln	Val	Lys	Val	Leu	Thr	Glu	Ser	Asn					

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 Ala Val Asp Asp Glu Leu Cys Gly Leu Ile Ala Ile Ala Asp Thr Val
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 5 Lys Pro Glu Ala Glu Leu Ala Ile His Ile Leu Lys Ser Met Gly Leu
 1235 1240 1245
 Glu Val Val Leu Met Thr Gly Asp Asn Ser Lys Thr Ala Arg Ser Ile
 1250 1255 1260
 10 Ala Ser Gln Val Gly Ile Thr Lys Val Phe Ala Glu Val Leu Pro Ser
 1265 1270 1275 1280
 His Lys Val Ala Lys Val Lys Gln Leu Gln Glu Glu Gly Lys Arg Val
 1285 1290 1295
 Ala Met Val Gly Asp Gly Ile Asn Asp Ser Pro Ala Leu Ala Met Ala
 1300 1305 1310
 15 Asn Val Gly Ile Ala Ile Gly Thr Gly Thr Asp Val Ala Ile Glu Ala
 1315 1320 1325
 Ala Asp Val Val Leu Ile Arg Asn Asp Leu Leu Asp Val Val Ala Ser
 1330 1335 1340
 20 Ile Asp Leu Ser Arg Glu Thr Val Lys Arg Ile Arg Ile Asn Phe Val
 1345 1350 1355 1360
 Phe Ala Leu Ile Tyr Asn Leu Val Gly Ile Pro Ile Ala Ala Gly Val
 1365 1370 1375
 Phe Met Pro Ile Gly Leu Val Leu Gln Pro Trp Met Gly Ser Ala Ala
 1380 1385 1390
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 1395 1400 1405
 Leu Tyr Arg Lys Pro Thr Tyr Glu Ser Tyr Glu Leu Pro Ala Arg Ser
 1410 1415 1420
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 Asp Asp Thr Ser Arg Asn Ser Pro Lys Leu Gly Leu Leu Asp Arg Ile
 1445 1450 1455
 Val Asn Tyr Ser Arg Ala Ser Ile Asn Ser Leu Leu Ser Asp Lys Arg
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 35 40 45
 Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe Glu Gln Phe
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 Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu Val Gln Val
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 55 Thr Val Asp Thr Pro Thr Ser Pro Val Thr Ser Gly Leu Pro Leu Phe
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 Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu Asp Cys Leu
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 60 Arg His Arg Ala Asp Asn Glu Val Asn Lys Ser Thr Val Tyr Ile Ile
 115 120 125

Glu Asn Ala Lys Arg Val Arg Lys Glu Ser Glu Lys Ile Lys Val Gly
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 Asp Val Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys Asp Leu Ile
 145 150 155 160
 5 Leu Leu Ser Ser Cys Thr Thr Asp Gly Thr Cys Tyr Val Thr Thr Ala
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 Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala Val Arg Asp
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 10 Thr Ile Ala Leu Cys Thr Ala Glu Ser Ile Asp Thr Leu Arg Ala Ala
 195 200 205
 Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe Val Gly Arg
 210 215 220
 Ile Asn Ile Tyr Ser Asn Ser Leu Glu Ala Val Ala Arg Ser Leu Gly
 225 230 235 240
 15 Pro Glu Asn Leu Leu Leu Lys Gly Ala Thr Leu Lys Asn Thr Glu Lys
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 Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys Met Ala Leu
 260 265 270
 20 Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu Lys Ser Ile
 275 280 285
 Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr Lys Ala Ala
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 Val Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro Tyr Asn Asp
 305 310 315 320
 25 Glu Pro Trp Tyr Asn Gln Lys Thr Gln Lys Glu Arg Glu Thr Leu Lys
 325 330 335
 Val Leu Lys Met Phe Thr Asp Phe Leu Ser Phe Met Val Leu Phe Asn
 340 345 350
 30 Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met Gln Lys Phe
 355 360 365
 Leu Gly Ser Phe Phe Ile Ser Trp Asp Lys Asp Phe Tyr Asp Glu Glu
 370 375 380
 Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn Glu Glu Leu
 385 390 395 400
 35 Gly Gln Val Asp Tyr Val Phe Thr Asp Lys Thr Gly Thr Leu Thr Glu
 405 410 415
 Asn Ser Met Glu Phe Ile Glu Cys Cys Ile Asp Gly His Lys Tyr Lys
 420 425 430
 40 Gly Val Thr Gln Glu Val Asp Gly Leu Ser Gln Thr Asp Gly Thr Leu
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 Thr Tyr Phe Asp Lys Val Asp Lys Asn Arg Glu Glu Leu Phe Leu Arg
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 Ala Leu Cys Leu Cys His Thr Val Glu Ile Lys Thr Asn Asp Ala Val
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 45 Asp Gly Ala Thr Glu Ser Ala Glu Leu Thr Tyr Ile Ser Ser Ser Pro
 485 490 495
 Asp Glu Ile Ala Leu Val Lys Gly Ala Lys Arg Tyr Gly Phe Thr Phe
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 50 Leu Gly Asn Arg Asn Gly Tyr Met Arg Val Glu Asn Gln Arg Lys Glu
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 Ile Glu Glu Tyr Glu Leu Leu His Thr Leu Asn Phe Asp Ala Val Arg
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 Arg Arg Met Ser Val Ile Val Lys Thr Gln Glu Gly Asp Ile Leu Leu
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 565 570 575
 Glu Ile Glu Leu Thr Lys Val His Val Glu Arg Asn Ala Met Asp Gly
 580 585 590
 60 Tyr Arg Thr Leu Cys Val Ala Phe Lys Glu Ile Ala Pro Asp Asp Tyr
 595 600 605
 Glu Arg Ile Asn Arg Gln Leu Ile Glu Ala Lys Met Ala Leu Gln Asp

610 615 620
 Arg Glu Glu Lys Met Glu Lys Val Phe Asp Asp Ile Glu Thr Asn Met
 625 630 635 640
 Asn Leu Ile Gly Ala Thr Ala Val Glu Asp Lys Leu Gln Asp Gln Ala
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 5 Ala Glu Thr Ile Glu Ala Leu His Ala Ala Gly Leu Lys Val Trp Val
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 675 680 685
 10 Arg Leu Phe Gln Thr Asn Thr Glu Leu Leu Glu Leu Thr Thr Lys Thr
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 Ile Glu Glu Ser Glu Arg Lys Glu Asp Arg Leu His Glu Leu Leu Ile
 705 710 715 720
 Glu Tyr Arg Lys Lys Leu Leu His Glu Phe Pro Lys Ser Thr Arg Ser
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 15 Phe Lys Lys Ala Trp Thr Glu His Gln Glu Tyr Gly Leu Ile Ile Asp
 740 745 750
 Gly Ser Thr Leu Ser Leu Ile Leu Asn Ser Ser Gln Asp Ser Ser Ser
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 Val Leu Cys Cys Arg Met Ala Pro Leu Gln Lys Ala Gln Ile Val Arg
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 Lys Glu Gly Arg Gln Ala Ala Arg Asn Ser Asp Tyr Ser Val Pro Lys
 835 840 845
 30 Phe Lys His Leu Lys Lys Leu Leu Leu Ala His Gly His Leu Tyr Tyr
 850 855 860
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 35 Gln Pro Leu Tyr Asp Ala Ala Tyr Leu Thr Met Tyr Asn Ile Cys Phe
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 Thr Ser Leu Pro Ile Leu Ala Tyr Ser Leu Leu Glu Gln His Ile Asn
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 930 935 940
 Asn Ala Met Leu Gln Leu Gly Pro Phe Leu Tyr Trp Thr Phe Leu Ala
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 965 970 975
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 995 1000 1005
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Pro Ser Gln Val Ser Asp His Gln Val Leu Asn Asp Ala Glu Val Ala
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Ala Leu Leu Glu Asn Phe Ser Ser Ser Tyr Asp Tyr Gly Glu Asn Glu
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20 Ser Asp Ser Cys Cys Thr Ser Pro Pro Cys Pro Gln Asp Phe Ser Leu
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Asn Phe Asp Arg Ala Phe Leu Pro Ala Leu Tyr Ser Leu Leu Phe Leu
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Leu Gly Leu Leu Gly Asn Gly Ala Val Ala Val Leu Leu Ser Arg
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Arg Thr Ala Leu Ser Ser Thr Asp Thr Phe Leu Leu His Leu Ala Val
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Ala Asp Thr Leu Leu Val Leu Thr Leu Pro Leu Trp Ala Val Asp Ala
145 150 155 160
30 Ala Val Gln Trp Val Phe Gly Ser Gly Leu Cys Lys Val Ala Gly Ala
165 170 175
Leu Phe Asn Ile Asn Phe Tyr Ala Gly Ala Leu Leu Leu Ala Cys Ile
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Ser Phe Asp Arg Tyr Leu Asn Ile Val His Ala Thr Gln Leu Tyr Arg
35 195 200 205
Arg Gly Pro Pro Ala Arg Val Thr Leu Thr Cys Leu Ala Val Trp Gly
210 215 220
Leu Cys Leu Leu Phe Ala Leu Pro Asp Phe Ile Phe Leu Ser Ala His
225 230 235 240
40 His Asp Glu Arg Leu Asn Ala Thr His Cys Gln Tyr Asn Phe Pro Gln
245 250 255
Val Gly Arg Thr Ala Leu Arg Val Leu Gln Leu Val Ala Gly Phe Leu
260 265 270
Leu Pro Leu Leu Val Met Ala Tyr Cys Tyr Ala His Ile Leu Ala Val
45 275 280 285
Leu Leu Val Ser Arg Gly Gln Arg Arg Leu Arg Ala Met Arg Leu Val
290 295 300
Val Val Val Val Val Ala Phe Ala Leu Cys Trp Thr Pro Tyr His Leu
305 310 315 320
50 Val Val Leu Val Asp Ile Leu Met Asp Leu Gly Ala Leu Ala Arg Asn
325 330 335
Cys Gly Arg Glu Ser Arg Val Asp Val Ala Lys Ser Val Thr Ser Gly
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Leu Gly Tyr Met His Cys Cys Leu Asn Pro Leu Leu Tyr Ala Phe Val
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Gly Val Lys Phe Arg Glu Arg Met Trp Met Leu Leu Leu Arg Leu Gly
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 5 <213> Human

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 50 55 60
 15 Val Ser Lys Pro Phe Gly Met Leu Met Leu Ser Ile Trp Ile Leu Leu
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 Phe Val Cys Tyr Tyr Leu Ser Tyr Tyr Leu Cys Ser Gly Ser Ser Tyr
 85 90 95
 20 Phe Val Leu Ala Asn Gly His Ile Leu Pro Asn Ser Glu Asn Ala His
 100 105 110
 Gly Gln Ser Leu Glu Glu Asp Ser Ala Leu Glu Ala Leu Leu Asn Phe
 115 120 125
 Phe Phe Pro Thr Thr Cys Asn Leu Arg Glu Asn Gln Val Ala Lys Pro
 130 135 140
 25 Cys Asn Glu Leu Gln Asp Leu Ser Glu Ser Glu Cys Leu Arg His Lys
 145 150 155 160
 Cys Cys Phe Ser Ser Ser Gly Thr Thr Ser Phe Lys Cys Phe Ala Pro
 165 170 175
 30 Phe Arg Asp Val Pro Lys Gln Met Met Gln Met Phe Gly Leu Gly Ala
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 Ile Ser Leu Ile Leu Val Cys Leu Pro Ile Tyr Cys Arg Ser Leu Phe
 195 200 205
 Trp Arg Ser Glu Pro Ala Asp Asp Leu Gln Arg Gln Asp Asn Arg Val
 210 215 220
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 Val Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
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 55 Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
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 Val Gln Val Thr Val Asp Thr Pro Thr Ser Pro Val Thr Ser Gly Leu
 85 90 95
 Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
 100 105 110
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115 120 125
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 130 135 140
 Lys Val Gly Asp Val Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
 145 150 155 160
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 Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
 180 185 190
 10 Val Arg Asp Thr Ile Ala Leu Cys Thr Ala Glu Ser Ile Asp Thr Leu
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 Arg Ala Ala Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe
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 Val Gly Arg Ile Asn Ile Tyr Ser Asn Ser Leu Glu Ala Val Ala Arg
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 Thr Glu Lys Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys
 260 265 270
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 275 280 285
 Lys Ser Ile Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr
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 Lys Ala Ala Val Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro
 25 305 310 315 320
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 325 330 335
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 340 345 350
 30 Leu Phe Asn Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met
 355 360 365
 Gln Lys Phe Leu Gly Ser Phe Phe Ile Ser Trp Asp Lys Asp Phe Tyr
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 Asp Glu Glu Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn
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 Glu Glu Leu Gly Gln Val Asp Tyr Val Phe Thr Asp Lys Thr Gly Thr
 405 410 415
 Leu Thr Glu Asn Ser Met Glu Phe Ile Glu Cys Cys Ile Asp Gly His
 420 425 430
 40 Lys Tyr Lys Gly Val Thr Gln Glu Val Asp Gly Leu Ser Gln Thr Asp
 435 440 445
 Gly Thr Leu Thr Tyr Phe Asp Lys Val Asp Lys Asn Arg Glu Glu Leu
 450 455 460
 Phe Leu Arg Ala Leu Cys Leu Cys His Thr Val Glu Ile Lys Thr Asn
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 Asp Ala Val Asp Gly Ala Thr Glu Ser Ala Glu Leu Thr Tyr Ile Ser
 485 490 495
 Ser Ser Pro Asp Glu Ile Ala Leu Val Lys Gly Ala Lys Arg Tyr Gly
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 Arg Lys Glu Ile Glu Glu Tyr Glu Leu Leu His Thr Leu Asn Phe Asp
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 Ala Val Arg Arg Arg Met Ser Val Ile Val Lys Thr Gln Glu Gly Asp
 55 545 550 555 560
 Ile Leu Leu Phe Cys Lys Gly Ala Asp Ser Ala Val Phe Pro Arg Val
 565 570 575
 Gln Asn His Glu Ile Glu Leu Thr Lys Val His Val Glu Arg Asn Ala
 580 585 590
 60 Met Asp Gly Tyr Arg Thr Leu Cys Val Ala Phe Lys Glu Ile Ala Pro
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Asp Asp Tyr Glu Arg Ile Asn Arg Gln Leu Ile Glu Ala Lys Met Ala
 610 615 620
 Leu Gln Asp Arg Glu Glu Lys Met Glu Lys Val Phe Asp Asp Ile Glu
 625 630 635 640
 5 Thr Asn Met Asn Leu Ile Gly Ala Thr Ala Val Glu Asp Lys Leu Gln
 645 650 655
 Asp Gln Ala Ala Glu Thr Ile Glu Ala Leu His Ala Ala Gly Leu Lys
 660 665 670
 10 Val Trp Val Leu Thr Gly Asp Lys Met Glu Thr Ala Lys Ser Thr Cys
 675 680 685
 Tyr Ala Cys Arg Leu Phe Gln Thr Asn Thr Glu Leu Leu Glu Leu Thr
 690 695 700
 Thr Lys Thr Ile Glu Glu Ser Glu Arg Lys Glu Asp Arg Leu His Glu
 705 710 715 720
 15 Leu Leu Ile Glu Tyr Arg Lys Lys Leu Leu His Glu Phe Pro Lys Ser
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 Thr Arg Ser Phe Lys Lys Ala Trp Thr Glu His Gln Glu Tyr Gly Leu
 740 745 750
 20 Ile Ile Asp Gly Ser Thr Leu Ser Leu Ile Leu Asn Ser Ser Gln Asp
 755 760 765
 Ser Ser Ser Asn Asn Tyr Lys Ser Ile Phe Leu Gln Ile Cys Met Lys
 770 775 780
 Cys Thr Ala Val Leu Cys Cys Arg Met Ala Pro Leu Gln Lys Ala Gln
 785 790 795 800
 25 Ile Val Arg Met Val Lys Asn Leu Lys Gly Ser Pro Ile Thr Leu Ser
 805 810 815
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 820 825 830
 30 Gly Ile Gly Ile Lys Gly Lys Glu Gly Arg Gln Ala Ala Arg Asn Ser
 835 840 845
 Asp Tyr Ser Val Pro Lys Phe Lys His Leu Lys Lys Leu Leu Leu Ala
 850 855 860
 His Gly His Leu Tyr Tyr Val Arg Ile Ala His Leu Val Gln Tyr Phe
 865 870 875 880
 35 Phe Tyr Lys Asn Leu Cys Phe Ile Leu Pro Gln Phe Leu Tyr Gln Phe
 885 890 895
 Phe Cys Gly Phe Ser Gln Gln Pro Leu Tyr Asp Ala Ala Tyr Leu Thr
 900 905 910
 40 Met Tyr Asn Ile Cys Phe Thr Ser Leu Pro Ile Leu Ala Tyr Ser Leu
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 Leu Glu Gln His Ile Asn Ile Asp Thr Leu Thr Ser Asp Pro Arg Leu
 930 935 940
 Tyr Met Lys Ile Ser Gly Asn Ala Met Leu Gln Leu Gly Pro Phe Leu
 945 950 955 960
 45 Tyr Trp Thr Phe Leu Ala Ala Phe Glu Gly Thr Val Phe Phe Phe Gly
 965 970 975
 Thr Tyr Phe Leu Phe Gln Thr Ala Ser Leu Glu Glu Asn Gly Lys Val
 980 985 990
 Tyr Gly Asn Trp Thr Phe Gly Thr Ile Val Phe Thr Val Leu Val Phe
 995 1000 1005
 50 Thr Val Thr Leu Lys Leu Ala Leu Asp Thr Arg Phe Trp Thr Trp Ile
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 55 Phe Phe Trp Gly Gly Ile Ile Trp Pro Phe Leu Lys Gln Gln Arg Met
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 Tyr Phe Val Phe Ala Gln Met Leu Ser Ser Val Ser Thr Trp Leu Ala
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 Ile Ile Leu Leu Ile Phe Ile Ser Leu Phe Pro Glu Ile Leu Leu Ile
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 60 Val Leu Lys Asn Val Arg Arg Arg Ser Ala Arg Val Thr Lys Arg Leu

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 35 40 45
 Val Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
 50 55 60
 20 Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
 65 70 75 80
 Val Gln Val Thr Val Asp Thr Pro Thr Ser Pro Val Thr Ser Gly Leu
 85 90 95
 25 Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
 100 105 110
 Asp Cys Leu Arg His Arg Ala Asp Asn Glu Val Asn Lys Ser Thr Val
 115 120 125
 Tyr Ile Ile Glu Asn Ala Lys Arg Val Arg Lys Glu Ser Glu Lys Ile
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 30 Lys Val Gly Asp Val Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
 145 150 155 160
 Asp Leu Ile Leu Leu Ser Ser Cys Thr Thr Asp Gly Thr Cys Tyr Val
 165 170 175
 35 Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
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 Val Arg Asp Thr Ile Ala Leu Cys Thr Ala Glu Ser Ile Asp Thr Leu
 195 200 205
 Arg Ala Ala Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe
 210 215 220
 40 Val Gly Arg Ile Asn Ile Tyr Ser Asn Ser Leu Glu Ala Val Ala Arg
 225 230 235 240
 Ser Leu Gly Pro Glu Asn Leu Leu Leu Lys Gly Ala Thr Leu Lys Asn
 245 250 255
 45 Thr Glu Lys Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys
 260 265 270
 Met Ala Leu Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu
 275 280 285
 Lys Ser Ile Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr
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 50 Lys Ala Ala Val Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro
 305 310 315 320
 Tyr Asn Asp Glu Pro Trp Tyr Asn Gln Lys Thr Gln Lys Glu Arg Glu
 325 330 335
 55 Thr Leu Lys Val Leu Lys Met Phe Thr Asp Phe Leu Ser Phe Met Val
 340 345 350
 Leu Phe Asn Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met
 355 360 365
 Gln Lys Phe Leu Gly Ser Phe Phe Ile Ser Trp Asp Lys Asp Phe Tyr
 370 375 380
 60 Asp Glu Glu Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn

	385		390		395		400									
	Glu	Glu	Leu	Gly	Gln	Val	Asp	Tyr	Val	Phe	Thr	Asp	Lys	Thr	Gly	Thr
				405						410					415	
5	Leu	Thr	Glu	Asn	Ser	Met	Glu	Phe	Ile	Glu	Cys	Cys	Ile	Asp	Gly	His
				420						425					430	
	Lys	Tyr	Lys	Gly	Val	Thr	Gln	Glu	Val	Asp	Gly	Leu	Ser	Gln	Thr	Asp
			435						440					445		
	Gly	Thr	Leu	Thr	Tyr	Phe	Asp	Lys	Val	Asp	Lys	Asn	Arg	Glu	Glu	Leu
		450					455					460				
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	465					470					475					480
	Asp	Ala	Val	Asp	Gly	Ala	Thr	Glu	Ser	Ala	Glu	Leu	Thr	Tyr	Ile	Ser
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	Ser	Ser	Pro	Asp	Glu	Ile	Ala	Leu	Val	Lys	Gly	Ala	Lys	Arg	Tyr	Gly
				500						505					510	
15	Phe	Thr	Phe	Leu	Gly	Asn	Arg	Asn	Gly	Tyr	Met	Arg	Val	Glu	Asn	Gln
			515					520						525		
	Arg	Lys	Glu	Ile	Glu	Glu	Tyr	Glu	Leu	Leu	His	Thr	Leu	Asn	Phe	Asp
		530					535					540				
20	Ala	Val	Arg	Arg	Arg	Met	Ser	Val	Ile	Val	Lys	Thr	Gln	Glu	Gly	Asp
	545					550					555					560
	Ile	Leu	Leu	Phe	Cys	Lys	Gly	Ala	Asp	Ser	Ala	Val	Phe	Pro	Arg	Val
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	Gln	Asn	His	Glu	Ile	Glu	Leu	Thr	Lys	Val	His	Val	Glu	Arg	Asn	Ala
				580					585					590		
25	Met	Asp	Gly	Tyr	Arg	Thr	Leu	Cys	Val	Ala	Phe	Lys	Glu	Ile	Ala	Pro
			595					600					605			
	Asp	Asp	Tyr	Glu	Arg	Ile	Asn	Arg	Gln	Leu	Ile	Glu	Ala	Lys	Met	Ala
		610					615					620				
30	Leu	Gln	Asp	Arg	Glu	Glu	Lys	Met	Glu	Lys	Val	Phe	Asp	Asp	Ile	Glu
	625					630					635					640
	Thr	Asn	Met	Asn	Leu	Ile	Gly	Ala	Thr	Ala	Val	Glu	Asp	Lys	Leu	Gln
				645						650						655
	Asp	Gln	Ala	Ala	Glu	Thr	Ile	Glu	Ala	Leu	His	Ala	Ala	Gly	Leu	Lys
			660						665					670		
35	Val	Trp	Val	Leu	Thr	Gly	Asp	Lys	Met	Glu	Thr	Ala	Lys	Ser	Thr	Cys
			675					680					685			
	Tyr	Ala	Cys	Arg	Leu	Phe	Gln	Thr	Asn	Thr	Glu	Leu	Leu	Glu	Leu	Thr
		690					695					700				
40	Thr	Lys	Thr	Ile	Glu	Glu	Ser	Glu	Arg	Lys	Glu	Asp	Arg	Leu	His	Glu
	705					710					715					720
	Leu	Leu	Ile	Glu	Tyr	Arg	Lys	Lys	Leu	Leu	His	Glu	Phe	Pro	Lys	Ser
				725						730						735
	Thr	Arg	Ser	Phe	Lys	Lys	Ala	Trp	Thr	Glu	His	Gln	Glu	Tyr	Gly	Leu
			740						745							750
45	Ile	Ile	Asp	Gly	Ser	Thr	Leu	Ser	Leu	Ile	Leu	Asn	Ser	Ser	Gln	Asp
			755					760					765			
	Ser	Ser	Ser	Asn	Asn	Tyr	Lys	Ser	Ile	Phe	Leu	Gln	Ile	Cys	Met	Lys
		770					775					780				
50	Cys	Thr	Ala	Val	Leu	Cys	Cys	Arg	Met	Ala	Pro	Leu	Gln	Lys	Ala	Gln
	785					790					795					800
	Ile	Val	Arg	Met	Val	Lys	Asn	Leu	Lys	Gly	Ser	Pro	Ile	Thr	Leu	Ser
				805						810						815
	Ile	Gly	Asp	Gly	Ala	Asn	Asp	Val	Ser	Met	Ile	Leu	Glu	Ser	His	Val
				820					825					830		
55	Gly	Ile	Gly	Ile	Lys	Gly	Lys	Glu	Gly	Arg	Gln	Ala	Ala	Arg	Asn	Ser
			835					840					845			
	Asp	Tyr	Ser	Val	Pro	Lys	Phe	Lys	His	Leu	Lys	Lys	Leu	Leu	Leu	Ala
		850					855					860				
60	His	Gly	His	Leu	Tyr	Tyr	Val	Arg	Ile	Ala	His	Leu	Val	Gln	Tyr	Phe
	865					870					875					880

Phe Tyr Lys Asn Leu Cys Phe Ile Leu Pro Gln Phe Leu Tyr Gln Phe
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 Phe Cys Gly Phe Ser Gln Gln Pro Leu Tyr Asp Ala Ala Tyr Leu Thr
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 5 Met Tyr Asn Ile Cys Phe Thr Ser Leu Pro Ile Leu Ala Tyr Ser Leu
 915 920 925
 Leu Glu Gln His Ile Asn Ile Asp Thr Leu Thr Ser Asp Pro Arg Leu
 930 935 940
 10 Tyr Met Lys Ile Ser Gly Asn Ala Met Leu Gln Leu Gly Pro Phe Leu
 945 950 955 960
 Tyr Trp Thr Phe Leu Ala Ala Phe Glu Gly Thr Val Phe Phe Phe Gly
 965 970 975
 Thr Tyr Phe Leu Phe Gln Thr Ala Ser Leu Glu Glu Asn Gly Lys Val
 980 985 990
 15 Tyr Gly Asn Trp Thr Phe Gly Thr Ile Val Phe Thr Val Leu Val Phe
 995 1000 1005
 Thr Val Thr Leu Lys Leu Ala Leu Asp Thr Arg Phe Trp Thr Trp Ile
 1010 1015 1020
 20 Asn His Phe Val Ile Trp Gly Ser Leu Ala Phe Tyr Val Phe Phe Ser
 1025 1030 1035 1040
 Phe Phe Trp Gly Gly Ile Ile Trp Pro Phe Leu Lys Gln Gln Arg Met
 1045 1050 1055
 Tyr Phe Val Phe Ala Gln Met Leu Ser Ser Val Ser Thr Trp Leu Ala
 1060 1065 1070
 25 Ile Ile Leu Leu Ile Phe Ile Ser Leu Phe Pro Glu Ile Leu Leu Ile
 1075 1080 1085
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 35 <213> Human
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 20 25 30
 Asp Leu Gln Arg Gln Asp Asn Arg Val Val Thr Gly Leu Lys Lys Gln
 35 40 45
 Arg Arg Lys Arg Lys Arg Lys Ser Glu Met Leu Gln Lys Ala Ala Arg
 50 55 60
 45 Gly Arg Glu Glu His Gly Asp Glu
 65 70
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 Ile Tyr Ala Cys Leu Leu Leu Phe Ser Val Leu Leu Ala Leu Arg Leu
 20 25 30
 Asp Gly Ile Ile Gln Trp Ser Tyr Trp Ala Val Phe Ala Pro Ile Trp
 35 40 45
 60 Leu Trp Lys Leu Met Val Ile Val Gly Ala Ser Val Gly Thr Gly Val

50 55 60
 Trp Ala Arg Asn Pro Gln Tyr Arg Ala Glu Gly Glu Thr Cys Val Glu
 65 70 75 80
 Phe Lys Ala Met Leu Ile Ala Val Gly Ile His Leu Leu Leu Leu Met
 85 90 95
 5 Phe Glu Val Leu Val Cys Asp Arg Ile Glu Arg Gly Ser His Phe Trp
 100 105 110
 Leu Leu Val Phe Met Pro Leu Phe Phe Val Ser Pro Val Ser Val Ala
 115 120 125
 10 Ala Cys Val Trp Gly Phe Arg His Asp Arg Ser Leu Glu Leu Glu Ile
 130 135 140
 Leu Cys Ser Val Asn Ile Leu Gln Phe Ile Phe Ile Ala Leu Arg Leu
 145 150 155 160
 Asp Lys Ile Ile His Trp Pro Trp Leu Val Val Cys Val Pro Leu Trp
 165 170 175
 15 Ile Leu Met Ser Phe Leu Cys Leu Val Val Leu Tyr Tyr Ile Val Trp
 180 185 190
 Ser Val Leu Phe Leu Arg Ser Met Asp Val Ile Ala Glu Gln Arg Arg
 195 200 205
 20 Thr His Ile Thr Met Ala Leu Ser Trp Met Thr Ile Val Val Pro Leu
 210 215 220
 Leu Thr Phe Glu Ile Leu Leu Val His Lys Leu Asp Gly His Asn Ala
 225 230 235 240
 Phe Ser Cys Ile Pro Ile Phe Val Pro Leu Trp Leu Ser Leu Ile Thr
 245 250 255
 25 Leu Met Ala Thr Thr Phe Gly Gln Lys Gly Gly Asn His Trp Trp Phe
 260 265 270
 Gly Ile Arg Lys Asp Phe Cys Gln Phe Leu Leu Glu Ile Phe Pro Phe
 275 280 285
 30 Leu Arg Glu Tyr Gly Asn Ile Ser Tyr Asp Leu His His Glu Asp Asn
 290 295 300
 Glu Glu Thr Glu Glu Thr Pro Val Pro Glu Pro Pro Lys Ile Ala Pro
 305 310 315 320
 Met Phe Arg Lys Lys Ala Arg Val Val Ile Thr Gln Ser Pro Gly Lys
 325 330 335
 35 Tyr Val Leu Pro Pro Pro Lys Leu Asn Ile Glu Met Pro Asp
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 35 40 45
 50 Leu Gly Tyr Ser Pro Gly Leu Leu Leu Glu His Arg Pro Leu Leu Ala
 50 55 60
 Gly Arg Thr Pro Arg Ser His Arg Arg Asn Glu Ser Ser Leu Ala Ser
 65 70 75 80
 55 Thr Leu Lys Thr Leu Phe Phe Thr Ala Leu Met Ile Thr Val Pro
 85 90 95
 Ile Gly Leu Tyr Phe Thr Thr Lys Ser Tyr Ile Phe Glu Gly Ala Leu
 100 105 110
 Gly Met Ser Asn Arg Asp Ser Tyr Phe Tyr Ala Ala Ile Val Ala Val
 115 120 125
 60 Val Ala Val His Val Val Leu Ala Leu Phe Val Tyr Val Ala Trp Asn

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	Glu Gly Ser Arg Gln Trp Arg Glu Gly Lys Gln Asp				
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 35 40 45
 Val Pro Pro Arg Glu Thr Trp Thr Arg Gln Met Asp Phe Ile Met Ser
 50 55 60
 Cys Val Gly Phe Ala Val Gly Leu Gly Asn Val Trp Arg Phe Pro Tyr
 65 70 75 80
 20 Leu Cys Tyr Lys Asn Gly Gly Gly Val Phe Leu Ile Pro Tyr Val Leu
 85 90 95
 Ile Ala Leu Val Gly Gly Ile Pro Ile Phe Phe Leu Glu Ile Ser Leu
 100 105 110
 25 Gly Gln Phe Met Lys Ala Gly Ser Ile Asn Val Trp Asn Ile Cys Pro
 115 120 125
 Leu Phe Lys Gly Leu Gly Tyr Ala Ser Met Val Ile Val Phe Tyr Cys
 130 135 140
 Asn Thr Tyr Tyr Ile Met Val Leu Ala Trp Gly Phe Tyr Tyr Leu Val
 145 150 155 160
 30 Lys Ser Phe Thr Thr Thr Leu Pro Trp Ala Thr Cys Gly His Thr Trp
 165 170 175
 Asn Thr Pro Asp Cys Val Glu Ile Phe Arg His Glu Asp Cys Ala Asn
 180 185 190
 35 Ala Ser Leu Ala Asn Leu Thr Cys Asp Gln Leu Ala Asp Arg Arg Ser
 195 200 205
 Pro Val Ile Glu Phe Trp Glu Asn Lys Val Leu Arg Leu Ser Gly Gly
 210 215 220
 Leu Glu Val Pro Gly Ala Leu Asn Trp Glu Val Thr Leu Cys Leu Leu
 225 230 235 240
 40 Ala Cys Trp Val Leu Val Tyr Phe Cys Val Trp Lys Gly Val Lys Ser
 245 250 255
 Thr Gly Lys Ile Val Tyr Phe Thr Ala Thr Phe Pro Tyr Val Val Leu
 260 265 270
 45 Val Val Leu Leu Val Arg Gly Val Leu Leu Pro Gly Ala Leu Asp Gly
 275 280 285
 Ile Ile Tyr Tyr Leu Lys Pro Asp Trp Ser Lys Leu Gly Ser Pro Gln
 290 295 300
 Val Trp Ile Asp Ala Gly Thr Gln Ile Phe Phe Ser Tyr Ala Ile Gly
 305 310 315 320
 50 Leu Gly Ala Leu Thr Ala Leu Gly Ser Tyr Asn Arg Phe Asn Asn Asn
 325 330 335
 Cys Tyr Lys Asp Ala Ile Ile Leu Ala Leu Ile Asn Ser Gly Thr Ser
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 55 Phe Phe Ala Gly Phe Val Val Phe Ser Ile Leu Gly Phe Met Ala Ala
 355 360 365
 Glu Gln Gly Val His Ile Ser Lys Val Ala Glu Ser Gly Pro Gly Leu
 370 375 380
 Ala Phe Ile Ala Tyr Pro Arg Ala Val Thr Leu Met Pro Val Ala Pro
 385 390 395 400
 60 Leu Trp Ala Ala Leu Phe Phe Phe Met Leu Leu Leu Leu Gly Leu Asp

405 410 415
 Ser Gln Phe Val Gly Val Glu Gly Phe Ile Thr Gly Leu Leu Asp Leu
 420 425 430
 Leu Pro Ala Ser Tyr Tyr Phe Arg Phe Gln Arg Glu Ile Ser Val Ala
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 Gly Gly Met Tyr Val Phe Gln Leu Phe Asp Tyr Tyr Ser Ala Ser Gly
 465 470 475 480
 10 Thr Thr Leu Leu Trp Gln Ala Phe Trp Glu Cys Val Val Val Ala Trp
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 Val Tyr Gly Ala Asp Arg Phe Met Asp Asp Ile Ala Cys Met Ile Gly
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 Tyr Arg Pro Cys Pro Trp Met Lys Trp Cys Trp Ser Phe Phe Thr Pro
 515 520 525
 15 Leu Val Cys Met Gly Ile Phe Ile Phe Asn Val Val Tyr Tyr Glu Pro
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 Leu Val Tyr Asn Asn Thr Tyr Val Tyr Pro Trp Trp Gly Glu Ala Met
 545 550 555 560
 20 Gly Trp Ala Phe Ala Leu Ser Ser Met Leu Cys Val Pro Leu His Leu
 565 570 575
 Leu Gly Cys Leu Leu Arg Ala Lys Gly Thr Met Ala Glu Arg Trp Gln
 580 585 590
 His Leu Thr Gln Pro Ile Trp Gly Leu His His Leu Glu Tyr Arg Ala
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 35 40 45
 Ile Glu Glu Ala Tyr Gly Asp Val Ser Gly Leu Cys Arg Arg Leu Lys
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 45 Thr Ser Pro Thr Glu Gly Leu Ala Asp Asn Thr Asn Asp Leu Glu Lys
 65 70 75 80
 Arg Arg Gln Ile Tyr Gly Gln Asn Phe Ile Pro Pro Lys Gln Pro Lys
 85 90 95
 Thr Phe Leu Gln Leu Val Trp Glu Ala Leu Gln Asp Val Thr Leu Ile
 100 105 110
 50 Ile Leu Glu Val Ala Ala Ile Val Ser Leu Gly Leu Ser Phe Tyr Ala
 115 120 125
 Pro Pro Gly Glu Glu Ser Glu Ala Cys Gly Asn Val Ser Gly Gly Ala
 130 135 140
 55 Glu Asp Glu Gly Glu Ala Glu Ala Gly Trp Ile Glu Gly Ala Ala Ile
 145 150 155 160
 Leu Leu Ser Val Ile Cys Val Val Leu Val Thr Ala Phe Asn Asp Trp
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 Ser Lys Glu Lys Gln Phe Arg Gly Leu Gln Ser Arg Ile Glu Gln Glu
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	Glu	Ser	Ser	Leu	Thr	Gly	Glu	Ser	Asp	His	Val	Arg	Lys	Ser	Ala	Asp			
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	Lys	Asp	Pro	Met	Leu	Leu	Ser	Gly	Thr	His	Val	Met	Glu	Gly	Ser	Gly			
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10	Arg	Met	Val	Val	Thr	Ala	Val	Gly	Val	Asn	Ser	Gln	Thr	Gly	Ile	Ile			
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	Phe	Thr	Leu	Leu	Gly	Ala	Gly	Gly	Glu	Glu	Glu	Glu	Lys	Lys	Asp	Lys			
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	Lys	Lys	Gln	Asp	Gly	Ala	Val	Ala	Met	Glu	Met	Gln	Pro	Leu	Lys	Ser			
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	Val	Gln	Ile	Gly	Lys	Ala	Gly	Leu	Val	Met	Ser	Ala	Ile	Thr	Val	Ile			
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	Phe	Phe	Ile	Ile	Gly	Val	Thr	Val	Leu	Val	Val	Ala	Val	Pro	Glu	Gly			
				420					425					430					
30	Leu	Pro	Leu	Ala	Val	Thr	Ile	Ser	Leu	Ala	Tyr	Ser	Val	Lys	Lys	Met			
			435					440						445					
	Met	Lys	Asp	Asn	Asn	Leu	Val	Arg	His	Leu	Asp	Ala	Cys	Glu	Thr	Met			
		450					455						460						
35	Gly	Asn	Ala	Thr	Ala	Ile	Cys	Ser	Asp	Lys	Thr	Gly	Thr	Leu	Thr	Thr			
		465				470					475					480			
	Asn	Arg	Met	Thr	Val	Val	Gln	Ser	Tyr	Leu	Gly	Asp	Thr	His	Tyr	Lys			
					485						490				495				
	Glu	Ile	Pro	Ala															

Glu Ala Ile Arg Lys Cys Gln Arg Ala Gly Ile Thr Val Arg Met Val
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 Thr Gly Asp Asn Ile Asn Thr Ala Arg Ala Ile Ala Ala Lys Cys Gly
 705 710 715 720
 5 Ile Ile Gln Pro Gly Glu Asp Phe Leu Cys Leu Glu Gly Lys Glu Phe
 725 730 735
 Asn Arg Arg Ile Arg Asn Glu Lys Gly Glu Ile Glu Gln Glu Arg Leu
 740 745 750
 10 Asp Lys Val Trp Pro Lys Leu Arg Val Leu Ala Arg Ser Ser Pro Thr
 755 760 765
 Asp Lys His Thr Leu Val Lys Gly Ile Ile Asp Ser Thr Thr Gly Glu
 770 775 780
 Gln Arg Gln Val Val Ala Val Thr Gly Asp Gly Thr Asn Asp Gly Pro
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 Asp Val Ala Lys Glu Ala Ser Asp Ile Ile Leu Thr Asp Asp Asn Phe
 820 825 830
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 835 840 845
 Ile Ser Lys Phe Leu Gln Phe Gln Leu Thr Val Asn Val Val Ala Val
 850 855 860
 Ile Val Ala Phe Thr Gly Ala Cys Ile Thr Gln Asp Ser Pro Leu Lys
 865 870 875 880
 25 Ala Val Gln Met Leu Trp Val Asn Leu Ile Met Asp Thr Phe Ala Ser
 885 890 895
 Leu Ala Leu Ala Thr Glu Pro Pro Thr Glu Ser Leu Leu Leu Arg Lys
 900 905 910
 Pro Tyr Gly Arg Asp Lys Pro Leu Ile Ser Arg Thr Met Met Lys Asn
 915 920 925
 30 Ile Leu Gly His Ala Val Tyr Gln Leu Ala Ile Ile Phe Thr Leu Leu
 930 935 940
 Phe Val Gly Glu Leu Phe Phe Asp Ile Asp Ser Gly Arg Asn Ala Pro
 945 950 955 960
 35 Leu His Ser Pro Pro Ser Glu His Tyr Thr Ile Ile Phe Asn Thr Phe
 965 970 975
 Val Met Met Gln Leu Phe Asn Glu Ile Asn Ala Arg Lys Ile His Gly
 980 985 990
 Glu Arg Asn Val Phe Asp Gly Ile Phe Ser Asn Pro Ile Phe Cys Thr
 995 1000 1005
 40 Ile Val Leu Gly Thr Phe Gly Ile Gln Ile Val Ile Val Gln Phe Gly
 1010 1015 1020
 Gly Lys Pro Phe Ser Cys Ser Pro Leu Ser Thr Glu Gln Trp Leu Trp
 1025 1030 1035 1040
 45 Cys Leu Phe Val Gly Val Gly Glu Leu Val Trp Gly Gln Val Ile Ala
 1045 1050 1055
 Thr Ile Pro Thr Ser Gln Leu Lys Cys Leu Lys Glu Ala Gly His Gly
 1060 1065 1070
 Pro Gly Lys Asp Glu Met Thr Asp Glu Glu Leu Ala Glu Gly Glu Glu
 1075 1080 1085
 50 Glu Ile Asp His Ala Glu Arg Glu Leu Arg Arg Gly Gln Ile Leu Trp
 1090 1095 1100
 Phe Arg Gly Leu Asn Arg Ile Gln Thr Gln Ile Arg Val Val Lys Ala
 1105 1110 1115 1120
 55 Phe Arg Ser Ser Leu Tyr Glu Gly Leu Glu Lys Pro Glu Ser Lys Thr
 1125 1130 1135
 Ser Ile His Asn Phe Met Ala Thr Pro Glu Phe Leu Ile Asn Asp Tyr
 1140 1145 1150
 Thr His Asn Ile Pro Leu Ile Asp Asp Thr Asp Val Asp Glu Asn Glu
 1155 1160 1165
 60 Glu Arg Leu Arg Ala Pro Pro Pro Pro Ser Pro Asn Gln Asn Asn Asn

1170 1175 1180
 Ala Ile Asp Ser Gly Ile Tyr Leu Thr Thr His Val Thr Lys Ser Ala
 1185 1190 1195 1200
 Thr Ser Ser Val Phe Ser Ser Ser Pro Gly Ser Pro Leu His Ser Val
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 5 Glu Thr Ser Leu
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 10 <211> 635
 <212> PRT
 <213> Human

 <400> 74
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 Glu Lys Lys Gly Pro Leu Ile Ala Pro Gly Pro Asp Gly Ala Pro Ala
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 Lys Gly Asp Gly Pro Val Gly Leu Gly Thr Pro Gly Gly Arg Leu Ala
 35 40 45
 20 Val Pro Pro Arg Glu Thr Trp Thr Arg Gln Met Asp Phe Ile Met Ser
 50 55 60
 Cys Val Gly Phe Ala Val Gly Leu Gly Asn Val Trp Arg Phe Pro Tyr
 65 70 75 80
 25 Leu Cys Tyr Lys Asn Gly Gly Gly Val Phe Leu Ile Pro Tyr Val Leu
 85 90 95
 Ile Ala Leu Val Gly Gly Ile Pro Ile Phe Phe Leu Glu Ile Ser Leu
 100 105 110
 Gly Gln Phe Met Lys Ala Gly Ser Ile Asn Val Trp Asn Ile Cys Pro
 115 120 125
 30 Leu Phe Lys Gly Leu Gly Tyr Ala Ser Met Val Ile Val Phe Tyr Cys
 130 135 140
 Asn Thr Tyr Tyr Ile Met Val Leu Ala Trp Gly Phe Tyr Tyr Leu Val
 145 150 155 160
 35 Lys Ser Phe Thr Thr Thr Leu Pro Trp Ala Thr Cys Gly His Thr Trp
 165 170 175
 Asn Thr Pro Asp Cys Val Glu Ile Phe Arg His Glu Asp Cys Ala Asn
 180 185 190
 Ala Ser Leu Ala Asn Leu Thr Cys Asp Gln Leu Ala Asp Arg Arg Ser
 195 200 205
 40 Pro Val Ile Glu Phe Trp Glu Asn Lys Val Leu Arg Leu Ser Gly Gly
 210 215 220
 Leu Glu Val Pro Gly Ala Leu Asn Trp Glu Val Thr Leu Cys Leu Leu
 225 230 235 240
 45 Ala Cys Trp Val Leu Val Tyr Phe Cys Val Trp Lys Gly Val Lys Ser
 245 250 255
 Thr Gly Lys Ile Val Tyr Phe Thr Ala Thr Phe Pro Tyr Val Val Leu
 260 265 270
 Val Val Leu Leu Val Arg Gly Val Leu Leu Pro Gly Ala Leu Asp Gly
 275 280 285
 50 Ile Ile Tyr Tyr Leu Lys Pro Asp Trp Ser Lys Leu Gly Ser Pro Gln
 290 295 300
 Val Trp Ile Asp Ala Gly Thr Gln Ile Phe Phe Ser Tyr Ala Ile Gly
 305 310 315 320
 55 Leu Gly Ala Leu Thr Ala Leu Gly Ser Tyr Asn Arg Phe Asn Asn Asn
 325 330 335
 Cys Tyr Lys Asp Ala Ile Ile Leu Ala Leu Ile Asn Ser Gly Thr Ser
 340 345 350
 Phe Phe Ala Gly Phe Val Val Phe Ser Ile Leu Gly Phe Met Ala Ala
 355 360 365
 60 Glu Gln Gly Val His Ile Ser Lys Val Ala Glu Ser Gly Pro Gly Leu

		370				375					380								
		Ala Phe Ile Ala Tyr Pro Arg Ala Val Thr Leu Met Pro Val Ala Pro																	
		385				390				395								400	
5		Leu Trp Ala Ala Leu Phe Phe Phe Met Leu Leu Leu Leu Gly Leu Asp																	
				405					410								415		
		Ser Gln Phe Val Gly Val Glu Gly Phe Ile Thr Gly Leu Leu Asp Leu																	
				420				425								430			
		Leu Pro Ala Ser Tyr Tyr Phe Arg Phe Gln Arg Glu Ile Ser Val Ala																	
				435			440							445					
10		Leu Cys Cys Ala Leu Cys Phe Val Ile Asp Leu Ser Met Val Thr Asp																	
				450			455						460						
		Gly Gly Met Tyr Val Phe Gln Leu Phe Asp Tyr Tyr Ser Ala Ser Gly																	
						470				475								480	
15		Thr Thr Leu Leu Trp Gln Ala Phe Trp Glu Cys Val Val Val Ala Trp																	
				485					490									495	
		Val Tyr Gly Ala Asp Arg Phe Met Asp Asp Ile Ala Cys Met Ile Gly																	
				500			505												
		Tyr Arg Pro Cys Pro Trp Met Lys Trp Cys Trp Ser Phe Phe Thr Pro																	
				515			520								525				
20		Leu Val Cys Met Gly Ile Phe Ile Phe Asn Val Val Tyr Tyr Glu Pro																	
				530			535							540					
		Leu Val Tyr Asn Asn Thr Tyr Val Tyr Pro Trp Trp Gly Glu Ala Met																	
						550				555								560	
25		Gly Trp Ala Phe Ala Leu Ser Ser Met Leu Cys Val Pro Leu His Leu																	
				565					570									575	
		Leu Gly Cys Leu Leu Arg Ala Lys Gly Thr Met Ala Glu Arg Trp Gln																	
				580			585											590	
		His Leu Thr Gln Pro Ile Trp Gly Leu His His Leu Glu Tyr Arg Ala																	
				595			600							605					
30		Gln Asp Ala Asp Val Arg Gly Leu Thr Thr Leu Thr Pro Val Ser Glu																	
				610			615						620						
		Ser Ser Lys Val Val Val Val Glu Ser Val Met																	
				625			630						635						
35		<210> 75																	
		<211> 1159																	
		<212> PRT																	
		<213> Human																	
40		<400> 75																	
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		1		5					10					15					
		Gln Gln Arg																	

165 170 175
 Ser Lys Glu Lys Gln Phe Arg Gly Leu Gln Ser Arg Ile Glu Gln Glu
 180 185 190
 Gln Lys Phe Thr Val Ile Arg Asn Gly Gln Leu Leu Gln Val Pro Val
 195 200 205
 5 Ala Ala Leu Val Val Gly Asp Ile Ala Gln Val Lys Tyr Gly Asp Leu
 210 215 220
 Leu Pro Ala Asp Gly Val Leu Ile Gln Ala Asn Asp Leu Lys Ile Asp
 225 230 235 240
 10 Glu Ser Ser Leu Thr Gly Glu Ser Asp His Val Arg Lys Ser Ala Asp
 245 250 255
 Lys Asp Pro Met Leu Leu Ser Gly Thr His Val Met Glu Gly Ser Gly
 260 265 270
 Arg Met Val Val Thr Ala Val Gly Val Asn Ser Gln Thr Gly Ile Ile
 275 280 285
 15 Phe Thr Leu Leu Gly Ala Gly Gly Glu Glu Glu Glu Lys Lys Asp Lys
 290 295 300
 Lys Ala Lys Lys Gln Asp Gly Ala Val Ala Met Glu Met Gln Pro Leu
 305 310 315 320
 20 Lys Ser Ala Glu Gly Gly Glu Met Glu Glu Arg Glu Lys Lys Lys Ala
 325 330 335
 Asn Ala Pro Lys Lys Glu Lys Ser Val Leu Gln Gly Lys Leu Thr Lys
 340 345 350
 Leu Ala Val Gln Ile Gly Lys Ala Gly Leu Val Met Ser Ala Ile Thr
 355 360 365
 25 Val Ile Ile Leu Val Leu Tyr Phe Val Ile Glu Thr Phe Val Val Glu
 370 375 380
 Gly Arg Thr Trp Leu Ala Glu Cys Thr Pro Val Tyr Val Gln Tyr Phe
 385 390 395 400
 30 Val Lys Phe Phe Ile Ile Gly Val Thr Val Leu Val Val Ala Val Pro
 405 410 415
 Glu Gly Leu Pro Leu Ala Val Thr Ile Ser Leu Ala Tyr Ser Val Lys
 420 425 430
 Lys Met Met Lys Asp Asn Asn Leu Val Arg His Leu Asp Ala Cys Glu
 435 440 445
 35 Thr Met Gly Asn Ala Thr Ala Ile Cys Ser Asp Lys Thr Gly Thr Leu
 450 455 460
 Thr Thr Asn Arg Met Thr Val Val Gln Ser Tyr Leu Gly Asp Thr His
 465 470 475 480
 40 Tyr Lys Glu Ile Pro Ala Pro Ser Ala Leu Thr Pro Lys Ile Leu Asp
 485 490 495
 Leu Leu Val His Ala Ile Ser Ile Asn Ser Ala Tyr Thr Thr Lys Ile
 500 505 510
 Leu Pro Pro Glu Lys Glu Gly Ala Leu Pro Arg Gln Val Gly Asn Lys
 515 520 525
 45 Thr Glu Cys Ala Leu Leu Gly Phe Val Leu Asp Leu Lys Arg Asp Phe
 530 535 540
 Gln Pro Val Arg Glu Gln Ile Pro Glu Asp Lys Leu Tyr Lys Val Tyr
 545 550 555 560
 50 Thr Phe Asn Ser Val Arg Lys Ser Met Ser Thr Val Ile Arg Met Pro
 565 570 575
 Asp Gly Gly Phe Arg Leu Phe Ser Lys Gly Ala Ser Glu Ile Leu Leu
 580 585 590
 Lys Lys Cys Thr Asn Ile Leu Asn Ser Asn Gly Glu Leu Arg Gly Phe
 595 600 605
 55 Arg Pro Arg Asp Arg Asp Asp Met Val Arg Lys Ile Ile Glu Pro Met
 610 615 620
 Ala Cys Asp Gly Leu Arg Thr Ile Cys Ile Ala Tyr Arg Asp Phe Ser
 625 630 635 640
 60 Ala Gly Gln Glu Pro Asp Trp Asp Asn Glu Asn Glu Val Val Gly Asp
 645 650 655

Leu Thr Cys Ile Ala Val Val Gly Ile Glu Asp Pro Val Arg Pro Glu
 660 665 670
 Val Pro Glu Ala Ile Arg Lys Cys Gln Arg Ala Gly Ile Thr Val Arg
 675 680 685
 5 Met Val Thr Gly Asp Asn Ile Asn Thr Ala Arg Ala Ile Ala Ala Lys
 690 695 700
 Cys Gly Ile Ile Gln Pro Gly Glu Asp Phe Leu Cys Leu Glu Gly Lys
 705 710 715 720
 10 Glu Phe Asn Arg Arg Ile Arg Asn Glu Lys Gly Glu Ile Glu Gln Glu
 725 730 735
 Arg Leu Asp Lys Val Trp Pro Lys Leu Arg Val Leu Ala Arg Ser Ser
 740 745 750
 Pro Thr Asp Lys His Thr Leu Val Lys Gly Ile Ile Asp Ser Thr Thr
 755 760 765
 15 Gly Glu Gln Arg Gln Val Val Ala Val Thr Gly Asp Gly Thr Asn Asp
 770 775 780
 Gly Pro Ala Leu Lys Lys Ala Asp Val Gly Phe Ala Met Gly Ile Ala
 785 790 795 800
 20 Gly Thr Asp Val Ala Lys Glu Ala Ser Asp Ile Ile Leu Thr Asp Asp
 805 810 815
 Asn Phe Thr Ser Ile Val Lys Ala Val Met Trp Gly Arg Asn Val Tyr
 820 825 830
 Asp Ser Ile Ser Lys Phe Leu Gln Phe Gln Leu Thr Val Asn Val Val
 835 840 845
 25 Ala Val Ile Val Ala Phe Thr Gly Ala Cys Ile Thr Gln Asp Ser Pro
 850 855 860
 Leu Lys Ala Val Gln Met Leu Trp Val Asn Leu Ile Met Asp Thr Phe
 865 870 875 880
 30 Ala Ser Leu Ala Leu Ala Thr Glu Pro Pro Thr Glu Ser Leu Leu Leu
 885 890 895
 Arg Lys Pro Tyr Gly Arg Asp Lys Pro Leu Ile Ser Arg Thr Met Met
 900 905 910
 Lys Asn Ile Leu Gly His Ala Val Tyr Gln Leu Ala Ile Ile Phe Thr
 915 920 925
 35 Leu Leu Phe Val Gly Glu Leu Phe Phe Asp Ile Asp Ser Gly Arg Asn
 930 935 940
 Ala Pro Leu His Ser Pro Pro Ser Glu His Tyr Thr Ile Ile Phe Asn
 945 950 955 960
 40 Thr Phe Val Met Met Gln Leu Phe Asn Glu Ile Asn Ala Arg Lys Ile
 965 970 975
 His Gly Glu Arg Asn Val Phe Asp Gly Ile Phe Ser Asn Pro Ile Phe
 980 985 990
 Cys Thr Ile Val Leu Gly Thr Phe Gly Ile Gln Ile Val Ile Val Gln
 995 1000 1005
 45 Phe Gly Gly Lys Pro Phe Ser Cys Ser Pro Leu Ser Thr Glu Gln Trp
 1010 1015 1020
 Leu Trp Cys Leu Phe Val Gly Val Gly Glu Leu Val Trp Gly Gln Val
 1025 1030 1035 1040
 50 Ile Ala Thr Ile Pro Thr Ser Gln Leu Lys Cys Leu Lys Glu Ala Gly
 1045 1050 1055
 His Gly Pro Gly Lys Asp Glu Met Thr Asp Glu Glu Leu Ala Glu Gly
 1060 1065 1070
 Glu Glu Glu Ile Asp His Ala Glu Arg Glu Leu Arg Arg Gly Gln Ile
 1075 1080 1085
 55 Leu Trp Phe Arg Gly Leu Asn Arg Ile Gln Thr Gln Met Glu Val Val
 1090 1095 1100
 Ser Thr Phe Lys Arg Ser Gly Ser Val Gln Gly Ala Val Arg Arg Arg
 1105 1110 1115 1120
 60 Ser Ser Val Leu Ser Gln Leu His Asp Val Thr Asn Leu Ser Thr Pro
 1125 1130 1135
 Thr His Ala Ile Leu Ser Ala Ala Asn Pro Thr Ser Ala Ala Gly Asn

1140 1145 1150
 Pro Gly Gly Glu Ser Val Pro
 1155

5 <210> 76
 <211> 101
 <212> PRT
 <213> Human

10 <400> 76
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 1 5 10 15
 Phe Arg Asn Glu Ser Ser Leu Ala Ser Thr Leu Lys Thr Leu Leu Phe
 20 25 30

15 Phe Thr Ala Leu Met Ile Thr Val Pro Ile Gly Leu Tyr Phe Thr Thr
 35 40 45
 Lys Ser Tyr Ile Phe Glu Gly Ala Leu Gly Met Ser Asn Arg Asp Ser
 50 55 60
 Tyr Phe Tyr Ala Ala Ile Val Ala Val Val Ala Val His Val Val Leu
 65 70 75 80

20 Ala Leu Phe Val Tyr Val Ala Trp Asn Glu Gly Ser Arg Gln Trp Arg
 85 90 95
 Glu Gly Lys Gln Asp
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25 <210> 77
 <211> 728
 <212> PRT
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30 <400> 77
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 Asp Arg Gly Pro Gly Arg His Cys Pro Phe Pro Val Pro Ile Thr Pro
 20 25 30

35 Thr Gly Ala Leu Leu Pro Val Ser Asp Ser Cys Asp Ser Leu Val Asp
 35 40 45
 Leu Val Trp Pro Ser Val Thr Tyr Leu Ala Leu Gly Thr Gln Ser Arg
 50 55 60

40 Val Trp Pro His Pro Leu Gly Ala Pro Gly Gln Ala Gly Glu Ser Pro
 65 70 75 80
 Glu Gln Arg Arg Gln Cys Leu Glu Leu Trp Asp Met Ala Ser Ser Leu
 85 90 95

45 Gly Asp Lys Val Pro Arg Ala Ala Cys Gly Lys Arg Gly Gln Thr Val
 100 105 110
 Trp Gln Leu His Leu Ala Cys Leu Cys Leu Ala Gln Phe His Ser Pro
 115 120 125

50 Pro Ala Gln Pro Pro Pro Leu Ser Arg Arg Gly Gly Gly Pro Asp Pro
 130 135 140
 Asp Pro Ile Ser Arg Ser Leu Pro Gly Pro Pro Thr Pro Ala Leu Pro
 145 150 155 160
 Thr His Ser Tyr Ser Ser His Ser Pro Arg Ala Pro Arg Leu Leu Ser
 165 170 175

55 Pro Leu Arg Arg Ala Pro Arg Gly Ser Pro Ala Pro His Arg His Ala
 180 185 190
 Ser Leu Gln Thr Asn Glu Ala Pro Arg Glu Leu Pro His Cys Thr Trp
 195 200 205

60 Pro Gly Leu Pro Gly Arg Ser Leu Ala Pro Ser Phe Leu Trp Arg Glu
 210 215 220
 Pro Trp Leu Gly Gly Gln Trp Gly Pro Leu Asn Ile Pro Ala Arg Lys
 225 230 235 240

Gly Asp Arg Arg Arg Trp Glu Trp Gly Cys Glu Gly Gly Gly Ala Thr
 245 250 255
 Ala Ser Ala Glu Gln Pro Pro Gln Ile Val Tyr Phe Thr Ala Thr Phe
 260 265 270
 5 Pro Tyr Val Val Leu Val Val Leu Val Arg Gly Val Leu Leu Pro
 275 280 285
 Gly Ala Leu Asp Gly Ile Ile Tyr Tyr Leu Lys Pro Asp Trp Ser Lys
 290 295 300
 10 Leu Gly Ser Pro Gln Val Trp Ile Asp Ala Gly Thr Gln Ile Phe Phe
 305 310 315 320
 Ser Tyr Ala Ile Gly Leu Gly Ala Leu Thr Ala Leu Gly Ser Tyr Asn
 325 330 335
 Arg Phe Asn Asn Asn Cys Tyr Lys Asp Ala Ile Ile Leu Ala Leu Ile
 340 345 350
 15 Asn Ser Gly Thr Ser Phe Phe Ala Gly Phe Val Val Phe Ser Ile Leu
 355 360 365
 Gly Phe Met Ala Ala Glu Gln Gly Val His Ile Ser Lys Val Ala Glu
 370 375 380
 20 Ser Gly Pro Gly Leu Ala Phe Ile Ala Tyr Pro Arg Ala Val Thr Leu
 385 390 395 400
 Met Pro Val Ala Pro Leu Trp Ala Ala Leu Phe Phe Met Leu Leu
 405 410 415
 Leu Leu Gly Leu Asp Ser Gln Val Cys Met Gly Leu Trp Asp Arg Glu
 420 425 430
 25 Pro Gly Gly Gly Arg Arg Glu Gly Cys Arg Gln Gly Lys Gly Trp Arg
 435 440 445
 Cys Gly Ala Arg Pro Glu Leu Pro Trp Pro Gln Phe Val Gly Val Glu
 450 455 460
 30 Gly Phe Ile Thr Gly Leu Leu Asp Leu Leu Pro Ala Ser Tyr Tyr Phe
 465 470 475 480
 Arg Phe Gln Arg Glu Ile Ser Val Ala Leu Cys Cys Ala Leu Cys Phe
 485 490 495
 Val Ile Asp Leu Ser Met Val Thr Asp Val Ser Gly Val Gly Gly Leu
 500 505 510
 35 Pro Val Thr Ser Gly Gly Arg Leu Pro Ser Ser Leu Thr Gly Leu Cys
 515 520 525
 Pro Gly Gly Met Tyr Val Phe Gln Leu Phe Asp Tyr Tyr Ser Ala Ser
 530 535 540
 40 Gly Thr Thr Leu Leu Trp Gln Ala Phe Trp Glu Cys Val Val Val Ala
 545 550 555 560
 Trp Val Tyr Gly Arg Ser Trp Leu Arg Ala Gly Leu Gly Asp Gly Gly
 565 570 575
 Gly Glu Gly Arg Ser Pro Ala Trp Pro Ser Arg Leu Thr Ser Pro Gln
 580 585 590
 45 Ala Asp Arg Phe Met Asp Asp Ile Ala Cys Met Ile Gly Tyr Arg Pro
 595 600 605
 Cys Pro Trp Met Lys Trp Cys Trp Ser Phe Phe Thr Pro Leu Val Cys
 610 615 620
 50 Met Gly Ile Phe Ile Phe Asn Val Val Tyr Tyr Glu Pro Leu Val Tyr
 625 630 635 640
 Asn Asn Thr Tyr Val Tyr Pro Trp Trp Gly Glu Ala Met Gly Trp Ala
 645 650 655
 Phe Ala Leu Ser Ser Met Leu Cys Val Pro Leu His Leu Leu Gly Cys
 660 665 670
 55 Leu Leu Arg Ala Lys Gly Thr Met Ala Glu Arg Trp Gln His Leu Thr
 675 680 685
 Gln Pro Ile Trp Gly Leu His His Leu Glu Tyr Arg Ala Gln Asp Ala
 690 695 700
 60 Asp Val Arg Gly Leu Thr Thr Leu Thr Pro Val Ser Glu Ser Ser Lys
 705 710 715 720
 Val Val Val Val Glu Ser Val Met

725

5 <210> 78
 <211> 1108
 <212> PRT
 <213> Human

<400> 78
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 Glu Lys Arg Val Gly Thr Arg Thr Val Phe Val Gly Asn His Pro Val
 20 25 30
 Ser Glu Thr Glu Ala Tyr Ile Ala Gln Arg Phe Cys Asp Asn Arg Ile
 35 40 45
 15 Val Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
 50 55 60
 Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
 65 70 75 80
 Val Gln Val Thr Val Asp Thr Pro Thr Ser Pro Val Thr Ser Gly Leu
 85 90 95
 20 Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
 100 105 110
 Asp Cys Leu Arg His Arg Ala Asp Asn Glu Val Asn Lys Ser Thr Val
 115 120 125
 25 Tyr Ile Ile Glu Asn Ala Lys Arg Val Arg Lys Glu Ser Glu Lys Ile
 130 135 140
 Lys Val Gly Asp Val Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
 145 150 155 160
 Asp Leu Ile Leu Leu Ser Ser Cys Thr Thr Asp Gly Thr Cys Tyr Val
 165 170 175
 30 Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
 180 185 190
 Val Arg Asp Thr Ile Ala Leu Cys Thr Ala Glu Ser Ile Asp Thr Leu
 195 200 205
 35 Arg Ala Ala Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe
 210 215 220
 Val Gly Arg Ile Asn Ile Tyr Ser Asn Ser Leu Glu Ala Val Ala Arg
 225 230 235 240
 Ser Leu Gly Pro Glu Asn Leu Leu Leu Lys Gly Ala Thr Leu Lys Asn
 245 250 255
 40 Thr Glu Lys Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys
 260 265 270
 Met Ala Leu Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu
 275 280 285
 45 Lys Ser Ile Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr
 290 295 300
 Lys Ala Ala Val Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro
 305 310 315 320
 Tyr Asn Asp Glu Pro Trp Tyr Asn Gln Lys Thr Gln Lys Glu Arg Glu
 325 330 335
 50 Thr Leu Lys Val Leu Lys Met Phe Thr Asp Phe Leu Ser Phe Met Val
 340 345 350
 Leu Phe Asn Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met
 355 360 365
 55 Gln Lys Phe Leu Gly Ser Phe Phe Ile Ser Trp Asp Lys Asp Phe Tyr
 370 375 380
 Asp Glu Glu Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn
 385 390 395 400
 Glu Glu Leu Gly Gln Val Asp Tyr Val Phe Thr Asp Lys Thr Gly Thr
 405 410 415
 60 Leu Thr Glu Asn Ser Met Glu Phe Ile Glu Cys Cys Ile Asp Gly His

[illegible]

Met Tyr Asn Ile Cys Phe Thr Ser Leu Pro Ile Leu Ala Tyr Ser Leu
 915 920 925
 Leu Glu Gln His Ile Asn Ile Asp Thr Leu Thr Ser Asp Pro Arg Leu
 930 935 940
 5 Tyr Met Lys Ile Ser Gly Asn Ala Met Leu Gln Leu Gly Pro Phe Leu
 945 950 955 960
 Tyr Trp Thr Phe Leu Ala Ala Phe Glu Gly Thr Val Phe Phe Phe Gly
 965 970 975
 10 Thr Tyr Phe Leu Phe Gln Thr Ala Ser Leu Glu Glu Asn Gly Lys Val
 980 985 990
 Tyr Gly Asn Trp Thr Phe Gly Thr Ile Val Phe Thr Val Leu Val Phe
 995 1000 1005
 Thr Val Thr Leu Lys Leu Ala Leu Asp Thr Arg Phe Trp Thr Trp Ile
 1010 1015 1020
 15 Asn His Phe Val Ile Trp Gly Ser Leu Ala Phe Tyr Val Phe Phe Ser
 1025 1030 1035 1040
 Phe Phe Trp Gly Gly Ile Ile Trp Pro Phe Leu Lys Gln Gln Arg Met
 1045 1050 1055
 20 Tyr Phe Val Phe Ala Gln Met Leu Ser Ser Val Ser Thr Trp Leu Ala
 1060 1065 1070
 Ile Ile Leu Leu Ile Phe Ile Ser Leu Phe Pro Glu Ile Leu Leu Ile
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 1090 1095 1100
 25 Ser Ser Ser Ala
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 Ser Glu Thr Glu Ala Tyr Ile Ala Gln Arg Phe Cys Asp Asn Arg Ile
 35 40 45
 40 Val Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
 50 55 60
 Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
 65 70 75 80
 Val Gln Val Thr Val Asp Thr Pro Thr Ser Pro Val Thr Ser Gly Leu
 85 90 95
 45 Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
 100 105 110
 Asp Cys Leu Arg His Arg Ala Asp Asn Glu Val Asn Lys Ser Thr Val
 115 120 125
 50 Tyr Ile Ile Glu Asn Ala Lys Arg Val Arg Lys Glu Ser Glu Lys Ile
 130 135 140
 Lys Val Gly Asp Val Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
 145 150 155 160
 Asp Leu Ile Leu Leu Ser Ser Cys Thr Thr Asp Gly Thr Cys Tyr Val
 165 170 175
 55 Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
 180 185 190
 Val Arg Asp Thr Ile Ala Leu Cys Thr Ala Glu Ser Ile Asp Thr Leu
 195 200 205
 60 Arg Ala Ala Ile Glu Cys Glu Gln Pro Gln Pro Asp Leu Tyr Lys Phe
 210 215 220

Val Gly Arg Ile Asn Ile Tyr Ser Asn Ser Leu Glu Ala Val Ala Arg
 225 230 235 240
 Ser Leu Gly Pro Glu Asn Leu Leu Leu Lys Gly Ala Thr Leu Lys Asn
 245 250 255
 5 Thr Glu Lys Ile Tyr Gly Val Ala Val Tyr Thr Gly Met Glu Thr Lys
 260 265 270
 Met Ala Leu Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu
 275 280 285
 10 Lys Ser Ile Asn Ala Phe Leu Ile Val Tyr Leu Phe Ile Leu Leu Thr
 290 295 300
 Lys Ala Ala Val Cys Thr Thr Leu Lys Tyr Val Trp Gln Ser Thr Pro
 305 310 315 320
 Tyr Asn Asp Glu Pro Trp Tyr Asn Gln Lys Thr Gln Lys Glu Arg Glu
 325 330 335
 15 Thr Leu Lys Val Leu Lys Met Phe Thr Asp Phe Leu Ser Phe Met Val
 340 345 350
 Leu Phe Asn Phe Ile Ile Pro Val Ser Met Tyr Val Thr Val Glu Met
 355 360 365
 20 Gln Lys Phe Leu Gly Ser Phe Phe Ile Ser Trp Asp Lys Asp Phe Tyr
 370 375 380
 Asp Glu Glu Ile Asn Glu Gly Ala Leu Val Asn Thr Ser Asp Leu Asn
 385 390 395 400
 Glu Glu Leu Gly Gln Val Asp Tyr Val Phe Thr Asp Lys Thr Gly Thr
 405 410 415
 25 Leu Thr Glu Asn Ser Met Glu Phe Ile Glu Cys Cys Ile Asp Gly His
 420 425 430
 Lys Tyr Lys Gly Val Thr Gln Glu Val Asp Gly Leu Ser Gln Thr Asp
 435 440 445
 30 Gly Thr Leu Thr Tyr Phe Asp Lys Val Asp Lys Asn Arg Glu Glu Leu
 450 455 460
 Phe Leu Arg Ala Leu Cys Leu Cys His Thr Val Glu Ile Lys Thr Asn
 465 470 475 480
 Asp Ala Val Asp Gly Ala Thr Glu Ser Ala Glu Leu Thr Tyr Ile Ser
 485 490 495
 35 Ser Ser Pro Asp Glu Ile Ala Leu Val Lys Gly Ala Lys Arg Tyr Gly
 500 505 510
 Phe Thr Phe Leu Gly Asn Arg Asn Gly Tyr Met Arg Val Glu Asn Gln
 515 520 525
 40 Arg Lys Glu Ile Glu Glu Tyr Glu Leu Leu His Thr Leu Asn Phe Asp
 530 535 540
 Ala Val Arg Arg Arg Met Ser Val Ile Val Lys Thr Gln Glu Gly Asp
 545 550 555 560
 Ile Leu Leu Phe Cys Lys Gly Ala Asp Ser Ala Val Phe Pro Arg Val
 565 570 575
 45 Gln Asn His Glu Ile Glu Leu Thr Lys Val His Val Glu Arg Asn Ala
 580 585 590
 Met Asp Gly Tyr Arg Thr Leu Cys Val Ala Phe Lys Glu Ile Ala Pro
 595 600 605
 50 Asp Asp Tyr Glu Arg Ile Asn Arg Gln Leu Ile Glu Ala Lys Met Ala
 610 615 620
 Leu Gln Asp Arg Glu Glu Lys Met Glu Lys Val Phe Asp Asp Ile Glu
 625 630 635 640
 Thr Asn Met Asn Leu Ile Gly Ala Thr Ala Val Glu Asp Lys Leu Gln
 645 650 655
 55 Asp Gln Ala Ala Glu Thr Ile Glu Ala Leu His Ala Ala Gly Leu Lys
 660 665 670
 Val Trp Val Leu Thr Gly Asp Lys Met Glu Thr Ala Lys Ser Thr Cys
 675 680 685
 60 Tyr Ala Cys Arg Leu Phe Gln Thr Asn Thr Glu Leu Leu Glu Leu Thr
 690 695 700
 Thr Lys Thr Ile Glu Glu Ser Glu Arg Lys Glu Asp Arg Leu His Glu

705 710 715 720
 Leu Leu Ile Glu Tyr Arg Lys Lys Leu Leu His Glu Phe Pro Lys Ser
 725 730 735
 5 Thr Arg Ser Phe Lys Lys Ala Trp Thr Glu His Gln Glu Tyr Gly Leu
 740 745 750
 Ile Ile Asp Gly Ser Thr Leu Ser Leu Ile Leu Asn Ser Ser Gln Asp
 755 760 765
 Ser Ser Ser Asn Asn Tyr Lys Ser Ile Phe Leu Gln Ile Cys Met Lys
 770 775 780
 10 Cys Thr Ala Val Leu Cys Cys Arg Met Ala Pro Leu Gln Lys Ala Gln
 785 790 795 800
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 15 Ile Gly Asp Gly Ala Asn Asp Val Ser Met Ile Leu Glu Ser His Val
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 Gly Ile Gly Ile Lys Gly Lys Glu Gly Arg Gln Ala Ala Arg Asn Ser
 835 840 845
 Asp Tyr Ser Val Pro Lys Phe Lys His Leu Lys Lys Leu Leu Leu Ala
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 20 His Gly His Leu Tyr Tyr Val Arg Ile Ala His Leu Val Gln Tyr Phe
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 Phe Tyr Lys Asn Leu Cys Phe Ile Leu Pro Gln Phe Leu Tyr Gln Phe
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 25 Phe Cys Gly Phe Ser Gln Gln Pro Leu Tyr Asp Ala Ala Tyr Leu Thr
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 Met Tyr Asn Ile Cys Phe Thr Ser Leu Pro Ile Leu Ala Tyr Ser Leu
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 Leu Glu Gln His Ile Asn Ile Asp Thr Leu Thr Ser Asp Pro Arg Leu
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 30 Tyr Met Lys Ile Ser Gly Asn Ala Met Leu Gln Leu Gly Pro Phe Leu
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 Tyr Trp Thr Phe Leu Ala Ala Phe Glu Gly Thr Val Phe Phe Phe Gly
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 980 985 990
 Tyr Gly Asn Trp Thr Phe Gly Thr Ile Val Phe Thr Val Leu Val Phe
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 40 Asn His Phe Val Ile Trp Gly Ser Leu Ala Phe Tyr Val Phe Phe Ser
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 Phe Phe Trp Gly Gly Ile Ile Trp Pro Phe Leu Lys Gln Gln Arg Met
 1045 1050 1055
 45 Tyr Phe Val Phe Ala Gln Met Leu Ser Ser Val Ser Thr Trp Leu Ala
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 Ile Ile Leu Leu Ile Phe Ile Ser Leu Phe Pro Glu Ile Leu Leu Ile
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 Val Leu Lys Asn Val Arg Arg Arg Ser Ala Arg Arg Asn Leu Ser Cys
 1090 1095 1100
 50 Arg Arg Ala Ser Asp Ser Leu Ser Ala Arg Pro Ser Val Arg Pro Leu
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 Leu Leu Arg Thr Phe Ser Asp Glu Ser Asn Val Leu
 1125 1130

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		50					55					60				
	Thr	Ser	Pro	Thr	Glu	Gly	Leu	Ala	Asp	Asn	Thr	Asn	Asp	Leu	Glu	Lys
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10	Arg	Arg	Gln	Ile	Tyr	Gly	Gln	Asn	Phe	Ile	Pro	Pro	Lys	Gln	Pro	Lys
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	Thr	Phe	Leu	Gln	Leu	Val	Trp	Glu	Ala	Leu	Gln	Asp	Val	Thr	Leu	Ile
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	Glu	Asp	Glu	Gly	Glu	Ala	Glu	Ala	Gly	Trp	Ile	Glu	Gly	Ala	Ala	Ile
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	Ser	Lys	Glu	Lys	Gln	Phe	Arg	Gly	Leu	Gln	Ser	Arg	Ile	Glu	Gln	Glu
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	Gln	Lys	Phe	Thr	Val	Ile	Arg	Asn	Gly	Gln	Leu	Leu	Gln	Val	Pro	Val
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	Ala	Ala	Leu	Val	Val	Gly	Asp	Ile	Ala	Gln	Val	Lys	Tyr	Gly	Asp	Leu
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	Leu	Pro	Ala	Asp	Gly	Val	Leu	Ile	Gln	Ala	Asn	Asp	Leu	Lys	Ile	Asp
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	Lys	Asp	Pro	Met	Leu	Leu	Ser	Gly	Thr	His	Val	Met	Glu	Gly	Ser	Gly
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	Arg	Met	Val	Val	Thr	Ala	Val	Gly	Val	Asn	Ser	Gln	Thr	Gly	Ile	Ile
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	Lys	Ala	Lys	Lys	Gln	Asp	Gly	Ala	Val	Ala	Met	Glu	Met	Gln	Pro	Leu
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	Asn	Ala	Pro	Lys	Lys	Glu	Lys	Ser	Val	Leu	Gln	Gly	Lys	Leu	Thr	Lys
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	Leu	Ala	Val	Gln	Ile	Gly	Lys	Ala	Gly	Leu	Val	Met	Ser	Ala	Ile	Thr
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	Glu	Gly	Leu	Pro	Leu	Ala	Val	Thr	Ile	Ser	Leu	Ala	Tyr	Ser	Val	Lys
			420					425					430			
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	Thr	Met	Gly	Asn	Ala	Thr	Ala	Ile	Cys	Ser	Asp	Lys	Thr	Gly	Thr	Leu
		450				455						460				
	Thr	Thr	Asn	Arg	Met	Thr	Val	Val	Gln	Ser	Tyr	Leu	Gly	Asp	Thr	His
	465				470						475				480	
60	Tyr	Lys	Glu	Ile	Pro	Ala	Pro	Ser	Ala	Leu	Thr	Pro	Lys	Ile	Leu	Asp
				485						490					495	

Leu Leu Val His Ala Ile Ser Ile Asn Ser Ala Tyr Thr Thr Lys Ile
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 Leu Pro Pro Glu Lys Glu Gly Ala Leu Pro Arg Gln Val Gly Asn Lys
 515 520 525
 5 Thr Glu Cys Ala Leu Leu Gly Phe Val Leu Asp Leu Lys Arg Asp Phe
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 Gln Pro Val Arg Glu Gln Ile Pro Glu Asp Lys Leu Tyr Lys Val Tyr
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 10 Thr Phe Asn Ser Val Arg Lys Ser Met Ser Thr Val Ile Arg Met Pro
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 Asp Gly Gly Phe Arg Leu Phe Ser Lys Gly Ala Ser Glu Ile Leu Leu
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 Lys Lys Cys Thr Asn Ile Leu Asn Ser Asn Gly Glu Leu Arg Gly Phe
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 Leu Thr Cys Ile Ala Val Val Gly Ile Glu Asp Pro Val Arg Pro Glu
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 Val Pro Glu Ala Ile Arg Lys Cys Gln Arg Ala Gly Ile Thr Val Arg
 675 680 685
 25 Met Val Thr Gly Asp Asn Ile Asn Thr Ala Arg Ala Ile Ala Ala Lys
 690 695 700
 Cys Gly Ile Ile Gln Pro Gly Glu Asp Phe Leu Cys Leu Glu Gly Lys
 705 710 715 720
 30 Glu Phe Asn Arg Arg Ile Arg Asn Glu Lys Gly Glu Ile Glu Gln Glu
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 Arg Leu Asp Lys Val Trp Pro Lys Leu Arg Val Leu Ala Arg Ser Ser
 740 745 750
 Pro Thr Asp Lys His Thr Leu Val Lys Gly Ile Ile Asp Ser Thr Thr
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 35 Gly Glu Gln Arg Gln Val Val Ala Val Thr Gly Asp Gly Thr Asn Asp
 770 775 780
 Gly Pro Ala Leu Lys Lys Ala Asp Val Gly Phe Ala Met Gly Ile Ala
 785 790 795 800
 40 Gly Thr Asp Val Ala Lys Glu Ala Ser Asp Ile Ile Leu Thr Asp Asp
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 Asn Phe Thr Ser Ile Val Lys Ala Val Met Trp Gly Arg Asn Val Tyr
 820 825 830
 Asp Ser Ile Ser Lys Phe Leu Gln Phe Gln Leu Thr Val Asn Val Val
 835 840 845
 45 Ala Val Ile Val Ala Phe Thr Gly Ala Cys Ile Thr Gln Asp Ser Pro
 850 855 860
 Leu Lys Ala Val Gln Met Leu Trp Val Asn Leu Ile Met Asp Thr Phe
 865 870 875 880
 50 Ala Ser Leu Ala Leu Ala Thr Glu Pro Pro Thr Glu Ser Leu Leu Leu
 885 890 895
 Arg Lys Pro Tyr Gly Arg Asp Lys Pro Leu Ile Ser Arg Thr Met Met
 900 905 910
 Lys Asn Ile Leu Gly His Ala Val Tyr Gln Leu Ala Ile Ile Phe Thr
 915 920 925
 55 Leu Leu Phe Val Gly Glu Leu Phe Phe Asp Ile Asp Ser Gly Arg Asn
 930 935 940
 Ala Pro Leu His Ser Pro Pro Ser Glu His Tyr Thr Ile Ile Phe Asn
 945 950 955 960
 60 Thr Phe Val Met Met Gln Leu Phe Asn Glu Ile Asn Ala Arg Lys Ile
 965 970 975
 His Gly Glu Arg Asn Val Phe Asp Gly Ile Phe Ser Asn Pro Ile Phe

980 985 990
 Cys Thr Ile Val Leu Gly Thr Phe Gly Ile Gln Ile Val Ile Val Gln
 995 1000 1005
 Phe Gly Gly Lys Pro Phe Ser Cys Ser Pro Leu Ser Thr Glu Gln Trp
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 5 Leu Trp Cys Leu Phe Val Gly Val Gly Glu Leu Val Trp Gly Gln Val
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 Ile Ala Thr Ile Pro Thr Ser Gln Leu Lys Cys Leu Lys Glu Ala Gly
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 10 His Gly Pro Gly Lys Asp Glu Met Thr Asp Glu Glu Leu Ala Glu Gly
 1060 1065 1070
 Glu Glu Glu Ile Asp His Ala Glu Arg Glu Leu Arg Arg Gly Gln Ile
 1075 1080 1085
 15 Leu Trp Phe Arg Gly Leu Asn Arg Ile Gln Thr Gln Ile Arg Val Val
 1090 1095 1100
 Lys Ala Phe Arg Ser Ser Leu Tyr Glu Gly Leu Glu Lys Pro Glu Ser
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 Lys Thr Ser Ile His Asn Phe Met Ala Thr Pro Glu Phe Leu Ile Asn
 1125 1130 1135
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 35 40 45
 Pro Thr Asp Asp Ile Ser Leu Lys Cys Glu Ala Ser Gly Lys Pro Glu
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 45 Val Gln Phe Arg Trp Thr Arg Asp Gly Val His Phe Lys Pro Lys Glu
 65 70 75 80
 Glu Leu Gly Val Thr Val Tyr Gln Ser Pro His Ser Gly Ser Phe Thr
 85 90 95
 Ile Thr Gly Asn Asn Ser Asn Phe Ala Gln Arg Phe Gln Gly Ile Tyr
 100 105 110
 50 Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr Ala Met Ser His Glu Ile
 115 120 125
 Arg Leu Met Ala Glu Gly Ala Pro Lys Trp Pro Lys Glu Thr Val Lys
 130 135 140
 55 Pro Val Glu Val Glu Glu Gly Glu Ser Val Val Leu Pro Cys Asn Pro
 145 150 155 160
 Pro Pro Ser Ala Glu Pro Leu Arg Ile Tyr Trp Met Asn Ser Lys Ile
 165 170 175
 60 Leu His Ile Lys Gln Asp Glu Arg Val Thr Met Gly Gln Asn Gly Asn
 180 185 190
 Leu Tyr Phe Ala Asn Val Leu Thr Ser Asp Asn His Ser Asp Tyr Ile

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	Glu	Asp	Asp	Gly	Glu	Tyr	Arg	Cys	Leu	Ala	Glu	Asn	Ser	Leu	Gly	Ser		
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	Ala	Arg	His	Ala	Tyr	Tyr	Val	Thr	Val	Glu	Ala	Ala	Pro	Tyr	Trp	Leu		
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	Asn	Gly	Ile	Pro	Val	Glu	Glu	Leu	Ala	Lys	Asp	Gln	Lys	Tyr	Arg	Ile		
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	Ala	Tyr	Ile	Tyr	Val	Val	Gln	Leu	Pro	Ala	Lys	Ile	Leu	Thr	Ala	Asp		
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 5 Val Lys Gly Glu Gly Asn Glu Thr Thr Asn Met Val Ile Thr Trp Lys
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 Pro Leu Arg Trp Met Asp Trp Asn Ala Pro Gln Val Gln Tyr Arg Val
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 10 Gln Trp Arg Pro Gln Gly Thr Arg Gly Pro Trp Gln Glu Gln Ile Val
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 Ser Asp Pro Phe Leu Val Val Ser Asn Thr Ser Thr Phe Val Pro Tyr
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 Glu Ile Lys Val Gln Ala Val Asn Ser Gln Gly Lys Gly Pro Glu Pro
 785 790 795 800
 15 Gln Val Thr Ile Gly Tyr Ser Gly Glu Asp Tyr Pro Gln Ala Ile Pro
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 Asn Val Thr Tyr Trp Arg Glu Gly Ser Gln Arg Lys His Ser Lys Arg
 850 855 860
 His Ile His Lys Asp His Val Val Val Pro Ala Asn Thr Thr Ser Val
 865 870 875 880
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 30 Thr Pro Glu Gly Val Pro Gly His Pro Glu Ala Leu His Leu Glu Cys
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 Gln Ser Asn Thr Ser Leu Leu Leu Arg Trp Gln Pro Pro Leu Ser His
 930 935 940
 Asn Gly Val Leu Thr Gly Tyr Val Leu Ser Tyr His Pro Leu Asp Glu
 945 950 955 960
 35 Gly Gly Lys Gly Gln Leu Ser Phe Asn Leu Arg Asp Pro Glu Leu Arg
 965 970 975
 Thr His Asn Leu Thr Asp Leu Ser Pro His Leu Arg Tyr Arg Phe Gln
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 40 Leu Gln Ala Thr Thr Lys Glu Gly Pro Gly Glu Ala Ile Val Arg Glu
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 Gly Gly Thr Met Ala Leu Ser Gly Ile Ser Asp Phe Gly Asn Ile Ser
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 1025 1030 1035 1040
 45 Gly Gln Cys Asn Phe Arg Phe His Ile Leu Phe Lys Ala Leu Gly Glu
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 50 Ser Ser Tyr Thr Gln Trp Asp Leu Gln Pro Asp Thr Asp Tyr Glu Ile
 1075 1080 1085
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 Asn Gly Thr Gly Arg Val Arg Leu Pro Pro Ala Gly Phe Ala Thr Glu
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 Gly Ser Ser Gln Pro Ser Leu Asn Gly Asp Ile Lys Pro Leu Gly Ser
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 35 40 45
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 Glu Leu Gly Val Thr Val Tyr Gln Ser Pro His Ser Gly Ser Phe Thr
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 Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr Ala Met Ser His Glu Ile
 115 120 125
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 Pro Val Glu Val Glu Glu Gly Glu Ser Val Val Leu Pro Cys Asn Pro
 145 150 155 160
 40 Pro Pro Ser Ala Glu Pro Leu Arg Ile Tyr Trp Met Asn Ser Lys Ile
 165 170 175
 Leu His Ile Lys Gln Asp Glu Arg Val Thr Met Gly Gln Asn Gly Asn
 180 185 190
 Leu Tyr Phe Ala Asn Val Leu Thr Ser Asp Asn His Ser Asp Tyr Ile
 195 200 205
 45 Cys His Ala His Phe Pro Gly Thr Arg Thr Ile Ile Gln Lys Glu Pro
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 Ile Asp Leu Arg Val Lys Ala Thr Asn Ser Met Ile Asp Arg Lys Pro
 225 230 235 240
 Arg Leu Leu Phe Pro Thr Asn Ser Ser Ser His Leu Val Ala Leu Gln
 245 250 255
 50 Gly Gln Pro Leu Val Leu Glu Cys Ile Ala Glu Gly Phe Pro Thr Pro
 260 265 270
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 275 280 285
 55 Thr Tyr Gln Asn His Asn Lys Thr Leu Gln Leu Leu Lys Val Gly Glu
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 Glu Asp Asp Gly Glu Tyr Arg Cys Leu Ala Glu Asn Ser Leu Gly Ser
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	Val	Thr	Gln	Cys	Glu	Ala	Arg	Asn	Arg	His	Gly	Leu	Leu	Leu	Ala	Asn
				405					410					415		
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			435					440					445			
	Lys	Ala	Phe	Gly	Ala	Pro	Val	Pro	Ser	Val	Gln	Trp	Leu	Asp	Glu	Asp
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	Thr	Leu	Gly	Ile	Arg	Asp	Leu	Gln	Ala	Asn	Asp	Thr	Gly	Arg	Tyr	Phe
				485					490					495		
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			500						505					510		
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	Ala	Ser	Thr	Glu	Leu	Asp	Val	Val	Glu	Ser	Arg	Ala	Gln	Leu	Leu	Val
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	625					630					635				640	
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	Thr	Ser	Thr	Thr	Leu	Lys	Leu	Ser	Pro	Tyr	Val	His	Tyr	Thr	Phe	Arg
			675					680					685			
	Val	Thr	Ala	Ile	Asn	Lys	Tyr	Gly	Pro	Gly	Glu	Pro	Ser	Pro	Val	Ser
45		690					695					700				
	Glu	Thr	Val	Val	Thr	Pro	Glu	Ala	Ala	Pro	Glu	Lys	Asn	Pro	Val	Asp
	705					710					715				720	
	Val	Lys	Gly	Glu	Gly	Asn	Glu	Thr	Thr	Asn	Met	Val	Ile	Thr	Trp	Lys
				725					730					735		
50	Pro	Leu	Arg	Trp	Met	Asp	Trp	Asn	Ala	Pro	Gln	Val	Gln	Tyr	Arg	Val
			740						745					750		
	Gln	Trp	Arg	Pro	Gln	Gly	Thr	Arg	Gly	Pro	Trp	Gln	Glu	Gln	Ile	Val
			755					760					765			
	Ser	Asp	Pro	Phe	Leu	Val	Val	Ser	Asn	Thr	Ser	Thr	Phe	Val	Pro	Tyr
55		770					775					780				
	Glu	Ile	Lys	Val	Gln	Ala	Val	Asn	Ser	Gln	Gly	Lys	Gly	Pro	Glu	Pro
	785					790					795				800	
	Gln	Val	Thr	Ile	Gly	Tyr	Ser	Gly	Glu	Asp	Tyr	Pro	Gln	Ala	Ile	Pro
				805					810					815		
60	Glu	Leu	Glu	Gly	Ile	Glu	Ile	Leu	Asn	Ser	Ser	Ala	Val	Leu	Val	Lys
				820					825					830		

Trp Arg Pro Val Asp Leu Ala Gln Val Lys Gly His Leu Arg Gly Tyr
 835 840 845
 Asn Val Thr Tyr Trp Arg Glu Gly Ser Gln Arg Lys His Ser Lys Arg
 850 855 860
 5 His Ile His Lys Asp His Val Val Val Pro Ala Asn Thr Thr Ser Val
 865 870 875 880
 Ile Leu Ser Gly Leu Arg Pro Tyr Ser Ser Tyr His Leu Glu Val Gln
 885 890 895
 10 Ala Phe Asn Gly Arg Gly Ser Gly Pro Ala Ser Glu Phe Thr Phe Ser
 900 905 910
 Thr Pro Glu Gly Val Pro Gly His Pro Glu Ala Leu His Leu Glu Cys
 915 920 925
 Gln Ser Asn Thr Ser Leu Leu Leu Arg Trp Gln Pro Pro Leu Ser His
 930 935 940
 15 Asn Gly Val Leu Thr Gly Tyr Val Leu Ser Tyr His Pro Leu Asp Glu
 945 950 955 960
 Gly Gly Lys Gly Gln Leu Ser Phe Asn Leu Arg Asp Pro Glu Leu Arg
 965 970 975
 20 Thr His Asn Leu Thr Asp Leu Ser Pro His Leu Arg Tyr Arg Phe Gln
 980 985 990
 Leu Gln Ala Thr Thr Lys Glu Gly Pro Gly Glu Ala Ile Val Arg Glu
 995 1000 1005
 Gly Gly Thr Met Ala Leu Ser Gly Ile Ser Asp Phe Gly Asn Ile Ser
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 1125 1130 1135
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 Val Lys Asp Lys Glu Asp Thr Gln Val Asp Ser Glu Ala Arg Pro Met
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 Lys Glu Lys Glu Ala Ala Gly Gly Asn Asp Ser Ser Gly Ala Thr Ser
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 20 25 30
 5 Glu Pro Pro Val Ile Thr Glu Gln Ser Pro Arg Arg Leu Val Val Phe
 35 40 45
 Pro Thr Asp Asp Ile Ser Leu Lys Cys Glu Ala Ser Gly Lys Pro Glu
 50 55 60
 10 Val Gln Phe Arg Trp Thr Arg Asp Gly Val His Phe Lys Pro Lys Glu
 65 70 75 80
 Glu Leu Gly Val Thr Val Tyr Gln Ser Pro His Ser Gly Ser Phe Thr
 85 90 95
 Ile Thr Gly Asn Asn Ser Asn Phe Ala Gln Arg Phe Gln Gly Ile Tyr
 100 105 110
 15 Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr Ala Met Ser His Glu Ile
 115 120 125
 Arg Leu Met Ala Glu Gly Ala Pro Lys Trp Pro Lys Glu Thr Val Lys
 130 135 140
 20 Pro Val Glu Val Glu Glu Gly Glu Ser Val Val Leu Pro Cys Asn Pro
 145 150 155 160
 Pro Pro Ser Ala Glu Pro Leu Arg Ile Tyr Trp Met Asn Ser Lys Ile
 165 170 175
 Leu His Ile Lys Gln Asp Glu Arg Val Thr Met Gly Gln Asn Gly Asn
 180 185 190
 25 Leu Tyr Phe Ala Asn Val Leu Thr Ser Asp Asn His Ser Asp Tyr Ile
 195 200 205
 Cys His Ala His Phe Pro Gly Thr Arg Thr Ile Ile Gln Lys Glu Pro
 210 215 220
 30 Ile Asp Leu Arg Val Lys Ala Thr Asn Ser Met Ile Asp Arg Lys Pro
 225 230 235 240
 Arg Leu Leu Phe Pro Thr Asn Ser Ser Ser His Leu Val Ala Leu Gln
 245 250 255
 Gly Gln Pro Leu Val Leu Glu Cys Ile Ala Glu Gly Phe Pro Thr Pro
 260 265 270
 35 Thr Ile Lys Trp Leu Arg Pro Ser Gly Pro Met Pro Ala Asp Arg Val
 275 280 285
 Thr Tyr Gln Asn His Asn Lys Thr Leu Gln Leu Leu Lys Val Gly Glu
 290 295 300
 40 Glu Asp Asp Gly Glu Tyr Arg Cys Leu Ala Glu Asn Ser Leu Gly Ser
 305 310 315 320
 Ala Arg His Ala Tyr Tyr Val Thr Val Glu Ala Ala Pro Tyr Trp Leu
 325 330 335
 His Lys Pro Gln Ser His Leu Tyr Gly Pro Gly Glu Thr Ala Arg Leu
 340 345 350
 45 Asp Cys Gln Val Gln Gly Arg Pro Gln Pro Glu Val Thr Trp Arg Ile
 355 360 365
 Asn Gly Ile Pro Val Glu Glu Leu Ala Lys Asp Gln Lys Tyr Arg Ile
 370 375 380
 50 Gln Arg Gly Ala Leu Ile Leu Ser Asn Val Gln Pro Ser Asp Thr Met
 385 390 395 400
 Val Thr Gln Cys Glu Ala Arg Asn Arg His Gly Leu Leu Leu Ala Asn
 405 410 415
 Ala Tyr Ile Tyr Val Val Gln Leu Pro Ala Lys Ile Leu Thr Ala Asp
 420 425 430
 55 Asn Gln Thr Tyr Met Ala Val Gln Gly Ser Thr Ala Tyr Leu Leu Cys
 435 440 445
 Lys Ala Phe Gly Ala Pro Val Pro Ser Val Gln Trp Leu Asp Glu Asp
 450 455 460
 60 Gly Thr Thr Val Leu Gln Asp Glu Arg Phe Phe Pro Tyr Ala Asn Gly
 465 470 475 480
 Thr Leu Gly Ile Arg Asp Leu Gln Ala Asn Asp Thr Gly Arg Tyr Phe

				485				490				495				
	Cys	Leu	Ala	Ala	Asn	Asp	Gln	Asn	Asn	Val	Thr	Ile	Met	Ala	Asn	Leu
				500				505						510		
5	Lys	Val	Lys	Asp	Ala	Thr	Gln	Ile	Thr	Gln	Gly	Pro	Arg	Ser	Thr	Ile
			515					520					525			
	Glu	Lys	Lys	Gly	Ser	Arg	Val	Thr	Phe	Thr	Cys	Gln	Ala	Ser	Phe	Asp
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	Pro	Ser	Leu	Gln	Pro	Ser	Ile	Thr	Trp	Arg	Gly	Asp	Gly	Arg	Asp	Leu
	545					550					555				560	
10	Gln	Glu	Leu	Gly	Asp	Ser	Asp	Lys	Tyr	Phe	Ile	Glu	Asp	Gly	Arg	Leu
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	Val	Ile	His	Ser	Leu	Asp	Tyr	Ser	Asp	Gln	Gly	Asn	Tyr	Ser	Cys	Val
				580					585					590		
	Ala	Ser	Thr	Glu	Leu	Asp	Val	Val	Glu	Ser	Arg	Ala	Gln	Leu	Leu	Val
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	Leu	Leu	Thr	Gln	Ser	Gln	Val	Arg	Val	Ser	Trp	Ser	Pro	Ala	Glu	Asp
	625					630					635				640	
20	His	Asn	Ala	Pro	Ile	Glu	Lys	Tyr	Asp	Ile	Glu	Phe	Glu	Asp	Lys	Glu
				645						650					655	
	Met	Ala	Pro	Glu	Lys	Trp	Tyr	Ser	Leu	Gly	Lys	Val	Pro	Gly	Asn	Gln
			660						665					670		
	Thr	Ser	Thr	Thr	Leu	Lys	Leu	Ser	Pro	Tyr	Val	His	Tyr	Thr	Phe	Arg
			675					680					685			
25	Val	Thr	Ala	Ile	Asn	Lys	Tyr	Gly	Pro	Gly	Glu	Pro	Ser	Pro	Val	Ser
			690				695					700				
	Glu	Thr	Val	Val	Thr	Pro	Glu	Ala	Ala	Pro	Glu	Lys	Asn	Pro	Val	Asp
	705					710					715				720	
30	Val	Lys	Gly	Glu	Gly	Asn	Glu	Thr	Thr	Asn	Met	Val	Ile	Thr	Trp	Lys
					725					730					735	
	Pro	Leu	Arg	Trp	Met	Asp	Trp	Asn	Ala	Pro	Gln	Val	Gln	Tyr	Arg	Val
			740						745					750		
	Gln	Trp	Arg	Pro	Gln	Gly	Thr	Arg	Gly	Pro	Trp	Gln	Glu	Gln	Ile	Val
			755					760					765			
35	Ser	Asp	Pro	Phe	Leu	Val	Val	Ser	Asn	Thr	Ser	Thr	Phe	Val	Pro	Tyr
		770					775					780				
	Glu	Ile	Lys	Val	Gln	Ala	Val	Asn	Ser	Gln	Gly	Lys	Gly	Pro	Glu	Pro
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40	Gln	Val	Thr	Ile	Gly	Tyr	Ser	Gly	Glu	Asp	Tyr	Pro	Gln	Ala	Ile	Pro
				805						810					815	
	Glu	Leu	Glu	Gly	Ile	Glu	Ile	Leu	Asn	Ser	Ser	Ala	Val	Leu	Val	Lys
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	Trp	Arg	Pro	Val	Asp	Leu	Ala	Gln	Val	Lys	Gly	His	Leu	Arg	Gly	Tyr
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45	Asn	Val	Thr	Tyr	Trp	Arg	Glu	Gly	Ser	Gln	Arg	Lys	His	Ser	Lys	Arg
		850					855					860				
	His	Ile	His	Lys	Asp	His	Val	Val	Val	Pro	Ala	Asn	Thr	Thr	Ser	Val
	865				870						875				880	
50	Ile	Leu	Ser	Gly	Leu	Arg	Pro	Tyr	Ser	Ser	Tyr	His	Leu	Glu	Val	Gln
				885						890					895	
	Ala	Phe	Asn	Gly	Arg	Gly	Ser	Gly	Pro	Ala	Ser	Glu	Phe	Thr	Phe	Ser
			900						905					910		
	Thr	Pro	Glu	Gly	Val	Pro	Gly	His	Pro	Glu	Ala	Leu	His	Leu	Glu	Cys
		915						920						925		
55	Gln	Ser	Asn	Thr	Ser	Leu	Leu	Arg	Trp	Gln	Pro	Pro	Leu	Ser	His	
		930					935					940				
	Asn	Gly	Val	Leu	Thr	Gly	Tyr	Val	Leu	Ser	Tyr	His	Pro	Leu	Asp	Glu
	945				950						955				960	
60	Gly	Gly	Lys	Gly	Gln	Leu	Ser	Phe	Asn	Leu	Arg	Asp	Pro	Glu	Leu	Arg
				965						970					975	

Thr His Asn Leu Thr Asp Leu Ser Pro His Leu Arg Tyr Arg Phe Gln
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 Leu Gln Ala Thr Thr Lys Glu Gly Pro Gly Glu Ala Ile Val Arg Glu
 995 1000 1005
 5 Gly Gly Thr Met Ala Leu Ser Gly Ile Ser Asp Phe Gly Asn Ile Ser
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 Ala Thr Ala Gly Glu Asn Tyr Ser Val Val Ser Trp Val Pro Lys Glu
 1025 1030 1035 1040
 Gly Gln Cys Asn Phe Arg Phe His Ile Leu Phe Lys Ala Leu Gly Glu
 10 1045 1050 1055
 Glu Lys Gly Gly Ala Ser Leu Ser Pro Gln Tyr Val Ser Tyr Asn Gln
 1060 1065 1070
 Ser Ser Tyr Thr Gln Trp Asp Leu Gln Pro Asp Thr Asp Tyr Glu Ile
 1075 1080 1085
 15 His Leu Phe Lys Glu Arg Met Phe Arg His Gln Met Ala Val Lys Thr
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 Asn Gly Thr Gly Arg Val Arg Leu Pro Pro Ala Gly Phe Ala Thr Glu
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 Gly Trp Phe Ile Gly Phe Val Ser Ala Ile Ile Leu Leu Leu Val
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 Val Lys Asp Lys Glu Asp Thr Gln Val Asp Ser Glu Ala Arg Pro Met
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 25 Lys Asp Glu Thr Phe Gly Glu Tyr Ser Asp Asn Glu Glu Lys Ala Phe
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 Gly Ser Ser Gln Pro Ser Leu Asn Gly Asp Ile Lys Pro Leu Gly Ser
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 Asp Asp Ser Leu Ala Asp Tyr Gly Gly Ser Val Asp Val Gln Phe Asn
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 35 40 45
 50 Ile Glu Glu Ala Tyr Gly Asp Val Ser Gly Leu Cys Arg Arg Leu Lys
 50 55 60
 Thr Ser Pro Thr Glu Gly Leu Ala Asp Asn Thr Asn Asp Leu Glu Lys
 65 70 75 80
 Arg Arg Gln Ile Tyr Gly Gln Asn Phe Ile Pro Pro Lys Gln Pro Lys
 55 85 90 95
 Thr Phe Leu Gln Leu Val Trp Glu Ala Leu Gln Asp Val Thr Leu Ile
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 Ile Leu Glu Val Ala Ala Ile Val Ser Leu Gly Leu Ser Phe Tyr Ala
 115 120 125
 60 Pro Pro Gly Glu Glu Ser Glu Ala Cys Gly Asn Val Ser Gly Gly Ala
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Glu Asp Glu Gly Glu Ala Glu Ala Gly Trp Ile Glu Gly Ala Ala Ile
 145 150 155 160
 Leu Leu Ser Val Ile Cys Val Val Leu Val Thr Ala Phe Asn Asp Trp
 165 170 175
 5 Ser Lys Glu Lys Gln Phe Arg Gly Leu Gln Ser Arg Ile Glu Gln Glu
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 Gln Lys Phe Thr Val Ile Arg Asn Gly Gln Leu Leu Gln Val Pro Val
 195 200 205
 10 Ala Ala Leu Val Val Gly Asp Ile Ala Gln Val Lys Tyr Gly Asp Leu
 210 215 220
 Leu Pro Ala Asp Gly Val Leu Ile Gln Ala Asn Asp Leu Lys Ile Asp
 225 230 235 240
 Glu Ser Ser Leu Thr Gly Glu Ser Asp His Val Arg Lys Ser Ala Asp
 245 250 255
 15 Lys Asp Pro Met Leu Leu Ser Gly Thr His Val Met Glu Gly Ser Gly
 260 265 270
 Arg Met Val Val Thr Ala Val Gly Val Asn Ser Gln Thr Gly Ile Ile
 275 280 285
 20 Phe Thr Leu Leu Gly Ala Gly Gly Glu Glu Glu Glu Lys Lys Asp Lys
 290 295 300
 Lys Gly Lys Gln Gln Asp Gly Ala Met Glu Ser Ser Gln Thr Lys Ala
 305 310 315 320
 Lys Lys Gln Asp Gly Ala Val Ala Met Glu Met Gln Pro Leu Lys Ser
 325 330 335
 25 Ala Glu Gly Gly Glu Met Glu Glu Arg Glu Lys Lys Lys Ala Asn Ala
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 Pro Lys Lys Glu Lys Ser Val Leu Gln Gly Lys Leu Thr Lys Leu Ala
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 30 Val Gln Ile Gly Lys Ala Gly Leu Val Met Ser Ala Ile Thr Val Ile
 370 375 380
 Ile Leu Val Leu Tyr Phe Val Ile Glu Thr Phe Val Val Glu Gly Arg
 385 390 395 400
 Thr Trp Leu Ala Glu Cys Thr Pro Val Tyr Val Gln Tyr Phe Val Lys
 405 410 415
 35 Phe Phe Ile Ile Gly Val Thr Val Leu Val Val Ala Val Pro Glu Gly
 420 425 430
 Leu Pro Leu Ala Val Thr Ile Ser Leu Ala Tyr Ser Val Lys Lys Met
 435 440 445
 40 Met Lys Asp Asn Asn Leu Val Arg His Leu Asp Ala Cys Glu Thr Met
 450 455 460
 Gly Asn Ala Thr Ala Ile Cys Ser Asp Lys Thr Gly Thr Leu Thr Thr
 465 470 475 480
 Asn Arg Met Thr Val Val Gln Ser Tyr Leu Gly Asp Thr His Tyr Lys
 485 490 495
 45 Glu Ile Pro Ala Pro Ser Ala Leu Thr Pro Lys Ile Leu Asp Leu Leu
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 Val His Ala Ile Ser Ile Asn Ser Ala Tyr Thr Thr Lys Ile Leu Pro
 515 520 525
 50 Pro Glu Lys Glu Gly Ala Leu Pro Arg Gln Val Gly Asn Lys Thr Glu
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 Cys Ala Leu Leu Gly Phe Val Leu Asp Leu Lys Arg Asp Phe Gln Pro
 545 550 555 560
 Val Arg Glu Gln Ile Pro Glu Asp Lys Leu Tyr Lys Val Tyr Thr Phe
 565 570 575
 55 Asn Ser Val Arg Lys Ser Met Ser Thr Val Ile Arg Met Pro Asp Gly
 580 585 590
 Gly Phe Arg Leu Phe Ser Lys Gly Ala Ser Glu Ile Leu Leu Lys Lys
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 60 Cys Thr Asn Ile Leu Asn Ser Asn Gly Glu Leu Arg Gly Phe Arg Pro
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 Arg Asp Arg Asp Asp Met Val Arg Lys Ile Ile Glu Pro Met Ala Cys

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5	Gln	Glu	Pro	Asp	Trp	Asp	Asn	Glu	Asn	Glu	Val	Val	Gly	Asp	Leu	Thr
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		690					695					700				
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	Ile	Ile	Gln	Pro	Gly	Glu	Asp	Phe	Leu	Cys	Leu	Glu	Gly	Lys	Glu	Phe
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	Ala	Leu	Lys	Lys	Ala	Asp	Val	Gly	Phe	Ala	Met	Gly	Ile	Ala	Gly	Thr
					805					810					815	
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	865					870					875					880
	Ala	Val	Gln	Met	Leu	Trp	Val	Asn	Leu	Ile	Met	Asp	Thr	Phe	Ala	Ser
					885					890					895	
35	Leu	Ala	Leu	Ala	Thr	Glu	Pro	Pro	Thr	Glu	Ser	Leu	Leu	Leu	Arg	Lys
			900						905					910		
	Pro	Tyr	Gly	Arg	Asp	Lys	Pro	Leu	Ile	Ser	Arg	Thr	Met	Met	Lys	Asn
			915					920					925			
	Ile	Leu	Gly	His	Ala	Val	Tyr	Gln	Leu	Ala	Ile	Ile	Phe	Thr	Leu	Leu
		930					935					940				
40	Phe	Val	Gly	Glu	Leu	Phe	Phe	Asp	Ile	Asp	Ser	Gly	Arg	Asn	Ala	Pro
	945					950					955					960
	Leu	His	Ser													

Phe Arg Ser Ser Leu Tyr Glu Gly Leu Glu Lys Pro Glu Ser Lys Thr
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 Ser Ile His Asn Phe Met Ala Thr Pro Glu Phe Leu Ile Asn Asp Tyr
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 35 40 45
 Pro Thr Asp Asp Ile Ser Leu Lys Cys Glu Ala Ser Gly Lys Pro Glu
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 30 Val Gln Phe Arg Trp Thr Arg Asp Gly Val His Phe Lys Pro Lys Glu
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 Glu Leu Gly Val Thr Val Tyr Gln Ser Pro His Ser Gly Ser Phe Thr
 85 90 95
 35 Ile Thr Gly Asn Asn Ser Asn Phe Ala Gln Arg Phe Gln Gly Ile Tyr
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 Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr Ala Met Ser His Glu Ile
 115 120 125
 Arg Leu Met Ala Glu Gly Ala Pro Lys Trp Pro Lys Glu Thr Val Lys
 130 135 140
 40 Pro Val Glu Val Glu Glu Gly Glu Ser Val Val Leu Pro Cys Asn Pro
 145 150 155 160
 Pro Pro Ser Ala Glu Pro Leu Arg Ile Tyr Trp Met Asn Ser Lys Ile
 165 170 175
 45 Leu His Ile Lys Gln Asp Glu Arg Val Thr Met Gly Gln Asn Gly Asn
 180 185 190
 Leu Tyr Phe Ala Asn Val Leu Thr Ser Asp Asn His Ser Asp Tyr Ile
 195 200 205
 Cys His Ala His Phe Pro Gly Thr Arg Thr Ile Ile Gln Lys Glu Pro
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 50 Ile Asp Leu Arg Val Lys Ala Thr Asn Ser Met Ile Asp Arg Lys Pro
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 Arg Leu Leu Phe Pro Thr Asn Ser Ser Ser His Leu Val Ala Leu Gln
 245 250 255
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 260 265 270
 Thr Ile Lys Trp Leu Arg Pro Ser Gly Pro Met Pro Ala Asp Arg Val
 275 280 285
 Thr Tyr Gln Asn His Asn Lys Thr Leu Gln Leu Leu Lys Val Gly Glu
 290 295 300
 60 Glu Asp Asp Gly Glu Tyr Arg Cys Leu Ala Glu Asn Ser Leu Gly Ser
 305 310 315 320

Ala Arg His Ala Tyr Tyr Val Thr Val Glu Ala Ala Pro Tyr Trp Leu
 325 330 335
 His Lys Pro Gln Ser His Leu Tyr Gly Pro Gly Glu Thr Ala Arg Leu
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 5 Asp Cys Gln Val Gln Gly Arg Pro Gln Pro Glu Val Thr Trp Arg Ile
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 Asn Gly Ile Pro Val Glu Glu Leu Ala Lys Asp Gln Lys Tyr Arg Ile
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 385 390 395 400
 Val Thr Gln Cys Glu Ala Arg Asn Arg His Gly Leu Leu Leu Ala Asn
 405 410 415
 Ala Tyr Ile Tyr Val Val Gln Leu Pro Ala Lys Ile Leu Thr Ala Asp
 420 425 430
 15 Asn Gln Thr Tyr Met Ala Val Gln Gly Ser Thr Ala Tyr Leu Leu Cys
 435 440 445
 Lys Ala Phe Gly Ala Pro Val Pro Ser Val Gln Trp Leu Asp Glu Asp
 450 455 460
 20 Gly Thr Thr Val Leu Gln Asp Glu Arg Phe Phe Pro Tyr Ala Asn Gly
 465 470 475 480
 Thr Leu Gly Ile Arg Asp Leu Gln Ala Asn Asp Thr Gly Arg Tyr Phe
 485 490 495
 Cys Leu Ala Ala Asn Asp Gln Asn Asn Val Thr Ile Met Ala Asn Leu
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 25 Lys Val Lys Asp Ala Thr Gln Ile Thr Gln Gly Pro Arg Ser Thr Ile
 515 520 525
 Glu Lys Lys Gly Ser Arg Val Thr Phe Thr Cys Gln Ala Ser Phe Asp
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 30 Pro Ser Leu Gln Pro Ser Ile Thr Trp Arg Gly Asp Gly Arg Asp Leu
 545 550 555 560
 Gln Glu Leu Gly Asp Ser Asp Lys Tyr Phe Ile Glu Asp Gly Arg Leu
 565 570 575
 Val Ile His Ser Leu Asp Tyr Ser Asp Gln Gly Asn Tyr Ser Cys Val
 580 585 590
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 595 600 605
 Val Gly Ser Pro Gly Pro Val Pro Arg Leu Val Leu Ser Asp Leu His
 610 615 620
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 625 630 635 640
 His Asn Ala Pro Ile Glu Lys Tyr Asp Ile Glu Phe Glu Asp Lys Glu
 645 650 655
 Met Ala Pro Glu Lys Trp Tyr Ser Leu Gly Lys Val Pro Gly Asn Gln
 660 665 670
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 675 680 685
 Val Thr Ala Ile Asn Lys Tyr Gly Pro Gly Glu Pro Ser Pro Val Ser
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 60 Glu Ile Lys Val Gln Ala Val Asn Ser Gln Gly Lys Gly Pro Glu Pro
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 Gln Val Thr Ile Gly Tyr Ser Gly Glu Asp Tyr Pro Gln Ala Ile Pro

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      35      40      45
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    50      55      60
    Thr Ser Pro Thr Glu Gly Leu Ala Asp Asn Thr Asn Asp Leu Glu Lys
    65      70      75      80
    Arg Arg Gln Ile Tyr Gly Gln Asn Phe Ile Pro Pro Lys Gln Pro Lys
      85      90      95
15  Thr Phe Leu Gln Leu Val Trp Glu Ala Leu Gln Asp Val Thr Leu Ile
    100      105      110
    Ile Leu Glu Val Ala Ala Ile Val Ser Leu Gly Leu Ser Phe Tyr Ala
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    Glu Asp Glu Gly Glu Ala Glu Ala Gly Trp Ile Glu Gly Ala Ala Ile
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    Leu Leu Ser Val Ile Cys Val Val Leu Val Thr Ala Phe Asn Asp Trp
      165      170      175
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    180      185      190
    Gln Lys Phe Thr Val Ile Arg Asn Gly Gln Leu Leu Gln Val Pro Val
    195      200      205
30  Ala Ala Leu Val Val Gly Asp Ile Ala Gln Val Lys Tyr Gly Asp Leu
    210      215      220
    Leu Pro Ala Asp Gly Val Leu Ile Gln Ala Asn Asp Leu Lys Ile Asp
    225      230      235      240
    Glu Ser Ser Leu Thr Gly Glu Ser Asp His Val Arg Lys Ser Ala Asp
      245      250      255
35  Lys Asp Pro Met Leu Leu Ser Gly Thr His Val Met Glu Gly Ser Gly
    260      265      270
    Arg Met Val Val Thr Ala Val Gly Val Asn Ser Gln Thr Gly Ile Ile
    275      280      285
40  Phe Thr Leu Leu Gly Ala Gly Gly Glu Glu Glu Glu Lys Lys Asp Lys
    290      295      300
    Lys Gly Lys Gln Gln Asp Gly Ala Met Glu Ser Ser Gln Thr Lys Ala
    305      310      315      320
    Lys Lys Gln Asp Gly Ala Val Ala Met Glu Met Gln Pro Leu Lys Ser
      325      330      335
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    340      345      350
    Pro Lys Lys Glu Lys Ser Val Leu Gln Gly Lys Leu Thr Lys Leu Ala
    355      360      365
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    370      375      380
    Ile Leu Val Leu Tyr Phe Val Ile Glu Thr Phe Val Val Glu Gly Arg
    385      390      395      400
    Thr Trp Leu Ala Glu Cys Thr Pro Val Tyr Val Gln Tyr Phe Val Lys
      405      410      415
55  Phe Phe Ile Ile Gly Val Thr Val Leu Val Val Ala Val Pro Glu Gly
    420      425      430
    Leu Pro Leu Ala Val Thr Ile Ser Leu Ala Tyr Ser Val Lys Lys Met
    435      440      445
60  Met Lys Asp Asn Asn Leu Val Arg His Leu Asp Ala Cys Glu Thr Met
    450      455      460

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Gly Asn Ala Thr Ala Ile Cys Ser Asp Lys Thr Gly Thr Leu Thr Thr
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 Asn Arg Met Thr Val Val Gln Ser Tyr Leu Gly Asp Thr His Tyr Lys
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 5 Glu Ile Pro Ala Pro Ser Ala Leu Thr Pro Lys Ile Leu Asp Leu Leu
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 Val His Ala Ile Ser Ile Asn Ser Ala Tyr Thr Thr Lys Ile Leu Pro
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 10 Pro Glu Lys Glu Gly Ala Leu Pro Arg Gln Val Gly Asn Lys Thr Glu
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 Cys Ala Leu Leu Gly Phe Val Leu Asp Leu Lys Arg Asp Phe Gln Pro
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 Val Arg Glu Gln Ile Pro Glu Asp Lys Leu Tyr Lys Val Tyr Thr Phe
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 15 Asn Ser Val Arg Lys Ser Met Ser Thr Val Ile Arg Met Pro Asp Gly
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 625 630 635 640
 Asp Gly Leu Arg Thr Ile Cys Ile Ala Tyr Arg Asp Phe Ser Ala Gly
 645 650 655
 25 Gln Glu Pro Asp Trp Asp Asn Glu Asn Glu Val Val Gly Asp Leu Thr
 660 665 670
 Cys Ile Ala Val Val Gly Ile Glu Asp Pro Val Arg Pro Glu Val Pro
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 Thr Gly Asp Asn Ile Asn Thr Ala Arg Ala Ile Ala Ala Lys Cys Gly
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 Ile Ile Gln Pro Gly Glu Asp Phe Leu Cys Leu Glu Gly Lys Glu Phe
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 820 825 830
 Thr Ser Ile Val Lys Ala Val Met Trp Gly Arg Asn Val Tyr Asp Ser
 835 840 845
 50 Ile Ser Lys Phe Leu Gln Phe Gln Leu Thr Val Asn Val Val Ala Val
 850 855 860
 Ile Val Ala Phe Thr Gly Ala Cys Ile Thr Gln Asp Ser Pro Leu Lys
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 915 920 925
 60 Ile Leu Gly His Ala Val Tyr Gln Leu Ala Ile Ile Phe Thr Leu Leu
 930 935 940
 Phe Val Gly Glu Leu Phe Phe Asp Ile Asp Ser Gly Arg Asn Ala Pro

102

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	370						375					380							
25	Gln	Arg	Gly	Ala	Leu	Ile	Leu	Ser	Asn	Val	Gln	Pro	Ser	Asp	Thr	Met			
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	Val	Thr	Gln	Cys	Glu	Ala	Arg	Asn	Arg	His	Gly	Leu	Leu	Leu	Ala	Asn			
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 Asn Arg Met Thr Val Val Gln Ser Tyr Leu Gly Asp Thr His Tyr Lys
 485 490 495
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 Asp Asp Thr Ser Arg Asn Ser Pro Lys Leu Gly Leu Leu Asp Arg Ile
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 20 Val Asn Tyr Ser Arg Ala Ser Ile Asn Ser Leu Leu Ser Asp Lys Arg
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30 <212> DNA

<213> Bovine

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<213> Bovine

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 10 Ala Leu Val Gln Leu Thr Leu Leu Phe Val His Arg Asp Phe Thr Arg
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 Asp Arg Pro Leu Val Leu Leu His Leu Leu Gln Leu Gly Pro Leu
 65 70 75 80
 Phe Arg Cys Phe Glu Val Phe Cys Ile Tyr Cys Gln Ser Asn His Ile
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 15 Glu Glu Pro Tyr Val Ser Ile Thr Lys Lys Arg Gln Ile Pro Lys Asn
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 Gly His Ser Glu Glu Ile Glu Lys Glu Val Gly Gln Ala Glu Gly Lys
 115 120 125
 20 Leu Phe Thr His Arg Ser Ala Phe Ser Arg Ala Ser Val Ile Gln Ala
 130 135 140
 Phe Leu Gly Ser Ala Pro Gln Leu Thr Leu Gln Leu Tyr Ile Ser Val
 145 150 155 160
 Leu Gln Gln Asp Val Ser Ile Gly Arg Cys Leu Phe Met Val Leu Ser
 165 170 175
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 Lys Ile Lys Tyr Asp Glu Tyr Asp Val Lys Val Lys Pro Leu Ala Tyr
 195 200 205
 30 Val Cys Ile Phe Leu Trp Arg Ser Phe Glu Ile Val Thr Arg Val Ile
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 Val Leu Val Leu Phe Thr Ser Val Leu Lys Ala Trp Val Val Ile Asp
 225 230 235 240
 Ile Leu Ile Asn Phe Leu Gly Phe Leu Phe Tyr Pro Trp Ile Leu Phe
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 Arg Leu Gly Thr Thr Ile Val Leu Cys Phe Leu Thr Leu Leu Tyr Ala
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 Pro Asp Leu Ile Ser Lys Ser Gln Asn Trp Tyr Arg Leu Leu Val Tyr
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 Tyr Met Val Arg Phe Ile Glu Asn Ala Phe Leu Leu Leu Met Trp Tyr
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 45 Leu Tyr Lys Thr Asp Ile Tyr Met Tyr Val Cys Ala Pro Leu Leu Met
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<400> 146

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35 40 45
Ile Ser Ser Lys Tyr Thr Leu Trp Asn Phe Leu Pro Lys Asn Leu Phe
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Glu Gln Phe Arg Arg Ile Ala Asn Phe Tyr Phe Leu Ile Ile Phe Leu
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Pro Leu Phe Phe Val Ile Thr Val Thr Ala Ile Lys Gln Gly Tyr Glu
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Lys Val Gly Asp Ile Val Glu Val Gln Ala Asp Glu Thr Phe Pro Cys
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Thr Thr Ala Ser Leu Asp Gly Glu Ser Asn Cys Lys Thr His Tyr Ala
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260 265 270
45 Met Ala Leu Asn Tyr Gln Gly Lys Ser Gln Lys Arg Ser Ala Val Glu
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 40 Thr Arg Ser Leu Lys Lys Ala Trp Thr Glu His Gln Glu Tyr Gly Leu
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 Gly Ile Gly Ile Lys Gly Lys Glu Gly Arg Gln Ala Ser Arg Asn Ser
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 55 Asp Tyr Ala Val Pro Lys Phe Lys His Leu Lys Lys Leu Leu Leu Ala
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 His Gly His Leu Tyr Tyr Val Arg Ile Ala His Leu Val Gln Tyr Phe
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 Phe Tyr Lys Asn Leu Cys Phe Ile Leu Pro Gln Phe Leu Tyr Gln Phe
 885 890 895
 60 Phe Cys Gly Phe Ser Gln Gln Pro Leu Tyr Asp Ala Ala Tyr Leu Thr

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<211> 351

<212> PRT

15 <213> Bovine

<400> 148

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 35 40 45
 25 Leu Ser Met Gly Phe Ser Val Lys Glu Asp Leu Ser Trp Pro Gly Leu
 50 55 60
 Ala Val Gly Asn Leu Phe His Arg Pro Arg Ala Thr Val Met Val Met
 65 70 75 80
 Val Lys Gly Val Asp Lys Leu Ala Leu Pro Pro Gly Ser Val Ile Ser
 85 90 95
 30 Tyr Pro Leu Glu Asn Ala Val Pro Phe Ser Leu Asp Ser Val Ala Asn
 100 105 110
 Ser Ile His Ser Leu Phe Ser Glu Glu Thr Pro Val Val Leu Gln Leu
 115 120 125
 35 Ala Pro Ser Glu Glu Arg Val Tyr Met Val Gly Lys Ala Asn Ser Val
 130 135 140
 Phe Glu Asp Leu Ser Val Thr Leu Arg Gln Leu Arg Asn Arg Leu Phe
 145 150 155 160
 Gln Glu Asn Ser Val Leu Thr Ser Leu Pro Leu Asn Ser Leu Ser Arg
 165 170 175
 40 Asn Asn Glu Val Asp Leu Leu Phe Leu Ser Glu Leu Gln Val Leu Arg
 180 185 190
 Asp Ile Ser Ser Leu Leu Ser Arg His Lys His Leu Ala Lys Asp His
 195 200 205
 45 Ser Pro Asp Leu Tyr Ser Leu Glu Leu Ala Gly Leu Asp Glu Ile Gly
 210 215 220
 Lys His Tyr Gly Glu Asp Ser Glu Gln Phe Arg Asp Ala Ser Lys Ile
 225 230 235 240
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 245 250 255
 50 Gly Gly Asn Ala Val Val Glu Leu Val Thr Val Arg Ser Phe Asp Thr
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 Ser Leu Val Arg Lys Thr Arg Asn Ile Leu Glu Thr Lys Gln Val Lys
 275 280 285
 55 Asp Pro Ser Thr Thr Tyr Asn Leu Ala Tyr Lys Tyr Asn Phe Glu Tyr
 290 295 300
 Pro Val Val Phe Asn Leu Val Leu Trp Ile Met Ile Gly Leu Ala Leu
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 cttgagaata ctactaccta caaagcattt gtcatttcag gaattctcca catagctgct 420
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 30 Glu Trp Arg Val Trp Tyr Leu Asp Asn Ala Ser Gln Phe Ser Gly Leu
 35 40 45
 Ala Cys Met Gly Met Trp Arg Val Cys Val Phe Arg Gln Thr Asn Ile
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 Thr Thr Ala Thr Ser Cys His Ser Tyr Ser Tyr His Asp Thr Tyr Leu
 65 70 75 80
 35 Pro Leu Asp Ile Arg Val Ser Gln His Leu Leu Leu Met Ala Ser Ile
 85 90 95
 Leu Gly Leu Leu Gly Lys Ala Ser Val Thr Phe Ala Leu Lys Asn Val
 100 105 110
 40 Ser Met Gly Ile Leu Glu Asn Thr Thr Tyr Lys Ala Phe Val Ile
 115 120 125
 Ser Gly Ile Leu His Ile Ala Ala Gly Ile Cys Ile Ser Val Ala Val
 130 135 140
 Ile Trp Asn Tyr His Ser Val Met Thr Glu Glu Gly Ile Val Phe Pro
 145 150 155 160
 45 Pro Ser Phe Asn Ile Pro Phe Lys Pro Tyr Ala Gln Lys Ile Gly Asn
 165 170 175
 Thr Val Ile Val Ala Cys Leu Ala Ala Phe Ala Leu Phe Leu Gly Gly
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55 <210> 151
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							Tyr
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							Ala
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							Asn
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							Asn
							Leu
							Ala
							Leu
							Ser
							Asp
							Leu
							Leu
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							80
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							Thr
							His
							Tyr
							Val
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							Asn
							Glu
							Gln
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	Gly	Leu	His	His	Ala	Thr	Cys
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							Leu
							Ile
							Thr
							Ala
							Phe
							Phe
							Phe
							Ile
							100
							105
							110
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							Ile
							Thr
							Val
							Ile
							Ser
							Val
							Asp
							Arg
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							125
	Phe	Leu	Ala	Ile	Val	Leu	Ala
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							Ser
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							Ser
							Asn
							Arg
							Thr
							Val
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							135
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							Gly
							Val
							Trp
							Ala
							Ala
							Ala
							Ile
							Leu
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							155
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							Thr
							Arg
							Glu
							Lys
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							Asn
							Glu
							Cys
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							Gln
							Glu
							Ile
							Trp
							Pro
							Val
							Ile
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							Leu
							Leu
							Pro
							Leu
							Leu
							Ile
							Met
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							Gln
							Thr
							Leu
							Phe
							Ser
							Cys
							Lys
							Asn
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							215
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							Arg
							Leu
							Ile
							Phe
							Leu
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							Asn
							Val
							Met
							Ile
							Phe
							Leu
							Gln
							Thr
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							255
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							Cys
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							Lys
							Arg
							Asp
							Leu
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							Thr
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							Ala
							Phe
							Ser
							His
							Cys
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<211> 480

<212> DNA

15 <213> Bovine

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<211> 159

<212> PRT

30 <213> Bovine

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 35 40 45
 Gln Glu Gln Ala Gln Asp Trp Leu Glu Ile Thr Leu Leu Trp Leu Phe
 50 55 60
 40 Phe Ile Val Leu Met Tyr Val Thr Val Lys Leu Ala Gly Glu Asn Gly
 65 70 75 80
 Glu Ser Arg Val Gln Thr Ser His Ala Leu Gln Gly Arg Ser Phe Gly
 85 90 95
 45 Phe Leu Gly Asn Lys Lys Val Lys Thr Ser Ser Lys Glu Val Tyr Met
 100 105 110
 Phe His Thr Leu Thr Leu Leu Glu Met Asp Leu Val Lys Phe Val Cys
 115 120 125
 Arg Val Gln Asn Leu Lys Leu Ala Thr Ser Thr Ser Gly Asn Ile Asn
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 50 Pro Leu Asn Val Lys Val Pro Ala Asp Val Ser Val Gln Gly Gln
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<210> 155

55 <211> 555

<212> DNA

<213> Bovine

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	ggcgatgacg	aaagtaatgc	gggcactcct	cctggccgtc	agggctgttc	atctggctct	300
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		35	40	45			
	Pro Glu Tyr Ala	Pro Gly Trp Phe	Gly Ser Lys Trp	His Trp Leu Leu			
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	Ile Phe Leu Met	Phe Leu Val Ile	Leu Lys Phe Pro	Gly Gly Asp Asp			
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	Ser Pro Gly Arg	Lys Lys Ile Arg	Asp Ser Pro Tyr	Lys Glu Ser Met			
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		130	135	140			
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	ttgctgctct	ttttgctgga	agagtagatg	ggctgggtct	ttacgaagaa	gattcaacag	780
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 aagttgtagt ttagttttgt gcatc 1045

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 <212> PRT
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 35 40 45
 Gly Ser Gln Pro Arg Gly Ser Met Ala Ser Ala Gln Gln Ser Arg Gly
 50 55 60
 Gln Ala Ala Ser Val His Gly Val Arg Gly Gly Thr Arg Arg Ser Thr
 65 70 75 80
 20 Leu Lys Val Trp Val Ser Gln Arg Phe Gly Leu Phe Leu Leu Gly Phe
 85 90 95
 Trp Phe Leu Leu Leu Cys Phe Tyr Met Ser Thr Gly Tyr Met Asp
 100 105 110
 25 Ser Val Ser Ala Asn Asn Tyr Ile Leu Trp Ser Ser Glu Asn Ala Asp
 115 120 125
 Gly Gln Ser Leu Asn Glu Thr Ser Ala Leu Arg Ser Leu Ile Arg Phe
 130 135 140
 Phe Phe Pro Thr Thr Cys Val Pro Val Glu Gly Gln Val Leu Thr Pro
 145 150 155 160
 30 Cys Lys Gln Gly Gln Asp Leu Asn Lys Asp Glu Cys Leu Lys Tyr Lys
 165 170 175
 Cys Cys Tyr Ser Ser Ile Glu Thr Ala Thr Val Ser Cys Phe Ala Pro
 180 185 190
 35 Leu Arg Asp Lys Pro Thr Gln Met Phe Arg Met Phe Gly Phe Gly Ala
 195 200 205
 Met Ser Met Val Phe Leu Gly Cys Leu Pro Met Tyr Cys Cys Ser Phe
 210 215 220
 Cys Trp Lys Ser Arg Trp Ala Gly Leu Leu Arg Arg Arg Phe Asn Arg
 225 230 235 240
 40 Thr Leu Lys Arg Leu Lys Lys His Arg Lys Lys Pro Lys Arg Asp Thr
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 Glu Met Leu Glu Thr Ala Val Asp Glu Gly Tyr Gly Asp Glu Lys
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 45 Asp Gln Glu Thr Thr Ala Leu Phe Ser Gln
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 50 <212> DNA
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 25 caggatcctc aggacattcg cagccctcct acccttcgag tccacggggc cctaagcgac 1980
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 35 40 45
 Val Ala Pro Cys Thr Asp Phe Phe Ser Phe Ala Cys Gly Asn Ile Asn
 50 55 60
 Arg Thr Gly Ser Pro Phe Gln Ala Leu Ala Glu Glu Asn Lys Arg Arg
 65 70 75 80
 45 Val Arg Arg Ile Leu Glu Thr Pro Gly Ser Trp Arg Leu Ala Pro Gly
 85 90 95
 Glu Glu Lys Ala Phe Glu Phe Tyr Asn Ser Cys Met Asn Met Ser Ala
 100 105 110
 Ile Glu Ala Ala Gly Ala Ser Pro Phe Arg Gln Val Ile Glu Glu Gln
 115 120 125
 50 Leu Gly Gly Trp Ser Ile Phe Gly Asn Trp Thr Pro Leu Asp Phe Asn
 130 135 140
 Gln Thr Leu Ser Leu Leu Met Ser Gln Tyr Gly His Phe Pro Phe Phe
 145 150 155 160
 55 Arg Ala Tyr Leu Lys Pro Leu Pro Thr Pro Pro Tyr Leu Pro Val Ile
 165 170 175
 Gln Val Ile Asp Gln Pro Glu Leu Asp Val Leu Leu Lys Gln Lys Gln
 180 185 190
 Glu Pro Asn Tyr Ala Gln Ile Leu Arg Glu Tyr Leu Ser Tyr Leu Asn
 195 200 205
 60 Arg Leu Val Thr Leu Leu Gly Gly Asp Pro Thr Lys Val Gly Asn Asp

210 215 220
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 225 230 235 240
 Pro Gly Glu Gln Gln Gln Ala Gln Gly Lys Val Phe Glu Met Val Thr
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 5 Ile Asp Gln Leu Gln Arg Val Ala Pro Ala Ile Asp Trp Leu Ser Cys
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 275 280 285
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 290 295 300
 Lys Asp Leu Met Lys His Arg Asp Phe Leu Gln Ser His Ile Ile Phe
 305 310 315 320
 Gly Leu Val Lys Thr Leu Ser Pro Ala Leu Asp Ser Gln Phe Gln Glu
 325 330 335
 15 Ala His Arg Ser Leu Ser Gln Lys Val Gly Glu Leu Thr Gly Arg Pro
 340 345 350
 Pro Met Pro Val His Pro Arg Trp Met Thr Cys Val Glu Lys Thr Glu
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 20 Ala Phe Phe Glu Pro Thr Leu Ala Thr Leu Phe Ile Lys Glu Thr Phe
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 Lys Pro Ser Thr His Ser Ala Ala Met Glu Leu Phe Thr Thr Ile Lys
 385 390 395 400
 Asp Thr Phe Ile Ser His Leu His Thr Val Pro Trp Met Asp Arg Glu
 405 410 415
 25 Thr Arg Ala Glu Ala Gln Asp Arg Leu Thr Gln Leu Gln Val Lys Met
 420 425 430
 Gly Pro Ser Glu Trp Ala Leu Lys Pro Asp Pro Ala Arg Gln Glu Tyr
 435 440 445
 30 Asp Asp Val Gln Leu Gly Pro Ser Phe Leu Gln Thr Phe Leu Ser Cys
 450 455 460
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 Ser Ser His Arg Trp Gln Val Leu Pro Trp Gly Leu Lys Ala Ser Tyr
 485 490 495
 35 Ser Ile Pro Asp His Val Met Val Phe Pro Ala Gly Leu Leu Gln Pro
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 Pro Phe Phe His Pro Gly Tyr Pro Arg Ala Val Asn Phe Gly Ala Ala
 515 520 525
 40 Gly Ser Ile Met Ala Arg Glu Leu Leu His Ile Phe Asp Gln Leu Leu
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 545 550 555 560
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 45 Thr Ser Phe Asn Val Ser Arg Thr Leu Leu Glu Asp Ala Ala Asp Ala
 580 585 590
 Gly Ala Leu Ala Ile Ala Leu Lys Ala Tyr Lys Lys Arg Leu Val Leu
 595 600 605
 50 Phe Arg Gly Glu Thr Ile Leu Pro Asn Leu Asp Leu Ser Pro Arg Gln
 610 615 620
 Leu Phe Phe Arg Ser Tyr Ala Gln Val Met Cys Arg Asp Pro Ser Thr
 625 630 635 640
 Gln Asp Pro Gln Asp Ile Arg Ser Pro Pro Thr Leu Arg Val His Gly
 645 650 655
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<211> 546
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 <213> Bovine

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<211> 181

<212> PRT

20 <213> Bovine

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 Pro Arg Met Val Pro Ser Gly Arg His Phe Arg Val Arg Gln Asn Gln
 35 40 45
 30 Pro Glu Tyr Ala Pro Gly Trp Phe Gly Ser Lys Trp His Trp Leu Leu
 50 55 60
 Ile Phe Leu Met Phe Leu Val Ile Leu Lys Phe Pro Gly Gly Asp Asp
 65 70 75 80
 Lys Ser Asn Ala Gly Thr Pro Pro Gly Arg Gln Gly Cys Ser Ser Gly
 85 90 95
 35 Ser Pro Gly Arg Lys Lys Ile Arg Pro Ser Pro Tyr Lys Asp Ser Met
 100 105 110
 Cys Gly Ala Leu Thr Gln Ser Glu Thr Ser Leu Met Asn Leu Met Ser
 115 120 125
 Arg Val Lys Asn Met Lys Leu Thr Val Ala Thr Gly Asp Gln Cys Gln
 130 135 140
 40 Cys Pro Asn Ile Glu Val Pro Gly Asn Ala Arg Asn Asn Val Thr Ile
 145 150 155 160
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 165 170 175
 45 Lys Glu Glu Lys Glu
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<210> 163

<211> 610

50 <212> DNA

<213> Bovine

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 <212> PRT
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 15 Pro Arg Met Val Pro Ser Gly Arg His Phe Arg Val Arg Gln Asn Gln
 35 40 45
 Pro Glu Tyr Ala Pro Gly Trp Phe Gly Ser Lys Trp His Trp Leu Leu
 50 55 60
 Ile Phe Leu Met Phe Leu Val Ile Leu Lys Phe Pro Gly Gly Asp Asp
 65 70 75 80
 20 Lys Ser Asn Ala Gly Thr Pro Pro Gly Arg Gln Gly Cys Ser Ser Gly
 85 90 95
 Ser Pro Gly Arg Lys Lys Ile Arg Pro Ser Pro Tyr Lys Glu Ser Met
 100 105 110
 25 Cys Gly Ala Leu Thr Gln Ser Glu Thr Ser Leu Met Asn Leu Met Ser
 115 120 125
 Arg Val Lys Asn Met Lys Leu Thr Val Ala Thr Gly Asp Gln Cys Gln
 130 135 140
 Cys Pro Asn Ile Glu Val Pro Gly Asp Ala Arg Asn Asn Val Thr Ile
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 Lys Glu Glu Lys Glu
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<211> 1071

10 <212> DNA

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<400> 167

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<211> 579

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<213> Equine

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<212> DNA
<213> Equine

<400> 172

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 <213> Equine

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 <211> 3762
 <212> DNA
 <213> Equine

30

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<211> 1193

40 <212> DNA

<213> Equine

<400> 182

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 <211> 359
 <212> PRT
 <213> Equine

<400> 183
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 35 40 45
 Val Val Ile Gly Leu Leu Gly Asn Leu Met Val Val Val Ile Leu Thr
 50 55 60
 Lys Tyr Lys Arg Leu Arg Ile Met Thr Asn Ile Phe Leu Phe Asn Leu
 65 70 75 80
 20 Ala Ile Ser Asp Leu Leu Phe Leu Phe Thr Leu Pro Phe Trp Ile His
 85 90 95
 Tyr Val Trp Arg Asp Glu Trp Val Phe Gly His His Met Cys Lys Phe
 100 105 110
 Leu Ile Gly Leu Cys Tyr Thr Gly Leu Tyr Ser Glu Ile Phe Phe Ile
 115 120 125
 25 Ile Leu Leu Thr Leu Asp Arg Tyr Leu Ala Ile Val His Ala Val Phe
 130 135 140
 Ala Leu Arg Thr Arg Thr Val Thr Phe Gly Ile Ile Thr Ser Val Phe
 145 150 155 160
 30 Thr Trp Gly Leu Ala Gly Leu Ala Ala Leu Pro Glu Phe Ile Phe His
 165 170 175
 Gly Phe Gln Glu Glu Phe Gly Gln Tyr Val Cys Leu Pro Phe Tyr Pro
 180 185 190
 Glu Ala Ala Glu Asn Ile Trp Lys Ser Thr His Val Leu Arg Met Asn
 195 200 205
 35 Ile Leu Ser Leu Ala Leu Pro Leu Leu Ile Met Ala Val Cys Tyr Ser
 210 215 220
 Gly Ile Ile Lys Thr Leu Leu Arg Cys Pro Asn Lys Lys Lys Tyr Lys
 225 230 235 240
 40 Ala Ile Arg Leu Ile Phe Val Ile Met Val Val Phe Phe Val Phe Trp
 245 250 255
 Ala Pro Tyr Asn Leu Val Leu Phe Phe Ser Thr Phe Gln Thr Thr Phe
 260 265 270
 Leu Gly Thr Ser Cys Asp Gln Ser Lys Gln Leu Asp Met Ala Leu Leu
 275 280 285
 45 Val Thr Glu Met Ile Ala Tyr Thr His Cys Cys Val Asn Pro Val Ile
 290 295 300
 Tyr Ala Phe Val Gly Glu Arg Phe Gln Lys Asn Leu His His Phe Phe
 305 310 315 320
 50 His Thr Tyr Val Ala Ile Tyr Leu Cys Lys Tyr Ile Pro Phe Leu Pro
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 Gln Glu Leu Ser Ala Ala Phe
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<210> 184
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 <212> PRT
 <213> Equine

<400> 184
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 35 40 45
 His Phe Lys Pro Lys Glu Glu Leu Gly Val Thr Val His Gln Glu Pro
 50 55 60
 10 His Ser Gly Ser Phe Thr Ile Thr Gly Asn Asn Ser Asn Phe Ala Gln
 65 70 75 80
 Arg Phe Gln Gly Thr Tyr Arg Cys Phe Ala Ser Asn Lys Leu Gly Thr
 85 90 95
 15 Ala Met Ser His Glu Ile Gln Leu Met Ala Glu Gly Ala Pro Lys Trp
 100 105 110
 Pro Lys Glu Thr Val Lys Pro Val Glu Val Glu Glu Gly Glu Ser Val
 115 120 125
 Ile Leu Pro Cys His Pro Pro Pro Ser Ala Glu Pro Leu Arg Ile Tyr
 130 135 140
 20 Trp Met Asn Ser Lys Ile Leu His Ile Lys Gln Asp Glu Arg Val Thr
 145 150 155 160
 Met Gly Gln Asn Gly Asn Leu Tyr Phe Ala Asn Val Leu Thr Ser Asp
 165 170 175
 25 Asn His Ser Asp Tyr Ile Cys Asn Ala His Phe Pro Gly Thr Arg Thr
 180 185 190
 Ile Ile Gln Lys Glu Pro Ile Asp Leu Arg Val Lys Ala Thr Asn Ser
 195 200 205
 Met Ile Ser Arg Lys Pro Arg Leu Leu Phe Pro Thr Asn Ser Ser Ser
 210 215 220
 30 His Leu Val Ala Leu Gln Gly Gln Pro Leu Ile Leu Glu Cys Ile Ala
 225 230 235 240
 Glu Gly Phe Pro Thr Pro Thr Ile Lys Trp Leu Arg Pro Ser Gly Pro
 245 250 255
 35 Met Pro Ser Asp Arg Val Thr Tyr Gln Asn His Asn Lys Thr Leu Gln
 260 265 270
 Leu Leu Asn Val Gly Glu Glu Asp Asp Gly Glu Tyr Arg Cys Leu Ala
 275 280 285
 Glu Asn Ser Leu Gly Ser Asp Arg His Ala Tyr Tyr Val Thr Val Glu
 290 295 300
 40 Ala Ala Pro Tyr Trp Leu Gln Lys Pro Gln Ser His Leu Tyr Gly Pro
 305 310 315 320
 Gly Glu Thr Val Arg Leu Asp Cys Gln Val Gln Gly Arg Pro Gln Pro
 325 330 335
 45 Glu Val Thr Trp Arg Ile Asn Gly Ile Pro Val Glu Glu Leu Ala Lys
 340 345 350
 Asp Gln Lys Tyr Arg Ile Gln Arg Gly Ala Leu Ile Leu Ser Asn Ile
 355 360 365
 Gln Pro Ser Asp Thr Met Val Thr Gln Cys Glu Ala Arg Asn Arg His
 370 375 380
 50 Gly Val Leu Leu Ala Asn Ala Tyr Ile Tyr Val Val Gln Leu Pro Ala
 385 390 395 400
 Lys Ile Leu Thr Pro Asp Asn Glu Thr Tyr Met Ala Val Glu Gly Ser
 405 410 415
 55 Thr Ala Tyr Leu Leu Cys Lys Ala Phe Gly Ala Pro Val Pro Ser Val
 420 425 430
 Gln Trp Leu Asp Lys Glu Gly Lys Thr Val Leu Gln Asp Glu Arg Phe
 435 440 445
 Phe Pro Tyr Thr Asp Gly Thr Leu Gly Ile Arg Asp Leu Gln Ala Asn
 450 455 460
 60 Asp Thr Gly His Tyr Phe Cys Gln Ala Ala Asn Asp Gln Asn Asn Val
 465 470 475 480

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		930					935					940				
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	Leu	Arg	Tyr	Arg	Phe	Gln	Leu	Gln	Ala	Thr	Thr	Lys	Glu	Gly	Pro	Gly

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5					Ser	Phe	Gly	Asn	Ile	Ser	Ala	Met	Ala	Gly	Glu	Asn	Tyr	Ser	Val	Val
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						1185				1190				1195					1200	
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							35				40				45					
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							100					105					110			
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 225 230 235 240
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 245 250 255
 Leu Asn Leu Tyr Asp Phe Phe Pro Asp Cys Asp Met Lys Arg Asp Leu
 260 265 270
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 275 280 285
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 290 295 300
 Leu Ser His Leu Tyr Arg Lys Cys Leu Ala Val Leu Cys Cys Tyr Ser
 305 310 315 320
 20 Val Asp Thr Gly Phe Ser Pro Pro Glu Ser Gln Thr Gly Arg Arg Glu
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 Val Gly Met Trp Lys Ile Cys Ile Tyr Tyr His Ala Asp Asn Phe Tyr
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 Arg Ala Thr Ser Cys Tyr His Tyr Thr Tyr Cys Asp Thr Phe Leu Pro
 50 55 60
 Leu Asp Ile Arg Ile Ala Gln Asn Leu Leu Ile Ala Ser Ile Leu
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 Gly Leu Leu Gly Lys Ala Ser Ile Thr Phe Ala Leu Arg Asn Val Tyr
 85 90 95
 45 Met Gly Ile Leu Arg Lys Asn Ala Thr Cys Asn Ala Phe Val Ala Ser
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 Gly Ile Leu Asn Ile Ala Ala Gly Val Cys Ile Ser Val Ala Val Thr
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 Trp Asn Tyr His Ser Val Met Asn Glu Glu Glu Ile Ala Phe Pro Pro
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 50 Tyr Phe Tyr Val Pro Phe Lys Pro Asp Ala Gln Glu Ile Gly Asn Ala
 145 150 155 160
 Ile Ile Val Ala Cys Leu Ala Ala Phe Leu Met Leu Leu Ser Gly Leu
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 Leu His Glu Leu Leu Ile Glu Tyr Cys Lys Lys Leu Arg His Glu Phe
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 35 Pro Lys Gly Ser Arg Asn Leu Lys Lys Ala Trp Thr Glu His Gln Glu
 740 745 750
 Tyr Gly Leu Ile Ile Asp Gly Ser Thr Leu Ser Leu Ile Leu Asn Ser
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 Lys Ala Gln Ile Val Arg Met Val Lys Asn Leu Lys Gly Ser Pro Ile
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 45 Thr Leu Ser Ile Gly Asp Gly Ala Asn Asp Val Ser Met Ile Leu Glu
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 Ser His Val Gly Ile Gly Ile Lys Gly Lys Glu Gly Arg Gln Ala Ala
 835 840 845
 50 Arg Asn Ser Asp Tyr Ser Val Pro Lys Phe Lys His Leu Lys Lys Leu
 850 855 860
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 865 870 875 880
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 Ala Ile Tyr Ile Thr Tyr Ala Val Ile Ile Ser Val Gly Ile Leu Gly
 50 55 60
 40 Asn Ala Ile Leu Ile Lys Val Phe Phe Lys Thr Lys Ser Met Gln Thr
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 Val Pro Asn Ile Phe Ile Thr Ser Leu Ala Phe Gly Asp Leu Leu Leu
 85 90 95
 45 Leu Leu Thr Cys Val Pro Val Asp Ala Thr His Tyr Leu Ala Glu Gly
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 Trp Leu Phe Gly Arg Ile Gly Cys Lys Val Leu Ser Phe Ile Arg Leu
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 Ser Glu Arg Leu Leu Gln Glu Ile His Ser Leu Leu Cys Phe Leu Val
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Ala Arg Thr Leu Tyr Lys Ser Thr Leu Asn Ile Pro Thr Glu Glu Gln
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Ser His Ala Arg Lys Gln Ile Glu Ser Arg Lys Arg Ile Ala Lys Thr
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5 Val Leu Val Leu Val Ala Leu Phe Ala Leu Cys Trp Leu Pro Asn His
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10 Ser Ala Val His Phe Leu Val Thr Ile Phe Ser Arg Val Leu Ala Phe
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325 330 335
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15 Pro Asp Pro Ala Pro Ala Asp Ala Thr Leu Asn Ser Leu Ala Val Met
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Leu Trp Lys Leu Met Val Ile Val Gly Ala Ser Val Gly Thr Gly Val
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Phe Lys Ala Met Leu Ile Ala Val Gly Ile His Leu Leu Leu Met
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Asp Lys Ile Ile His Trp Pro Trp Leu Val Val Cys Val Pro Leu Trp
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Thr His Ile Thr Met Ala Leu Ser Trp Met Thr Ile Val Val Pro Leu
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55 Leu Thr Phe Glu Ile Leu Leu Val His Lys Leu Asp Gly His Asn Ala
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Gly Ile Arg Lys Asp Phe Cys Gln Phe Leu Leu Glu Ile Phe Pro Phe
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 Pro Arg Leu Lys Arg Arg Asp Phe Thr Pro Ala Glu Leu Arg Arg Phe
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 Gly Val Phe Ala Gly Arg Asp Ala Ser Arg Gly Leu Ala Thr Phe Cys
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	Pro	Ser	Pro	His	His	Arg	Trp	Gln	Val	Leu	Pro	Trp	Glu	Val	Asn	Ala			
				500					505					510					
55	Tyr	Tyr	Ser	Ile	Ser	Asp	His	Val	Val	Val	Phe	Pro	Ala	Gly	Leu	Phe			
			515					520					525						
	Gln	Pro	Pro	Phe	Phe	His	Pro	Gly	Tyr	Pro	Arg	Ala	Val	Asn	Phe	Gly			
		530				535						540							
	Ala	Ala	Gly	Ser	Ile	Met	Ala	His	Glu	Leu	Leu	His	Val	Phe	Tyr	Lys			
		545			550						555				560				
60	Leu	Leu	Leu	Pro	Gly	Gly	Cys	Pro	Ala	Cys	Asp	Thr	Arg	Ala	Leu	Gln			
				565						570					575				

Gly Ala Leu Leu Cys Leu Glu His Leu Tyr Ala Ala Phe Pro Leu Pro
 580 585 590
 Arg Gly Val Ser Phe Asn Gly Ser Arg Thr Leu Leu Glu Asn Ala Ala
 595 600 605
 5 Asp Thr Gly Gly Leu Val Ile Ala Leu Lys Ala Tyr Arg Lys Arg Leu
 610 615 620
 Leu Trp His Arg Gly Glu Thr Val Leu Pro Asn Leu Asn Leu Ser Pro
 625 630 635 640
 10 Gln Gln Leu Phe Phe Arg Ser Tyr Ala Gln Val Met Cys Gly Asp Pro
 645 650 655
 Ser Thr Gln Asp Ser Gln Asp Thr His Ser Pro Pro Thr Leu Arg Ile
 660 665 670
 His Gly Pro Leu Ser Asn Ile Pro Asp Phe Ala Arg Tyr Phe Arg Cys
 675 680 685
 15 Pro Arg Gly Ala Leu Met Asn Pro Ser Ser His Cys Pro Leu Trp
 690 695 700
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 20 <212> PRT
 <213> Equine
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 Val Val Leu Ala Leu Cys Arg Leu Ala Thr Pro Leu Ala Lys Asn Leu
 20 25 30
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 35 40 45
 30 Gly Leu Val Ile Tyr Pro Lys Ile Gly Asp Lys Leu Asp Ile Ile Cys
 50 55 60
 Pro Arg Ala Glu Ala Gly Arg Pro Tyr Glu Tyr Tyr Lys Leu Tyr Leu
 65 70 75 80
 Val Arg Pro Glu Gln Ala Ala Ala Cys Ser Thr Val Leu Asp Pro Asn
 35 85 90 95
 Val Leu Val Thr Cys Asn Arg Pro Glu Gln Glu Ile Arg Phe Thr Ile
 100 105 110
 Lys Phe Gln Glu Phe Ser Pro Asn Tyr Met Gly Leu Glu Phe Lys Lys
 115 120 125
 40 His His Asp Tyr Tyr Ile Thr Cys Glu Phe Leu Ala Asp Leu Pro Gly
 130 135 140
 Leu Leu Ala Glu Pro Phe Gly Ile Gly Gln Leu Phe Ser Leu Ser Leu
 145 150 155 160
 His Arg Lys Phe Phe Pro Asp Pro Lys Ser Arg Ile Pro Ser Pro Cys
 45 165 170 175
 Thr Ser Ser Leu Ala Pro Gly Gln Ser Gly Gly Ser Leu Gly Val Leu
 180 185 190
 Gly Trp Ser Pro Arg Gly Gln Lys Pro Phe Leu Gly Cys Pro Phe Arg
 195 200 205
 50 Pro Tyr Thr Val Asn Gln Glu Glu Lys Ser Gly Ser Gly Asp Pro Asp
 210 215 220
 Ser Phe Phe Asn Ser Lys Val Ala Leu Phe Ala Ala Val Gly Ala Gly
 225 230 235 240
 Cys Val Ile Phe Leu Leu Ile Ile Ile Phe Leu Thr Val Leu Leu Leu
 55 245 250 255
 Lys Leu Arg Lys Arg His Arg Lys His Thr Gln Gln Arg Ala Pro Ala
 260 265 270
 Leu Ser Leu Ser Thr Leu Ala Ser Pro Lys Gly Gly Ser Gly Thr Ala
 275 280 285
 60 Gly Thr Glu Pro Ser Asp Ile Ile Ile Pro Leu Arg Thr Thr Glu Asn
 290 295 300

Asn Tyr Cys Pro His Tyr Glu Lys Val Ser Gly Asp Tyr Gly His Pro
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 Val Tyr Ile Val Gln Glu Met Pro Pro Gln Ser Pro Ala Asn Ile Tyr
 325 330 335

5 Tyr Lys Val

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 10 <212> PRT
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<400> 193
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 Pro Ile Phe Phe Leu Glu Ile Ser Leu Gly Gln Phe Met Lys Ala Gly
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 Ser Ile Asn Val Trp Asn Ile Cys Pro Leu Phe Lys Gly Leu Gly Tyr
 35 40 45
 20 Ala Ser Met Val Ile Val Phe Tyr Cys Asn Thr Tyr Ile Met Val
 50 55 60
 Leu Ala Trp Gly Phe Tyr Tyr Leu Val Lys Ser Phe Thr Thr Thr Leu
 65 70 75 80
 25 Pro Trp Ala Thr Cys Gly His Thr Trp Asn Thr Pro Asp Cys Val Glu
 85 90 95
 Ile Phe Arg His Glu Asp Cys Ala Asn Ala Ser Leu Ala Asn Leu Thr
 100 105 110
 Cys Asp Gln Leu Ala Asp Arg Arg Ser Pro Val Ile Glu Phe Trp Glu
 115 120 125
 30 Asn Lys Val Leu Arg Leu Ser Gly Gly Leu Glu Val Pro Gly Ala Leu
 130 135 140
 Asn Trp Glu Val Thr Leu Cys Leu Leu Ala Cys Trp Val Leu Val Tyr
 145 150 155 160
 Phe Cys Val Trp Lys Gly Val Lys Ser Thr Gly Lys Ile Val Tyr Phe
 165 170 175
 35 Thr Ala Thr Phe Pro Tyr Val Val Leu Val Val Leu Leu Val Arg Gly
 180 185 190
 Val Leu Leu Pro Gly Ala Leu Asp Gly Ile Ile Tyr Tyr Leu Lys Pro
 195 200 205
 40 Asp Trp Ser Lys Leu Gly Ser Pro Gln Val Trp Ile Asp Ala Gly Thr
 210 215 220
 Gln Ile Phe Phe Ser Tyr Ala Ile Gly Leu Gly Ala Leu Thr Ala Leu
 225 230 235 240
 Gly Ser Tyr Asn Arg Phe Asn Asn Asn Cys Tyr Lys Asp Ala Ile Ile
 245 250 255
 45 Leu Ala Leu Ile Asn Ser Gly Thr Ser Phe Phe Ala Gly Phe Val Val
 260 265 270
 Phe Ser Ile Leu Gly Phe Met Ala Ala Glu Gln Gly Val His Ile Ser
 275 280 285
 50 Lys Val Ala Glu Ser Gly Pro Gly Leu Ala Phe Ile Ala Tyr Pro Arg
 290 295 300
 Ala Val Thr Leu Met Pro Val Ala Pro Leu Trp Ala Ala Leu Phe Phe
 305 310 315 320
 Phe Met Leu Leu Leu Leu Gly Leu Asp Ser Gln Phe Val Gly Val Glu
 325 330 335
 55 Gly Phe Ile Thr Gly Leu Leu Asp Leu Leu Pro Ala Ser Tyr Tyr Phe
 340 345 350
 Arg Phe Gln Arg Glu Ile Ser Val Ala Leu Cys Cys Ala Leu Cys Phe
 355 360 365
 60 Val Ile Asp Leu Ser Met Val Thr Asp Gly Gly Met Tyr Val Phe Gln
 370 375 380

Leu Phe Asp Tyr Tyr Ser Ala Ser Gly Thr Thr Leu Leu Trp Gln Ala
 385 390 395 400
 Phe Trp Glu Cys Val Val Ala Trp Val Tyr Gly Ala Asp Arg Phe
 405 410 415
 5 Met Asp Asp Val Ala Cys Met Ile Gly Tyr Arg Pro Cys Pro Trp Met
 420 425 430
 Lys Trp Cys Trp Ser Phe Phe Thr Pro Leu Val Cys Met Gly Ile Phe
 435 440 445
 10 Ile Phe Asn Val Val Tyr Tyr Lys Pro Leu Val Tyr Asn Asn Thr Tyr
 450 455 460
 Val Tyr Pro Trp Trp Gly Glu Ala Met Gly Trp Ala Phe Ala Leu Ser
 465 470 475 480
 Ser Met Leu Cys Val Pro Leu His Leu Leu Gly Cys Leu Leu Arg Ala
 485 490 495
 15 Lys Gly Thr Val Ala Glu Arg Trp Gln His Leu Thr Gln Pro Val Trp
 500 505 510
 Gly Leu His His Leu Glu Tyr Arg Ala Gln Asp Ser Asp Val Arg Gly
 515 520 525
 20 Leu Thr Thr Leu Thr Pro Val Ser Glu Ser Ser Lys Val Val Val Val
 530 535 540
 Glu Ser Val Met
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 25 <211> 439
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 35 40 45
 Thr Leu Leu Phe Val His Arg Asp Phe Ser Arg Asp Arg Pro Leu Val
 50 55 60
 Leu Leu Leu His Leu Leu Gln Leu Gly Pro Leu Phe Arg Cys Phe Glu
 65 70 75 80
 40 Val Phe Cys Ile Tyr Cys Gln Ser Asn His Val Glu Glu Pro Tyr Val
 85 90 95
 Ser Ile Ile Lys Lys Arg Gln Met Pro Arg Asn Gly Leu Ser Glu Glu
 100 105 110
 45 Ile Glu Arg Glu Val Gly Gln Ala Glu Gly Lys Leu Phe Thr His Arg
 115 120 125
 Ser Ala Phe Ser Arg Ala Ser Val Ile Gln Ala Phe Leu Gly Ser Ala
 130 135 140
 Pro Gln Leu Thr Leu Gln Leu Tyr Ile Ser Thr Leu Gln Arg Lys Val
 145 150 155 160
 50 Thr Ile Thr Arg Cys Phe Phe Met Val Leu Ser Leu Leu Ser Ile Val
 165 170 175
 Tyr Gly Ala Leu Arg Cys Asn Ile Leu Ala Ile Lys Ile Lys Tyr Asp
 180 185 190
 55 Glu Tyr Leu Val Lys Val Lys Pro Leu Ala Tyr Val Cys Ile Phe Leu
 195 200 205
 Trp Arg Ser Phe Glu Ile Ala Thr Arg Val Val Val Leu Val Leu Phe
 210 215 220
 Thr Ser Val Leu Lys Ala Trp Val Val Met Ile Ile Leu Ile Asn Phe
 225 230 235 240
 60 Leu Ser Phe Phe Phe Tyr Pro Trp Ile Leu Phe Trp Cys Ser Gly Ser
 245 250 255

Pro Phe Pro Glu Asn Ile Glu Lys Ala Leu Ser Arg Val Gly Thr Thr
 260 265 270
 Ile Val Leu Cys Phe Leu Thr Phe Leu Tyr Ala Gly Ile Asn Met Phe
 275 280 285
 5 Cys Trp Ser Ala Val Gln Leu Lys Ile Asn Asn Pro Asp Leu Ile Ser
 290 295 300
 Lys Ser Gln Asn Trp Tyr Gln Leu Leu Val Tyr Tyr Met Leu Arg Phe
 305 310 315 320
 10 Val Glu Asn Ala Phe Leu Leu Leu Met Trp Tyr Leu Tyr Lys Thr Asp
 325 330 335
 Ile Tyr Met Tyr Val Cys Ala Pro Leu Leu Ile Leu Gln Leu Leu Ile
 340 345 350
 Gly Tyr Cys Thr Ala Ile Leu Phe Met Leu Val Phe Tyr Gln Phe Phe
 355 360 365
 15 His Pro Cys Lys Lys Leu Phe Ser Thr Ser Val Ser Glu Gly Leu Gln
 370 375 380
 Glu Trp Leu Arg Cys Val Cys Cys Asp Cys Arg Arg Gln Lys Ser Cys
 385 390 395 400
 20 Glu Ser Val Gly Lys Ala Asp Leu Arg Ser Pro Ala Asp Ile Asp Glu
 405 410 415
 Thr Pro Ser Ser Ser Lys Ile Ser Ser Met Pro Ser Glu Ile Leu Asn
 420 425 430
 Pro Asn Glu Phe Cys Ser Ile
 435
 25
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 Leu Glu Glu Glu Glu Glu Glu Ala Ala Thr Ser Ser Ser Ser Pro Ser
 20 25 30
 35 Ser Ser Ser Val Ser Gly Pro Asp Asp Asp Glu Glu Asp Glu Glu
 35 40 45
 Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu Glu
 50 55 60
 40 Thr Pro Pro Pro Pro Arg Val Val Ser Glu Glu His Leu Arg Arg Tyr
 65 70 75 80
 Ala Pro Asp Pro Val Leu Val Arg Gly Ala Gly His Ile Thr Val Phe
 85 90 95
 Gly Leu Ser Asn Lys Phe Asp Thr Glu Phe Pro Ser Val Leu Thr Gly
 100 105 110
 45 Lys Val Ala Pro Glu Glu Phe Lys Thr Ser Ile Gly Arg Val Asn Ala
 115 120 125
 Cys Leu Lys Lys Ala Leu Pro Val Asn Val Lys Trp Leu Leu Cys Gly
 130 135 140
 50 Cys Leu Cys Cys Cys Cys Thr Leu Gly Cys Ser Leu Trp Pro Val Val
 145 150 155 160
 Cys Leu Asn Lys Arg Thr Arg Arg Ser Ile Gln Lys Leu Leu Glu Trp
 165 170 175
 Glu Asn Asn Arg Leu Tyr His Lys Leu Ala Leu His Trp Lys Leu Thr
 180 185 190
 55 Lys Arg Lys Cys Glu Thr Ser Asn Met Met Glu Tyr Val Ile Leu Ile
 195 200 205
 Glu Phe Leu Pro Lys Tyr Pro Ile Phe Arg Pro Asp
 210 215 220
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 <210> 196

<211> 1501
 <212> PRT
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 20 25 30
 10 Leu Ser Gly Val His His Ile Lys Val Ser Leu Glu Glu Lys Cys Ala
 35 40 45
 Thr Ile Ile Tyr Asp Pro Lys Leu Gln Thr Pro Lys Thr Leu Gln Glu
 50 55 60
 15 Ala Ile Asp Asp Met Gly Phe Asp Ala Ile Leu Asn His Pro Asn Pro
 65 70 75 80
 Leu Pro Val Leu Thr Asp Thr Val Phe Leu Thr Val Thr Ala Ser Leu
 85 90 95
 Ser Pro Pro Trp Asp His Ile Gln Ser Thr Leu Leu Lys Thr Lys Gly
 100 105 110
 20 Val Thr Asp Ile Lys Ile Ser Pro Gln Gln Arg Thr Ala Val Val Thr
 115 120 125
 Ile Ile Pro Ser Val Val Thr Ala Asn Gln Ile Ile Glu Leu Val Pro
 130 135 140
 25 Asp Leu Ser Leu Asp Ile Gly Thr Leu Glu Lys Lys Ser Gly Thr Cys
 145 150 155 160
 Glu Asp Tyr Ser Met Ala Gln Ala Gly Glu Val Met Val Lys Met Lys
 165 170 175
 Val Glu Gly Met Thr Cys His Ser Cys Thr Ser Thr Ile Glu Gly Lys
 180 185 190
 30 Ile Gly Lys Leu Gln Gly Val Gln Arg Ile Lys Val Ser Leu Asp Asn
 195 200 205
 Gln Glu Ala Thr Ile Val Tyr Gln Pro His Leu Ile Thr Val Glu Glu
 210 215 220
 35 Ile Lys Lys Gln Ile Glu Ala Ala Gly Phe Pro Ala Phe Ile Lys Lys
 225 230 235 240
 Gln Pro Lys Phe Leu Lys Leu Gly Ala Ile Asp Ile Glu Arg Leu Lys
 245 250 255
 Asn Thr Pro Val Lys Ser Ser Glu Arg Pro Gln Gln Arg Ser Pro Ser
 260 265 270
 40 Cys Thr Asn Asp Ser Ala Val Thr Phe Ile Val Asp Gly Met His Cys
 275 280 285
 Lys Ser Cys Val Ser Asn Ile Glu Ser Ala Leu Ser Thr Leu Gln Tyr
 290 295 300
 Val Ser Ser Val Val Val Ser Leu Glu Asn Arg Ser Ala Ile Val Lys
 305 310 315 320
 45 Tyr Asn Ala Ser Leu Val Thr Pro Glu Thr Leu Arg Lys Ala Ile Glu
 325 330 335
 Ala Ile Ser Pro Gly Gln Tyr Arg Val Ser Phe Pro Ser Glu Val Glu
 340 345 350
 50 Ser Thr Ser Asn Ser Pro Ser Gly Ser Ser Leu His Lys Ile Pro Leu
 355 360 365
 Asn Ile Val Ser Gln Pro Leu Thr Gln Glu Thr Val Ile Asn Ile Asp
 370 375 380
 55 Gly Met Thr Cys Asn Ser Cys Val Gln Ser Ile Glu Gly Val Ile Ser
 385 390 395 400
 Lys Lys Ala Gly Val Lys Ser Ile Arg Val Ser Leu Ala Asn Gly Asn
 405 410 415
 Gly Thr Val Glu Tyr Asp Pro Leu Leu Thr Ser Pro Glu Thr Leu Arg
 420 425 430
 60 Lys Ala Ile Glu Asp Met Gly Phe Asp Ala Thr Leu Ser Asp Thr Asn
 435 440 445

	Glu	Pro	Leu	Val	Val	Ile	Ala	Gln	Pro	Ser	Ser	Glu	Val	Pro	Leu	Leu
	450						455					460				
	Thr	Ser	Thr	Asn	Glu	Phe	Cys	Pro	Lys	Thr	Met	Thr	Pro	Thr	His	Asp
	465					470					475					480
5	Lys	Glu	Glu	Ala	Lys	Thr	Ser	Ser	Lys	Cys	Tyr	Ile	Gln	Val	Thr	Gly
					485					490					495	
	Met	Thr	Cys	Ala	Ser	Cys	Val	Ala	Asn	Ile	Glu	Arg	Asn	Leu	Arg	Arg
				500					505					510		
10	Glu	Glu	Gly	Ile	Tyr	Ser	Val	Leu	Val	Ala	Leu	Met	Ala	Gly	Lys	Ala
			515					520					525			
	Glu	Val	Arg	Tyr	Asn	Pro	Ala	Val	Ile	Gln	Pro	Pro	Ile	Ile	Ala	Glu
		530					535					540				
	Phe	Ile	Arg	Glu	Leu	Gly	Phe	Gly	Ala	Thr	Val	Ile	Glu	Asn	Ala	Asp
	545					550					555					560
15	Gly	Gly	Asp	Gly	Ile	Leu	Glu	Leu	Val	Val	Arg	Gly	Met	Thr	Cys	Ala
					565					570					575	
	Ser	Cys	Val	His	Lys	Ile	Glu	Ser	Thr	Leu	Thr	Lys	His	Arg	Gly	Ile
				580					585					590		
20	Phe	Tyr	Cys	Ser	Val	Ala	Leu	Ala	Thr	Asn	Lys	Ala	His	Ile	Lys	Tyr
			595					600						605		
	Asp	Pro	Glu	Ile	Ile	Gly	Pro	Arg	Asp	Ile	Ile	His	Thr	Ile	Glu	Ser
		610					615					620				
	Leu	Gly	Phe	Lys	Ala	Ser	Leu	Val	Lys	Lys	Asp	Arg	Ser	Ala	Ser	His
	625					630					635					640
25	Leu	Asp	His	Lys	Arg	Glu	Ile	Arg	Gln	Trp	Arg	Arg	Ser	Phe	Leu	Val
					645					650					655	
	Ser	Leu	Phe	Phe	Cys	Ile	Pro	Val	Met	Gly	Leu	Met	Ile	Tyr	Met	Met
				660					665					670		
30	Val	Met	Asp	His	His	Leu	Glu	Thr	Leu	His	His	Asn	Gln	Asn	Ile	Ser
			675					680					685			
	Gln	Glu	Glu	Met	Ile	His	Ile	His	Ser	Ser	Met	Phe	Leu	Glu	Arg	Gln
		690					695					700				
	Ile	Leu	Pro	Gly	Leu	Ser	Ile	Met	Asn	Leu	Leu	Ser	Phe	Leu	Leu	Cys
	705					710					715					720
35	Val	Pro	Pro	Lys	Glu	Phe	Phe	Gly	Gly	Trp	His	Phe	Tyr	Ile	Gln	Ala
					725					730					735	
	Tyr	Lys	Ala	Leu	Lys	His	Lys	Thr	Ala	Asn	Met	Asp	Val	Leu	Ile	Val
				740					745					750		
40	Leu	Ala	Thr	Thr	Ile	Ala	Phe	Ala	Tyr	Ser	Leu	Val	Ile	Leu	Leu	Val
			755					760					765			
	Ala	Met	Tyr	Glu	Arg	Ala	Lys	Val	Asn	Pro	Ile	Thr	Phe	Phe	Asp	Thr
		770					775					780				
	Pro	Pro	Met	Leu	Phe	Val	Phe	Ile	Ala	Leu	Gly	Arg	Trp	Leu	Glu	His
	785					790					795					800
45	Ile	Ala	Lys	Gly	Lys	Thr	Ser	Glu	Ala	Leu	Ala	Lys	Leu	Ile	Ser	Leu
					805					810					815	
	Gln	Ala	Thr	Glu	Ala	Thr	Ile	Val	Thr	Leu	Asp	Ser	Asp	Asn	Ile	Leu
				820					825					830		
50	Leu	Ser	Glu	Glu	Gln	Val	Asp	Val	Glu	Leu	Val	Gln	Arg	Gly	Asp	Ile
			835					840					845			
	Ile	Lys	Val	Val	Pro	Gly	Gly	Lys	Phe	Pro	Val	Asp	Gly	Arg	Val	Ile
		850					855					860				
	Glu	Gly	His	Ser	Met	Val	Asp	Glu	Ser	Leu	Ile	Thr	Gly	Glu	Ala	Met
	865					870					875					880
55	Pro	Val	Ala	Lys	Lys	Pro	Gly	Ser	Thr	Val	Ile	Ala	Gly	Ser	Ile	Asn
					885					890					895	
	Gln	Asn	Gly	Ser	Leu	Leu	Ile	Arg	Ala	Thr	His	Val	Gly	Gly	Asp	Thr
				900					905					910		
60	Thr	Leu	Ser	Gln	Ile	Val	Lys	Leu	Val	Glu	Glu	Ala	Gln	Thr	Ser	Lys
			915					920					925			
	Ala	Pro	Ile	Gln	Gln	Phe	Ala	Asp	Lys	Leu	Ser	Gly	Tyr	Phe	Val	Pro

	930		935		940	
	Phe Ile Val Ile Val	Ser Ile Ala Thr Leu	Leu Val Trp Ile Ile Ile			
	945	950	955	960		
5	Gly Phe Leu Asn Phe	Glu Ile Val Glu Ala	Tyr Phe Pro Gly Tyr Asn			
	965	970	975			
	Arg Ser Ile Ser Arg	Thr Glu Thr Ile Val	Arg Phe Ala Phe Gln Ala			
	980	985	990			
	Ser Ile Thr Val Leu	Cys Ile Ala Cys Pro	Cys Ser Leu Gly Leu Ala			
	995	1000	1005			
10	Thr Pro Thr Ala Val	Met Val Gly Thr Gly	Val Gly Ala Gln Asn Gly			
	1010	1015	1020			
	Ile Leu Ile Lys Gly	Gly Glu Pro Leu Glu	Met Ala His Lys Val Lys			
	1025	1030	1035	1040		
	Val Val Val Phe Asp	Lys Thr Gly Thr Ile	Thr His Gly Thr Pro	Val		
15		1045	1050	1055		
	Val Asn Gln Val Lys	Val Leu Val Glu Ser	Asn Arg Met Ser Arg	Asn		
	1060	1065	1070			
	Lys Ile Leu Ala Ile	Val Gly Thr Ala Glu	Ser Asn Ser Ser Glu	His Pro		
	1075	1080	1085			
20	Leu Gly Ala Ala Ile	Thr Lys Tyr Cys Lys	Lys Glu Leu Asn Thr	Glu		
	1090	1095	1100			
	Thr Leu Gly Thr Cys	Thr Asp Phe Gln Val	Val Pro Gly Cys Gly	Ile		
	1105	1110	1115	1120		
	Ser Cys Lys Val Thr	Asn Ile Glu Gly Phe	Leu His Lys Asn Asn	Trp		
25		1125	1130	1135		
	Lys Ile Glu Glu Asn	Asn Ile Lys Asn Ala	Ser Leu Val Gln Ile	Asp		
	1140	1145	1150			
	Ala Ser Asn Glu Gln	Pro Ser Thr Ser Ser	Ile Ile Ile Asp Ala			
	1155	1160	1165			
30	Gln Leu Ser Asn Ser	Leu Asn Ser Gln Gln	Tyr Lys Val Leu Ile	Gly		
	1170	1175	1180			
	Asn Arg Glu Trp Met	Ile Arg Asn Gly Leu	Val Ile Asn Asn Asp	Val		
	1185	1190	1195	1200		
	Asp Asp Ser Met Asn	Glu His Glu Arg Lys	Gly Arg Thr Ala Val	Leu		
35		1205	1210	1215		
	Val Ala Val Asp Asp	Glu Leu Cys Gly Leu	Ile Ala Ile Ala Asp	Thr		
	1220	1225	1230			
	Val Lys Pro Glu Ala	Glu Leu Ala Val His	Thr Leu Lys Ser Met	Gly		
	1235	1240	1245			
40	Leu Glu Val Val Leu	Met Thr Gly Asp Asn	Ser Lys Thr Ala Arg	Ser		
	1250	1255	1260			
	Ile Ala Ser Gln Val	Gly Ile Thr Lys Val	Phe Ala Glu Val Leu	Pro		
	1265	1270	1275	1280		
	Ser His Lys Val Ala	Lys Val Lys Gln Leu	Gln Glu Glu Gly Lys	Gln		
45		1285	1290	1295		
	Val Ala Met Val Gly	Asp Gly Ile Asn Asp	Ser Pro Ala Leu Ala	Met		
	1300	1305	1310			
	Ala Asn Val Gly Ile	Ala Ile Gly Thr Gly	Thr Asp Val Ala Ile	Glu		
	1315	1320	1325			
50	Ala Ala Asp Val Val	Leu Ile Arg Asn Asp	Leu Leu Asp Val Val	Ala		
	1330	1335	1340			
	Ser Ile Asp Leu Ser	Arg Lys Thr Val Lys	Arg Ile Arg Ile Asn	Phe		
	1345	1350	1355	1360		
	Val Phe Ala Leu Ile	Tyr Asn Leu Val Gly	Ile Pro Ile Ala Ala	Gly		
55		1365	1370	1375		
	Val Phe Met Pro Ile	Gly Leu Val Leu Gln	Pro Trp Met Gly Ser	Ala		
	1380	1385	1390			
	Ala Met Ala Ala Ser	Ser Val Ser Val Val	Leu Ser Ser Leu Phe	Leu		
	1395	1400	1405			
60	Lys Leu Tyr Arg Lys	Pro Thr Tyr Glu Asn	Tyr Glu Leu His Ala	Arg		
	1410	1415	1420			

Ser Gln Met Gly Gln Lys Ser Pro Ser Glu Ile Ser Val His Val Gly
 1425 1430 1435 1440
 Ile Asp Asp Thr Ser Arg Asn Ser Pro Lys Leu Gly Leu Leu Asp Arg
 1445 1450 1455
 5 Ile Val Asn Tyr Ser Arg Ala Ser Ile Asn Ser Leu Leu Ser Asp Lys
 1460 1465 1470
 Arg Ser Leu Asn Ser Ile Gly Thr Ser Glu Pro Asp Lys His Ser Leu
 1475 1480 1485
 10 Leu Val Gly Asp Cys Arg Glu Asp Asp Asp Thr Ala Leu
 1490 1495 1500

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 <211> 382
 <212> PRT
 15 <213> Equine

 <400> 197
 Met Val Phe Ala Phe Trp Lys Val Phe Leu Ile Leu Asn Cys Leu Ala
 1 5 10 15
 20 Gly Gln Val Thr Ala Val Gln Val Thr Ile Pro Asp Ser Phe Val Asn
 20 25 30
 Val Thr Val Gly Ser Asp Val Thr Leu Ile Cys Thr Tyr Thr Thr Thr
 35 40 45
 25 Val Ala Ser Arg Asp Lys Leu Ser Ile Gln Trp Ser Phe Phe His Lys
 50 55 60
 Lys Glu Leu Gln Pro Val Ser Ile Tyr Tyr Ser Glu Gly Gly Gln Ala
 65 70 75 80
 Ala Ala Ile Gly Gln Phe Lys Gly Arg Ile Val Gly Ser Asn Glu Pro
 85 90 95
 30 Gly Asn Ala Ser Ile Thr Ile Ser His Met Gln Pro Ala Asp Ser Gly
 100 105 110
 Ile Tyr Ile Cys Asp Val Asn Asn Pro Pro Asp Phe Val Gly Thr Asn
 115 120 125
 35 Gln Gly Ile Leu Asn Val Ser Val Leu Val Lys Pro Ser Lys Pro Phe
 130 135 140
 Cys Ser Ile Gln Gly Ile Pro Glu Thr Gly His Pro Ile Ser Leu Ser
 145 150 155 160
 Cys Leu Ser Val Leu Gly Thr Pro Ser Pro Val Tyr Tyr Trp Tyr Arg
 165 170 175
 40 Leu Glu Gly Arg Asp Ile Val Pro Val Lys Glu Ser Phe Asn Pro Ala
 180 185 190
 Thr Gly Ile Leu Val Ile Gly Asn Leu Thr Asn Phe Glu Gln Gly Tyr
 195 200 205
 Tyr Gln Cys Thr Ala Ile Asn Ile Leu Gly Asn Ser Ser Cys Glu Ile
 210 215 220
 45 Asp Leu Thr Ser Ser His Pro Glu Val Gly Ile Ile Val Gly Ala Leu
 225 230 235 240
 Val Gly Thr Leu Val Gly Ala Ala Ile Ile Thr Ser Ile Val Cys Phe
 245 250 255
 50 Ala Arg Ser Lys Ala Lys Ala Lys Gly Lys Gly Lys Glu Arg Lys Arg
 260 265 270
 Asn Ser Lys Thr Asn Pro Glu Leu Glu Pro Met Arg Met Ile Asn Gln
 275 280 285
 Ser Thr Glu Cys Glu Thr Met Pro Asn Glu Asp Ala Val Gln Leu Glu
 290 295 300
 55 Ala Thr Leu Pro Val Ser Thr His Glu Thr Asp Pro Asp Thr Ile Leu
 305 310 315 320
 Gly Leu Asp His Glu Pro Ile Pro Glu Pro Glu Pro Val Pro Glu Pro
 325 330 335
 60 Val Pro Glu Pro Thr Ala Gly Pro Glu Leu Val Pro Val Pro Glu Ile
 340 345 350

Glu Ile His Leu Glu Pro Glu Pro Glu Pro Glu Pro Glu Thr Glu Pro
 355 360 365
 Glu Pro Gly Ile Val Val Glu Pro Phe Cys Asp Glu Glu Lys
 370 375 380

5

<210> 198
 <211> 351
 <212> PRT
 <213> Equine

10

<400> 198
 Met Ala Val Leu Val Val Leu Leu Ser Leu Leu Val Ala Gly Val Leu
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 Gly Asn Glu Phe Ser Ile Leu Lys Ser Pro Gly Ser Val Val Phe Arg
 20 25 30
 Asp Gly Asn Trp Pro Ile Pro Gly Glu Arg Ile Pro Asp Val Ala Ala
 35 40 45
 Leu Ser Met Gly Phe Ser Val Lys Glu Asp Leu Ser Trp Pro Gly Leu
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 Ala Val Gly Asn Leu Phe His Arg Pro Arg Ala Thr Val Met Val Met
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 Tyr Pro Leu Glu Asn Ala Val Pro Phe Ser Leu Asp Ser Val Ala Asn
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 Ser Ile His Ser Leu Phe Ser Glu Glu Thr Pro Val Val Leu Gln Leu
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 Phe Glu Asp Leu Ser Val Thr Leu Arg Gln Leu Arg Asn Arg Leu Phe
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 Gln Glu Asn Ser Ile Leu Asn Ser Leu Pro Leu Asn Ser Leu Ser Arg
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 Asn Asn Glu Val Asp Leu Leu Phe Leu Ser Glu Leu Gln Val Leu His
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 Asp Ile Ser Ser Leu Leu Ser Arg His Lys His Leu Ala Lys Asp His
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 Ser Pro Asp Leu Tyr Ser Leu Glu Leu Ala Gly Leu Asp Glu Ile Gly
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 Lys His Tyr Gly Glu Asp Ser Glu Gln Phe Arg Asp Ala Ser Lys Ile
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 Gly Gly Asn Ala Val Val Glu Leu Val Thr Ile Lys Ser Phe Asp Thr
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 Ser Val Val Arg Lys Thr Arg Thr Ile Leu Glu Ala Glu Gln Ala Lys
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 Ser Pro Ser Ser Pro Tyr Asn Leu Ala Tyr Lys Tyr Asn Leu Glu Tyr
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 Pro Val Val Phe Asn Met Val Leu Trp Ile Met Ile Ala Leu Ala Leu
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