

SEQUENCE LISTING

<110> GenEdit Inc.

<120> CATIONIC POLYMER WITH ALKYL SIDE CHAINS

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<151> 2018-10-24

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<170> PatentIn version 3.5

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<211> 1368

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<213> Streptococcus pyogenes

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<223> AKP81606.1

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Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
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Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
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Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
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Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
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His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
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His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
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Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
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Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
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Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
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Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
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Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
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Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
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Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
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Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
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Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
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Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
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Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
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Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
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Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
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Gly Glu Leu His Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe
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Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
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Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
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Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
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Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
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Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
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Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
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Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
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Val Gly Thr Ala Leu Ile Lys Lys Tyr Pro Lys Leu Glu Ser Glu Phe
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Asn Gly Glu Ile Arg Lys Arg Pro Leu Ile Glu Thr Asn Gly Glu
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Thr Gly Glu Ile Val Trp Asp Lys Gly Arg Asp Phe Ala Thr Val
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Arg Lys Val Leu Ser Met Pro Gln Val Asn Ile Val Lys Lys Thr
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Glu Val Gln Thr Gly Gly Phe Ser Lys Glu Ser Ile Leu Pro Lys
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Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
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Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
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Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
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Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
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His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
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His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
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Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
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Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro

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Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
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Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
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Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
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Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
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Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
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Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
 275 280 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
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Ile Leu Arg Val Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser
 305 310 315 320

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

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
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Gly Glu Leu His Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe
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Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
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Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
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Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
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Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
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Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
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Tyr Val Thr Glu Gly Met Arg Lys Pro Ala Phe Leu Ser Gly Glu Gln
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Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
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Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
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Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp

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Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
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Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
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Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
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Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
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Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
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Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
 980 985 990

Val Gly Thr Ala Leu Ile Lys Lys Tyr Pro Lys Leu Glu Ser Glu Phe
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Val Tyr Gly Asp Tyr Lys Val Tyr Asp Val Arg Lys Met Ile Ala
 1010 1015 1020

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

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Thr Gly Glu Ile Val Trp 1070	Asp Lys Gly Arg Asp 1075	Phe Ala Thr Val 1080
Arg Lys Val Leu Ser Met 1085	Pro Gln Val Asn Ile 1090	Val Lys Lys Thr 1095
Glu Val Gln Thr Gly Gly 1100	Phe Ser Lys Glu Ser 1105	Ile Leu Pro Lys 1110
Arg Asn Ser Asp Lys Leu 1115	Ile Ala Arg Lys Lys 1120	Asp Trp Asp Pro 1125
Lys Lys Tyr Gly Gly Phe 1130	Asp Ser Pro Thr Val 1135	Ala Tyr Ser Val 1140
Leu Val Val Ala Lys Val 1145	Glu Lys Gly Lys Ser 1150	Lys Lys Leu Lys 1155
Ser Val Lys Glu Leu Leu 1160	Gly Ile Thr Ile Met 1165	Glu Arg Ser Ser 1170
Phe Glu Lys Asn Pro Ile 1175	Asp Phe Leu Glu Ala 1180	Lys Gly Tyr Lys 1185
Glu Val Lys Lys Asp Leu 1190	Ile Ile Lys Leu Pro 1195	Lys Tyr Ser Leu 1200
Phe Glu Leu Glu Asn Gly 1205	Arg Lys Arg Met Leu 1210	Ala Ser Ala Gly 1215
Glu Leu Gln Lys Gly Asn 1220	Glu Leu Ala Leu Pro 1225	Ser Lys Tyr Val 1230

Asn Phe Leu Tyr Leu Ala Ser His Tyr Glu Lys Leu Lys Gly Ser
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Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu Met Ser Ile
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Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr Leu Arg
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Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys Ala
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Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
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Tyr Ser Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn
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Leu Gln Lys Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln
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Ile Ser Glu Tyr Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe
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Asn Gln Asn Leu Ile Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu
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Ile Leu Trp Leu Lys Gln Ser Lys Asp Asn Gly Ile Glu Leu Phe
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Ile Lys Ser Phe Lys Gly Trp Thr Thr Tyr Phe Lys Gly Phe His

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Ala Ile Leu Phe Ile Lys 1880	Asp Asp Lys Tyr Tyr 1885	Leu Gly Val Met 1890
Asn Lys Lys Asn Asn Lys 1895	Ile Phe Asp Asp Lys 1900	Ala Ile Lys Glu 1905
Asn Lys Gly Glu Gly Tyr 1910	Lys Lys Ile Val Tyr 1915	Lys Leu Leu Pro 1920
Gly Ala Asn Lys Met Leu 1925	Pro Lys Val Phe Phe 1930	Ser Ala Lys Ser 1935
Ile Lys Phe Tyr Asn Pro 1940	Ser Glu Asp Ile Leu 1945	Arg Ile Arg Asn 1950
His Ser Thr His Thr Lys 1955	Asn Gly Ser Pro Gln 1960	Lys Gly Tyr Glu 1965
Lys Phe Glu Phe Asn Ile 1970	Glu Asp Cys Arg Lys 1975	Phe Ile Asp Phe 1980
Tyr Lys Gln Ser Ile Ser 1985	Lys His Pro Glu Trp 1990	Lys Asp Phe Gly 1995
Phe Arg Phe Ser Asp Thr 2000	Gln Arg Tyr Asn Ser 2005	Ile Asp Glu Phe 2010
Tyr Arg Glu Val Glu Asn 2015	Gln Gly Tyr Lys Leu 2020	Thr Phe Glu Asn 2025
Ile Ser Glu Ser Tyr Ile 2030	Asp Ser Val Val Asn 2035	Gln Gly Lys Leu 2040

Tyr	Leu	Phe	Gln	Ile	Tyr	Asn	Lys	Asp	Phe	Ser	Ala	Tyr	Ser	Lys
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Glu	Arg	Asn	Leu	Gln	Asp	Val	Val	Tyr	Lys	Leu	Asn	Gly	Glu	Ala
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Glu	Leu	Phe	Tyr	Arg	Lys	Gln	Ser	Ile	Pro	Lys	Lys	Ile	Thr	His
2090						2095					2100			
Pro	Ala	Lys	Glu	Ala	Ile	Ala	Asn	Lys	Asn	Lys	Asp	Asn	Pro	Lys
2105						2110					2115			
Lys	Glu	Ser	Val	Phe	Glu	Tyr	Asp	Leu	Ile	Lys	Asp	Lys	Arg	Phe
2120						2125					2130			
Thr	Glu	Asp	Lys	Phe	Phe	Phe	His	Cys	Pro	Ile	Thr	Ile	Asn	Phe
2135						2140					2145			
Lys	Ser	Ser	Gly	Ala	Asn	Lys	Phe	Asn	Asp	Glu	Ile	Asn	Leu	Leu
2150						2155					2160			
Leu	Lys	Glu	Lys	Ala	Asn	Asp	Val	His	Ile	Leu	Ser	Ile	Asp	Arg
2165						2170					2175			
Gly	Glu	Arg	His	Leu	Ala	Tyr	Tyr	Thr	Leu	Val	Asp	Gly	Lys	Gly
2180						2185					2190			
Asn	Ile	Ile	Lys	Gln	Asp	Thr	Phe	Asn	Ile	Ile	Gly	Asn	Asp	Arg
2195						2200					2205			
Met	Lys	Thr	Asn	Tyr	His	Asp	Lys	Leu	Ala	Ala	Ile	Glu	Lys	Asp
2210						2215					2220			
Arg	Asp	Ser	Ala	Arg	Lys	Asp	Trp	Lys	Lys	Ile	Asn	Asn	Ile	Lys
2225						2230					2235			
Glu	Met	Lys	Glu	Gly	Tyr	Leu	Ser	Gln	Val	Val	His	Glu	Ile	Ala

2240		2245		2250
Lys Leu Val Ile Glu Tyr Asn Ala Ile Val Val Phe Glu Asp Leu				
2255		2260		2265
Asn Phe Gly Phe Lys Arg Gly Arg Phe Lys Val Glu Lys Gln Val				
2270		2275		2280
Tyr Gln Lys Leu Glu Lys Met Leu Ile Glu Lys Leu Asn Tyr Leu				
2285		2290		2295
Val Phe Lys Asp Asn Glu Phe Asp Lys Thr Gly Gly Val Leu Arg				
2300		2305		2310
Ala Tyr Gln Leu Thr Ala Pro Phe Glu Thr Phe Lys Lys Met Gly				
2315		2320		2325
Lys Gln Thr Gly Ile Ile Tyr Tyr Val Pro Ala Gly Phe Thr Ser				
2330		2335		2340
Lys Ile Cys Pro Val Thr Gly Phe Val Asn Gln Leu Tyr Pro Lys				
2345		2350		2355
Tyr Glu Ser Val Ser Lys Ser Gln Glu Phe Phe Ser Lys Phe Asp				
2360		2365		2370
Lys Ile Cys Tyr Asn Leu Asp Lys Gly Tyr Phe Glu Phe Ser Phe				
2375		2380		2385
Asp Tyr Lys Asn Phe Gly Asp Lys Ala Ala Lys Gly Lys Trp Thr				
2390		2395		2400
Ile Ala Ser Phe Gly Ser Arg Leu Ile Asn Phe Arg Asn Ser Asp				
2405		2410		2415
Lys Asn His Asn Trp Asp Thr Arg Glu Val Tyr Pro Thr Lys Glu				
2420		2425		2430
Leu Glu Lys Leu Leu Lys Asp Tyr Ser Ile Glu Tyr Gly His Gly				
2435		2440		2445

Glu Cys Ile Lys Ala Ala Ile Cys Gly Glu Ser Asp Lys Lys Phe
 2450 2455 2460

Phe Ala Lys Leu Thr Ser Val Leu Asn Thr Ile Leu Gln Met Arg
 2465 2470 2475

Asn Ser Lys Thr Gly Thr Glu Leu Asp Tyr Leu Ile Ser Pro Val
 2480 2485 2490

Ala Asp Val Asn Gly Asn Phe Phe Asp Ser Arg Gln Ala Pro Lys
 2495 2500 2505

Asn Met Pro Gln Asp Ala Asp Ala Asn Gly Ala Tyr His Ile Gly
 2510 2515 2520

Leu Lys Gly Leu Met Leu Leu Gly Arg Ile Lys Asn Asn Gln Glu
 2525 2530 2535

Gly Lys Lys Leu Asn Leu Val Ile Lys Asn Glu Glu Tyr Phe Glu
 2540 2545 2550

Phe Val Gln Asn Arg Asn Asn
 2555 2560

<210> 3
 <211> 15
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 3

Ile Gly Leu Asp Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile
 1 5 10 15

<210> 4
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 4

Ile Val Ile Glu Met Ala Arg Glu
1 5

<210> 5

<211> 27

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Sequence

<400> 5

Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys Asp Asp Ser Ile
1 5 10 15

Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn
20 25

<210> 6

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Sequence

<400> 6

His His Ala His Asp Ala Tyr Leu
1 5

<210> 7

<211> 11

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Sequence

<400> 7

Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg
1 5 10

<210> 8

<211> 12
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 8

Arg Arg Gln Arg Arg Thr Ser Lys Leu Met Lys Arg
 1 5 10

<210> 9
 <211> 27
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 9

Gly Trp Thr Leu Asn Ser Ala Gly Tyr Leu Leu Gly Lys Ile Asn Leu
 1 5 10 15

Lys Ala Leu Ala Ala Leu Ala Lys Lys Ile Leu
 20 25

<210> 10
 <211> 33
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 10

Lys Ala Leu Ala Trp Glu Ala Lys Leu Ala Lys Ala Leu Ala Lys Ala
 1 5 10 15

Leu Ala Lys His Leu Ala Lys Ala Leu Ala Lys Ala Leu Lys Cys Glu
 20 25 30

Ala

<210> 11

<211> 16
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 11

Arg	Gln	Ile	Lys	Ile	Trp	Phe	Gln	Asn	Arg	Arg	Met	Lys	Trp	Lys	Lys
1				5					10					15	

<210> 12
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 12

Tyr	Gly	Arg	Lys	Lys	Arg	Arg	Gln	Arg	Arg	Arg
1				5				10		

<210> 13
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 13

Arg	Lys	Lys	Arg	Arg	Gln	Arg	Arg	Arg
1				5				

<210> 14
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 14

Tyr	Gly	Arg	Lys	Lys	Arg	Arg	Gln	Arg	Arg	Arg
1				5				10		

<210> 15
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 15

Arg Lys Lys Arg Arg Gln Arg Arg
 1 5

<210> 16
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 16

Tyr Ala Arg Ala Ala Ala Arg Gln Ala Arg Ala
 1 5 10

<210> 17
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 17

Thr His Arg Leu Pro Arg Arg Arg Arg Arg Arg
 1 5 10

<210> 18
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Sequence

<400> 18

Gly Gly Arg Arg Ala Arg Arg Arg Arg Arg Arg

<400> 19

Ser Phe Asp Lys Phe Thr Thr Tyr Phe Ser Gly Phe Tyr Glu Asn Arg

165

170

175

Lys Asn Val Phe Ser Ala Glu Asp Ile Ser Thr Ala Ile Pro His Arg
 180 185 190

Ile Val Gln Asp Asn Phe Pro Lys Phe Lys Glu Asn Cys His Ile Phe
 195 200 205

Thr Arg Leu Ile Thr Ala Val Pro Ser Leu Arg Glu His Phe Glu Asn
 210 215 220

Val Lys Lys Ala Ile Gly Ile Phe Val Ser Thr Ser Ile Glu Glu Val
 225 230 235 240

Phe Ser Phe Pro Phe Tyr Asn Gln Leu Leu Thr Gln Thr Gln Ile Asp
 245 250 255

Leu Tyr Asn Gln Leu Leu Gly Gly Ile Ser Arg Glu Ala Gly Thr Glu
 260 265 270

Lys Ile Lys Gly Leu Asn Glu Val Leu Asn Leu Ala Ile Gln Lys Asn
 275 280 285

Asp Glu Thr Ala His Ile Ile Ala Ser Leu Pro His Arg Phe Ile Pro
 290 295 300

Leu Phe Lys Gln Ile Leu Ser Asp Arg Asn Thr Leu Ser Phe Ile Leu
 305 310 315 320

Glu Glu Phe Lys Ser Asp Glu Glu Val Ile Gln Ser Phe Cys Lys Tyr
 325 330 335

Lys Thr Leu Leu Arg Asn Glu Asn Val Leu Glu Thr Ala Glu Ala Leu
 340 345 350

Phe Asn Glu Leu Asn Ser Ile Asp Leu Thr His Ile Phe Ile Ser His
 355 360 365

Lys Lys Leu Glu Thr Ile Ser Ser Ala Leu Cys Asp His Trp Asp Thr
 370 375 380

Leu Arg Asn Ala Leu Tyr Glu Arg Arg Ile Ser Glu Leu Thr Gly Lys
 385 390 395 400

Ile Thr Lys Ser Ala Lys Glu Lys Val Gln Arg Ser Leu Lys His Glu
 405 410 415

Asp Ile Asn Leu Gln Glu Ile Ile Ser Ala Ala Gly Lys Glu Leu Ser
 420 425 430

Glu Ala Phe Lys Gln Lys Thr Ser Glu Ile Leu Ser His Ala His Ala
 435 440 445

Ala Leu Asp Gln Pro Leu Pro Thr Thr Leu Lys Lys Gln Glu Glu Lys
 450 455 460

Glu Ile Leu Lys Ser Gln Leu Asp Ser Leu Leu Gly Leu Tyr His Leu
 465 470 475 480

Leu Asp Trp Phe Ala Val Asp Glu Ser Asn Glu Val Asp Pro Glu Phe
 485 490 495

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

Phe Tyr Asn Lys Ala Arg Asn Tyr Ala Thr Lys Lys Pro Tyr Ser Val
 515 520 525

Glu Lys Phe Lys Leu Asn Phe Gln Met Pro Thr Leu Ala Ser Gly Trp
 530 535 540

Asp Val Asn Lys Glu Lys Asn Asn Gly Ala Ile Leu Phe Val Lys Asn
 545 550 555 560

Gly Leu Tyr Tyr Leu Gly Ile Met Pro Lys Gln Lys Gly Arg Tyr Lys
 565 570 575

Ala Leu Ser Phe Glu Pro Thr Glu Lys Thr Ser Glu Gly Phe Asp Lys
 580 585 590

Met Tyr Tyr Asp Tyr Phe Pro Asp Ala Ala Lys Met Ile Pro Lys Cys

595

600

605

Ser Thr Gln Leu Lys Ala Val Thr Ala His Phe Gln Thr His Thr Thr
 610 615 620

Pro Ile Leu Leu Ser Asn Asn Phe Ile Glu Pro Leu Glu Ile Thr Lys
 625 630 635 640

Glu Ile Tyr Asp Leu Asn Asn Pro Glu Lys Glu Pro Lys Lys Phe Gln
 645 650 655

Thr Ala Tyr Ala Lys Lys Thr Gly Asp Gln Lys Gly Tyr Arg Glu Ala
 660 665 670

Leu Cys Lys Trp Ile Asp Phe Thr Arg Asp Phe Leu Ser Lys Tyr Thr
 675 680 685

Lys Thr Thr Ser Ile Asp Leu Ser Ser Leu Arg Pro Ser Ser Gln Tyr
 690 695 700

Lys Asp Leu Gly Glu Tyr Tyr Ala Glu Leu Asn Pro Leu Leu Tyr His
 705 710 715 720

Ile Ser Phe Gln Arg Ile Ala Glu Lys Glu Ile Met Asp Ala Val Glu
 725 730 735

Thr Gly Lys Leu Tyr Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ala Lys
 740 745 750

Gly His His Gly Lys Pro Asn Leu His Thr Leu Tyr Trp Thr Gly Leu
 755 760 765

Phe Ser Pro Glu Asn Leu Ala Lys Thr Ser Ile Lys Leu Asn Gly Gln
 770 775 780

Ala Glu Leu Phe Tyr Arg Pro Lys Ser Arg Met Lys Arg Met Ala His
 785 790 795 800

Arg Leu Gly Glu Lys Met Leu Asn Lys Lys Leu Lys Asp Gln Lys Thr
 805 810 815

Pro Ile Pro Asp Thr Leu Tyr Gln Glu Leu Tyr Asp Tyr Val Asn His
 820 825 830

Arg Leu Ser His Asp Leu Ser Asp Glu Ala Arg Ala Leu Leu Pro Asn
 835 840 845

Val Ile Thr Lys Glu Val Ser His Glu Ile Ile Lys Asp Arg Arg Phe
 850 855 860

Thr Ser Asp Lys Phe Phe Phe His Val Pro Ile Thr Leu Asn Tyr Gln
 865 870 875 880

Ala Ala Asn Ser Pro Ser Lys Phe Asn Gln Arg Val Asn Ala Tyr Leu
 885 890 895

Lys Glu His Pro Glu Thr Pro Ile Ile Gly Ile Asp Arg Gly Glu Arg
 900 905 910

Asn Leu Ile Tyr Ile Thr Val Ile Asp Ser Thr Gly Lys Ile Leu Glu
 915 920 925

Gln Arg Ser Leu Asn Thr Ile Gln Gln Phe Asp Tyr Gln Lys Lys Leu
 930 935 940

Asp Asn Arg Glu Lys Glu Arg Val Ala Ala Arg Gln Ala Trp Ser Val
 945 950 955 960

Val Gly Thr Ile Lys Asp Leu Lys Gln Gly Tyr Leu Ser Gln Val Ile
 965 970 975

His Glu Ile Val Asp Leu Met Ile His Tyr Gln Ala Val Val Val Leu
 980 985 990

Glu Asn Leu Asn Phe Gly Phe Lys Ser Lys Arg Thr Gly Ile Ala Glu
 995 1000 1005

Lys Ala Val Tyr Gln Gln Phe Glu Lys Met Leu Ile Asp Lys Leu
 1010 1015 1020

Asn Cys Leu Val Leu Lys Asp Tyr Pro Ala Glu Lys Val Gly Gly

1025	1030	1035
Val Leu Asn Pro Tyr Gln 1040	Leu Thr Asp Gln Phe 1045	Thr Ser Phe Ala 1050
Lys Met Gly Thr Gln Ser 1055	Gly Phe Leu Phe Tyr 1060	Val Pro Ala Pro 1065
Tyr Thr Ser Lys Ile Asp 1070	Pro Leu Thr Gly Phe 1075	Val Asp Pro Phe 1080
Val Trp Lys Thr Ile Lys 1085	Asn His Glu Ser Arg 1090	Lys His Phe Leu 1095
Glu Gly Phe Asp Phe Leu 1100	His Tyr Asp Val Lys 1105	Thr Gly Asp Phe 1110
Ile Leu His Phe Lys Met 1115	Asn Arg Asn Leu Ser 1120	Phe Gln Arg Gly 1125
Leu Pro Gly Phe Met Pro 1130	Ala Trp Asp Ile Val 1135	Phe Glu Lys Asn 1140
Glu Thr Gln Phe Asp Ala 1145	Lys Gly Thr Pro Phe 1150	Ile Ala Gly Lys 1155
Arg Ile Val Pro Val Ile 1160	Glu Asn His Arg Phe 1165	Thr Gly Arg Tyr 1170
Arg Asp Leu Tyr Pro Ala 1175	Asn Glu Leu Ile Ala 1180	Leu Leu Glu Glu 1185
Lys Gly Ile Val Phe Arg 1190	Asp Gly Ser Asn Ile 1195	Leu Pro Lys Leu 1200
Leu Glu Asn Asp Asp Ser 1205	His Ala Ile Asp Thr 1210	Met Val Ala Leu 1215
Ile Arg Ser Val Leu Gln 1220	Met Arg Asn Ser Asn 1225	Ala Ala Thr Gly 1230

Glu Asp Tyr Ile Asn Ser Pro Val Arg Asp Leu Asn Gly Val Cys
 1235 1240 1245

Phe Asp Ser Arg Phe Gln Asn Pro Glu Trp Pro Met Asp Ala Asp
 1250 1255 1260

Ala Asn Gly Ala Tyr His Ile Ala Leu Lys Gly Gln Leu Leu Leu
 1265 1270 1275

Asn His Leu Lys Glu Ser Lys Asp Leu Lys Leu Gln Asn Gly Ile
 1280 1285 1290

Ser Asn Gln Asp Trp Leu Ala Tyr Ile Gln Glu Leu Arg Asn
 1295 1300 1305

<210> 20
 <211> 1228
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 20

Ala Ala Ser Lys Leu Glu Lys Phe Thr Asn Cys Tyr Ser Leu Ser Lys
 1 5 10 15

Thr Leu Arg Phe Lys Ala Ile Pro Val Gly Lys Thr Gln Glu Asn Ile
 20 25 30

Asp Asn Lys Arg Leu Leu Val Glu Asp Glu Lys Arg Ala Glu Asp Tyr
 35 40 45

Lys Gly Val Lys Lys Leu Leu Asp Arg Tyr Tyr Leu Ser Phe Ile Asn
 50 55 60

Asp Val Leu His Ser Ile Lys Leu Lys Asn Leu Asn Asn Tyr Ile Ser
 65 70 75 80

Leu Phe Arg Lys Lys Thr Arg Thr Glu Lys Glu Asn Lys Glu Leu Glu
 85 90 95

Asn Leu Glu Ile Asn Leu Arg Lys Glu Ile Ala Lys Ala Phe Lys Gly
 100 105 110

Ala Ala Gly Tyr Lys Ser Leu Phe Lys Lys Asp Ile Ile Glu Thr Ile
 115 120 125

Leu Pro Glu Ala Ala Asp Asp Lys Asp Glu Ile Ala Leu Val Asn Ser
 130 135 140

Phe Asn Gly Phe Thr Thr Ala Phe Thr Gly Phe Phe Asp Asn Arg Glu
 145 150 155 160

Asn Met Phe Ser Glu Glu Ala Lys Ser Thr Ser Ile Ala Phe Arg Cys
 165 170 175

Ile Asn Glu Asn Leu Thr Arg Tyr Ile Ser Asn Met Asp Ile Phe Glu
 180 185 190

Lys Val Asp Ala Ile Phe Asp Lys His Glu Val Gln Glu Ile Lys Glu
 195 200 205

Lys Ile Leu Asn Ser Asp Tyr Asp Val Glu Asp Phe Phe Glu Gly Glu
 210 215 220

Phe Phe Asn Phe Val Leu Thr Gln Glu Gly Ile Asp Val Tyr Asn Ala
 225 230 235 240

Ile Ile Gly Gly Phe Val Thr Glu Ser Gly Glu Lys Ile Lys Gly Leu
 245 250 255

Asn Glu Tyr Ile Asn Leu Tyr Asn Ala Lys Thr Lys Gln Ala Leu Pro
 260 265 270

Lys Phe Lys Pro Leu Tyr Lys Gln Val Leu Ser Asp Arg Glu Ser Leu
 275 280 285

Ser Phe Tyr Gly Glu Gly Tyr Thr Ser Asp Glu Glu Val Leu Glu Val
 290 295 300

Phe Arg Asn Thr Leu Asn Lys Asn Ser Glu Ile Phe Ser Ser Ile Lys

305		310		315		320									
Lys	Leu	Glu	Lys	Leu	Phe	Lys	Asn	Phe	Asp	Glu	Tyr	Ser	Ser	Ala	Gly
			325						330					335	
Ile	Phe	Val	Lys	Asn	Gly	Pro	Ala	Ile	Ser	Thr	Ile	Ser	Lys	Asp	Ile
			340					345					350		
Phe	Gly	Glu	Trp	Asn	Leu	Ile	Arg	Asp	Lys	Trp	Asn	Ala	Glu	Tyr	Asp
		355					360					365			
Asp	Ile	His	Leu	Lys	Lys	Lys	Ala	Val	Val	Thr	Glu	Lys	Tyr	Glu	Asp
	370						375				380				
Asp	Arg	Arg	Lys	Ser	Phe	Lys	Lys	Ile	Gly	Ser	Phe	Ser	Leu	Glu	Gln
385					390					395					400
Leu	Gln	Glu	Tyr	Ala	Asp	Ala	Asp	Leu	Ser	Val	Val	Glu	Lys	Leu	Lys
				405				410						415	
Glu	Ile	Ile	Ile	Gln	Lys	Val	Asp	Glu	Ile	Tyr	Lys	Val	Tyr	Gly	Ser
			420					425					430		
Ser	Glu	Lys	Leu	Phe	Asp	Ala	Asp	Phe	Val	Leu	Glu	Lys	Ser	Leu	Lys
		435					440					445			
Lys	Asn	Asp	Ala	Val	Val	Ala	Ile	Met	Lys	Asp	Leu	Leu	Asp	Ser	Val
	450					455					460				
Lys	Ser	Phe	Glu	Asn	Tyr	Ile	Lys	Ala	Phe	Phe	Gly	Glu	Gly	Lys	Glu
465					470				475						480
Thr	Asn	Arg	Asp	Glu	Ser	Phe	Tyr	Gly	Asp	Phe	Val	Leu	Ala	Tyr	Asp
			485						490					495	
Ile	Leu	Leu	Lys	Val	Asp	His	Ile	Tyr	Asp	Ala	Ile	Arg	Asn	Tyr	Val
			500					505					510		
Thr	Gln	Lys	Pro	Tyr	Ser	Lys	Asp	Lys	Phe	Lys	Leu	Tyr	Phe	Gln	Asn
		515					520					525			

Pro Gln Phe Met Gly Gly Trp Asp Lys Asp Lys Glu Thr Asp Tyr Arg
 530 535 540

Ala Thr Ile Leu Arg Tyr Gly Ser Lys Tyr Tyr Leu Ala Ile Met Asp
 545 550 555 560

Lys Lys Tyr Ala Lys Cys Leu Gln Lys Ile Asp Lys Asp Asp Val Asn
 565 570 575

Gly Asn Tyr Glu Lys Ile Asn Tyr Lys Leu Leu Pro Gly Pro Asn Lys
 580 585 590

Met Leu Pro Lys Val Phe Phe Ser Lys Lys Trp Met Ala Tyr Tyr Asn
 595 600 605

Pro Ser Glu Asp Ile Gln Lys Ile Tyr Lys Asn Gly Thr Phe Lys Lys
 610 615 620

Gly Asp Met Phe Asn Leu Asn Asp Cys His Lys Leu Ile Asp Phe Phe
 625 630 635 640

Lys Asp Ser Ile Ser Arg Tyr Pro Lys Trp Ser Asn Ala Tyr Asp Phe
 645 650 655

Asn Phe Ser Glu Thr Glu Lys Tyr Lys Asp Ile Ala Gly Phe Tyr Arg
 660 665 670

Glu Val Glu Glu Gln Gly Tyr Lys Val Ser Phe Glu Ser Ala Ser Lys
 675 680 685

Lys Glu Val Asp Lys Leu Val Glu Glu Gly Lys Leu Tyr Met Phe Gln
 690 695 700

Ile Tyr Asn Lys Asp Phe Ser Asp Lys Ser His Gly Thr Pro Asn Leu
 705 710 715 720

His Thr Met Tyr Phe Lys Leu Leu Phe Asp Glu Asn Asn His Gly Gln
 725 730 735

Ile Arg Leu Ser Gly Gly Ala Glu Leu Phe Met Arg Arg Ala Ser Leu

740

745

750

Lys Lys Glu Glu Leu Val Val His Pro Ala Asn Ser Pro Ile Ala Asn
 755 760 765

Lys Asn Pro Asp Asn Pro Lys Lys Thr Thr Thr Leu Ser Tyr Asp Val
 770 775 780

Tyr Lys Asp Lys Arg Phe Ser Glu Asp Gln Tyr Glu Leu His Ile Pro
 785 790 795 800

Ile Ala Ile Asn Lys Cys Pro Lys Asn Ile Phe Lys Ile Asn Thr Glu
 805 810 815

Val Arg Val Leu Leu Lys His Asp Asp Asn Pro Tyr Val Ile Gly Ile
 820 825 830

Asp Arg Gly Glu Arg Asn Leu Leu Tyr Ile Val Val Val Asp Gly Lys
 835 840 845

Gly Asn Ile Val Glu Gln Tyr Ser Leu Asn Glu Ile Ile Asn Asn Phe
 850 855 860

Asn Gly Ile Arg Ile Lys Thr Asp Tyr His Ser Leu Leu Asp Lys Lys
 865 870 875 880

Glu Lys Glu Arg Phe Glu Ala Arg Gln Asn Trp Thr Ser Ile Glu Asn
 885 890 895

Ile Lys Glu Leu Lys Ala Gly Tyr Ile Ser Gln Val Val His Lys Ile
 900 905 910

Cys Glu Leu Val Glu Lys Tyr Asp Ala Val Ile Ala Leu Glu Asp Leu
 915 920 925

Asn Ser Gly Phe Lys Asn Ser Arg Val Lys Val Glu Lys Gln Val Tyr
 930 935 940

Gln Lys Phe Glu Lys Met Leu Ile Asp Lys Leu Asn Tyr Met Val Asp
 945 950 955 960

Lys Lys Ser Asn Pro Cys Ala Thr Gly Gly Ala Leu Lys Gly Tyr Gln
 965 970 975

Ile Thr Asn Lys Phe Glu Ser Phe Lys Ser Met Ser Thr Gln Asn Gly
 980 985 990

Phe Ile Phe Tyr Ile Pro Ala Trp Leu Thr Ser Lys Ile Asp Pro Ser
 995 1000 1005

Thr Gly Phe Val Asn Leu Leu Lys Thr Lys Tyr Thr Ser Ile Ala
 1010 1015 1020

Asp Ser Lys Lys Phe Ile Ser Ser Phe Asp Arg Ile Met Tyr Val
 1025 1030 1035

Pro Glu Glu Asp Leu Phe Glu Phe Ala Leu Asp Tyr Lys Asn Phe
 1040 1045 1050

Ser Arg Thr Asp Ala Asp Tyr Ile Lys Lys Trp Lys Leu Tyr Ser
 1055 1060 1065

Tyr Gly Asn Arg Ile Arg Ile Phe Ala Ala Ala Lys Lys Asn Asn
 1070 1075 1080

Val Phe Ala Trp Glu Glu Val Cys Leu Thr Ser Ala Tyr Lys Glu
 1085 1090 1095

Leu Phe Asn Lys Tyr Gly Ile Asn Tyr Gln Gln Gly Asp Ile Arg
 1100 1105 1110

Ala Leu Leu Cys Glu Gln Ser Asp Lys Ala Phe Tyr Ser Ser Phe
 1115 1120 1125

Met Ala Leu Met Ser Leu Met Leu Gln Met Arg Asn Ser Ile Thr
 1130 1135 1140

Gly Arg Thr Asp Val Asp Phe Leu Ile Ser Pro Val Lys Asn Ser
 1145 1150 1155

Asp Gly Ile Phe Tyr Asp Ser Arg Asn Tyr Glu Ala Gln Glu Asn

1160

1165

1170

Ala	Ile	Leu	Pro	Lys	Asn	Ala	Asp	Ala	Asn	Gly	Ala	Tyr	Asn	Ile
1175						1180					1185			

Ala	Arg	Lys	Val	Leu	Trp	Ala	Ile	Gly	Gln	Phe	Lys	Lys	Ala	Glu
1190						1195					1200			

Asp	Glu	Lys	Leu	Asp	Lys	Val	Lys	Ile	Ala	Ile	Ser	Asn	Lys	Glu
1205						1210					1215			

Trp	Leu	Glu	Tyr	Ala	Gln	Thr	Ser	Val	Lys
1220						1225			