

60806923

SEQUENCE LISTING

<110> Evolva SA

<120> METHODS AND MATERIALS FOR BIOSYNTHESIS
OF MOGROSIDE COMPOUNDS

<130> 30998-0013w01

<150> 61/563,303

<151> 2011-11-23

<160> 5

<170> FastSEQ for windows Version 4.0

<210> 1

<211> 496

<212> PRT

<213> Arabidopsis thaliana

<400> 1

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

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Ile	Lys	Gly	Trp	Ala	Pro	Gln	Val	Leu	Ile	Leu	Ser	His	Pro	Ser	Val
		355					360					365			
Gly	Gly	Phe	Leu	Thr	His	Cys	Gly	Trp	Asn	Ser	Thr	Leu	Glu	Gly	Ile
	370					375					380				
Thr	Ser	Gly	Ile	Pro	Leu	Ile	Thr	Trp	Pro	Leu	Phe	Gly	Asp	Gln	Phe
385					390					395					400
Cys	Asn	Gln	Lys	Leu	Val	Val	Gln	Val	Leu	Lys	Ala	Gly	Val	Ser	Ala
				405					410					415	
Gly	Val	Glu	Glu	Val	Met	Lys	Trp	Gly	Glu	Glu	Asp	Lys	Ile	Gly	Val
			420					425					430		
Leu	Val	Asp	Lys	Glu	Gly	Val	Lys	Lys	Ala	Val	Glu	Glu	Leu	Met	Gly
		435					440					445			
Asp	Ser	Asp	Asp	Ala	Lys	Glu	Arg	Arg	Arg	Arg	Val	Lys	Glu	Leu	Gly
	450					455					460				
Glu	Leu	Ala	His	Lys	Ala	Val	Glu	Lys	Gly	Gly	Ser	Ser	His	Ser	Asn
465					470					475					480
Ile	Thr	Leu	Leu	Leu	Gln	Asp	Ile	Met	Gln	Leu	Ala	Gln	Phe	Lys	Asn
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<212> PRT

<213> Arabidopsis thaliana

<400> 2

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

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Ser	Glu	Ser	Gly	Phe	Glu	Asp	Arg	Ile	Gln	Asp	Arg	Gly	Leu	Leu	Ile
			340					345					350		
Lys	Gly	Trp	Ser	Pro	Gln	Met	Leu	Ile	Leu	Ser	His	Pro	Ser	Val	Gly
		355					360					365			
Gly	Phe	Leu	Thr	His	Cys	Gly	Trp	Asn	Ser	Thr	Leu	Glu	Gly	Ile	Thr
	370					375					380				
Ala	Gly	Leu	Pro	Leu	Leu	Thr	Trp	Pro	Leu	Phe	Ala	Asp	Gln	Phe	Cys
385					390					395					400
Asn	Glu	Lys	Leu	Val	Val	Glu	Val	Leu	Lys	Ala	Gly	Val	Arg	Ser	Gly
				405					410					415	
Val	Glu	Gln	Pro	Met	Lys	Trp	Gly	Glu	Glu	Glu	Lys	Ile	Gly	Val	Leu
			420					425					430		
Val	Asp	Lys	Glu	Gly	Val	Lys	Lys	Ala	Val	Glu	Glu	Leu	Met	Gly	Glu
		435					440					445			
Ser	Asp	Asp	Ala	Lys	Glu	Arg	Arg	Arg	Arg	Ala	Lys	Glu	Leu	Gly	Asp
	450					455					460				
Ser	Ala	His	Lys	Ala	Val	Glu	Glu	Gly	Gly	Ser	Ser	His	Ser	Asn	Ile
465					470					475					480
Ser	Phe	Leu	Leu	Gln	Asp	Ile	Met	Glu	Leu	Ala	Glu	Pro	Asn	Asn	
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<211> 495

<212> PRT

<213> Arabidopsis thaliana

<400> 3

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

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

<210> 4

<211> 495

<212> PRT

<213> Stevia rebaudiana

<400> 4

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

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Ala	Ala	Gln	Ala	Ile	Glu	Leu	Gly	Leu	Gly	Leu	Glu	Ser	Ile	Asn	Arg
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Pro	Phe	Ile	Trp	Cys	Val	Arg	Asn	Glu	Thr	Asp	Glu	Leu	Lys	Thr	Trp
				325					330					335	
Phe	Leu	Asp	Gly	Phe	Glu	Glu	Arg	Val	Arg	Asp	Arg	Gly	Leu	Ile	Val
			340					345					350		
His	Gly	Trp	Ala	Pro	Gln	Val	Leu	Ile	Leu	Ser	His	Pro	Thr	Ile	Gly
		355					360					365			
Gly	Phe	Leu	Thr	His	Cys	Gly	Trp	Asn	Ser	Thr	Ile	Glu	Ser	Ile	Thr
	370					375					380				
Ala	Gly	Val	Pro	Met	Ile	Thr	Trp	Pro	Phe	Phe	Ala	Asp	Gln	Phe	Leu
385					390				395						400
Asn	Glu	Ala	Phe	Ile	Val	Glu	Val	Leu	Lys	Ile	Gly	Val	Arg	Ile	Gly
				405					410					415	
Val	Glu	Arg	Ala	Cys	Leu	Phe	Gly	Glu	Glu	Asp	Lys	Val	Gly	Val	Leu
			420					425					430		
Val	Lys	Lys	Glu	Asp	Val	Lys	Lys	Ala	Val	Glu	Cys	Leu	Met	Asp	Glu
	435					440					445				
Asp	Glu	Asp	Gly	Asp	Gln	Arg	Arg	Lys	Arg	Val	Ile	Glu	Leu	Ala	Lys
	450				455						460				
Met	Ala	Lys	Ile	Ala	Met	Ala	Glu	Gly	Gly	Ser	Ser	Tyr	Glu	Asn	Val
465					470					475					480
Ser	Ser	Leu	Ile	Arg	Asp	Val	Thr	Glu	Thr	Val	Arg	Ala	Pro	His	
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<210> 5

<211> 481

<212> PRT

<213> Stevia rebaudiana

<400> 5

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

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Gln	Ser	Lys	Glu	Pro	Asn	Ser	Val	Val	Tyr	Val	Asn	Phe	Gly	Ser	Thr
	290					295					300				
Thr	Val	Met	Ser	Leu	Glu	Asp	Met	Thr	Glu	Phe	Gly	Trp	Gly	Leu	Ala
305					310					315					320
Asn	Ser	Asn	His	Tyr	Phe	Leu	Trp	Ile	Ile	Arg	Ser	Asn	Leu	Val	Ile
				325					330					335	
Gly	Glu	Asn	Ala	Val	Leu	Pro	Pro	Glu	Leu	Glu	Glu	His	Ile	Lys	Lys
			340					345					350		
Arg	Gly	Phe	Ile	Ala	Ser	Trp	Cys	Ser	Gln	Glu	Lys	Val	Leu	Lys	His
		355					360					365			
Pro	Ser	Val	Gly	Gly	Phe	Leu	Thr	His	Cys	Gly	Trp	Gly	Ser	Thr	Ile
	370					375					380				
Glu	Ser	Leu	Ser	Ala	Gly	Val	Pro	Met	Ile	Cys	Trp	Pro	Tyr	Ser	Trp
385					390					395					400
Asp	Gln	Leu	Thr	Asn	Cys	Arg	Tyr	Ile	Cys	Lys	Glu	Trp	Glu	Val	Gly
				405					410					415	
Leu	Glu	Met	Gly	Thr	Lys	Val	Lys	Arg	Asp	Glu	Val	Lys	Arg	Leu	Val
			420					425					430		
Gln	Glu	Leu	Met	Gly	Glu	Gly	Gly	His	Lys	Met	Arg	Asn	Lys	Ala	Lys
		435					440					445			
Asp	Trp	Lys	Glu	Lys	Ala	Arg	Ile	Ala	Ile	Ala	Pro	Asn	Gly	Ser	Ser
	450					455					460				
Ser	Leu	Asn	Ile	Asp	Lys	Met	Val	Lys	Glu	Ile	Thr	Val	Leu	Ala	Arg
465					470					475					480
Asn															