

SIA-B-0001-PCT1-SL_ST25
SEQUENCE LISTING

<110> GLYCOTRECK
RONIN, Catherine

<120> METHODS FOR PRODUCING SIALYLATED THERAPEUTIC PROTEINS

<130> SIA-B-0001-PCT1

<150> EP13003501.7
<151> 2013-07-11

<160> 43

<170> PatentIn version 3.5

<210> 1
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<213> Artificial sequence

<220>
<223> Catalytic domain of ST6Gal1 sialyl transférase

<400> 1

Glu Ala Ser Phe Gln Val Trp Asn Lys Asp Ser Ser Ser Lys Asn Leu
1 5 10 15

Ile Pro Arg Leu Gln Lys Ile Trp Lys Asn Tyr Leu Ser Met Asn Lys
20 25 30

Tyr Lys Val Ser Tyr Lys Gly Pro Gly Ile Lys Phe Ser Ala
35 40 45

Glu Ala Leu Arg Cys His Leu Arg Asp His Val Asn Val Ser Met Val
50 55 60

Glu Val Thr Asp Phe Pro Phe Asn Thr Ser Glu Trp Glu Gly Tyr Leu
65 70 75 80

Pro Lys Glu Ser Ile Arg Thr Lys Ala Gly Pro Trp Gly Arg Cys Ala
85 90 95

Val Val Ser Ser Ala Gly Ser Leu Lys Ser Ser Gln Leu Gly Arg Glu
100 105 110

Ile Asp Asp His Asp Ala Val Leu Arg Phe Asn Gly Ala Pro Thr Ala
115 120 125

Asn Phe Gln Gln Asp Val Gly Thr Lys Thr Thr Ile Arg Leu Met Asn
130 135 140

Ser Gln Leu Val Thr Thr Glu Lys Arg Phe Leu Lys Asp Ser Leu Tyr
145 150 155 160

Asn Glu Gly Ile Leu Ile Val Trp Asp Pro Ser Val Tyr His Ser Asp
165 170 175

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Ile Pro Lys Trp Tyr Gln Asn Pro Asp Tyr Asn Phe Phe Asn Asn Tyr
180 185 190

Lys Thr Tyr Arg Lys Leu His Pro Asn Gln Pro Phe Tyr Ile Leu Lys
195 200 205

Pro Gln Met Pro Trp Glu Leu Trp Asp Ile Leu Gln Glu Ile Ser Pro
210 215 220

Glu Glu Ile Gln Pro Asn Pro Pro Ser Ser Gly Met Leu Gly Ile Ile
225 230 235 240

Ile Met Met Thr Leu Cys Asp Gln Val Asp Ile Tyr Glu Phe Leu Pro
245 250 255

Ser Lys Arg Lys Thr Asp Val Cys Tyr Tyr Tyr Gln Lys Phe Phe Asp
260 265 270

Ser Ala Cys Thr Met Gly Ala Tyr His Pro Leu Leu Tyr Glu Lys Asn
275 280 285

Leu Val Lys His Leu Asn Gln Gly Thr Asp Glu Asp Ile Tyr Leu Leu
290 295 300

Gly Lys Ala Thr Leu Pro Gly Phe Arg Thr Ile His Cys
305 310 315

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<223> transmembrane domain of human ST6GalI

<400> 2

Cys Cys Val Leu Val Phe Leu Leu Phe Ala Val Ile Cys Val Trp Lys
1 5 10 15

Glu Lys Lys Lys Gly Ser Tyr Tyr
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<210> 3
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<213> Artificial Sequence

<220>
<223> transmembrane domain of CHO ST6GalI

<400> 3

Tyr Phe Ile Leu Ala Phe Leu Leu Phe Ala Leu Ile Cys Val Trp Lys
1 5 10 15

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Lys Gly Ser Tyr
20

<210> 4
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> transmembrane domain of mouse ST6GalI

<400> 4

Cys Phe Val Leu Val Phe Leu Leu Phe Ala Ile Ile Cys Val Trp Lys
1 5 10 15

Lys Gly Ser Asp Tyr
20

<210> 5
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> transmembrane domain of rat ST6GalI

<400> 5

Leu Phe Ile Leu Val Phe Leu Leu Phe Ala Val Ile Cys Val Trp Lys
1 5 10 15

Lys Gly Ser Asp Tyr
20

<210> 6
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<220>
<223> TMD human ST6GalII

<400> 6

Met Leu Phe Gly Ile Phe Ala Trp Gly Leu Leu Phe Leu Leu Ile Phe
1 5 10 15

Ile Tyr Phe Thr Asp
20

<210> 7
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<223> transmembrane domain CHO ST6GalII

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<400> 7

Met Leu Phe Gly Ile Phe Val Trp Gly Leu Leu Phe Leu Ala Ile Phe
1 5 10 15

Ile Tyr Phe Thr Asn
20

<210> 8
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<223> transmembrane domain mouse ST6GalII

<400> 8

Met Leu Phe Gly Ile Phe Val Trp Gly Leu Leu Phe Leu Ala Ile Phe
1 5 10 15

Ile Tyr Phe Thr Asn
20

<210> 9
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<220>
<223> TMD rat ST6GalII

<400> 9

Met Leu Phe Ala Ile Phe Val Trp Gly Leu Leu Phe Leu Ala Ile Phe
1 5 10 15

Ile Tyr Phe Thr Asn
20

<210> 10
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<212> PRT
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<220>
<223> TMD human ST3GalIII

<400> 10

Asn Leu Leu Leu Ala Leu Cys Leu Phe Leu Val Leu Gly Phe Leu Tyr
1 5 10 15

Tyr Ser Ala Trp
20

<210> 11
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<220>

<223> TMD CHO ST3GalIII

<400> 11

Asn Leu Leu Leu Ala Leu Cys Leu Phe Leu Val Leu Gly Phe Leu Tyr
1 5 10 15

Tyr Ser Ala Trp
20

<210> 12

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<212> PRT

<213> Artificial Sequence

<220>

<223> TMD mouse ST3GalIII

<400> 12

Asn Leu Leu Leu Ala Leu Cys Leu Phe Leu Val Leu Gly Phe Leu Tyr
1 5 10 15

Tyr Ser Ala Trp
20

<210> 13

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> TMD rat ST3GalIII

<400> 13

Asn Leu Leu Leu Ala Leu Cys Leu Phe Leu Val Leu Gly Phe Leu Tyr
1 5 10 15

Tyr Ser Ala Trp
20

<210> 14

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> TMD human ST8SiaIV

<400> 14

Trp Thr Ile Cys Thr Ile Ser Leu Leu Ile Phe Tyr
1 5 10

<210> 15

<211> 13

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<223> TMD mouse ST8SiaIV

<400> 15

Trp Thr Ile Cys Thr Ile Ser Leu Leu Leu Ile Phe Tyr
1 5 10

<210> 16

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> TMD rat ST8SiaIV

<400> 16

Trp Thr Ile Cys Thr Ile Ser Leu Leu Leu Ile Phe Tyr
1 5 10

<210> 17

<211> 54

<212> PRT

<213> Artificial Sequence

<220>

<223> SR (stem region) human ST6GalI

<400> 17

Asp Ser Phe Lys Leu Gln Thr Lys Glu Phe Gln Val Leu Lys Ser Leu
1 5 10 15

Gly Lys Leu Ala Met Gly Ser Asp Ser Gln Ser Val Ser Ser Ser Ser
20 25 30

Thr Gln Asp Pro His Arg Gly Arg Gln Thr Leu Gly Ser Leu Arg Gly
35 40 45

Leu Ala Lys Ala Lys Pro
50

<210> 18

<211> 54

<212> PRT

<213> Artificial Sequence

<220>

<223> SR CHO ST6GalI

<400> 18

Glu Ala Leu Lys Leu Gln Ala Lys Glu Phe Gln Val Thr Arg Ser Leu
1 5 10 15

Glu Lys Leu Ala Met Arg Ser Gly Ser Gln Ser Met Ser Ser Ser Ser
20 25 30

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Lys Gln Asp Pro Lys Gln Asp Ser Gln Val Leu Ser His Ala Arg Val
35 40 45

Thr Ala Lys Val Lys Pro
50

<210> 19
<211> 53
<212> PRT
<213> Artificial Sequence

<220>
<223> SR mouse ST6GalI

<400> 19

Glu Ala Leu Thr Leu Gln Ala Lys Val Phe Gln Met Pro Lys Ser Gln
1 5 10 15

Glu Lys Val Ala Val Gly Pro Ala Pro Ala Val Phe Ser Asn Ser Lys
20 25 30

Gln Asp Pro Lys Glu Gly Val Gln Ile Leu Ser Tyr Pro Arg Val Thr
35 40 45

Ala Lys Val Lys Pro
50

<210> 20
<211> 54
<212> PRT
<213> Artificial Sequence

<220>
<223> SR rat ST6GalI

<400> 20

Glu Ala Leu Thr Leu Gln Ala Lys Glu Phe Gln Met Pro Lys Ser Gln
1 5 10 15

Glu Lys Val Ala Met Gly Ser Ala Ser Gln Val Val Phe Ser Asn Ser
20 25 30

Lys Gln Asp Pro Lys Glu Asp Ile Pro Ile Leu Ser Tyr His Arg Val
35 40 45

Thr Ala Lys Val Lys Pro
50

<210> 21
<211> 53
<212> PRT
<213> Artificial Sequence

<220>
<223> SR human ST6GalII

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<400> 21

Ser Asn Pro Ala Glu Pro Val Pro Ser Ser Leu Ser Phe Leu Glu Thr
1 5 10 15

Arg Arg Leu Leu Pro Val Gln Gly Lys Gln Arg Ala Ile Met Gly Ala
20 25 30

Ala His Glu Pro Ser Pro Pro Gly Gly Leu Asp Ala Arg Gln Ala Leu
35 40 45

Pro Arg Ala His Pro
50

<210> 22

<211> 53

<212> PRT

<213> Artificial sequence

<220>

<223> SR CHO ST6GalII

<400> 22

Ser Asn Pro Ala Ser Pro Val Pro Ser Ser Phe Ser Phe Val Glu Asn
1 5 10 15

Arg Gly Leu Leu Pro Val Gln Gly Lys Gln Arg Ala Ile Met Gly Ala
20 25 30

Leu Gln Glu Ser Ser Leu Pro Arg Ser Leu Glu Ala Ser Lys Ala Leu
35 40 45

Pro Gly Ser His Pro
50

<210> 23

<211> 53

<212> PRT

<213> Artificial sequence

<220>

<223> SR mouse ST6GalII

<400> 23

Ser Asn Pro Ala Ala Pro Met Pro Ser Ser Phe Ser Phe Leu Glu Ser
1 5 10 15

Arg Gly Leu Leu Pro Leu Gln Gly Lys Gln Arg Val Ile Met Gly Ala
20 25 30

Leu Gln Glu Pro Ser Leu Pro Arg Ser Leu Asp Ala Ser Lys Val Leu
35 40 45

Leu Asp Ser His Pro
50

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<210> 24
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 <212> PRT
 <213> Artificial sequence

<220>
 <223> SR rat ST6GalII

<400> 24

Ser Asn Pro Ala Ala Pro Met Pro Ser Ser Phe Ser Phe Leu Glu Ser
 1 5 10 15

Arg Gly Leu Leu Pro Val Gln Gly Lys Gln Arg Val Ile Met Gly Ala
 20 25 30

Leu Gln Glu Pro Ser Leu Pro Arg Ser Leu Glu Pro Ser Lys Val Leu
 35 40 45

Met Asp Gly His Ser
 50

<210> 25
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> SR human ST3GalIII

<400> 25

Lys Leu His Leu Leu Gln Trp Glu Glu Asp Ser Asn Ser Val Val Leu
 1 5 10 15

Ser Phe

<210> 26
 <211> 17
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> SR CHO ST3GalIII

<400> 26

Lys Leu His Leu Leu Gln Trp Glu Asp Ser Asn Ser Leu Leu Leu Ser
 1 5 10 15

Leu

<210> 27
 <211> 17
 <212> PRT
 <213> Artificial Sequence

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<220>

<223> SR mouse ST3GalIII

<400> 27

Lys Leu His Leu Leu Gln Trp Glu Asp Ser Asn Ser Leu Leu Leu Ser
1 5 10 15

Leu

<210> 28

<211> 17

<212> PRT

<213> Artificial sequence

<220>

<223> SR rat ST3GalIII

<400> 28

Lys Leu His Leu Leu Gln Trp Glu Asp Ser Asn Ser Leu Ile Leu Ser
1 5 10 15

Leu

<210> 29

<211> 47

<212> PRT

<213> Artificial sequence

<220>

<223> SR human ST8SiaIV

<400> 29

Lys Thr Lys Glu Ile Ala Arg Thr Glu Glu His Gln Glu Thr Gln Leu
1 5 10 15

Ile Gly Asp Gly Glu Leu Ser Leu Ser Arg Ser Leu Val Asn Ser Ser
20 25 30

Asp Lys Ile Ile Arg Lys Ala Gly Ser Ser Ile Phe Gln His Asn
35 40 45

<210> 30

<211> 47

<212> PRT

<213> Artificial sequence

<220>

<223> SR mouse ST8SiaIV

<400> 30

Lys Thr Lys Glu Ile Ala Arg Thr Glu Glu His Gln Glu Thr Gln Leu
1 5 10 15

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Ile Gly Asp Gly Glu Leu Cys Leu Ser Arg Ser Leu Val Asn Ser Ser
20 25 30

Asp Lys Ile Ile Arg Lys Ala Gly Ser Thr Ile Phe Gln His Ser
35 40 45

<210> 31
<211> 47
<212> PRT
<213> Artificial Sequence

<220>
<223> SR rat ST8SiaIV

<400> 31

Lys Thr Lys Glu Ile Ala Arg Thr Glu Glu His Gln Glu Thr Gln Leu
1 5 10 15

Ile Gly Asp Gly Glu Leu Cys Leu Ser Arg Ser Leu Val Asn Asn Ser
20 25 30

Asp Lys Ile Thr Arg Lys Ala Gly Ser Thr Ile Phe Gln His Ser
35 40 45

<210> 32
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> SR human ST8SiaII

<400> 32

Asp Ile Ser Glu Ile Glu Glu Glu Ile Gly Asn Ser Gly Gly Arg Gly
1 5 10 15

Thr Ile Arg Ser Ala Val Asn Ser Leu His Ser Lys Ser Asn Arg Ala
20 25 30

Glu Val Val Ile Asn Gly Ser Ser Ser Pro Ala Val Val Asp Arg Ser
35 40 45

Asn Glu Ser Ile Lys His Asn Ile
50 55

<210> 33
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> SR mouse ST8SiaII

<400> 33

Asp Ile Ser Glu Ile Glu Glu Glu Ile Gly Asn Ser Gly Gly Arg Gly
1 5 10 15

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Thr Ile Arg Ser Ala Val Asn Ser Leu His Ser Lys Ser Asn Arg Ala
20 25 30

Glu Val Val Ile Asn Gly Ser Ser Pro Pro Ala Val Ala Asp Arg Ser
35 40 45

Asn Glu Ser Leu Lys His Asn Ile
50 55

<210> 34
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> SR rat ST8SiaII

<400> 34

Asp Ile Ser Glu Ile Glu Glu Glu Ile Gly Asn Ser Gly Gly Arg Gly
1 5 10 15

Thr Ile Arg Ser Ala Val Asn Ser Leu His Ser Lys Ser Asn Arg Ala
20 25 30

Glu Val Val Ile Asn Gly Ser Ser Leu Pro Ala Val Ala Asp Arg Ser
35 40 45

Asn Glu Ser Leu Lys His Ser Ile
50 55

<210> 35
<211> 402
<212> PRT
<213> Artificial Sequence

<220>
<223> Anchor sequence of ST6Gal1 of CHO and Catalytic domain of human ST6Gal1

<400> 35

Met Ile His Thr Asn Leu Lys Lys Lys Phe Ser Tyr Phe Ile Leu Ala
1 5 10 15

Phe Leu Leu Phe Ala Leu Ile Cys Val Trp Lys Lys Gly Ser Tyr Glu
20 25 30

Ala Leu Lys Leu Gln Ala Lys Glu Phe Gln Val Thr Arg Ser Leu Glu
35 40 45

Lys Leu Ala Met Arg Ser Gly Ser Gln Ser Met Ser Ser Ser Ser Lys
50 55 60

Gln Asp Pro Lys Gln Asp Ser Gln Val Leu Ser His Ala Arg Val Thr

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

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 340 345 350

Gln Lys Phe Phe Asp Ser Ala Cys Thr Met Gly Ala Tyr His Pro Leu
 355 360 365

Leu Tyr Glu Lys Asn Leu Val Lys His Leu Asn Gln Gly Thr Asp Glu
 370 375 380

Asp Ile Tyr Leu Leu Gly Lys Ala Thr Leu Pro Gly Phe Arg Thr Ile
 385 390 395 400

His Cys

<210> 36
 <211> 406
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Anchor sequence of human ST8Sia2 and Catalytic domain of human
 ST6Gal1

<400> 36

Met Asp Tyr Lys Asp Asp Asp Asp Lys Gln Leu Gln Phe Arg Ser Trp
 1 5 10 15

Met Leu Ala Ala Leu Thr Leu Leu Val Val Phe Leu Ile Phe Ala Asp
 20 25 30

Ile Ser Glu Ile Glu Glu Glu Ile Gly Asn Ser Gly Gly Arg Gly Thr
 35 40 45

Ile Arg Ser Ala Val Asn Ser Leu His Ser Lys Ser Asn Arg Ala Glu
 50 55 60

Val Val Ile Asn Gly Ser Ser Ser Pro Ala Val Val Asp Arg Ser Asn
 65 70 75 80

Glu Ser Ile Lys His Asn Ile Lys Leu Glu Ala Ser Phe Gln Val Trp
 85 90 95

Asn Lys Asp Ser Ser Ser Lys Asn Leu Ile Pro Arg Leu Gln Lys Ile
 100 105 110

Trp Lys Asn Tyr Leu Ser Met Asn Lys Tyr Lys Val Ser Tyr Lys Gly
 115 120 125

Pro Gly Pro Gly Ile Lys Phe Ser Ala Glu Ala Leu Arg Cys His Leu
 130 135 140

Arg Asp His Val Asn Val Ser Met Val Glu Val Thr Asp Phe Pro Phe
 145 150 155 160

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Asn Thr Ser Glu Trp Glu Gly Tyr Leu Pro Lys Glu Ser Ile Arg Thr
165 170 175

Lys Ala Gly Pro Trp Gly Arg Cys Ala Val Val Ser Ser Ala Gly Ser
180 185 190

Leu Lys Ser Ser Gln Leu Gly Arg Glu Ile Asp Asp His Asp Ala Val
195 200 205

Leu Arg Phe Asn Gly Ala Pro Thr Ala Asn Phe Gln Gln Asp Val Gly
210 215 220

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

Lys Arg Phe Leu Lys Asp Ser Leu Tyr Asn Glu Gly Ile Leu Ile Val
245 250 255

Trp Asp Pro Ser Val Tyr His Ser Asp Ile Pro Lys Trp Tyr Gln Asn
260 265 270

Pro Asp Tyr Asn Phe Phe Asn Asn Tyr Lys Thr Tyr Arg Lys Leu His
275 280 285

Pro Asn Gln Pro Phe Tyr Ile Leu Lys Pro Gln Met Pro Trp Glu Leu
290 295 300

Trp Asp Ile Leu Gln Glu Ile Ser Pro Glu Glu Ile Gln Pro Asn Pro
305 310 315 320

Pro Ser Ser Gly Met Leu Gly Ile Ile Ile Met Met Thr Leu Cys Asp
325 330 335

Gln Val Asp Ile Tyr Glu Phe Leu Pro Ser Lys Arg Lys Thr Asp Val
340 345 350

Cys Tyr Tyr Tyr Gln Lys Phe Phe Asp Ser Ala Cys Thr Met Gly Ala
355 360 365

Tyr His Pro Leu Leu Tyr Glu Lys Asn Leu Val Lys His Leu Asn Gln
370 375 380

Gly Thr Asp Glu Asp Ile Tyr Leu Leu Gly Lys Ala Thr Leu Pro Gly
385 390 395 400

Phe Arg Thr Ile His Cys
405

<210> 37
<211> 420

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<212> PRT

<213> Artificial Sequence

<220>

<223> preprotrypsinogen signal sequence, a Flag-Tag, the anchor sequence of the human ST8Sia2 fused to the catalytic domain of the human ST6Gal1

<400> 37

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

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Thr Thr Ile Arg Leu Met Asn Ser Gln Leu Val Thr Thr Glu Lys Arg
245 250 255

Phe Leu Lys Asp Ser Leu Tyr Asn Glu Gly Ile Leu Ile Val Trp Asp
260 265 270

Pro Ser Val Tyr His Ser Asp Ile Pro Lys Trp Tyr Gln Asn Pro Asp
275 280 285

Tyr Asn Phe Phe Asn Asn Tyr Lys Thr Tyr Arg Lys Leu His Pro Asn
290 295 300

Gln Pro Phe Tyr Ile Leu Lys Pro Gln Met Pro Trp Glu Leu Trp Asp
305 310 315 320

Ile Leu Gln Glu Ile Ser Pro Glu Glu Ile Gln Pro Asn Pro Pro Ser
325 330 335

Ser Gly Met Leu Gly Ile Ile Ile Met Met Thr Leu Cys Asp Gln Val
340 345 350

Asp Ile Tyr Glu Phe Leu Pro Ser Lys Arg Lys Thr Asp Val Cys Tyr
355 360 365

Tyr Tyr Gln Lys Phe Phe Asp Ser Ala Cys Thr Met Gly Ala Tyr His
370 375 380

Pro Leu Leu Tyr Glu Lys Asn Leu Val Lys His Leu Asn Gln Gly Thr
385 390 395 400

Asp Glu Asp Ile Tyr Leu Leu Gly Lys Ala Thr Leu Pro Gly Phe Arg
405 410 415

Thr Ile His Cys
420

<210> 38
<211> 373
<212> PRT
<213> Artificial Sequence

<220>
<223> Anchor sequence of human ST3Gal3 and Catalytic domain of human
ST6Gal1

<400> 38

Met Asp Tyr Lys Asp Asp Asp Asp Lys Gly Leu Leu Val Phe Val Arg
1 5 10 15

Asn Leu Leu Leu Ala Leu Cys Leu Phe Leu Val Leu Gly Phe Leu Tyr
20 25 30

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

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Val Asp Ile Tyr Glu Phe Leu Pro Ser Lys Arg Lys Thr Asp Val Cys
305 310 315 320

Tyr Tyr Tyr Gln Lys Phe Phe Asp Ser Ala Cys Thr Met Gly Ala Tyr
325 330 335

His Pro Leu Leu Tyr Glu Lys Asn Leu Val Lys His Leu Asn Gln Gly
340 345 350

Thr Asp Glu Asp Ile Tyr Leu Leu Gly Lys Ala Thr Leu Pro Gly Phe
355 360 365

Arg Thr Ile His Cys
370

<210> 39

<211> 391

<212> PRT

<213> Artificial Sequence

<220>

<223> cytoplasmic domain of human ST3Gal3, the transmembrane domain of human ST8Sia2, and the stem region of human ST8Sia2 fused to the catalytic domain of the human ST6Gal1

<400> 39

Met Asp Tyr Lys Asp Asp Asp Asp Lys Gly Leu Leu Val Phe Val Arg
1 5 10 15

Ser Trp Met Leu Ala Ala Leu Thr Leu Leu Val Val Phe Leu Ile Phe
20 25 30

Ala Lys Glu Pro Gln Thr Lys Pro Ser Arg His Gln Arg Thr Glu Asn
35 40 45

Ile Lys Glu Arg Ser Leu Gln Ser Leu Ala Lys Pro Lys Ser Gln Ala
50 55 60

Pro Thr Arg Ala Arg Arg Thr Thr Gly Ser Glu Ala Ser Phe Gln Val
65 70 75 80

Trp Asn Lys Asp Ser Ser Ser Lys Asn Leu Ile Pro Arg Leu Gln Lys
85 90 95

Ile Trp Lys Asn Tyr Leu Ser Met Asn Lys Tyr Lys Val Ser Tyr Lys
100 105 110

Gly Pro Gly Pro Gly Ile Lys Phe Ser Ala Glu Ala Leu Arg Cys His
115 120 125

Leu Arg Asp His Val Asn Val Ser Met Val Glu Val Thr Asp Phe Pro
130 135 140

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Phe Asn Thr Ser Glu Trp Glu Gly Tyr Leu Pro Lys Glu Ser Ile Arg
 145 150 155 160
 Thr Lys Ala Gly Pro Trp Gly Arg Cys Ala Val Val Ser Ser Ala Gly
 165 170 175
 Ser Leu Lys Ser Ser Gln Leu Gly Arg Glu Ile Asp Asp His Asp Ala
 180 185 190
 Val Leu Arg Phe Asn Gly Ala Pro Thr Ala Asn Phe Gln Gln Asp Val
 195 200 205
 Gly Thr Lys Thr Thr Ile Arg Leu Met Asn Ser Gln Leu Val Thr Thr
 210 215 220
 Glu Lys Arg Phe Leu Lys Asp Ser Leu Tyr Asn Glu Gly Ile Leu Ile
 225 230 235 240
 Val Trp Asp Pro Ser Val Tyr His Ser Asp Ile Pro Lys Trp Tyr Gln
 245 250 255
 Asn Pro Asp Tyr Asn Phe Phe Asn Asn Tyr Lys Thr Tyr Arg Lys Leu
 260 265 270
 His Pro Asn Gln Pro Phe Tyr Ile Leu Lys Pro Gln Met Pro Trp Glu
 275 280 285
 Leu Trp Asp Ile Leu Gln Glu Ile Ser Pro Glu Glu Ile Gln Pro Asn
 290 295 300
 Pro Pro Ser Ser Gly Met Leu Gly Ile Ile Ile Met Met Thr Leu Cys
 305 310 315 320
 Asp Gln Val Asp Ile Tyr Glu Phe Leu Pro Ser Lys Arg Lys Thr Asp
 325 330 335
 Val Cys Tyr Tyr Tyr Gln Lys Phe Phe Asp Ser Ala Cys Thr Met Gly
 340 345 350
 Ala Tyr His Pro Leu Leu Tyr Glu Lys Asn Leu Val Lys His Leu Asn
 355 360 365
 Gln Gly Thr Asp Glu Asp Ile Tyr Leu Leu Gly Lys Ala Thr Leu Pro
 370 375 380
 Gly Phe Arg Thr Ile His Cys
 385 390

<210> 40
 <211> 683
 <212> DNA

<213> Artificial Sequence

<220>

<223> Fc IgG1

<400> 40

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gcgacaagac ccacacctgt ccccttctgtc ctgcccctga actgctgggc ggacccagcg      60
tgttcctgtt ccccccaaag cccaaggaca ccctcatgat ctcccggacc cctgagggtca      120
catgctgtgt ggtggacgtg agccacgaag accctgaggt caagttcaac tggtagctgg      180
acggcgtgga ggtgcataat gccaaagaca agccgcggga ggagcagtac aacagcacgt      240
accgtgtgtt cagcgtcctc accgtcctgc accaggactg gctgaatggc aaggagtaca      300
agtgaagggt ctccaacaaa gccctcccag ccccatcga gaaaaccatc tccaaagcca      360
aagggcagcc ccgagaacca caggtgtaca ccctgcccc atcccgggag gagatgacca      420
agaaccaggt cagcctgacc tgcttgggtc aaggcttcta tcccagcgac atcgccgtgg      480
agtgggagag caatgggcag ccggagaaca actacaagac cagcctccc gtgctggact      540
ccgacggctc cttcttcttc tacagcaagc tcaccgtgga caagagcagg tggcagcagg      600
ggaacgtctt ctcatgtctc gtgatgcacg aggtcttgca caaccactac acgcagaaga      660
gcctctccct gtctccgggt aaa                                         683

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<210> 41

<211> 1413

<212> DNA

<213> Artificial Sequence

<220>

<223> Heavy chain of Infliximab

<400> 41

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gaagtgaagc tggaagagtc cggcggaggc ctggtgcagc ctggcggatc tatgaagctg      120
tcctgcgtgg cctccggctt catcttctcc aaccactgga tgaactgggt gcgacagtcc      180
cccgagaagg gcctggaatg ggtggccgag atccggtcca agtccatcaa ctccgccacc      240
cactacgccg agtctgtgaa gggccggttc accatctccc gggacgactc caagtccgcc      300
gtgtacctgc agatgaccga cctgagaacc gaggacaccg gcgtgtacta ctgctcccgg      360
aactactacg gctccaccta cgactactgg ggccagggca ccaccctgac cgtgtctgct      420
gcttctacca agggcccctc cgtgttccct ctggcccctt ccagcaagtc tacctctggc      480
ggcacagccg ctctgggctg cctcgtgaag gactacttcc ccgagcccgt gacagtgtcc      540
tggaactctg gcgtctgac ctccggcgtg cacaccttcc cagctgtgct gcagtcctcc      600
ggcctgtact ccctgtcctc cgtcgtgacc gtgccttcca gctctctggg caccagacc      660
tacatctgca acgtgaacca caagccctcc aacaccaagg tggacaagaa ggtggaaccc      720
aagtcctgca acaagacca cacctgtccc ccttgtcctg cccctgaact gctgggcgga      780
cccagcgtgt tcctgttccc cccaaagccc aaggacaccc tcatgatctc ccggaccctc      840

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gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgagggtcaa gttcaactgg 900
 tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgaggagga gcagtacaac 960
 agcacgtacc gtgtggtcag cgctctcacc gtcctgcacc aggactggct gaatggcaag 1020
 gagtacaagt gcaagggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 1080
 aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgcccccatc ccgggaggag 1140
 atgaccaaga accagggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 1200
 gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 1260
 ctggactccg acggctcctt ctctctctac agcaagctca ccgtggacaa gagcagggtg 1320
 cagcagggga acgtcttctc atgctccgtg atgcacgagg ctctgcacaa ccactacacg 1380
 cagaagagcc tctccctgtc tccgggtaaa tga 1413

<210> 42
 <211> 708
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Light chain Infliximab

<400> 42
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 gacatcctgc tgaccagtc ccccgccatc ctgagtgtgt ctccaggcga gcgggtgtcc 120
 ttctcttgtc gggcctctca gtctgtgggc tcttccatcc actggtatca gcagcggacc 180
 aacggctccc ctggtgtgt gattaagtac gcctccgagt ctatgtccgg catccctcc 240
 agattctccg gctctggctc tggcaccgac ttcacctgt ccatcaacac cgtggaatcc 300
 gaggatatcg ccgactacta ctgccagcag tcccactcct ggcccttcac cttcgggtcc 360
 ggcaccaacc tggaagtga gagaaccgtg gccgctccct ccgtgttcat ctccacac 420
 tccgacgagc agctgaagtc cggcaccgct tctgtcgtgt gcctgctgaa caacttctac 480
 ccccgcgagg ccaaggtgca gtggaagggt gacaacgccc tgcagtccgg caactcccag 540
 gaatccgtga ccgagcagga ctccaaggac agcacctact ccctgtcctc caccctgacc 600
 ctgagcaagg ccgactacga gaagcacaag gtgtacgcct gcgaagtga ccaccagggc 660
 ctgtctagcc ccgtgaccaa gtcttttaac cggggcgagt gctgatga 708

<210> 43
 <211> 336
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Catalytic domain of ST6Gal2

<400> 43

Arg Leu Tyr Ser Ser Met Ser Arg Ala Phe Leu Tyr Arg Leu Trp Lys
 1 5 10 15

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

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Tyr His Pro Leu Leu Tyr Glu Lys Leu Leu Val Gln Arg Leu Asn Met
290 295 300

Gly Thr Gln Gly Asp Leu His Arg Lys Gly Lys Val Val Leu Pro Gly
305 310 315 320

Phe Gln Ala Val His Cys Pro Ala Pro Ser Pro Val Ile Pro His Ser
325 330 335