

SEQUENCE LISTING

<110> NOVARTIS AG
 <120> IMMUNOGENIC COMPOSITIONS INCLUDING TLR ACTIVITY MODULATORS
 <130> P055393W0
 <140> PCT/IB2010/_____
 <141> 2010-09-01
 <150> US 61/239,156
 <151> 2009-09-02
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 <170> SeqWin2010, version 1.0
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 <213> Neisseria meningitidis
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 Val Arg Lys Asn Glu Lys Leu Lys Leu Ala Ala Gln Gly Ala Glu Lys
 35 40 45
 Thr Tyr Gly Asn Gly Asp Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp
 50 55 60
 Lys Val Ser Arg Phe Asp Phe Ile Arg Gln Ile Glu Val Asp Gly Gln
 65 70 75 80
 Leu Ile Thr Leu Glu Ser Gly Glu Phe Gln Val Tyr Lys Gln Ser His
 85 90 95
 Ser Ala Leu Thr Ala Phe Gln Thr Glu Gln Ile Gln Asp Ser Glu His
 100 105 110
 Ser Gly Lys Met Val Ala Lys Arg Gln Phe Arg Ile Gly Asp Ile Ala
 115 120 125
 Gly Glu His Thr Ser Phe Asp Lys Leu Pro Glu Gly Gly Arg Ala Thr
 130 135 140
 Tyr Arg Gly Thr Ala Phe Gly Ser Asp Asp Ala Gly Gly Lys Leu Thr
 145 150 155 160
 Tyr Thr Ile Asp Phe Ala Ala Lys Gln Gly Asn Gly Lys Ile Glu His
 165 170 175
 Leu Lys Ser Pro Glu Leu Asn Val Asp Leu Ala Ala Ala Asp Ile Lys
 180 185 190
 Pro Asp Gly Lys Arg His Ala Val Ile Ser Gly Ser Val Leu Tyr Asn
 195 200 205
 Gln Ala Glu Lys Gly Ser Tyr Ser Leu Gly Ile Phe Gly Gly Lys Ala
 210 215 220
 Gln Glu Val Ala Gly Ser Ala Glu Val Lys Thr Val Asn Gly Ile Arg
 225 230 235 240

His Ile Gly Leu Ala Ala Lys Gln
245

<210> 2
<211> 247
<212> PRT
<213> Neisseria meningitidis

<400> 2
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Leu Asp His Lys Asp Lys Ser Leu Gln Ser Leu Thr Leu Asp Gln Ser
20 25 30
Val Arg Lys Asn Glu Lys Leu Lys Leu Ala Ala Gln Gly Ala Glu Lys
35 40 45
Thr Tyr Gly Asn Gly Asp Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp
50 55 60
Lys Val Ser Arg Phe Asp Phe Ile Arg Gln Ile Glu Val Asp Gly Gln
65 70 75 80
Leu Ile Thr Leu Glu Ser Gly Glu Phe Gln Ile Tyr Lys Gln Asp His
85 90 95
Ser Ala Val Val Ala Leu Gln Ile Glu Lys Ile Asn Asn Pro Asp Lys
100 105 110
Ile Asp Ser Leu Ile Asn Gln Arg Ser Phe Leu Val Ser Gly Leu Gly
115 120 125
Gly Glu His Thr Ala Phe Asn Gln Leu Pro Asp Gly Lys Ala Glu Tyr
130 135 140
His Gly Lys Ala Phe Ser Ser Asp Asp Ala Gly Gly Lys Leu Thr Tyr
145 150 155 160
Thr Ile Asp Phe Ala Ala Lys Gln Gly His Gly Lys Ile Glu His Leu
165 170 175
Lys Thr Pro Glu Gln Asn Val Glu Leu Ala Ala Ala Glu Leu Lys Ala
180 185 190
Asp Glu Lys Ser His Ala Val Ile Leu Gly Asp Thr Arg Tyr Gly Ser
195 200 205
Glu Glu Lys Gly Thr Tyr His Leu Ala Leu Phe Gly Asp Arg Ala Gln
210 215 220
Glu Ile Ala Gly Ser Ala Thr Val Lys Ile Gly Glu Lys Val His Glu
225 230 235 240
Ile Gly Ile Ala Gly Lys Gln
245

<210> 3
<211> 250
<212> PRT
<213> Neisseria meningitidis

<400> 3
Val Ala Ala Asp Ile Gly Thr Gly Leu Ala Asp Ala Leu Thr Ala Pro
1 5 10 15
Leu Asp His Lys Asp Lys Gly Leu Lys Ser Leu Thr Leu Glu Asp Ser

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

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 <211> 644
 <212> PRT
 <213> Neisseria meningitidis

<400> 4															
Met	Ala	Ser	Pro	Asp	Val	Lys	Ser	Ala	Asp	Thr	Leu	Ser	Lys	Pro	Ala
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Ala	Pro	Val	Val	Ser	Glu	Lys	Glu	Thr	Glu	Ala	Lys	Glu	Asp	Ala	Pro
			20					25					30		
Gln	Ala	Gly	Ser	Gln	Gly	Gln	Gly	Ala	Pro	Ser	Ala	Gln	Gly	Gly	Gln
		35					40					45			
Asp	Met	Ala	Ala	Val	Ser	Glu	Glu	Asn	Thr	Gly	Asn	Gly	Gly	Ala	Ala
	50					55					60				
Ala	Thr	Asp	Lys	Pro	Lys	Asn	Glu	Asp	Glu	Gly	Ala	Gln	Asn	Asp	Met
65					70					75					80
Pro	Gln	Asn	Ala	Ala	Asp	Thr	Asp	Ser	Leu	Thr	Pro	Asn	His	Thr	Pro
				85					90					95	

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Ala	Ser	Asn	Met	Pro	Ala	Gly	Asn	Met	Glu	Asn	Gln	Ala	Pro	Asp	Ala	
			100					105					110			
Gly	Glu	Ser	Glu	Gln	Pro	Ala	Asn	Gln	Pro	Asp	Met	Ala	Asn	Thr	Ala	
		115					120					125				
Asp	Gly	Met	Gln	Gly	Asp	Asp	Pro	Ser	Ala	Gly	Gly	Glu	Asn	Ala	Gly	
	130					135					140					
Asn	Thr	Ala	Ala	Gln	Gly	Thr	Asn	Gln	Ala	Glu	Asn	Asn	Gln	Thr	Ala	
145					150					155					160	
Gly	Ser	Gln	Asn	Pro	Ala	Ser	Ser	Thr	Asn	Pro	Ser	Ala	Thr	Asn	Ser	
				165					170					175		
Gly	Gly	Asp	Phe	Gly	Arg	Thr	Asn	Val	Gly	Asn	Ser	Val	Val	Ile	Asp	
			180					185					190			
Gly	Pro	Ser	Gln	Asn	Ile	Thr	Leu	Thr	His	Cys	Lys	Gly	Asp	Ser	Cys	
		195					200					205				
Ser	Gly	Asn	Asn	Phe	Leu	Asp	Glu	Glu	Val	Gln	Leu	Lys	Ser	Glu	Phe	
	210					215					220					
Glu	Lys	Leu	Ser	Asp	Ala	Asp	Lys	Ile	Ser	Asn	Tyr	Lys	Lys	Asp	Gly	
225					230					235					240	
Lys	Asn	Asp	Gly	Lys	Asn	Asp	Lys	Phe	Val	Gly	Leu	Val	Ala	Asp	Ser	
				245					250					255		
Val	Gln	Met	Lys	Gly	Ile	Asn	Gln	Tyr	Ile	Ile	Phe	Tyr	Lys	Pro	Lys	
			260					265					270			
Pro	Thr	Ser	Phe	Ala	Arg	Phe	Arg	Arg	Ser	Ala	Arg	Ser	Arg	Arg	Ser	
		275					280					285				
Leu	Pro	Ala	Glu	Met	Pro	Leu	Ile	Pro	Val	Asn	Gln	Ala	Asp	Thr	Leu	
	290					295					300					
Ile	Val	Asp	Gly	Glu	Ala	Val	Ser	Leu	Thr	Gly	His	Ser	Gly	Asn	Ile	
305					310					315					320	
Phe	Ala	Pro	Glu	Gly	Asn	Tyr	Arg	Tyr	Leu	Thr	Tyr	Gly	Ala	Glu	Lys	
				325					330					335		
Leu	Pro	Gly	Gly	Ser	Tyr	Ala	Leu	Arg	Val	Gln	Gly	Glu	Pro	Ser	Lys	
			340					345					350			
Gly	Glu	Met	Leu	Ala	Gly	Thr	Ala	Val	Tyr	Asn	Gly	Glu	Val	Leu	His	
		355					360					365				
Phe	His	Thr	Glu	Asn	Gly	Arg	Pro	Ser	Pro	Ser	Arg	Gly	Arg	Phe	Ala	
	370					375					380					
Ala	Lys	Val	Asp	Phe	Gly	Ser	Lys	Ser	Val	Asp	Gly	Ile	Ile	Asp	Ser	
385					390					395					400	
Gly	Asp	Gly	Leu	His	Met	Gly	Thr	Gln	Lys	Phe	Lys	Ala	Ala	Ile	Asp	
				405					410					415		
Gly	Asn	Gly	Phe	Lys	Gly	Thr	Trp	Thr	Glu	Asn	Gly	Gly	Gly	Asp	Val	
			420					425					430			
Ser	Gly	Lys	Phe	Tyr	Gly	Pro	Ala	Gly	Glu	Glu	Val	Ala	Gly	Lys	Tyr	
		435					440					445				
Ser	Tyr	Arg	Pro	Thr	Asp	Ala	Glu	Lys	Gly	Gly	Phe	Gly	Val	Phe	Ala	
	450					455					460					

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Gly Lys Lys Glu Gln Asp Gly Ser Gly Gly Gly Gly Ala Thr Tyr Lys
 465 470 475 480
 Val Asp Glu Tyr His Ala Asn Ala Arg Phe Ala Ile Asp His Phe Asn
 485 490 495
 Thr Ser Thr Asn Val Gly Gly Phe Tyr Gly Leu Thr Gly Ser Val Glu
 500 505 510
 Phe Asp Gln Ala Lys Arg Asp Gly Lys Ile Asp Ile Thr Ile Pro Val
 515 520 525
 Ala Asn Leu Gln Ser Gly Ser Gln His Phe Thr Asp His Leu Lys Ser
 530 535 540
 Ala Asp Ile Phe Asp Ala Ala Gln Tyr Pro Asp Ile Arg Phe Val Ser
 545 550 555 560
 Thr Lys Phe Asn Phe Asn Gly Lys Lys Leu Val Ser Val Asp Gly Asn
 565 570 575
 Leu Thr Met His Gly Lys Thr Ala Pro Val Lys Leu Lys Ala Glu Lys
 580 585 590
 Phe Asn Cys Tyr Gln Ser Pro Met Ala Lys Thr Glu Val Cys Gly Gly
 595 600 605
 Asp Phe Ser Thr Thr Ile Asp Arg Thr Lys Trp Gly Val Asp Tyr Leu
 610 615 620
 Val Asn Val Gly Met Thr Lys Ser Val Arg Ile Asp Ile Gln Ile Glu
 625 630 635 640
 Ala Ala Lys Gln

<210> 5
 <211> 434
 <212> PRT
 <213> Neisseria meningitidis

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

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130					135					140					
Val 145	Met	Gly	Ile	Leu	Thr 150	Pro	Glu	Glu	Gln	Ala 155	Gln	Ile	Thr	Gln	Lys 160
Val	Ser	Thr	Thr	Val 165	Gly	Val	Gln	Lys	Val 170	Ile	Thr	Leu	Tyr	Gln	Asn 175
Tyr	Val	Gln	Arg 180	Gly	Ser	Gly	Gly	Gly	Gly	Val	Ala	Ala	Asp 190	Ile	Gly
Ala	Gly	Leu 195	Ala	Asp	Ala	Leu	Thr 200	Ala	Pro	Leu	Asp	His 205	Lys	Asp	Lys
Gly	Leu 210	Gln	Ser	Leu	Thr	Leu 215	Asp	Gln	Ser	Val	Arg 220	Lys	Asn	Glu	Lys
Leu 225	Lys	Leu	Ala	Ala	Gln 230	Gly	Ala	Glu	Lys	Thr 235	Tyr	Gly	Asn	Gly	Asp 240
Ser	Leu	Asn	Thr	Gly 245	Lys	Leu	Lys	Asn	Asp 250	Lys	Val	Ser	Arg	Phe	Asp 255
Phe	Ile	Arg	Gln 260	Ile	Glu	Val	Asp	Gly 265	Gln	Leu	Ile	Thr	Leu	Glu	Ser 270
Gly	Glu	Phe 275	Gln	Val	Tyr	Lys 280	Gln	Ser	His	Ser	Ala	Leu 285	Thr	Ala	Phe
Gln	Thr 290	Glu	Gln	Ile	Gln	Asp 295	Ser	Glu	His	Ser	Gly 300	Lys	Met	Val	Ala
Lys 305	Arg	Gln	Phe	Arg	Ile 310	Gly	Asp	Ile	Ala	Gly 315	Glu	His	Thr	Ser	Phe 320
Asp	Lys	Leu	Pro	Glu 325	Gly	Gly	Arg	Ala	Thr 330	Tyr	Arg	Gly	Thr	Ala	Phe 335
Gly	Ser	Asp	Asp 340	Ala	Gly	Gly	Lys	Leu 345	Thr	Tyr	Thr	Ile	Asp 350	Phe	Ala
Ala	Lys	Gln 355	Gly	Asn	Gly	Lys	Ile 360	Glu	His	Leu	Lys	Ser 365	Pro	Glu	Leu
Asn	Val 370	Asp	Leu	Ala	Ala	Ala 375	Asp	Ile	Lys	Pro	Asp 380	Gly	Lys	Arg	His
Ala 385	Val	Ile	Ser	Gly	Ser 390	Val	Leu	Tyr	Asn 395	Gln	Ala	Glu	Lys	Gly	Ser 400
Tyr	Ser	Leu	Gly	Ile 405	Phe	Gly	Gly	Lys	Ala 410	Gln	Glu	Val	Ala	Gly 415	Ser
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Lys Gln

<210> 6
 <211> 327
 <212> PRT
 <213> *Neisseria meningitidis*

<400> 6
 Ala Thr Asn Asp Asp Asp Val Lys Lys Ala Ala Thr Val Ala Ile Ala
 1 5 10 15

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Ala Ala Tyr Asn Asn Gly Gln Glu Ile Asn Gly Phe Lys Ala Gly Glu
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 Thr Ile Tyr Asp Ile Asp Glu Asp Gly Thr Ile Thr Lys Lys Asp Ala
 35 40 45
 Thr Ala Ala Asp Val Glu Ala Asp Asp Phe Lys Gly Leu Gly Leu Lys
 50 55 60
 Lys Val Val Thr Asn Leu Thr Lys Thr Val Asn Glu Asn Lys Gln Asn
 65 70 75 80
 Val Asp Ala Lys Val Lys Ala Ala Glu Ser Glu Ile Glu Lys Leu Thr
 85 90 95
 Thr Lys Leu Ala Asp Thr Asp Ala Ala Leu Ala Asp Thr Asp Ala Ala
 100 105 110
 Leu Asp Ala Thr Thr Asn Ala Leu Asn Lys Leu Gly Glu Asn Ile Thr
 115 120 125
 Thr Phe Ala Glu Glu Thr Lys Thr Asn Ile Val Lys Ile Asp Glu Lys
 130 135 140
 Leu Glu Ala Val Ala Asp Thr Val Asp Lys His Ala Glu Ala Phe Asn
 145 150 155 160
 Asp Ile Ala Asp Ser Leu Asp Glu Thr Asn Thr Lys Ala Asp Glu Ala
 165 170 175
 Val Lys Thr Ala Asn Glu Ala Lys Gln Thr Ala Glu Glu Thr Lys Gln
 180 185 190
 Asn Val Asp Ala Lys Val Lys Ala Ala Glu Thr Ala Ala Gly Lys Ala
 195 200 205
 Glu Ala Ala Ala Gly Thr Ala Asn Thr Ala Ala Asp Lys Ala Glu Ala
 210 215 220
 Val Ala Ala Lys Val Thr Asp Ile Lys Ala Asp Ile Ala Thr Asn Lys
 225 230 235 240
 Asp Asn Ile Ala Lys Lys Ala Asn Ser Ala Asp Val Tyr Thr Arg Glu
 245 250 255
 Glu Ser Asp Ser Lys Phe Val Arg Ile Asp Gly Leu Asn Ala Thr Thr
 260 265 270
 Glu Lys Leu Asp Thr Arg Leu Ala Ser Ala Glu Lys Ser Ile Ala Asp
 275 280 285
 His Asp Thr Arg Leu Asn Gly Leu Asp Lys Thr Val Ser Asp Leu Arg
 290 295 300
 Lys Glu Thr Arg Gln Gly Leu Ala Glu Gln Ala Ala Leu Ser Gly Leu
 305 310 315 320
 Phe Gln Pro Tyr Asn Val Gly
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<210> 7
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Immunostimulatory oligonucleotide

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<220>
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 <222> 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25
 <223> 'n' is 'i' (Inosine)

<400> 7
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26

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

<220>
 <223> Polycationic oligopeptide

<400> 8
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