

SEQUENCE LISTING

<110> Regeneron Pharmaceuticals, Inc.

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<120> Hydroxysteroid 17-beta Dehydrogenase 13 (HSD17B13)Variants And
Uses Thereof

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augaucucag cucacugcaa guccaccuc ccggguucac gccauucucc ugccucagcc	1980
uccugaguag cugggacuac aggcgcccgc caccacacc ggcuauuuu uuguauuuu	2040
uguagagacg ggguuucacc auguuagcca agauggucuc gaucuccuga ccucgugauc	2100
caccugccuc ggccucccaa agugcuggga uuacgggugu gagccaccgu gccagccuu	2160
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aacaaugau uuuuuuaaaa gucacaaaa caauucacua aaaaauaaua ugucauugug	2340

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 uucucauuac uggagcuggg cauggaauag gcaggcagac uacuuaugaa uuugcaaaac 240
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 caaucguggu gaauaaugcu gggacaguau auccagccga ucuucucagc accaaggaug 360
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 gccacgaagg gauuccuuac cucaucccau auuguuccag caaaauugcc gcuguuggcu 540
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 cuguauugga gacagaugaa gucguaagaa gucugauaga uggaauacuu accaauaaga 720
 aaugauuuu uguuccaucg uauaucaua ucuuucugag acuacagaag uuucuuccug 780
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aucuuguuuu	guguguuuuu	cacauguauu	auagaauvcu	uuugcaugga	cuauccucuu	2160
guuuuuauua	aaaacaaaug	auuuuuuuua	aagucacaaa	aacaauucac	uaaaaauaaa	2220
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uucucauuac	uggagcuggg cauggauuag gcaggcagac uacuuaugaa uuugcaaaac 240
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agugccgaaa	acuaggcguc acugcgcaug cguauguggu agacugcagc aacagagaag 360
agaucuaucg	cucucuaaau caggugaaga aagaaguggg ugauguaaca aucgugguga 420

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ugacaucaga	acuucaggcc	uugggaaaaa	cugguaucaa	aaccucaugu	cucugcccag	720
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auugguuugg	cacuagcagc	agucaaacga	acaagauuaa	uuaccugucu	uccuguuuuc	1020
caagaauauu	uacguaguuu	uucauagguc	uguuuuuuccu	uucaugccuc	uuaaaaacuu	1080
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aaaaacaaau	gauuuuuuuu	aaagucacaa	aaacaauuca	cuaaaaaaaa	auaugucauu	2220
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uucucauuac	uggagcuggg cauggaauag gcaggcagac uacuuaugaa uuugcaaaac 240
gacagagcau	auugguucug ugggauauua auaagcgcg uguggaggaa acugcagcug 300
agugccgaaa	acuaggcguc acugcgcaug cguauguggu agacugcagc aacagagaag 360
agaucuaucg	cucucuaaaau caggugaaga aagaaguggg ugauguaaca aucgugguga 420
auaaugcugg	gacaguauau ccagccgauc uucucagcac caaggaugaa gagauuacca 480
agacauuuga	ggucaacauc cuaggacauu uuuggaucac aaaagcacuu cuuccaucga 540
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ugacaucaga	acuucaggcc uugggaaaaa cugguaucaa aaccucaugu cucugcccag 720
uuuuugugaa	uacuggguuc accaaaaaau caagcacaag auuauggccu guauuggaga 780
cagaugaagu	cguaagaagu cugauagaug gaauacuuac caauaagaaa augauuuuug 840
uuccaucgua	uaucaauauc uuucugagac uacagaaggu uucuuccuga acgcgccuca 900
gcgauuuuuu	aucguaugca gaauauucua uuugaagcag ugguuggcca caaaaucaaa 960
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cgaaucaaug	cugcaaagcu uuauuucaca uuuuuucagu ccugauaaua uaaaaaacau 1080
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cuccugagua	gcugggacua	caggcgcccc	ccaccacacc	cggcuauuuu	uuuguauuuu	2040
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aaacaaauga	uuuuuuuuaa	agucacaaaa	acaauucacu	aaaaauaaa	augucauugu	2340
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agugccgaaa	acuaggcguc	acugcgcaug	cguauguggu	agacugcagc	aacagagaag	360
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gacagagcau	auugguucug ugggauauua auagcgcgug uguggaggaa acugcagcug 300
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agaucuaucg	cucucuaaa	caggugaaga	aagaaguggg	ugauguaaca	aucgugguga	420
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aaucuaaaaa	caccaauaga	gcuuuuuuuu	uugcuuuuuu	uuuuuuuaga	cagagucuca	960
cucugucacc	cuggcuggau	ugcggugguu	gcaguggcau	gaucuuggcu	cacugcaacc	1020
uccgccuccu	ggguucaagc	aauucucaug	ccucagaccc	ccaaguaacu	gggauuuauag	1080
gugugugcug	ccacacuaca	cccagcuauu	uuuuguauuu	uuugauagag	acagguuucc	1140
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ggagcaucuu	ucaguuguga	aaauuggcau	ggaaacucuc	caucccuggg	gagaacaguu	1320
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aaucuaugu	cucugcccaa	acuuugcuga	agacuauucu	aacuaaagga	aacacaguuu	1440
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ggaaguuugg	uugggauugc	acugaaucua	uagagcaauu	ggggaguauu	gacauaucaa	1560
caauauugag	uuuucuaauc	caagaacaua	auaucuauuu	uuaaaaucuu	cuucaaaauc	1620
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 <212> RNA
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uggagucguu	ggugaaguuu	uucauuccuc	agaggagaaa	aucuguggcu	ggggagauug	180
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gacagagcau	auugguucug	ugggauauua	auaaggugaa	gaaagaagug	ggugauguaa	300
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aagagauuac	caagacauuu	gaggucaaca	uccuaggaca	uuuuuggauc	acaaaagcac	420
uucuuccauc	gaugauggag	agaaaucaug	gccacaucgu	cacaguggcu	ucagugugcg	480
gccacgaagg	gauuccuuac	cucaucccau	auuguuccag	caaaauugcc	gcuguuggcu	540
uucacagagg	ucugacauca	gaacuucagg	ccuugggaaa	aacugguaua	aaaaccucau	600
gucucugccc	aguuuuugug	aauacugggu	ucaccaaaaa	uccaagcaca	agauuauggc	660
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uccuguuucu	caagaauauu	uacguaguuu	uucauagguc	uguuuuuccu	uucaugccuc	1080
uuaaaaacuu	cugugcuuac	auaaaacauac	uuaaaagguu	uucuuuaaga	uauuuuauuu	1140
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ggagugcagu gguaugaucu cagcucacug caagcuccac cucccgguu cacgccauuc	1860
uccugccuca gccuccugag uagcugggac uacaggcgcc cgccaccaca cccggcuauu	1920
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ugaccucgug auccaccugc cucggccucc caaagugcug ggauuacggg ugugagccac	2040
cgugcccagc cuuuuuuuuu uuaauagaaa aaauaauccg acucccacua caucaagacu	2100
aaucuuguuu uguguguuuu ucacauguau uauagaaugc uuuugcaugg acuauccucu	2160
uguuuuuauu aaaaacaaau gauuuuuuuu aaagucacaa aaacaauuca cuaaaaauaa	2220
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<210> 11
 <211> 2470
 <212> RNA
 <213> homo sapien

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uucucauuac uggagcuggg cauggaauag gcaggcagac uacuuauugaa uuugcaaaac	240
gacagagcau auugguucug ugggauuuu auaagcgagg uguggaggaa acugcagcug	300
agugccgaaa acuaggcguc acugcgcaug cguauguggu agacugcagc aacagagaag	360
agaucuaucg cucucuaaa uaggugaaga aagaaguggg ugauguaaca aucgugguga	420
auaaugcugg gacaguauau ccagccgauc uucucagcac caaggaugaa gagauuacca	480
agacauuuga ggucaauauc cuaggacauu uuuggaauug aaaggacauc agaaguauuu	540
acuuggaugu auauaggauc gaggacacuu uuggacgaga cucugagauc aaaaagcac	600
uucuucauc gaugauggag agaaaucaug gccacauugu cacaguggcu ucagugugcg	660
gccacgaagg gauuccuuac cucauccau auuguuccag caauuuugcc gcuguuggcu	720

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cuguauugga	gacagaugaa	gucguaagaa	gucugauaga	uggaauacuu	accaauaaga	900
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gaacgcgccu	cagcgauuuu	aaaucguaug	cagaauauuc	aauuugaagc	agugguuggc	1020
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uaugaauagu	uucgaaucaa	ugcugcaaag	cuuuauuua	cauuuuuua	guccugauaa	1140
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uuaaaaacuu	cugugcuuac	auaaacauac	uuaaaagguu	uucuuuaaga	uauuuuauuu	1320
uuccauuuua	agguggacaa	aagcuaccuc	ccuaaaagua	aauacaaaga	gaacuuauuu	1380
acacagggaa	gguuuuagac	uguucaagua	gcuuuccaau	cuguagccau	gccacagaau	1440
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uaagauacau	uauaagguu	gaccgacucu	auuuuuuuu	ucagaauuuu	aaguucuagc	1740
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ggagugcagu	gguaugaucu	cagcucacug	caagcuccac	cucccgguu	cacgccauuc	2040
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ugaccucgug	auccaccugc	cucggccucc	caaagugcug	ggauuacggg	ugugagccac	2220
cgugcccagc	cuuuuuuuuu	uuauaagaaa	aaauaaucg	acucccacua	caucaagacu	2280
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uguuuuuuuu	aaaaacaaau	gauuuuuuuu	aaagucacaa	aaacaauuca	cuaaaaauaa	2400
auaugucauu	gugcuuuuuu	aaaauaaccu	cuuguaguua	uaaaauaaaa	cguuugacuu	2460
cuaaacucug						2470

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 <211> 900
 <212> DNA
 <213> homo sapien

<400> 12						
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auuacuggag	cugggcaugg	aaauaggcagg	cagacuacuu	augaauuugc	aaaacgacag	180
agcauauugg	uucuguggga	uauuaauaag	cgcggugugg	aggaaacugc	agcugagugc	240
cgaaaacuag	gcgucacugc	gcaugcguau	gugguagacu	gcagcaacag	agaagagauc	300
uauvcgucuc	uaauucaggu	gaagaaagaa	gugggugaug	uaacaauvcu	ggugaauauu	360
gcugggacag	uauauccagc	cgaucuucuc	agcaccaagg	augaagagau	uaccaagaca	420
uuugagguga	acaucucagg	acauuuuugg	aucacaaaag	cacuucucc	aucgaugaug	480
gagagaaauc	auggccacau	cgucacagug	gcuucagugu	gcggccacga	agggaauccu	540
uaccucaucc	cauauuguuc	cagcaauuuu	gccgcuguug	gcuuucacag	aggucugaca	600
ucagaacuuc	aggccuuggg	aaaaacuggu	aucaaaaccu	caugucucug	cccaguuuuu	660
gugaauacug	gguucaccaa	aaauccaagc	acaagauuau	ggccuguauu	ggagacagau	720
gaagucguua	gaagucugau	agauggaaua	cuuaccaaua	agaaaaugau	uuuuguucca	780
ucguauauca	auaucuuucu	gagacuacag	aaguuuucuc	cugaacgcgc	cucagcgauu	840
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<210> 13
 <211> 792
 <212> DNA
 <213> homo sapien

<400> 13						
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auuacuggag	cugggcaugg	aauaggcagg	cagacuacuu	augaauuugc	aaaacgacag	180
agcauauugg	uucuguggga	uauuaauaag	gugaagaaag	aaguggguga	uguaacaau	240
guggugaaua	augcugggac	aguauaucca	gccgaucuu	ucagcaccaa	ggaugaagag	300
auuaccaaga	cauuugaggu	caacauccua	ggacauuuuu	ggaucacaaa	agcacuucuu	360
ccaucgauga	uggagagaaa	ucauggccac	aucgucacag	uggcuucagu	gugcggccac	420
gaagggaau	cuuaccucau	cccauauugu	uccagcaau	uugccgcugu	uggcuuucac	480
agaggucuga	caucagaacu	ucaggccuug	ggaaaaacug	guaucacaa	cucaugucuc	540
ugcccaguuu	uugugaauac	uggguucacc	aaaaauccaa	gcacaagauu	auggccugua	600
uuggagacag	augaagucgu	aagaagucug	auagauggaa	uacuuaccaa	uaagaaaug	660
auuuuuguuc	caucguauau	cauaucuuu	cugagacuac	agaaguucu	uccugaacgc	720
gccucagcga	uuuuaaaucg	uaugcagaau	auucaauuug	aagcaguggu	uggccacaaa	780
aucaaaauga	aa					792

<210> 14
 <211> 783
 <212> DNA
 <213> homo sapien

<400> 14						
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auuacuggag	cugggcaugg	aauaggcagg	cagacuacuu	augaauuugc	aaaacgacag	180
agcauauugg	uucuguggga	uauuaauaag	cgcgguugug	aggaaacugc	agcugagugc	240
cgaaaacuag	gcgucacugc	gcaugcgau	gugguagacu	gcagcaacag	agaagagauc	300
uauugcucuc	uaaaucaggu	gaagaaagaa	gugggugaug	uaacaucgu	ggugaauaau	360
gcugggacag	uauauccagc	cgauucucuc	agcaccaagg	augaagagau	uaccaagaca	420
uuugagguca	acauccuagg	acauuuuugg	aucacaaaag	cacuucucc	aucgaugaug	480
gagagaaauc	auggccacau	cgucacagug	gcuucagugu	gcggccacga	agggaauccu	540
uaccucaucc	cauauuguuc	cagcaauuuu	gccgcuguug	gcuucacag	aggucugaca	600
ucagaacuuc	aggccuuggg	aaaaacuggu	aucaaaaccu	caugucucug	cccaguuuuu	660

gugaauacug gguucaccaa aaauccaagc acaagguuuc uuccugaacg cgccucagcg	720
auuuuuuuuuc guaugcagaa uauucauuu gaagcagugg uggccacaa aaucaaaug	780
aaa	783

<210> 15
 <211> 822
 <212> DNA
 <213> homo sapien

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ucguugguga aguuuuuau uccucagagg agaaaucug uggcugggga gauuguucuc	120
auuacuggag cugggcaugg aaauaggcagg cagacuacuu augaauuugc aaaacgacag	180
agcauuuugg uucuguggga uauuaauaag cgcggugugg aggaaacugc agcugagugc	240
cgaaaacuag gcgucacugc gcaugcgauu gugguagacu gcagcaacag agaagagauc	300
uauugcucuc uaaauaggu gaagaaagaa gugggugaug uaacaauugu ggugaauau	360
gcugggacag uauauccagc cgaucuucuc agcaccaagg augaagagau uaccaagaca	420
uuugagguca acauccuagg acuuuuuugg aucacaaaag cacuucuucc aucgaugaug	480
gagagaaauc auggccacau cgucacagug gcuucagugu gcggccacga agggauuccu	540
uaccucaucc cauauuguuc cagcaauuu gccgcuguug gcuuucacag aggucugaca	600
ucagaacuuc aggccuuggg aaaaacuggu aucaaaaccu caugucucug cccaguuuuu	660
gugaauacug gguucaccaa aaauccaagc acaagauuau ggccuguauu ggagacagau	720
gaagucguua gaagucugau agauggaaua cuuaccaaua agaaaugau uuuuguucca	780
ucguauauca auauuuuuc gagacuacag aagguuuuu cc	822

<210> 16
 <211> 972
 <212> DNA
 <213> homo sapien

<400> 16	
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auuacuggag cugggcaugg aaauaggcagg cagacuacuu augaauuugc aaaacgacag	180

agcauauugg uucuguggga uauuaauaag cgcggugugg aggaaacugc agcugagugc	240
cgaaaacuag gcgucacugc gcaugcguau gugguagacu gcagcaacag agaagagauc	300
uaucgcucuc uaaaucaggu gaagaaagaa gugggugaug uaacaaucgu ggugaauaau	360
gcugggacag uauauccagc cgaucuucuc agcaccaagg augaagagau uaccaagaca	420
uuugagguca acauccuagg acauuuuugg aauggaaagg acaucagaag uaauuacuug	480
gauguauaua ggaucgagga cacuuuugga cgagacucug agaucacaaa agcacuucuu	540
ccaucgauga uggagagaaa ucauggccac aucgucacag uggcuucagu gugcgccac	600
gaagggauuc cuuaccucau cccauauugu uccagcaau uugccgcugu uggcuuucac	660
agaggucuga caucagaacu ucaggccuug ggaaaaacug guaucaaaac cucaugucuc	720
ugcccaguuu uugugaauac uggguucacc aaaaauccaa gcacaagauu auggccugua	780
uuggagacag augaagucgu aagaagucug auagauggaa uacuuaccaa uaagaaaug	840
auuuuuuguuc caucguauau caauaucuuu cugagacuac agaaguucu uccugaacgc	900
gccucagcga uuuuaaaucg uaucgagaau auucaauuug aagcaguggu uggccacaaa	960
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<210> 17
 <211> 852
 <212> DNA
 <213> homo sapien

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auuacuggag cugggcaugg aauaggcagg cagacuacuu augaauuugc aaaacgacag	180
agcauauugg uucuguggga uauuaauaag cgcggugugg aggaaacugc agcugagugc	240
cgaaaacuag gcgucacugc gcaugcguau gugguagacu gcagcaacag agaagagauc	300
uaucgcucuc uaaaucaggu gaagaaagaa gugggugaug uaacaaucgu ggugaauaau	360
gcugggacag uauauccagc cgaucuucuc agcaccaagg augaagagau uaccaagaca	420
uuugagguca acauccuagg acauuuuugg aucacaaaag cacuucuucc aucgaugaug	480
gagagaaauc auggccacau cgucacagug gcuucagugu gcggccacga agggauuccu	540
uaccucaucc cauauuguuc cagcaaaauu gccgcuguug gcuuucacag aggucugaca	600

ucagaacuuc aggccuuggg aaaaacuggu aucaaaaccu caugucucug cccaguuuuu	660
gugaauacug gguucaccaa aaauccaagc acaagauuau ggccuguauu ggagacagau	720
gaagucguua gaagucugau agauggaaua cuuaccaaua agaaaaugau uuuuguucca	780
ucguauauca auaucuuucu gagacuacag aaguuaagua cagcacagaa cacccaaaua	840
cuaaaacacc aa	852

<210> 18
 <211> 813
 <212> DNA
 <213> homo sapien

<400> 18	
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auuacuggag cugggcaugg aaauaggcagg cagacuacuu augaaauugc aaaacgacag	180
agcauuuugg uucuguggga uauuaauaag cgcggugugg aggaaacugc agcugagugc	240
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gcugggacag uauauccagc cgaucuucuc agcaccaagg augaagagau uaccaagaca	420
uuugagguca acauccuagg acuuuuuugg aucacaaaag cacuucuucc aucgaugaug	480
gagagaaauc auggccacau cgucacagug gcuucagugu gcggccacga agggauuccu	540
uaccucaucc cauauuguuc cagcaauuuu gccgcuguug gcuuucacag aggucugaca	600
ucagaacuuc aggccuuggg aaaaacuggu aucaaaaccu caugucucug cccaguuuuu	660
gugaauacug gguucaccaa aaauccaagc acaagauuau ggccuguauu ggagacagau	720
gaagucguua gaagucugau agauggaaua cuuaccaaua agaaaaugau uuuuguucca	780
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<210> 19
 <211> 714
 <212> DNA
 <213> homo sapien

<400> 19	
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auuacuggag	cuggggcaugg	aaauaggcagg	cagacuacuu	augaauuugc	aaaacgacag	180
agcauauugg	uucuguggga	uauuaauaag	gugaagaaag	aaguggguga	uguaacaau	240
guggugaaua	augcugggac	aguauaucca	gccgaucuuc	ucagcaccaa	ggaugaagag	300
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cgaucuucuc	agcaccaagg
augaagagau	uaccaagaca
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acaauuuugg	aauggaaagg
acaucagaag	uaauuacuug
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cacuuuugga	cgagacucug
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cccauauugu	uccagcaauu
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guaucaaaac	cucaugucuc
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cgaaaactag gcgtcactgc gcatgcgtat gtggtagact gcagcaacag agaagagatc	300
tatcgctctc taaatcaggt gaagaaagaa gtgggtgatg taacaatcgt ggtgaataat	360
gctgggacag tatatccagc cgatcttctc agcaccaagg atgaagagat taccaagaca	420
tttgagggtca acatcctagg acatttttgg atcacaaaag cacttcttcc atcgaatgatg	480
gagagaaatc atggccacat cgtcacagtg gcttcagtgt gcggccacga agggattcct	540
tacctcatcc catattgttc cagcaaattt gccgctgttg gctttcacag aggtctgaca	600
tcagaacttc aggccctggg aaaaactggg atcaaaacct catgtctctg cccagttttt	660
gtgaatactg ggttcaccaa aaatccaagc acaagattat ggctgtatt ggagacagat	720
gaagtcgtaa gaagtctgat agatggaata cttaccaata agaaaatgat ttttgttcca	780
tcgtatatca atatctttct gagactacag aagttaagta cagcacagaa cacccaaata	840
ctaaaacacc aa	852

<210> 36
 <211> 813
 <212> DNA
 <213> homo sapien

<400> 36

atgaacatca tcctagaaat ctttctgctt ctgacacca tcatctactc ctacttggag	60
tcgttgggtga agtttttcat tcctcagagg agaaaatctg tggctgggga gattgttctc	120
attactggag ctgggcatgg aataggcagg cagactactt atgaatttgc aaaacgacag	180
agcatattgg ttctgtggga tattaataag cgcggtgtgg aggaaactgc agctgagtgc	240
cgaaaactag gcgtcactgc gcatgcgtat gtggtagact gcagcaacag agaagagatc	300
tatcgctctc taaatcaggt gaagaaagaa gtgggtgatg taacaatcgt ggtgaataat	360
gctgggacag tatatccagc cgatcttctc agcaccaagg atgaagagat taccaagaca	420
tttgagggtca acatcctagg acatttttgg atcacaaaag cacttcttcc atcgatgatg	480
gagagaaatc atggccacat cgtcacagtg gcttcagtgt gcggccacga agggattcct	540
tacctcatcc catattgttc cagcaaattt gccgctgttg gctttcacag aggtctgaca	600
tcagaacttc aggccctggg aaaaactggg atcaaaacct catgtctctg cccagttttt	660
gtgaatactg ggttcaccaa aaatccaagc acaagattat ggcctgtatt ggagacagat	720
gaagtcgtaa gaagtctgat agatggaata cttaccaata agaaaatgat ttttgttcca	780
tcgtatatca atatctttct gagactacag aag	813

<210> 37
 <211> 714
 <212> DNA
 <213> homo sapien

<400> 37	
atgaacatca tcctagaaat ctttctgctt ctgacacca tcatctactc ctacttggag	60
tcgttgggtga agtttttcat tcctcagagg agaaaatctg tggctgggga gattgttctc	120
attactggag ctgggcatgg aataggcagg cagactactt atgaatttgc aaaacgacag	180
agcatattgg ttctgtggga tattaataag gtgaagaaag aagtgggtga tgtaacaatc	240
gtggtgaata atgctgggac agtatatcca gccgatcttc tcagcaccaa ggatgaagag	300
attaccaaga catttgaggt caacatccta ggacattttt ggatcacaaa agcacttctt	360
ccatcgatga tggagagaaa tcatggccac atcgtcacag tggcttcagt gtgcggccac	420
gaagggattc cttacctcat cccatattgt tccagcaaat ttgccgctgt tggctttcac	480
agagggtctga catcagaact tcaggccttg ggaaaaactg gtatcaaaac ctcatgtctc	540
tgcccagttt ttgtgaatac tgggttcacc aaaaatccaa gcacaagatt atggcctgta	600

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met
145 150 155 160

Glu Arg Asn His Gly His Ile Val Thr Val Ala Ser Val Cys Gly His
165 170 175

Glu Gly Ile Pro Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala
180 185 190

Val Gly Phe His Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys
195 200 205

Thr Gly Ile Lys Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly
210 215 220

Phe Thr Lys Asn Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp
225 230 235 240

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

Ile Phe Val Pro Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys Phe
260 265 270

Leu Pro Glu Arg Ala Ser Ala Ile Leu Asn Arg Met Gln Asn Ile Gln
275 280 285

Phe Glu Ala Val Val Gly His Lys Ile Lys Met Lys
290 295 300

<210> 40
<211> 264
<212> PRT
<213> homo sapien

<400> 40

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Val Lys Lys Glu Val Gly Asp Val Thr Ile
65 70 75 80

Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp Leu Leu Ser Thr
85 90 95

Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn Ile Leu Gly His
100 105 110

Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met Glu Arg Asn His

115

120

125

Gly His Ile Val Thr Val Ala Ser Val Cys Gly His Glu Gly Ile Pro
 130 135 140

Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala Val Gly Phe His
 145 150 155 160

Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys Thr Gly Ile Lys
 165 170 175

Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly Phe Thr Lys Asn
 180 185 190

Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp Glu Val Val Arg
 195 200 205

Ser Leu Ile Asp Gly Ile Leu Thr Asn Lys Lys Met Ile Phe Val Pro
 210 215 220

Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys Phe Leu Pro Glu Arg
 225 230 235 240

Ala Ser Ala Ile Leu Asn Arg Met Gln Asn Ile Gln Phe Glu Ala Val
 245 250 255

Val Gly His Lys Ile Lys Met Lys
 260

<210> 41
 <211> 261
 <212> PRT
 <213> homo sapien

<400> 41

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
 1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
 20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met
145 150 155 160

Glu Arg Asn His Gly His Ile Val Thr Val Ala Ser Val Cys Gly His
165 170 175

Glu Gly Ile Pro Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala
180 185 190

Val Gly Phe His Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys
195 200 205

Thr Gly Ile Lys Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly
210 215 220

Phe Thr Lys Asn Pro Ser Thr Arg Phe Leu Pro Glu Arg Ala Ser Ala
225 230 235 240

Ile Leu Asn Arg Met Gln Asn Ile Gln Phe Glu Ala Val Val Gly His
245 250 255

Lys Ile Lys Met Lys
260

<210> 42
<211> 274
<212> PRT
<213> homo sapien

<400> 42

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met
145 150 155 160

Glu Arg Asn His Gly His Ile Val Thr Val Ala Ser Val Cys Gly His

165

170

175

Glu Gly Ile Pro Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala
 180 185 190

Val Gly Phe His Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys
 195 200 205

Thr Gly Ile Lys Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly
 210 215 220

Phe Thr Lys Asn Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp
 225 230 235 240

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

Ile Phe Val Pro Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys Val
 260 265 270

Ser Ser

<210> 43
 <211> 324
 <212> PRT
 <213> homo sapien

<400> 43

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
 1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
 20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
 35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
 50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Asn Gly Lys Asp Ile Arg Ser Asn Tyr Leu
145 150 155 160

Asp Val Tyr Arg Ile Glu Asp Thr Phe Gly Arg Asp Ser Glu Ile Thr
165 170 175

Lys Ala Leu Leu Pro Ser Met Met Glu Arg Asn His Gly His Ile Val
180 185 190

Thr Val Ala Ser Val Cys Gly His Glu Gly Ile Pro Tyr Leu Ile Pro
195 200 205

Tyr Cys Ser Ser Lys Phe Ala Ala Val Gly Phe His Arg Gly Leu Thr
210 215 220

Ser Glu Leu Gln Ala Leu Gly Lys Thr Gly Ile Lys Thr Ser Cys Leu
225 230 235 240

Cys Pro Val Phe Val Asn Thr Gly Phe Thr Lys Asn Pro Ser Thr Arg
245 250 255

Leu Trp Pro Val Leu Glu Thr Asp Glu Val Val Arg Ser Leu Ile Asp
260 265 270

Gly Ile Leu Thr Asn Lys Lys Met Ile Phe Val Pro Ser Tyr Ile Asn
275 280 285

Ile Phe Leu Arg Leu Gln Lys Phe Leu Pro Glu Arg Ala Ser Ala Ile
290 295 300

Leu Asn Arg Met Gln Asn Ile Gln Phe Glu Ala Val Val Gly His Lys
305 310 315 320

Ile Lys Met Lys

<210> 44
<211> 284
<212> PRT
<213> homo sapien

<400> 44

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn

130

135

140

Ile Leu Gly His Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met
 145 150 155 160

Glu Arg Asn His Gly His Ile Val Thr Val Ala Ser Val Cys Gly His
 165 170 175

Glu Gly Ile Pro Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala
 180 185 190

Val Gly Phe His Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys
 195 200 205

Thr Gly Ile Lys Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly
 210 215 220

Phe Thr Lys Asn Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp
 225 230 235 240

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

Ile Phe Val Pro Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys Leu
 260 265 270

Ser Thr Ala Gln Asn Thr Gln Ile Leu Lys His Gln
 275 280

<210> 45
 <211> 271
 <212> PRT
 <213> homo sapien

<400> 45

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
 1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
 20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met
145 150 155 160

Glu Arg Asn His Gly His Ile Val Thr Val Ala Ser Val Cys Gly His
165 170 175

Glu Gly Ile Pro Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala
180 185 190

Val Gly Phe His Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys
195 200 205

Thr Gly Ile Lys Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly
210 215 220

Phe Thr Lys Asn Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp
225 230 235 240

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

Ile Phe Val Pro Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys
260 265 270

<210> 46
<211> 238
<212> PRT
<213> homo sapien

<400> 46

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Leu Ile Thr Ile Ile Tyr
1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
50 55 60

Leu Trp Asp Ile Asn Lys Val Lys Lys Glu Val Gly Asp Val Thr Ile
65 70 75 80

Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp Leu Leu Ser Thr
85 90 95

Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn Ile Leu Gly His
100 105 110

Phe Trp Ile Thr Lys Ala Leu Leu Pro Ser Met Met Glu Arg Asn His
115 120 125

Gly His Ile Val Thr Val Ala Ser Val Cys Gly His Glu Gly Ile Pro
130 135 140

Tyr Leu Ile Pro Tyr Cys Ser Ser Lys Phe Ala Ala Val Gly Phe His
145 150 155 160

Arg Gly Leu Thr Ser Glu Leu Gln Ala Leu Gly Lys Thr Gly Ile Lys

165

170

175

Thr Ser Cys Leu Cys Pro Val Phe Val Asn Thr Gly Phe Thr Lys Asn
 180 185 190

Pro Ser Thr Arg Leu Trp Pro Val Leu Glu Thr Asp Glu Val Val Arg
 195 200 205

Ser Leu Ile Asp Gly Ile Leu Thr Asn Lys Lys Met Ile Phe Val Pro
 210 215 220

Ser Tyr Ile Asn Ile Phe Leu Arg Leu Gln Lys Val Ser Ser
 225 230 235

<210> 47
 <211> 298
 <212> PRT
 <213> homo sapien

<400> 47

Met Asn Ile Ile Leu Glu Ile Leu Leu Leu Ile Thr Ile Ile Tyr
 1 5 10 15

Ser Tyr Leu Glu Ser Leu Val Lys Phe Phe Ile Pro Gln Arg Arg Lys
 20 25 30

Ser Val Ala Gly Glu Ile Val Leu Ile Thr Gly Ala Gly His Gly Ile
 35 40 45

Gly Arg Gln Thr Thr Tyr Glu Phe Ala Lys Arg Gln Ser Ile Leu Val
 50 55 60

Leu Trp Asp Ile Asn Lys Arg Gly Val Glu Glu Thr Ala Ala Glu Cys
 65 70 75 80

Arg Lys Leu Gly Val Thr Ala His Ala Tyr Val Val Asp Cys Ser Asn
 85 90 95

Arg Glu Glu Ile Tyr Arg Ser Leu Asn Gln Val Lys Lys Glu Val Gly
 100 105 110

Asp Val Thr Ile Val Val Asn Asn Ala Gly Thr Val Tyr Pro Ala Asp
115 120 125

Leu Leu Ser Thr Lys Asp Glu Glu Ile Thr Lys Thr Phe Glu Val Asn
130 135 140

Ile Leu Gly His Phe Trp Asn Gly Lys Asp Ile Arg Ser Asn Tyr Leu
145 150 155 160

Asp Val Tyr Arg Ile Glu Asp Thr Phe Gly Arg Asp Ser Glu Ile Thr
165 170 175

Lys Ala Leu Leu Pro Ser Met Met Glu Arg Asn His Gly His Ile Val
180 185 190

Thr Val Ala Ser Val Cys Gly His Glu Gly Ile Pro Tyr Leu Ile Pro
195 200 205

Tyr Cys Ser Ser Lys Phe Ala Ala Val Gly Phe His Arg Gly Leu Thr
210 215 220

Ser Glu Leu Gln Ala Leu Gly Lys Thr Gly Ile Lys Thr Ser Cys Leu
225 230 235 240

Cys Pro Val Phe Val Asn Thr Gly Phe Thr Lys Asn Pro Ser Thr Arg
245 250 255

Leu Trp Pro Val Leu Glu Thr Asp Glu Val Val Arg Ser Leu Ile Asp
260 265 270

Gly Ile Leu Thr Asn Lys Lys Met Ile Phe Val Pro Ser Tyr Ile Asn
275 280 285

Ile Phe Leu Arg Leu Gln Lys Val Ser Ser
290 295

<210> 48

<211> 25

<212> DNA

<213> artificial sequence

<220>

<223> Forward Primer for HSD17B13

<400> 48
atgaacatca tcctagaaat ccttc 25

<210> 49
<211> 25
<212> DNA
<213> artificial sequence

<220>
<223> Reverse Primer for HSD17B13

<400> 49
atcatgcata catctctggc tggag 25

<210> 50
<211> 20
<212> DNA
<213> artificial sequence

<220>
<223> Primer DE002 for HSD17B13

<400> 50
atcagaactt caggccttgg 20

<210> 51
<211> 21
<212> DNA
<213> artificial sequence

<220>
<223> Primer for first exon of HSD17B13

<400> 51
gcaaagccat gaacatcatc c 21

<210> 52
<211> 24
<212> DNA
<213> artificial sequence

<220>
<223> Primer for last exon of HSD17B13

<400> 52
tcttgatgta gtgggagtcg gatt 24

<210> 53
 <211> 600
 <212> DNA
 <213> artificial sequence

<220>
 <223> Endogenous HSD17B13 Promoter

<400> 53
 cactgcacca cgaactcatg gactgaagca atcctcctgc ctcagcctcc tgggtagctg 60
 ggactacaga cacatgccac catatccagc taatTTTTTT ctatagTTTT tTTTTTTTTT 120
 tttgagacag ggtcttacta tgttgcccag actggtctcg aactcctggg ctcaagcaat 180
 cctctgcctc agcctcccaa agtgctggga ttacagatgt gagccactgc acctggcccc 240
 tagaattgtt tctagagggtg aaacttcaag gtgaaatata gtacataact gcttttcaga 300
 taaacaagtc cagagagcac actctcttgt gctcttggca tcacttggca tcacttcata 360
 tttgagggtg ttcaaaccac ttagaacacg tgaacaaggc ctgcttccaa agctggcttc 420
 catctggtag tcccattaac aactgggcac accccttccc tagagctctg tgtagacagt 480
 acctcctccc taggactaca caaggactga accagaagga agaggacaga gcaaagccat 540
 gaacatcatc ctagaaatcc ttctgcttct gatcaccatc atctactcct acttggagtc 600