

LT83WO-2015-01-23-sequence_listing

SEQUENCE LISTING

<110> LanzaTech New Zealand Limited

<120> RECOMBINANT MICROORGANISMS AND USES
THEREFOR

<130> LT83 008156.00014

<160> 26

<170> FastSEQ for windows Version 4.0

<210> 1

<211> 854

<212> PRT

<213> Clostridium autoethanogenum

<400> 1

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

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			340				345				350				
Gly	Gln	Thr	Ile	Asp	Gly	Arg	Asp	Ala	Thr	Asn	Glu	Leu	Ser	Phe	Met
		355					360					365			
Cys	Leu	Glu	Ala	Thr	Ala	His	Thr	Lys	Leu	Pro	Gln	Pro	Ser	Ile	Ser
	370					375					380				
Ile	Arg	Ala	Trp	Asn	Lys	Thr	Pro	Asp	Glu	Leu	Leu	Leu	Lys	Ala	Ala
385					390					395					400
Glu	Val	Thr	Arg	Leu	Gly	Leu	Gly	Met	Pro	Ala	Tyr	Tyr	Asn	Asp	Glu
				405					410					415	
Val	Ile	Ile	Pro	Ser	Leu	Thr	Ser	Arg	Gly	Leu	Thr	Leu	Glu	Asp	Ala
			420					425					430		
Arg	Asp	Tyr	Gly	Ile	Ile	Gly	Cys	Val	Glu	Pro	Gln	Lys	Gly	Gly	Lys
		435					440						445		
Thr	Glu	Gly	Trp	His	Asp	Ala	Ala	Phe	Phe	Asn	Ile	Val	Lys	Val	Leu
	450					455					460				
Glu	Ile	Thr	Ile	Asn	Asn	Gly	Met	Asp	Asn	Gly	Lys	Gln	Ile	Gly	Leu
465					470					475					480
Arg	Thr	Gly	Asp	Phe	Thr	Ser	Phe	Thr	Ser	Phe	Glu	Lys	Leu	Phe	Asp
				485					490					495	
Ala	Tyr	Lys	Leu	Gln	Met	Glu	Tyr	Phe	Val	Lys	Leu	Leu	Val	Asn	Ala
			500					505					510		
Asp	Asn	Ser	Val	Asp	Leu	Ala	His	Gly	Glu	Arg	Ala	Pro	Leu	Pro	Phe
	515						520					525			
Leu	Ser	Ser	Met	Ala	Asp	Asp	Cys	Ile	Ala	Arg	Gly	Lys	Ser	Leu	Gln
	530					535					540				
Glu	Gly	Gly	Ala	His	Tyr	Asn	Phe	Thr	Gly	Pro	Gln	Gly	Val	Gly	Val
545					550					555					560
Ala	Asn	Ala	Ala	Asp	Ser	Leu	Glu	Ala	Ile	Lys	Lys	Leu	Val	Phe	Glu
				565					570					575	
Asp	Lys	Lys	Ile	Thr	Leu	Gln	Asp	Leu	Lys	Asn	Ala	Leu	Asp	Thr	Asn
			580					585					590		
Phe	Gly	Glu	Cys	Lys	Lys	Asn	Pro	Ile	Ser	Glu	Leu	Ala	Asn	Ser	Ile
		595					600					605			
Asn	Glu	Val	Gly	Asp	Met	Lys	Gly	Leu	Thr	Pro	Glu	Thr	Ile	Leu	Lys
	610					615					620				
Val	Ile	Glu	Lys	Leu	Leu	Ser	Glu	Glu	Lys	Lys	Thr	Ser	Leu	Glu	Gly
625					630					635					640
Leu	Glu	Pro	Gly	Lys	Asp	Ile	Asn	Leu	Gly	Ser	Tyr	Gly	Asn	Lys	Glu
				645					650					655	
Ser	Ile	Arg	Gln	Met	Leu	Leu	Asn	Arg	Ala	Pro	Lys	Phe	Gly	Asn	Asp
			660					665					670		
Ile	Asp	Glu	Val	Asp	Asp	Leu	Ala	Arg	Glu	Ala	Ala	Leu	Ile	Tyr	Cys
		675					680					685			
Asn	Glu	Val	Glu	Lys	Tyr	Thr	Asn	Pro	Arg	Asn	Gly	Gln	Phe	Gln	Pro
	690					695					700				
Gly	Leu	Tyr	Pro	Val	Ser	Ala	Asn	Val	Pro	Met	Gly	Ser	Gln	Thr	Gly
705					710					715					720
Ala	Thr	Pro	Asp	Gly	Arg	Lys	Ala	Gly	Glu	Pro	Leu	Ala	Asp	Gly	Val
				725					730					735	
Ser	Pro	Val	Ser	Gly	Arg	Asp	Ala	Met	Gly	Pro	Thr	Ala	Ala	Ala	Asn
			740					745					750		
Ser	Val	Ala	Lys	Ile	Asp	His	Cys	Lys	Ala	Ser	Asn	Gly	Thr	Leu	Phe
		755					760					765			
Asn	Gln	Lys	Phe	His	Pro	Ser	Ala	Leu	Glu	Gly	Gln	Thr	Gly	Leu	Gln
	770					775					780				
Asn	Leu	Ser	Ser	Leu	Val	Arg	Thr	Phe	Phe	Asp	Glu	Lys	Gly	Leu	His
785					790					795					800
Val	Gln	Phe	Asn	Val	Val	Ser	Arg	Glu	Thr	Leu	Leu	Asp	Ala	Gln	Lys
				805					810					815	
Asn	Pro	Glu	Asn	Tyr	Arg	Asn	Leu	Val	Val	Arg	Val	Ala	Gly	Tyr	Ser
			820					825					830		
Ala	His	Phe	Thr	Ser	Leu	Asp	Lys	Ser	Ile	Gln	Asp	Asp	Ile	Ile	Lys
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Arg Thr Glu His Thr Phe
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<210> 2
<211> 259
<212> PRT
<213> Clostridium autoethanogenum

<400> 2
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Lys Cys Tyr Glu Val Cys Ser Asn Gly Ala Ile Asp Phe Asn Leu Pro
20 25 30
Ser Arg Val Asp Gln Asn Lys Cys Val Lys Cys Gly Lys Cys Val Glu
35 40 45
Asn Cys Tyr Ala Gly Ala Leu Asn Leu Ala Gly Asn Thr Arg Thr Val
50 55 60
Lys Glu Leu Leu Leu Glu Leu Lys Lys Asp Asn Ile Tyr Tyr Arg Arg
65 70 75 80
Ser Gly Gly Gly Ile Thr Leu Ser Gly Gly Glu Val Thr Ala Gln Pro
85 90 95
Glu Phe Ala Glu Glu Leu Leu Lys Gly Cys Lys Gln Asn Gly Trp His
100 105 110
Thr Ala Ile Glu Thr Ala Ala Phe Thr Ser Gln Ser Val Leu Glu Arg
115 120 125
Met Leu Pro Trp Leu Asp Leu Val Met Leu Asp Ile Lys His Met Asp
130 135 140
Ala Asn Lys His Leu Glu Tyr Thr Gly Lys Pro Asn Glu Leu Ile Leu
145 150 155 160
Gln Asn Ala Lys Leu Ile Ala Gln Phe Gly Val Gln Leu Ile Ile Arg
165 170 175
Val Pro Val Ile Pro Gly Val Asn Ser Asp Glu Asn Asn Ile Arg Ala
180 185 190
Thr Ala Asn Phe Ala Thr Ser Leu Lys Ser Val Lys Glu Leu His Leu
195 200 205
Leu Pro Tyr His Arg Leu Gly Glu Asn Lys Tyr Glu Tyr Leu Gly His
210 215 220
Asp Tyr Ile Met Lys Gly Leu Gln Pro Pro Thr Lys Glu Glu Ile Asn
225 230 235 240
Lys Leu Lys Glu Leu Val Glu Glu Cys Gly Leu Ile Cys Lys Val Gly
245 250 255
Gly Ile Asp

<210> 3
<211> 2565
<212> DNA
<213> Clostridium autoethanogenum

<400> 3
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gaatctttta aggaactga agcttatcct atgattatta gaagagctaa agcttttagaa 180
aaaataactaa atgaaatgga tatagttatt cgtgatgaag aacttattgt aggaaattta 240
actaaaaaac ctagagcggc ttcaatatgt ccggaatttt caaataagtg gcttttggag 300
gaatttgata ctcttgcaaa aagaactggt gatgtatttc ttattagtga agatgtaaaa 360
tcacaactta gagaagtatt caaatatttg gatggaaaaa caacaaatga gcttgcaaca 420
gagtatatgt tttcagaaac gaaggaagca atggaagcag gggatattac tgttggaat 480
tattacttca atggatatagg tcatatttct gtagattatg caaaagtatt atctaaagga 540
tttaacggta taattgaaga tgcagaaagt gaaaaggcta aagcagataa agcagatcca 600
gattacataa agaaggatca gtttttaaca gctgtaatca taacttcaaa agctgttatt 660
aagtttgcta gacgttttgc tgaattagct agaaatttag caagtcaatc attggattca 720
cgaagacgtg aagagttaat gcaaatagct gaaaattgtc agtgggtacc tgaaagacca 780

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aagaaggatg	tatcaaatgg	acttattaca	caagaaaaag	cccaagaact	tttagattgt	960
ctatgggtta	aatttaataga	tgtaataaag	gttcgtgatg	aaggatcaac	aaaagcattt	1020
ggtggatatc	caatgttcca	gaacttaatt	gtaggtggac	aaactattga	tggaagagat	1080
gctacaaatg	agctttcatt	tatgtgcctt	gaagctactg	cacataccaa	attaccgcaa	1140
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gaagtaactc	gttttaggtt	aggtatgcca	gcttactata	atgatgaagt	tatcattcct	1260
tctttgacaa	gccgcggtct	tacgttagaa	gatgctagag	attatggtat	tattggatgt	1320
gtagaacctc	aaaaagggtg	aaagacggaa	ggatggcatg	atgctgcatt	ctttaataat	1380
gtaaaggatg	tagagataac	tataaataat	ggtagggata	atggcaaaca	gataaggatta	1440
agaactggag	acttcacttc	ttttacatca	tttgagaaat	tatttgatgc	atacaaatta	1500
cagatggagt	atttttgtta	acttttagtt	aatgcagata	acagtgtaga	tttagcacat	1560
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atgctattaa	atagagcacc	taagtttggt	aatgatatag	atgagggtga	tgatttagca	2040
cgagaagccg	cattaattta	ctgtaatgaa	gttgaaaaat	acactaatcc	acgtaatggt	2100
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aaagcttcaa	atggtacatt	atttaataca	agaagttcatc	catctgcttt	agaaggctcag	2340
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gtacaattta	atgtagtaag	tagagaaacg	cttttagatg	ctcaaaaagaa	tcctgaaaaat	2460
tatagaaatc	tggtagtagc	tgtagccgga	tatagtgtct	actttacttc	tttagataag	2520
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<210> 4
 <211> 780
 <212> DNA
 <213> Clostridium autoethanogenum

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gttaagtgtg	gtaagtgtgt	tgagaattgt	tatgctggag	ctttgaattt	agcaggaaac	180
acgagaactg	taaaggaatt	gttactagaa	ttgaaaaagg	ataacatata	ttatagacga	240
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gaattactaa	aaggatgcaa	acaaaaatggt	tggcacacag	ctattgaaac	cgcagcattt	360
acatctcaaa	gtgttttaga	aaggatgcta	ccttggcttg	atttagttat	gcttgatatt	420
aagcacatgg	atgcaaatga	acatttagag	tatacaggaa	agcctaata	gttaattctta	480
cagaatgcaa	aattaatagc	tcagtttgga	gttcagttaa	taataagagt	acctgttatt	540
ccaggagtta	atagcgatga	aaataatata	agagctacag	ctaattttgc	aactagcctt	600
aaaagtgtta	aagaattaca	tcttctacca	taccatcgtc	ttggtgaaaa	taagtatgag	660
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<210> 5
 <211> 351
 <212> PRT
 <213> Clostridium autoethanogenum

<400> 5															
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Lys	Lys	Asn	Pro	Val	Pro	Gly	Pro	Tyr	Asp	Ala	Ile	Val	His	Pro	Leu
			20					25					30		
Ala	Val	Ser	Pro	Cys	Thr	Ser	Asp	Ile	His	Thr	Val	Phe	Glu	Gly	Ala
		35					40					45			

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Leu Gly Asn Arg Glu Asn Met Ile Leu Gly His Glu Ala Val Gly Glu
50 55 60
Ile Ala Glu Val Gly Ser Glu Val Lys Asp Phe Lys Val Gly Asp Arg
65 70 75 80
Val Ile Val Pro Cys Thr Thr Pro Asp Trp Arg Ser Leu Glu Val Gln
85 90 95
Ala Gly Phe Gln Gln His Ser Asn Gly Met Leu Ala Gly Trp Lys Phe
100 105 110
Ser Asn Phe Lys Asp Gly Val Phe Ala Asp Tyr Phe His Val Asn Asp
115 120 125
Ala Asp Met Asn Leu Ala Ile Leu Pro Asp Glu Ile Pro Leu Glu Ser
130 135 140
Ala Val Met Met Thr Asp Met Met Thr Thr Gly Phe His Gly Ala Glu
145 150 155 160
Leu Ala Asp Ile Lys Met Gly Ser Ser Val Val Val Ile Gly Ile Gly
165 170 175
Ala Val Gly Leu Met Gly Ile Ala Gly Ser Lys Leu Arg Gly Ala Gly
180 185 190
Arg Ile Ile Gly Val Gly Ser Arg Pro Val Cys Val Glu Thr Ala Lys
195 200 205
Phe Tyr Gly Ala Thr Asp Ile Val Asn Tyr Lys Asn Gly Asp Ile Val
210 215 220
Glu Gln Ile Met Asp Leu Thr His Gly Lys Gly Val Asp Arg Val Ile
225 230 235 240
Met Ala Gly Gly Gly Ala Glu Thr Leu Ala Gln Ala Val Thr Met Val
245 250 255
Lys Pro Gly Gly Val Ile Ser Asn Ile Asn Tyr His Gly Ser Gly Asp
260 265 270
Thr Leu Pro Ile Pro Arg Val Gln Trp Gly Cys Gly Met Ala His Lys
275 280 285
Thr Ile Arg Gly Gly Leu Cys Pro Gly Gly Arg Leu Arg Met Glu Met
290 295 300
Leu Arg Asp Leu Val Leu Tyr Lys Arg Val Asp Leu Ser Lys Leu Val
305 310 315 320
Thr His Val Phe Asp Gly Ala Glu Asn Ile Glu Lys Ala Leu Leu Leu
325 330 335
Met Lys Asn Lys Pro Lys Asp Leu Ile Lys Ser Val Val Thr Phe
340 345 350

<210> 6

<211> 1056

<212> DNA

<213> Clostridium autoethanogenum

<400> 6

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gctgtaggtg	aaatagccga	agttggcagc	gaagttaaag	attttaaagt	tggcgataga	240
gttatcgtac	catgcacaac	acctgactgg	agatctttag	aagtccaagc	tggttttcag	300
cagcattcaa	acggtatgct	tgcaggatgg	aagttttcca	attttaaaga	tgggtgtattt	360
gcagattact	ttcatgtaaa	cgatgcagat	atgaatcttg	ccatactccc	agatgaaata	420
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ggtgatatag	ttgaacaaat	catggactta	actcatggta	aagggtgtaga	ccgtgtaatc	720
atggcaggcg	gtggtgctga	aacactagca	caagcagtaa	ctatgggttaa	acctggcggc	780
gtaatttcta	acatcaacta	ccatggaagc	ggtgatactt	taccaatacc	tcgtgttcaa	840
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agaatggaaa	tgctaagaga	tcttgttcta	tataaacgtg	ttgatttgag	taaacttggt	960
actcatgtat	ttgatgggtgc	agaaaaatatt	gaaaaggccc	ttttgcttat	gaaaaataag	1020
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<210> 7
 <211> 601
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> designed type II methyltransferase

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 Ile Asp Val Glu Glu Lys Met His Phe Ile Glu Thr Tyr Lys Gln Lys
 35 40 45
 Ser Asn Met Lys Lys Glu Ile Ser Phe Ser Glu Glu Tyr Tyr Lys Gln
 50 55 60
 Lys Ile Met Asn Gly Lys Asn Gly Val Val Tyr Thr Pro Pro Glu Met
 65 70 75 80
 Ala Ala Phe Met Val Lys Asn Leu Ile Asn Val Asn Asp Val Ile Gly
 85 90 95
 Asn Pro Phe Ile Lys Ile Ile Asp Pro Ser Cys Gly Ser Gly Asn Leu
 100 105 110
 Ile Cys Lys Cys Phe Leu Tyr Leu Asn Arg Ile Phe Ile Lys Asn Ile
 115 120 125
 Glu Val Ile Asn Ser Lys Asn Leu Asn Leu Lys Leu Glu Asp Ile
 130 135 140
 Ser Tyr His Ile Val Arg Asn Asn Leu Phe Gly Phe Asp Ile Asp Glu
 145 150 155 160
 Thr Ala Ile Lys Val Leu Lys Ile Asp Leu Phe Leu Ile Ser Asn Gln
 165 170 175
 Phe Ser Glu Lys Asn Phe Gln Val Lys Asp Phe Leu Val Glu Asn Ile
 180 185 190
 Asp Arg Lys Tyr Asp Val Phe Ile Gly Asn Pro Pro Tyr Ile Gly His
 195 200 205
 Lys Ser Val Asp Ser Ser Tyr Ser Tyr Val Leu Arg Lys Ile Tyr Gly
 210 215 220
 Ser Ile Tyr Arg Asp Lys Gly Asp Ile Ser Tyr Cys Phe Phe Gln Lys
 225 230 235 240
 Ser Leu Lys Cys Leu Lys Glu Gly Gly Lys Leu Val Phe Val Thr Ser
 245 250 255
 Arg Tyr Phe Cys Glu Ser Cys Ser Gly Lys Glu Leu Arg Lys Phe Leu
 260 265 270
 Ile Glu Asn Thr Ser Ile Tyr Lys Ile Ile Asp Phe Tyr Gly Ile Arg
 275 280 285
 Pro Phe Lys Arg Val Gly Ile Asp Pro Met Ile Ile Phe Leu Val Arg
 290 295 300
 Thr Lys Asn Trp Asn Asn Ile Glu Ile Ile Arg Pro Asn Lys Ile
 305 310 315 320
 Glu Lys Asn Glu Lys Asn Lys Phe Leu Asp Ser Leu Phe Leu Asp Lys
 325 330 335
 Ser Glu Lys Cys Lys Lys Phe Ser Ile Ser Gln Lys Ser Ile Asn Asn
 340 345 350
 Asp Gly Trp Val Phe Val Asp Glu Val Glu Lys Asn Ile Ile Asp Lys
 355 360 365
 Ile Lys Glu Lys Ser Lys Phe Ile Leu Lys Asp Ile Cys His Ser Cys
 370 375 380
 Gln Gly Ile Ile Thr Gly Cys Asp Arg Ala Phe Ile Val Asp Arg Asp
 385 390 395 400
 Ile Ile Asn Ser Arg Lys Ile Glu Leu Arg Leu Ile Lys Pro Trp Ile
 405 410 415
 Lys Ser Ser His Ile Arg Lys Asn Glu Val Ile Lys Gly Glu Lys Phe

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Ile	Lys	Tyr	Ile	Glu	Gln	Tyr	Lys	Lys	Arg	Leu	Met	Glu	Arg	Arg	Glu			
	450					455					460							
Cys	Lys	Lys	Gly	Thr	Arg	Lys	Trp	Tyr	Glu	Leu	Gln	Trp	Gly	Arg	Lys			
465					470					475					480			
Pro	Glu	Ile	Phe	Glu	Lys	Lys	Ile	Val	Phe	Pro	Tyr	Lys	Ser	Cys				
			485					490						495				
Asp	Asn	Arg	Phe	Ala	Leu	Asp	Lys	Gly	Ser	Tyr	Phe	Ser	Ala	Asp	Ile			
			500					505						510				
Tyr	Ser	Leu	Val	Leu	Lys	Lys	Asn	Val	Pro	Phe	Thr	Tyr	Glu	Ile	Leu			
		515					520						525					
Leu	Asn	Ile	Leu	Asn	Ser	Pro	Leu	Tyr	Glu	Phe	Tyr	Phe	Lys	Thr	Phe			
	530					535						540						
Ala	Lys	Lys	Leu	Gly	Glu	Asn	Leu	Tyr	Glu	Tyr	Tyr	Pro	Asn	Asn	Leu			
545					550					555					560			
Met	Lys	Leu	Cys	Ile	Pro	Ser	Ile	Asp	Phe	Gly	Gly	Glu	Asn	Asn	Ile			
			565						570					575				
Glu	Lys	Lys	Leu	Tyr	Asp	Phe	Phe	Gly	Leu	Thr	Asp	Lys	Glu	Ile	Glu			
			580					585					590					
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<210> 8

<211> 1806

<212> DNA

<213> Artificial Sequence

<220>

<223> designed type II methyltransferase

<400> 8

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1806

<210> 9

<211> 61

<212> PRT

<213> Clostridium autoethanogenum

<400> 9

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<210> 10

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

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28

<210> 11

<211> 28

<212> DNA

<213> Artificial Sequence

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<400> 11

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28

<210> 12

<211> 2941

<212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized pddABD operon

<400> 12

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<212> DNA

<213> Artificial Sequence

<220>

<223> intron targeting region for diol dehydratase

<400> 13

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<211> 25

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<220>

<223> oligonucleotide og84f

<400> 14

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25

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<210> 18
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<212> DNA
<213> Clostridium autoethanogenum

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<210> 19
<211> 1124
<212> DNA
<213> Clostridium autoethanogenum

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<210> 20

<211> 1279

<212> DNA

<213> Clostridium autoethanogenum

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<212> DNA

<213> Clostridium autoethanogenum

<400> 21

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 <212> DNA
 <213> Clostridium autoethanogenum

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 <211> 1005
 <212> DNA
 <213> Clostridium autoethanogenum

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<220>

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