

SEQUENCE LISTING

<110> Mitsui Chemicals, Inc.
Meiji Seika Pharma Co., Ltd

<120> Thermostable xylanase, production method and use thereof, and
method for producing lignocellulosic glycation product

<130> MT-F03104-00

<150> JP2011-257389
<151> 2011-11-25

<150> JP2012-099096
<151> 2012-04-24

<160> 75

<170> PatentIn version 3.1

<210> 1
<211> 190
<212> PRT
<213> *Trichoderma viride*

<400> 1

Gln Thr Ile Gly Pro Gly Thr Gly Phe Asn Asn Gly Tyr Phe Tyr Ser
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
50 55 60

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

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
115 120 125

Glu Gly Thr Ser Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Thr His
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
145 150 155 160

Ser His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
180 185 190

<210> 2
<211> 243
<212> PRT
<213> Acremonium cellulolyticus

<400> 2

Ala Glu Ala Ile Asn Tyr Asn Gln Asn Tyr Ile Ala Ser Gly Ala Asn
1 5 10 15

Val Gln Tyr Ser Pro Asn Ile Ala Ala Gly Ser Phe Ser Ile Asn Tyr
20 25 30

Asn Thr Gln Gly Asp Phe Val Val Gly Leu Gly Trp Gln Pro Gly Asp
35 40 45

Ala Asn Pro Ile Thr Tyr Ser Gly Ser Phe Ser Ala Ser Gly Val Gly
50 55 60

Ile Leu Ala Val Tyr Gly Trp Thr Thr Asn Pro Leu Val Glu Tyr Tyr
65 70 75 80

Ile Met Glu Val His Asp Gly Tyr Gln Thr Val Gly Thr His Lys Gly
85 90 95

Thr Val Thr Ser Asp Gly Gly Thr Tyr Asp Ile Trp Glu His Gln Gln
100 105 110

Val Asn Gln Pro Ser Ile Leu Gly Thr Ser Thr Phe Asn Gln Tyr Ile
115 120 125

Ser Ile Arg Gln Ser Pro Arg Thr Ser Gly Thr Val Thr Val Gln Asn
130 135 140

His Phe Asn Ala Trp Ala Gln Ala Gly Leu Asn Leu Gly Thr Met Asn
 145 150 155 160

Tyr Gln Val Leu Ala Val Glu Ser Trp Ser Gly Ser Gly Ser Gly Gln
 165 170 175

Ile Ser Leu Ser Lys Gly Thr Gly Gly Gly Thr Thr Thr Thr Thr Pro
 180 185 190

Thr Gly Pro Thr Ser Thr Ser Thr Ala Pro Ser Ser Gly Gly Thr Gly
 195 200 205

Ala Ala Gln Trp Gly Gln Cys Gly Gly Ile Gly Trp Thr Gly Pro Thr
 210 215 220

Thr Cys Val Ser Pro Tyr Thr Cys Lys Tyr Phe Asn Ala Tyr Tyr Ser
 225 230 235 240

Gln Cys Gln

<210> 3
 <211> 573
 <212> DNA
 <213> Trichoderma viride

<400> 3
 cagacgattg gtcccggcac gggcttcaac aacggctact tctactcgta ctggaacgac 60
 ggccacggcg gcgtgacgta caccaatggc cccggcggcc agttctccgt caactgggtcc 120
 aactcgggca actttgtcgg cggcaaggga tggcagcccg gcaccaagaa caaggatcgc 180
 aacttctcgg gcacctacaa cccaacggc aacagctacc tctccgtgta cggctgggtcg 240
 cgcaaccccc tgatcgagta ctacatcgtc gagaactttg gcacctacaa ccogtccacc 300
 ggcgccacca agctgggcca ggtgacgtcg gacggcagcg tctacgacat ctaccgcacg 360
 cagcgcgtca accagccgtc catcgagggc acctccacct tttaccagta ctggtccgtc 420
 cgccgcaccc accgctccag cggctccgtc aacacggcga accacttcaa cgcgtgggcc 480
 togcacggcc tgacgctggg caccatggat taccagattg ttgccgtgga gggctacttt 540
 agctctggct ctgcttctat taccgtcagc taa 573

<210> 4

<211> 732
 <212> DNA
 <213> Acremonium cellulolyticus

<400> 4
 gctgaggcga tcaactacaa ccaaaactac attgctagtgt gtgccaatgt tcaataactcg 60
 cccaacatcg ctgcgggttc tttctccatc aactacaata cgcaggggga ctttgtggtg 120
 ggacttgggtt ggcaaccagg tgatgctaac cccatcacct acagcggctc cttctcggcc 180
 tcgggtgttg gtatccttgc cgtgtacggc tggaccacca acccgctcgt ggaatactat 240
 atcatggagg ttcacgacgg ataccagact gtccggcacac acaagggcac tgtgacgagc 300
 gacggcggca cctatgatat ctgggagcac cagcaggtea atcagccgtc cattctgggc 360
 acctccacct tcaaccagta catctcgatc cgccaaagcc cccggacgag cggtagcggtt 420
 accgtgcaga accacttcaa tgcttgggag caggcggggt tgaatctcgg cacaatgaac 480
 taccaggtcc tggcagtcga gagctggagc ggcagcggct ctggacaaat ctgcctcagc 540
 aagggcactg gcggtggcac caccaccacc acaccacgg gtcccaccag cagcagcacc 600
 gctccttcga gcggaggtac cgggtctgct caatggggac aatgcggagg aattggctgg 660
 accggcccca ctacctgcgt gtccccttat acttgcaagt actttaacgc ttactacagt 720
 cagtgccaat ag 732

<210> 5
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

<400> 5
 gtacaccctc ggccccggcg gccag 25

<210> 6
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

<400> 6
 cggggccgag ggtgtacgtc acgcc 25

<210> 7
 <211> 25

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 7
 caagaacagg gtcacaaact tctcg 25

<210> 8
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 8
 gatgaccctg ttcttggtgc cgg 23

<210> 9
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 9
 cgtgacgttc accctcggcc ccggc 25

<210> 10
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 10
 cgagggtgaa cgtcacgccg ccgtg 25

<210> 11
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 11
 ctcgggcagc tttgtcggcg gcaag 25

<210>	12	
<211>	26	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	12	
	cgacaaagct gcccgagttg gaccag	26
<210>	13	
<211>	25	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	13	
	catcaactac gatacgcagg gggac	25
<210>	14	
<211>	24	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	14	
	ccctgcgtat cgtagttgat ggag	24
<210>	15	
<211>	25	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	15	
	gatacgcaga gggactttgt ggtgg	25
<210>	16	
<211>	26	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	16	
	caaagtcct ctgcgtatcg tagttg	26

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

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 17
 gataccagtc tgtcggcaca cacaag 26

 <210> 18
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 18
 gccgacagac tggatatcgt cgtg 24

 <210> 19
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 19
 gatccgccga agcccccgga cgag 24

 <210> 20
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 20
 gggggcttcg gcggatcgag atgtac 26

 <210> 21
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

<400> 21
caggcgggca tgaatctcgg cacaatg 27

<210> 22
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 22
ccgagattca tgcccgcctg cgccc 25

<210> 23
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 23
gcagcggcac tggacaaatc tcgctc 26

<210> 24
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 24
gatttgtcca gtgccgctgc cgctcc 26

<210> 25
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 25
cacgggtcac accagcacga gcac 24

<210> 26
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 26

gtgctggtgt gacccgtggg tgtg

24

<210> 27

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 27

gtcacaccaa caccgagcacc gctcc

25

<210> 28

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 28

gtgctcgtgt tgggtgagacc cgtgg

25

<210> 29

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 29

caatgcggag aaattggctg gaccgg

26

<210> 30

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 30

ccagccaatt tctccgcatt gtcgcc

26

<210> 31

<211> 24

<212> DNA

<213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 31
 ctttctccgt caactacaat acgc 24

<210> 32
 <211> 23
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 32
 gtagttgacg gagaaagaac ccg 23

<210> 33
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 33
 gtcaactacg atacgcaggg ggactttg 28

<210> 34
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 34
 ccctgcgtat cgtagttgac ggagaaag 28

<210> 35
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 35
 ctcccttcacg gcctcgggtc ggggtg 25

<210> 36
 <211> 26

<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Oligonucleotide to act as a PCR primer	
<400> 36	
cagaggccgt gaaggagccg ctgtag	26
<210> 37	
<211> 25	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Oligonucleotide to act as a PCR primer	
<400> 37	
cgcttaccac agtcagtgcc aatag	25
<210> 38	
<211> 27	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Oligonucleotide to act as a PCR primer	
<400> 38	
cactgactgt ggtaagcgtt aaagtac	27
<210> 39	
<211> 24	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Oligonucleotide to act as a PCR primer	
<400> 39	
cagtcagagc caatagggat cctc	24
<210> 40	
<211> 25	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Oligonucleotide to act as a PCR primer	
<400> 40	
cctattggct ctgactgtag taagc	25

<210> 41
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 41
 cgtgacgttc accaatggcc ccggc 25

<210> 42
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 42
 cattggtgaa cgtcacgccg ccgtg 25

<210> 43
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 43
 caacaacggc ttcttctact cgtactg 27

<210> 44
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 44
 cgagtagaag aagccgttgt tgaagcc 27

<210> 45
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 45
 caactttgtc tgcggcaagg gatgg 25

<210>	46	
<211>	25	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	46	
	ccatcccttg ccgcagacaa agttg	25
<210>	47	
<211>	22	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	47	
	ctccgtcagc acggcgaacc ac	22
<210>	48	
<211>	22	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	48	
	gtggttcgcc gtgctgacgg ag	22
<210>	49	
<211>	25	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	
<400>	49	
	gcaactttat cggcggcaag ggatg	25
<210>	50	
<211>	25	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	Oligonucleotide to act as a PCR primer	

<400> 50
cttgccgccg ataaagttgc ccgag 25

<210> 51
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 51
cactgtgacg tgcgacggcg gcac 24

<210> 52
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 52
ccgccgtcgc acgtcacagt gcc 23

<210> 53
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 53
ccgtgcagtg ccacttcaat gcc 23

<210> 54
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide to act as a PCR primer

<400> 54
cattgaagtg gcactgcacg gtaac 25

<210> 55
<211> 29
<212> DNA
<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 55

gactagcccg ggtagagttt atcattatc

29

<210> 56

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 56

gacgagagat ctccattttg tttatttatg tg

32

<210> 57

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 57

gactagagat ctatgcaact gttcaatttg cc

32

<210> 58

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 58

cagcatgagc tcagcagaaa ccagcaaag

29

<210> 59

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide to act as a PCR primer

<400> 59

atggtttctt tcacctccct cctcgccggc

30

<210> 60

<211> 30

<212> DNA

<213> Artificial Sequence

<220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 60
 ttagctgacg gtaatagaag cagagccaga 30

 <210> 61
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 61
 atgggcatct catctattct tctctctgct 30

 <210> 62
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 62
 ctattggcac tgactgtagt aagcgtaaa 30

 <210> 63
 <211> 28
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 63
 gattaggagc tccagacgat tgggtcccg 28

 <210> 64
 <211> 29
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 64
 gactagggat ccttagctga cggtaatag 29

 <210> 65
 <211> 30

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 65
 gattatgagc togctgaggc gatcaactac 30

<210> 66
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 66
 gattagggat ccctattggc actgactgta g 31

<210> 67
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 67
 cagacgattg gtcccggcac gggcttcaac aacggctact 40

<210> 68
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 68
 ccctcgagt tagctgacgg taatagaagc agagc 35

<210> 69
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 69
 gggaggcctg cgcacatg tttccttcac ctccc 35

<210> 70
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 70
 gtgccgggac caatcgtctg gcgcttttca acgtccacgg 40

 <210> 71
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 71
 gggaggcctg cgcacatcgg ttcccttcac ctccc 35

 <210> 72
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide to act as a PCR primer

 <400> 72
 cccctcgagt tagctgacgg taatagaagc agagc 35

 <210> 73
 <211> 117
 <212> DNA
 <213> A. cellulolyticus

 <400> 73
 atgggcatct catctattct tctctctgct ctgatcgagg ggggagcctt ggctctgccc 60
 gctgcagaac ctgtgtcggt cgatatccgg gatgaaaaca tcaccctggc gcgccgc 117

 <210> 74
 <211> 672
 <212> DNA
 <213> T. viride

 <400> 74
 atggtttcct tcacctccct cctcgccggc gtcgcggcca tctccggagt cttggccgct 60
 cccgctgctg aggtcgagtc cgtggacgtt gaaaagcgcc agacgattgg tcccggcacg 120
 ggcttcaaca acggctactt ctactcgtac tggaacgacg gccacggcgg cgtgacgtac 180

<210> 75
<211> 849
<212> DNA
<213> A. cellulolyticus
<400> 75
atggggcatct catctatctt tctctctgct ctgatacgcgg ggggagacctt ggcctctgccc
60
gctgcagaac cttgtgtcgtt cgtatcggg gatgaaaaa tcaaccctggc ggcgcgcgcct
120
gagcgatca actacaaca aacctacatc gctagtgttg ccaatgttca atactcgcgc
180
aaacatcgcct cgggttcttt ctcatacaac taacatacgc agggggacctt tgtgtgtggga
240
aacatcgcctg acggttcttt ctcatacaac taacatacgc agggggacctt tgtgtgtggga
300
cttgggttggc aacacgggtga tgcctaaaccc atcaacctaca ggcgcctcctt ctcggcctcg
360
ggtgttgtga tccctgccgt gtaacgcctgg aaccaccaacc cgcctcgtgga atactatatc
420
atggaggttc acgacgggata ccagacctgtc ggcaacaaca agggcacctgt gacggagcgac
480
ggcggcaacct atgatatctg ggaagcaacag caggctcaatc agccgttccat tctgggcaac
540
tcaacctca accagtacat ctcgatcggc caaagcccc ggaagagcgg tacgggttacc
600
gtgcagaacc accttcaatgc cttggcgcag ggcgcgcgcg atctcgggcac atgtgaaactac
660
ccttcgagcgg gagttaacggg gttggcaacga ccaaccacga cccacagcgc gtagcaccgcct
720
ccttcgagcgg gagttaacggg gttggcaacga ccaaccacga cccacagcgc gtagcaccgcct
780
ggcccgcacta cctgcgtgtc ccccttatct tgcagaatct ttaacgcctta ctacagttcag
840
tgccaatag

accgatggcc cggcggcca gttctcgtc aactggtcca actcgggcaa ctttgtcggc
240
ggcaagggat ggcagcccg caccagaaac aaggttcata acttctcgg caccctacaac
300
cccaacggca acagctacct ctcggtgtac ggcgtgtcgc gcaacccccc gatcgaatc
360
taacatcgtcg agaaacttgg caccctacaac ccgtccaacc ggcgcaca gctlggqcgag
420
gtgaacgtcgg acgacagcgt ctacgaatc taacgcacgc agcgcgtcaaa ccagccgtcc
480
atcgaaggca cctccacctt taacagtaac tggttccgtcc gccgcaccca ccgctccagc
540
ggctcgtcca acacggcgaa ccaactcaac gcgtggggcct cgcacggcctt gaacgctgggc
600
accatggatc accagatltg tgcggtgga ggcatactta gctcctggctc tgccttctatt
660
accgtcagct aa