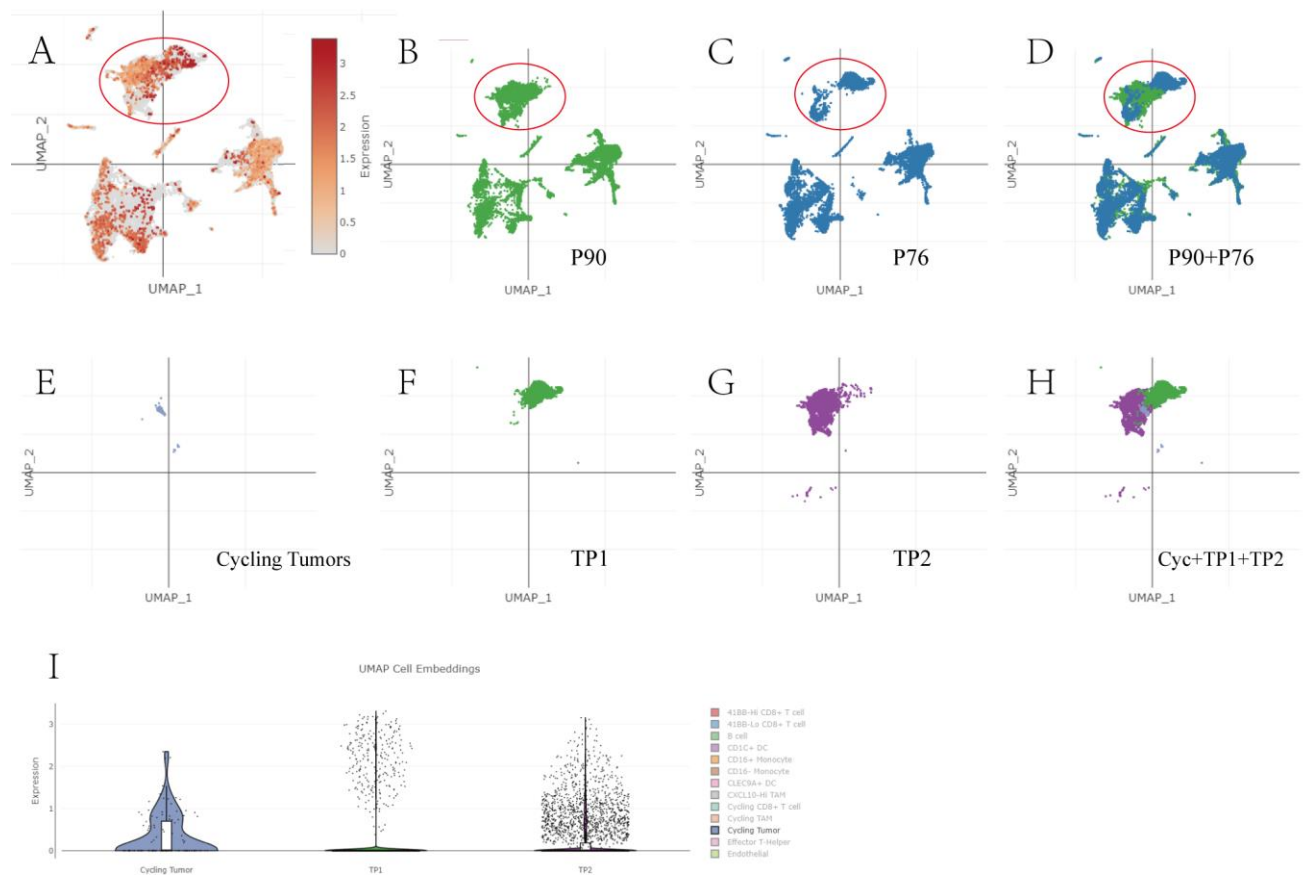


Supplementary Figure 1



Supplementary Fig.1. The single cell expression levels of GALNT2 in different ccRCC stage in Single cell Portal. (https://singlecell.broadinstitute.org/single_cell/study/SCP1288/tumor-and-immune-reprogramming-during-immunotherapy-in-advanced-renal-cell-carcinoma#study-visualize)

Sample : P90, Study ID: 0600890_T1 , Age: 71, Sex: Female, Biopsy site: Kidney, Histology: ccRCC, Grade: 4, Stage: I, Cells: 8426.

Sample : P76, Study ID:0600876_T1 , Age: 68, Sex: Female, Biopsy site: Kidney, Histology: ccRCC, Grade: 4, Stage: IV, Cells: 7912.

(A) The UMAP of the expression of GALNT2, (B) The UMAP of P90, (C) The UMAP of P76, (D) The UMAP of P90+P96, (E) The UMAP of the cycling tumor cells, (F) The UMAP of TP1, (G) The UMAP of TP2, (H) The UMAP of cycling tumor cells, TP1 and TP2, (I) The GALNT2 expression of cycling tumor cells, TP1 and TP2.

GALNT2 targeted by miR-139-5p
promotes proliferation of clear cell renal
cell carcinoma via inhibition of LATS2
activation

Gels and Blots

WB Marker

产品图例

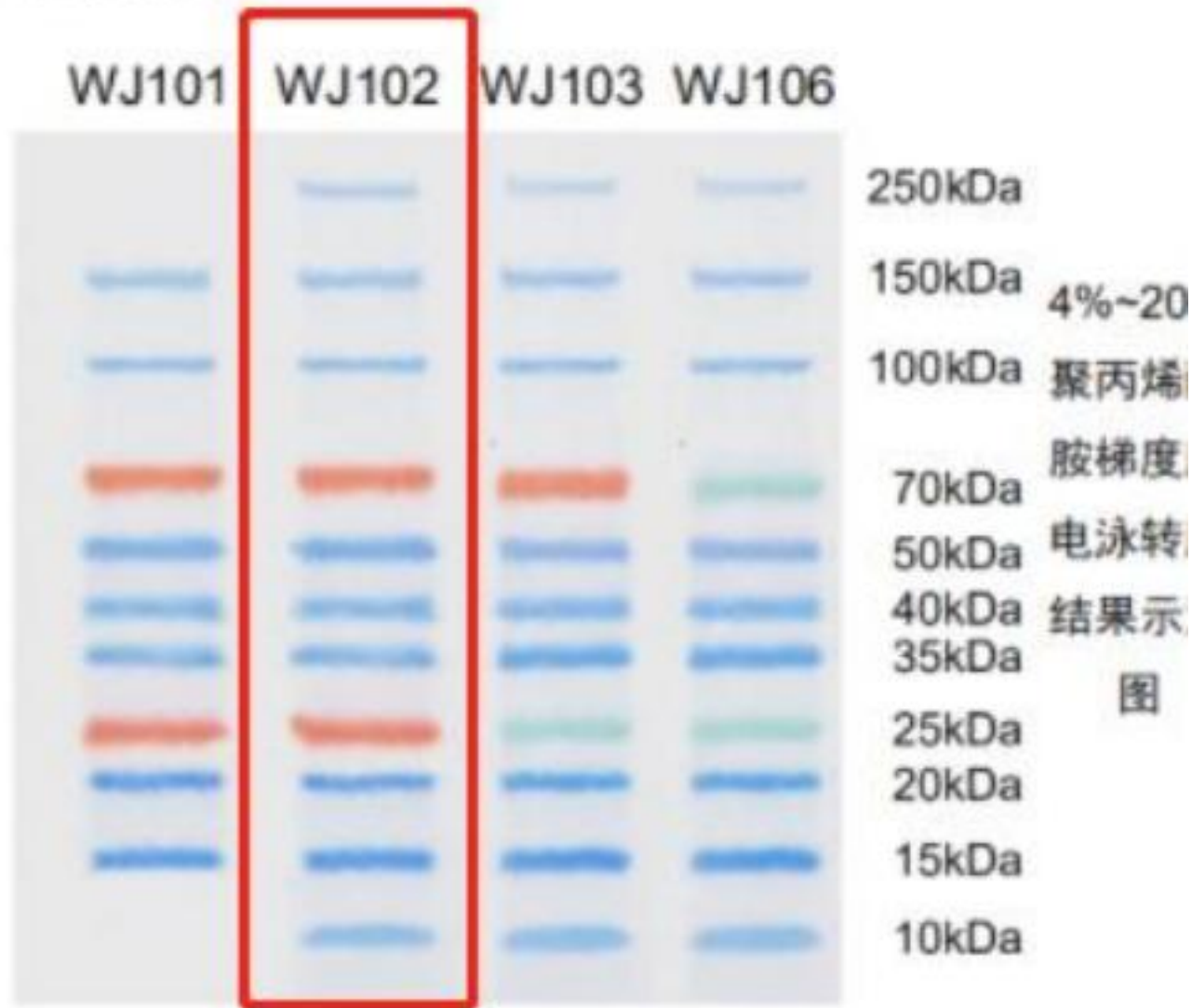


Figure 2B

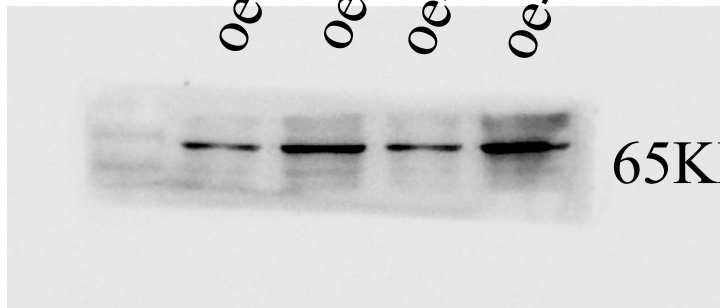
Caki-1

OS-RC-2

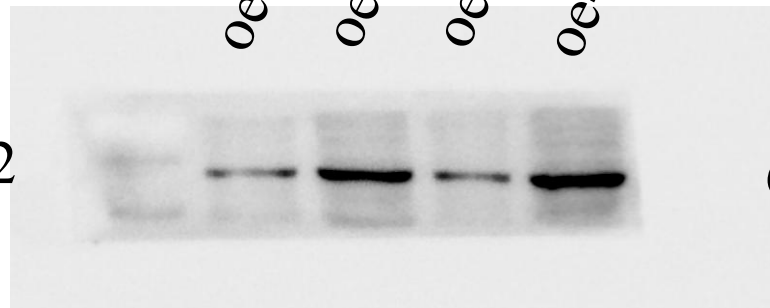
oe-vector
oe-GALNT2
oe-vector
oe-GALNT2

oe-vector
oe-GALNT2
oe-vector
oe-GALNT2

GALNT2

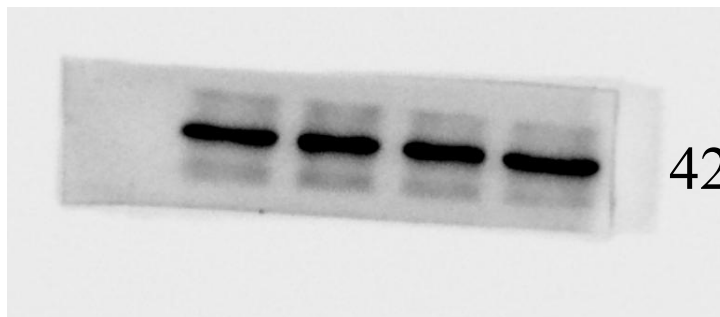


GALNT2



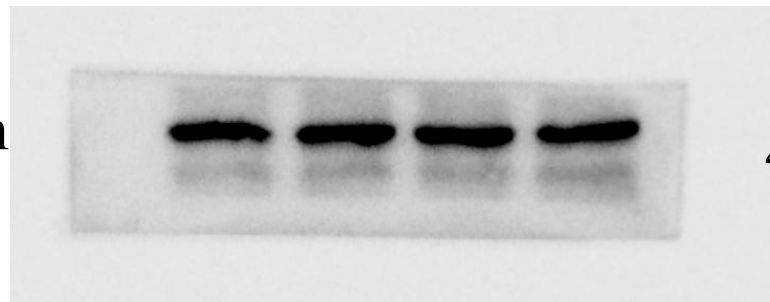
65KD

β -actin



42KD

β -actin



42KD

Figure 3B

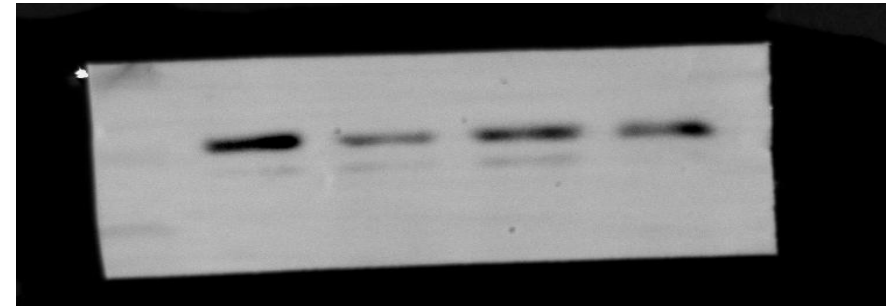
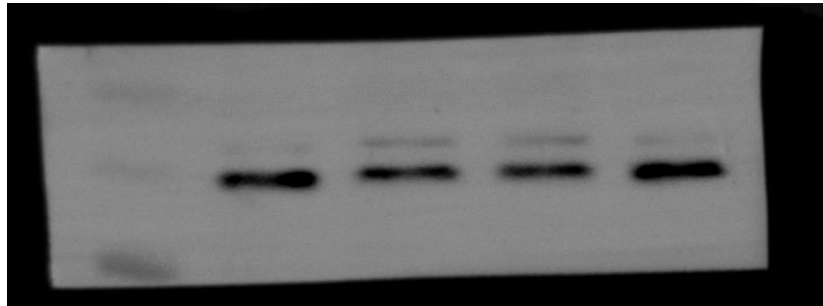
786-O

ACHN

shNC shRNA1 shRNA2 shRNA3

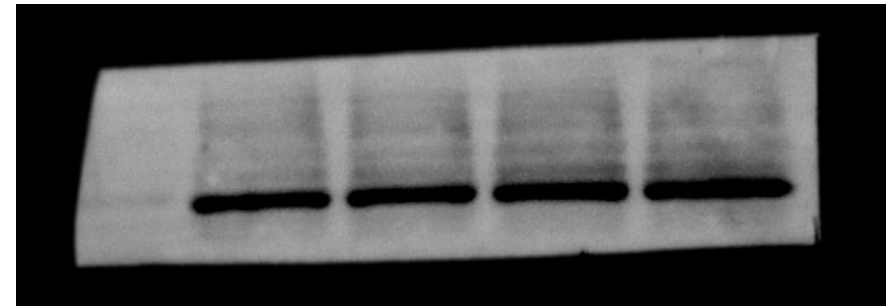
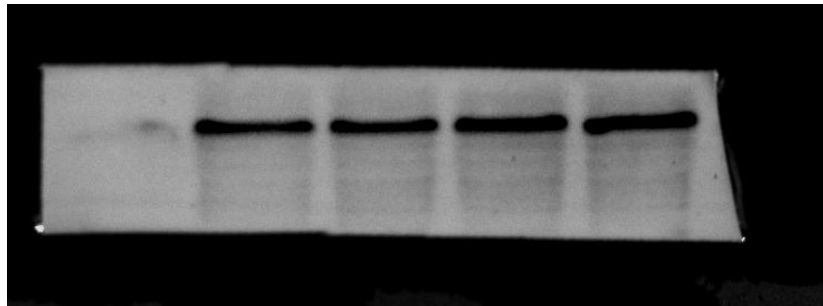
shNC shRNA1 shRNA2 shRNA3

GALNT2



65KD

GAPDH



36KD

Figure 3C

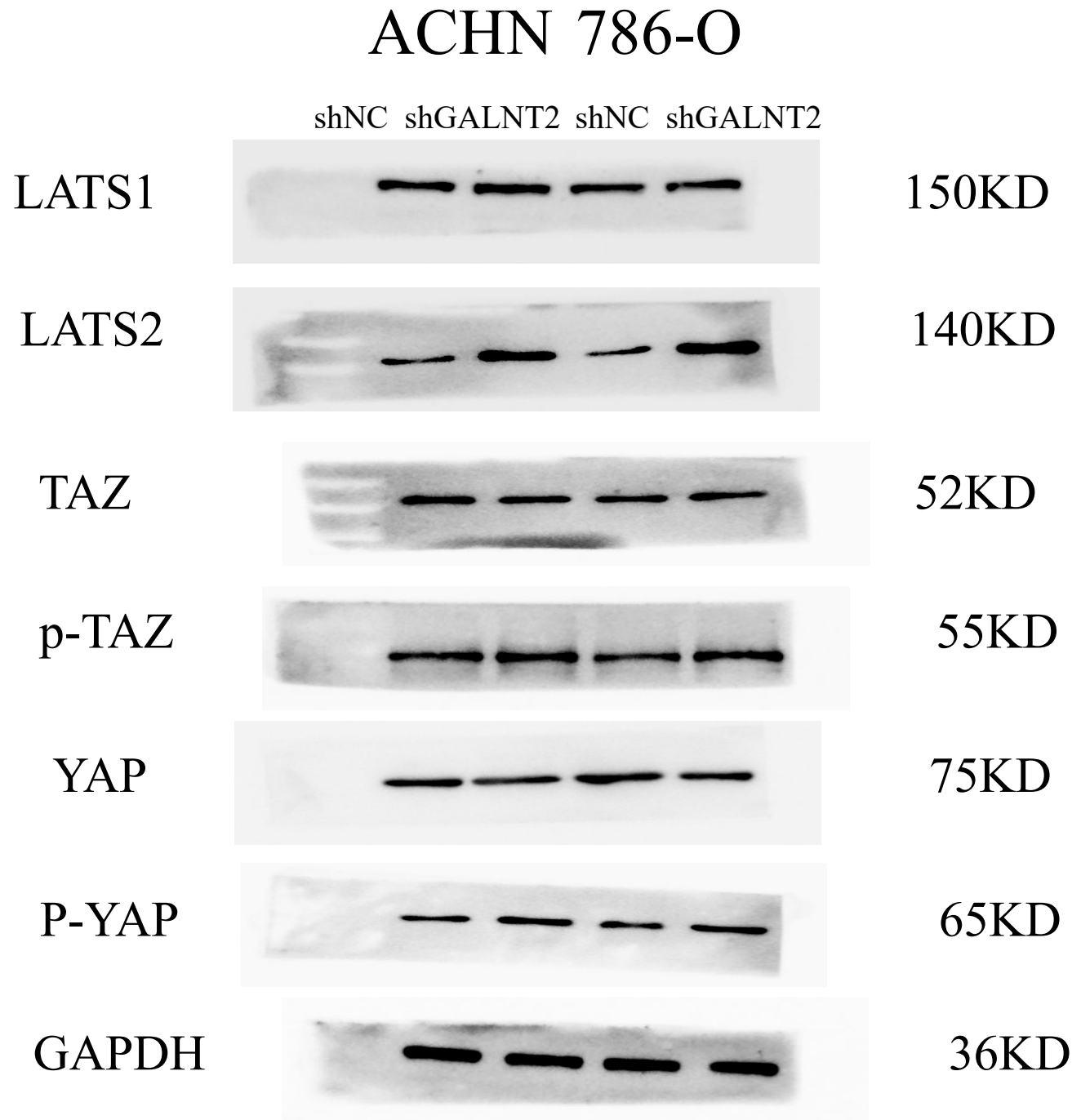


Figure 3D

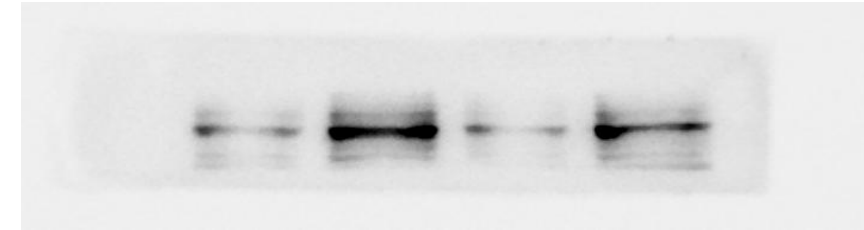
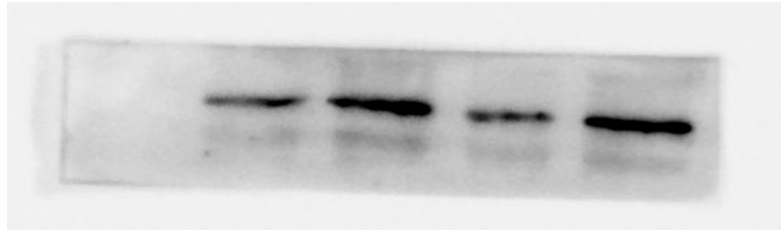
786-O

ACHN

shNC shGALNT2 shNC shGALNT2

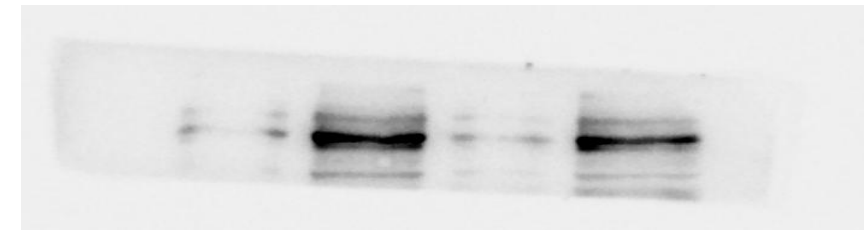
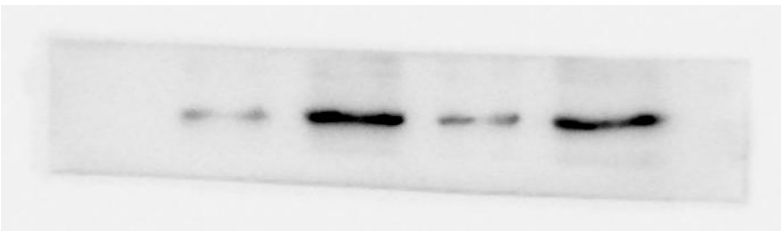
shNC shGALNT2 shNC shGALNT2

LATS2



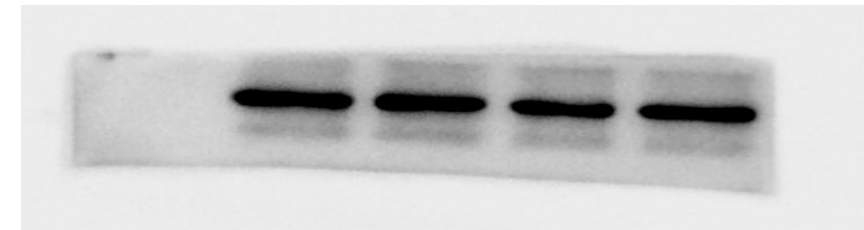
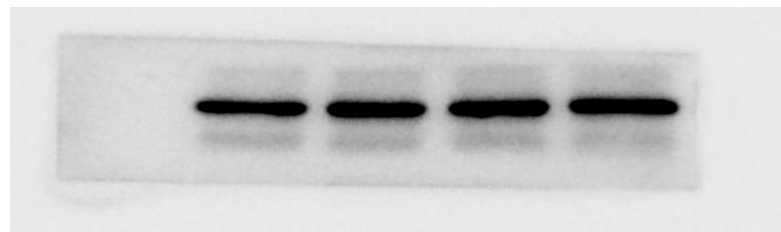
120KD

p-LATS2



127KD

β -actin



42KD

Figure 4K

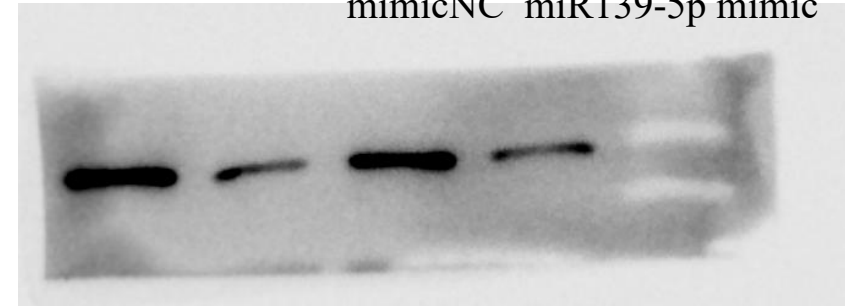
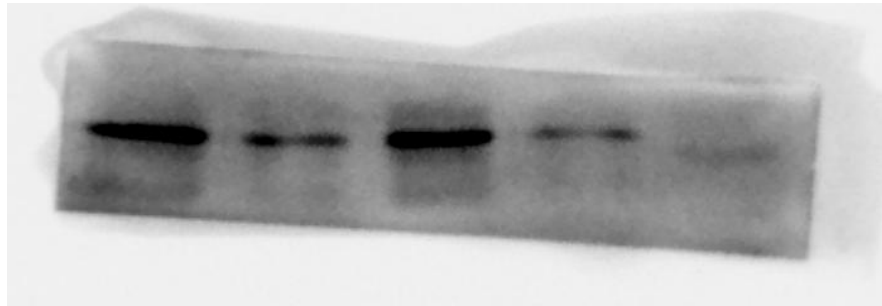
Caki-1

OS-RC-2

mimicNC miR139-5p mimic
mimicNC miR139-5p mimic

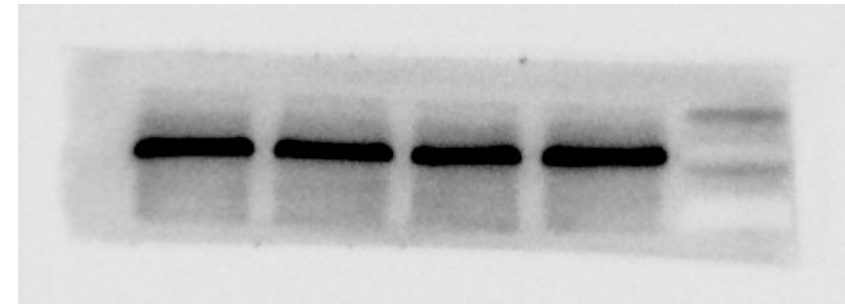
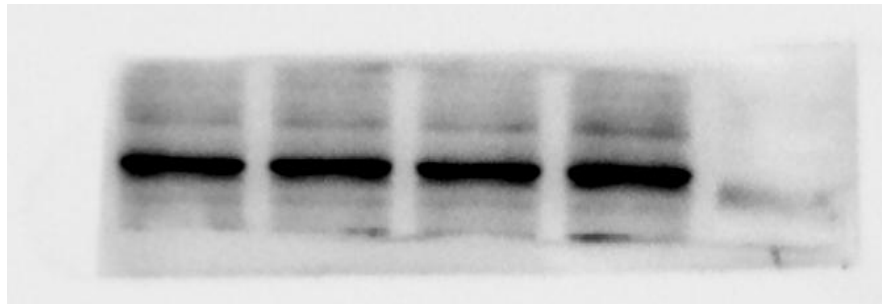
mimicNC miR139-5p mimic
mimicNC miR139-5p mimic

GALNT2



65KD

β -actin



42KD

GALNT2 (wt) -psiCHECK-2

agatctgcgcagcaccatggcctgaaataacctctgaaagaggaacttggttaggtacctctgaggcggaaagaaccagctgtggaatgtgt
gtcagttagggtgtgaaagtccccaggctccccagcaggcagaagatgcaaagcatgcatctcaattagtcagcaaccaggtgtggaag
tccccaggctccccagcaggcagaagatgcaaagcatgcatctcaattagtcagcaaccatagtcggccccctactccgccatcccgc
cctaactccgccagttccgccattctccgccatggctgactaattttttattatgagagggccaggccgctcgccctctgagctatfc
cagaagtagtgaggagctttttggaggcctaggcttttgcaaaaagcttgattctctgacacaacagctcgaactaaactgcagaagttg
gtcgtgaggcactgggcaggtaagtatcaaggttacaagacaggtttaaaggagaccaatagaactgggctgtcagacagagaagactct
tgcgttctgataggcacctattggcttactgacatccactttgctttctctccacaggtgtccactcccagttcaattacagctctaaaggctaga
gtacttaatacactactataggttagccaccatggctccaaggtgtacgaccccgagcaacgcaaacgatgatcactggccctcagttg
tggctcgtgcaagcaaatgaacgtgctggactcctcatcaactactatgattccgagaagcacgccgagaacgccgtgattttctgcatg
gtaacgtgctccagctacgtgtggaggcacgtcgtgcctcacatcgagccgtggctagatgcatcaccctgatctgacggaatgggta
agtccggcaagagcgggaatggctcatatgcctcctggatcactacaagtacctaccgcttggttcgagctgctgaacctccaagaaaa
tcatctttgtggccacgactgggggctgtctggccttactactcctacgagcacaagacaagatcaaggccatgctcatgctgagag
tgtcgtggacgtgatcgagctgggacgagtgccctgacatcgaggaggatgcctgatcaagagcgaagaggcagaaaatgt
gcttgagaataacttctctgagaccatgctccaagcaagatcatgaggaaactggagcctgaggagttcgtgctacctggagccatt
caagagaaaggcaggttagacggcctaccctctctggcctcgcgagatccctctgftaaggaggcaagcccagctgctcagatt
gtccgcaactacaacgcctaccttggccagcagatctgcctaagatgttcatcgagtcgacccctgggtctttccaacgctattgtcga
gggagctaaaggtcccaacaccgagttcgtgaaggtgaaggcctccactcagccaggaggacgtccagatgaaatgggtaagtac
atcaagagcttctgtgagcgtgctgaagaacgagcagtaatttaggcgatcgtcagAGTCCCTCTCTGCTCCTC
CATTCGCAAGTGTCTTCTGGGCCAGACTCCCCTCCACCTCATGTACTTGCTATATTGAG
GATGAAGTTTTCTATGGTGGGACACTAAATATAAAGCTATATAGAGAAAGAATGTACGG
TCAGTTCCCTATGGTTTCTGTAGATCATCGTCATCTTGTATATTCCCCACAAAGCCGTT
GCAGTTCCGGGAGAAGGGGCCAGAGCCCGGTGGGGCCAGTTTCTCACAGAGGGAG
GAGGTGGCCTCGTGC ACTGTGGCCTTGGAGTTAGGAGCCACCCTGGGAGGTTGTGCC
GGTGCCATGCTCCTCCCTGTGTCTTGTATGAAAGGGGCCACTGTGTGTCTTCTCCCCG
GCGGGAGCCCCACATGTAGGACAGCGGCCCGAGGTGGAAGCCTGGCTGGAGGGCTG
CCCTATAGGTCTTCTTCTCCCGCTCCCCTGCCATGCAACCAGATGTGTTGTGAGTGGG
CAGCGTGCCCCA gcgccgctggccgcaataaataatctttatttaccatctgtgtgtgtgtgtgtgagatctaatga
gtcttcggaactcgcggggccgcttaagcgggtggtaggggttctgacgcggggggagggggaaggaacgaacactctcattcggag
ggcgtcgggggtgtgtgtgtgtggccagggcacgagaagagcggcgcgatccttaagcaccccccgccctcgtgaggcgggg
gtttgctggcgggtgtaactggcggccgctgactcggcgggtcgcgcgccagagtgacctttcgtgtctgcagaccccc
ggggggcggccggcggcgagggcgtcgtgggtcctaggctccatggggaccgtatagtgagacaggtctggagatccgcac
gactcgggtgatattaccggagaccttctcgggacgagccgggtcacggcgtgacgcggagcgtccgttggcgacaacaccagga
cggggcacaggtacactatctgtcaccggagcgcgagggactgcaggagctcagggagtggcgcagctgctcatccccgtggccc
gttctcgcgttctgtggcgtgtccccggaagaatataatttgcattgtcttttagttctatgatgacacaacccccgccagcttctcattggc
gaattcgaacacgagatgcagtcggggcggcgggtcccaggctccacttgcataaaggtgacgcgtgtggcctcgaacaccgagcg
acctgcagcagaccgcttaaaagcttggcattccggtactgttgtaaaaccaccatggccgatgctaagaacattaagaaggccctgctc
cttctacctctggaggatggcaccgctggcagcagctgcacaaggccatgaagaggtatgccctggtgctggcaccattgcttacc
gatgccacattgaggtggacatcacctatgccagctactcagatgtctgtgcctggccgagccatgaagaggtacggcctgaacac
caaccaccgacgtgtgtgtctgagaactctcagcttctcatgccagctgtggcgcctgttcatcgagtgggcgtggcccctgct
aacgacattfacaacgagcgcgagctgtgaacagcatggcatttctagcctaccgtggtgtctgtctaaagggcctgcagaagatc
ctgaacgtgcagaagaagctgcctatcatcagaagatcatcatatggacttaagaccgactaccagggctccagagatgtacacattc
gtgacatctcatctgctcctggcttaacgagtagcttctgacagggacaaaaccattgcctgatcatgaacagctc

tgggtctaccggcctgcctaaggcgtggccctgcctcatcgaccgctgtgtgcgcttctcacgcccgcaccctatfttcggaacca
gatcatccccgacaccgctatftctgagcgtggtgccattccaccagggcttcggcatgttaccaccctgggctactgatttgcggcttctggg
tgggtctgatgtaccgcttcgaggagagctgttctctgcgcagcctgcaagactacaaaattcagcttgcctctgctggtccaacctgttcag
cttctcctaagagcaccctgatcgacaagctacacctgtctaacctgcacgagattgctctggcggcggccactgtctaaggaggtggg
cgaagcctggccaagcgttctatctgccaggcatccgccagggtacggcctgaccgagacaaccagcgcattctgattaccagag
ggcgacgacaagcctggcggcctggggcaaggtggtgccattctcagggccaaggtggtggacctggacaccggcaagacctgggagt
gaaccagcgcggcagctgtgtgtgcgcccctatgattatgtccggctacgtgaataacctgaggccacaacgcctgatcgacaag
gacggctggctgcactctggcgacattgcctactgggacgaggacgagcacttctcatctggaccgctgaagtctctgatcaagtaag
ggctaccaggtggccccagccgagctggagctatctctgtgcagaccctaacttttcgacggcggagtggccggcctgcccagcagc
atgccggcagctgctgcccggctgctgtctggaacacggcaagacctgaccgagaaggagatcgtggactatgtggccagccag
gtgacaaccgccaagaagctgcgcggcggagtgggtgtctgtggacgaggtgccaaggcctgaccggcaagctggacggccgcaaga
tccgcgagatcctgatcaaggctaagaaggcggcaagatgccgtgtaataattctagatcggggcggccggccttcgagcagacat
gataagatactgatgagttggacaaccacaactagaatgcagtgaaaaaatgctttatgtgaaattgtgatgctattgctttatgtaac
cattataagctgcaataaacaagtaacaacaacaattgcatctttatgtttcaggttcagggggaggtgtgggaggttttaagcaagtaa
aacctctacaatgtggtaaaatcgataaggatccaggtggcacttttcgggaaatgtgcgcggaaccttattgtttatcttaatacattc
aaatgtatccgctcatgagacaataacctgataaatgcttaataatgaaaaaggaagatgagattcaacattccctgtcgcctt
attcccttttgcggcattttgcttctgttttgcaccagaacgctgtgaaagtaaaagatgctgaagatcagttgggtgcacgagtg
gtacatcgaactggatctcaacagcggtaagatccttgagattttcggccgaagaactttccaatgatgagcacttttaagtctgctatg
tggcgggtattatcccgtattgacggcggcaagcaactcggcgcatacactattctcagaatgacttgggtgagctaccagtc
acagaaaagcatctacggatggatgacagtaagagaattatgcagtgctccataacctgagtgataaactgcggccaacttacttctga
caacgatcggaggaccgaaggagtaaccgctttttgcacaacatgggggatcatgtaactcgccttgatcgttgggaaccggagctgaatg
aagccatacaaacgacgagcgtgacaccagatgctgtagcaatggcaacaacttgcgcaactatfaactggcgaacttactctag
cttcccgcaacaatfaatagactggatggagggcgaataaagtgcaggaccacttctgcgctcggccctccggctggctggtttatgctgat
aaatctggagccggtgagcgtgggtctcgggtatcattgcagcactggggccagatggtaagccctcccgtatcgtatctacacgacg
gggagtcaggcaactatggatgaacgaaatagacagatcgtgagataggtgcctcactgattaagcattgtaactgtcagaccaagtact
catatatactttagattgatttaaaactcatttttaatttaaaaggatctaggtgaagatccttttgataatctcatgaccaaaatccctaacgtgag
ttctgctcactgagcgtcagaccccgtagaaaagatcaaaagatctcttgatcctttttctgcgcgtaactgctgcttgcacaacaaaaa
accaccgctaccagcgggtggtttgttccggatcaagactaccaactttttcgaaggtaactggcttcagcagagcgcagatacaaaat
actgttctctagtgtagccgtagtttagccaccactcaagaactctgtagcaccgctacatacctcgtctgctaactctgttaccagtgctg
ctgccagtgccgataagctgtcttaccgggtggactcaagacgatgtagccgataaggcgcagcggctcgggctgaaccggggggttc
gtgcacacagccagcttggagcgaacgacctacaccgaactgagatactacagcgtgagctatgagaaagcggcacttcccgaagg
gagaaagcggacaggtatccggtaaagcggcagggctggaacagggagagcgcacgagggagctccagggggaaacgcctggtatctt
atagctctgctgggttccacacctctgacttgagcgtcgtttttgtgatgctcgtcagggggcgggacctatgaaaaacgccagcaacgc
ggccttttacggctcctggccttttctgctcacttttctccacatggctcgac

GALNT2 (mut) -psiCHECK-2

agatctgcgcagccatggcctgaaataacctctgaaagaggaacttgggttaggtacttctgagggcggaaagaaccagctgtggaatgtg
gtcagttagggtgtgaaagtccccaggtccccagcagcagaagatgcaaaagatgcatctcaattagtcagcaaccaggtgtggaag
tccccaggtccccagcagcagaagatgcaaaagatgcatctcaattagtcagcaaccatagtcggcccttaactccgccatcccccc
cctaactccgccagttccgccattctcggcccatggctgactaattttttatgatgagggccgagggcctcggcctctgagctatc
cagaagtagtgaggagctttttggaggcctaggttttcaaaaagcttattcttgacacaacagtctcgaacttaagctgcagaagttg
gtcgtgaggcactggcaggttaagatcaaggttaacagacaggttaaggagaccaatagaaactgggcttctcagacagagaagactc
tgcgttctgataggcacctattggtcttactgacatccactttgcttctccacaggtgtccactcccagttcaattacagctcttaaggctaga

gtacttaatacactactataggctagccaccatggctccaaggtgtacgacccccgagcaacgcaaacgatgatcactgggacctcagtggtggctcgtgcaagcaaatgaacgtgctggactcctcatcaactactatgattccgagaagcagccggagaacgccgtgatttttctgcatggtaacgtgacctccagctacgttgaggacgctgctgacctacatcgagcccggtggctagatgcatcatccctgatctgatcggaaatgggtagtccggcaagagcgggaatggctcatatgctcctggatcactacaagtacctaccgcttggtcagctgctgaacctccaagaaaaatcatcttggggccagctgggggctgtctggccttactactctacgagcaccagaagacaagatcaaggccatgctccatgctgagagtctgtggacgtgatcagctcctgggacgagtgccctgacatcgaggaggatcgccctgatcaagagcgaagaggcgagaaaatggtgcttgagaataactctctgctgagaccatgctccaagcaagatcatcggaactggagcctgaggagttcgtgctacctggagccattcaaggagaaggcgaggttagacggcctaccctctctggcctcgcgagatccctctgtaaggagggaagcccagctcgtccagattgtccgcaactacaacgcctaccttggccaagcagctgctcaagatgctcatcgagctccgacctgggtctttccaacgctattgtcaggggagcctaagaagtcccaaacaccgagttcgtgaaggtgaaggcctcactcagccaggagacgctccagatgaaatgggtaagtagatcaagagcttctgagcgcgtgctgaagaacgagcagtaattctaggcgtcgtcagAGTCCCTCTCTGCTCCTCCATTCGCAAGTGTCTTCCCTGGGCCAGACTCCCCTCCACCTCATGTACTTGCTATATTGAGGATGAAGTTTTCTATGGTGGGACACTAAATATAAAGCTATATAGAGAAAGAATGTACGGTCAGTTCCCTATGGTTTTTATGGATCATCGTCATCTTGTATATTCCCCACAAAGCCGTTCCAGCTTCCGGGAGAAGGGGCCAGAGCCCGGTGGGGCCAGTTTCTCACAGAGGGAGGAGGTGGCCTCGGCCTTGGAGTTAGGAGCCACCCTGGGAGGTTGTGCCGGTGCCATGCTCCTCCCTGTGTCTTGTATGAAAGGGGCCACTGTGTGTCTTCTCCCCGGCGGGAGCCCACATGTATACGCCGACAGGACAGCGGCCCCGAGGTGGAAGCCTGGCTGGAGGGCTGCCCTATAGGTCTTCTTCCCCGCTCCCCTGCCATGCAACCAGATGTGTTGTGAGTGGGCAGCGTGCCCCAagcgccctggccgcaataaaatcttttttcttaccatctgtgtgtgtttttgtgtgaggatctaaatgagcttccgacctcgcggggcgcttaagcgggtggttaggggttctgacgcggggggagggggaaggaacgaaacactctcattcggaggcggctcgggggttcttggggccacgggcacgcagaagagcgcgcgatccttcttaagcaccctccctcctggaggcgggggttggctcgggggtgtaactggcgccgctgactggcgggctcgcgcgccccagagtgtagctttctggctgctcgcagacccccggcgccgcccgcggcggcgagggctcgtgggtcctaggtccatggggaccgtatacgtggacaggtctggagcatccgcacgactcgggtgatattaccggagacctctcgggacgagccgggtcacgcggctgacgcggagcgtccgttggcgacaacaccaggacgggacaggtactatctgtcaccggagcgcgagggactgcaggagctcaggagtgggcgagctgctcatccccgtggcccgtgctcgcgttctggtggctgcccgaagaatataattgcatgtctttagtctatgatgacacaaacccccccagcgttctgctcattggcgatcgaacacgcagatgcagtcggggcgccgctccaggtccactcgcataaaggtgacgcgtgtggcctcgaacaccgagcaccctgcagcagaccgctfaaaagcttggcattccggtactgttggtaaagccaccatggccgatgctaagaacattaagaaggccctgctccctctaccctctggaggatggcaccgctggcgagcagctgcacaagccatgaagaggtatgcctggtgctggcaccattgcctcaccgatgccacattgaggtggacatcacctatccgagtacttcgagatgctgtgctgcccgtggcgaggccatgaagaggtacggcctgaacaccaaaccaccgcatcgtgtgtctgagaactctcagttctcatgccagtgctggcgccctgttcatcgagtgccgtggcccctgctaagacattacaacgagcgcgagctgctgaacagatggcatttctcagcctaccgtgtgtctgcttaagaaggccctgcagaagatcctgaacgtgcagaagaagctgcctatcatccagaagatcatcatggacttaagaccactaccagggtccagagcatgtacacattcgtgacatctcctcctcctgctcaacgagtagcactcgtgcccagctttcagaggacaaaaccattgcctgatcatgaacagctctgggtctaccggcctgctaaggcgctggccctgctcaccgacctgctgctgctcaccgcccgcacctattttcggaaccagatcctcccagaccgctattctgagcgtggtccattccaccaggttcggcatgtcaccacctgggctacctgattgcggcttccgggtggtgctgatgaccgcttcgaggaggagctgttctcgcagcctgcaagactacaaaattcagctcctcgtggtgccaacctgttcagcttctgctaagagcaccctgatcgacaagtagcactgtctaacctgcacgagattgctctggcgcccccactgtctaaggaggtggcggaagcgtggccaagcgttcatctgccaggatccgccagggtacggcctgaccgagacaaccagcgcattctgattacccagaggcgacgacaagcctggcgccgtgggcaaggtggtgcttctcagggccaaggtggtggacctggacaccggaacacctgggagtgaaacagcggcgagctgtgtgctcgcggccctatgattatgctccgctactgtgaataacctgagggcacaacgcctgatcgacaaggagctgtgctgactctggcgacattgcctactgggacgaggacgagcacttctcatctgtggaccgctgaagtctctgatcaagtagggctaccagggtggccccagcgagctggagctctatcctgctgcagcacccctaactttcagcggcgctcccagcagcatgc

cggcgagctgcctgccgccgctgctgctggaacacggcaagaccatgaccgagaaggagatcgtggactatgtggccagccaggtga
caaccgccaagaagctgcgcggcggagtggtgctgctggacgaggtgcccaggcctgaccggcaagctggacgcccgaagatccg
cgagatcctgatcaaggctaagaaaggcggcaagatccgctgtaataattctagatcggggcggccggccttcgagcagacatgata
agatacattgatgagttggacaaccacaactagaatgcagtgaaaaaatgctttattgtgaaattgtgatgctattgctttattgtaaccatt
ataagctgcaataacaagttaacaacaacaattgcattcatttatgtttcaggttcagggggaggtgtgggaggtttttaaagcaagtaaac
ctctcaaatgtggtaaaatcgataaggatccaggtggcactttcggggaatgtgcgcggaaccctattgttttttaataacattcaaa
tatgtatccgctcatgagacaataaccctgataaatgcttcaataatgaaaaaggaagatgatgattcaacattccgtgctgccttattc
cctttttgcggcattttgccttctgttttctcaccagaaacgctggtgaaagtaaaagatgctgaagatcagttgggtgcacgagtggtta
catcgaactggatcacaacagcggtaagatccttgagagttttgccccgaagaacgtttccaatgatgagcacttttaaaagtctgctatgtg
cgcggtattatccctgattgacgcggcgaagagcaactcggctgccgatacactattctcagaatgactgggtgagctaccagtcaca
gaaaagcatcttacggatggcatgacagtaagaaatfatgcagtgctgcataaacatgatgataacactcggccaacttactctgaca
cgatcggaggaccgaaggagctaaccgctttttgcacaacatgggggatcatgtaactgccttgatcgttgggaaccggagctgaatgaa
gccatacaaacgacgagcgtgacaccacgatgcctgtagcaatggcaacaacgctgcgcaactattaactggcgaactacttacttagct
tcccgcaacaattaatagactggatggaggcggataaagtgcaggaccacttctgcctcggccttccggctggtggtttattgctgata
aatctggagccggtgagcgtgggtctcgcggtatcattgcagcactggggccagatgtaagccctccgctatctagttatctacacgagg
ggagtcaggcaactatggatgaacgaaatagacagatcgtgagataggtgcctcactgattaagcattgtaactgtagaccaagttactc
atatacttttagattgattaaaactcatttttaattaaaaggatctaggtgaagatccttttgataatctatgacaaaatccctaactgagtt
ttcgtccactgagcgtcagaccccgtagaaaagatcaaggatcttcttgatcctttttctgcgcgtaactgctgcttgaacaaaaaaa
ccaccgtaccagcgggtggtttgttgcggatcaagagctaccaactctttccgaaggtaactggcttcagcagagcgcagataccaata
ctgttcttagttagccgtagttagccaccactcaagaactctgtagaccgcctacatacctcgtctgtaactctgttaccagtggtgctg
tgccagtggcgataagctgcttaccgggtggactcaagacgatagttaccggataaggcgcagcggctcgggctgaacggggggtcgt
gcacacagcccagctggagcgaacgacctacaccgaactgagatacctacagcgtgagctatgagaaagcgcacgcttccgaaggga
gaaaggcggacaggtatccggtgaagcggcagggtcggaacaggagagcgcacgaggagcttccaggggaaacgcctggtatctttat
agtctgctgggttccacactctgactgagcgtcgtttttgtgatgctcgtcagggggcggagcctatggaaaaacgccagcaacgcg
gccttttacggttctggccttttgccttttgcctcaccatggctcgac