# YTK Primer Design Software Test Description

Version 1.0

## Test case TC0001

1. test each type individually
2. copy pYTK sequence for type to test into Rshiny app
3. choose type accordingly (same type prefix and suffix)
4. validate primers
   1. check if primer sequence in test document matches primer sequence in Rshiny app (search with ctr+F in app, sequence does not need to have same length! sequence in Rshiny app is same length or longer than sequence in test document)
   2. all fwd primers in Rshiny app should have the same lower-case sequence and only differ in the length of the upper-case sequence, same is true for all rev primers
5. export FASTA file
6. validate FASTA file
   1. login Benchling test account <https://www.benchling.com>
      1. login: testbenchling@outlook.com
      2. password: [Not entered here]
      3. You can also use another account
   2. on left-hand side of website click on “Projects” icon ()
   3. choose MoClo folder from list
   4. type “pYTKXXX” in search bar, with XXX being the type-specific number found in this document
   5. open the pYTKXXX vector by clicking on it
   6. on right-hand side of the website click on “Alignment” icon ()
   7. click on “Create new alignment”
   8. click on “Choose file”
   9. choose FASTA file exported from Rshinyapp
   10. click “Create Alignment”
   11. check if FASTA file aligns 100% with pYTK vector (mismatches are highlighted in red)
       1. type 4B shows single bp difference in fwd primer, CGGTCTC**A**TGGC instead of CGGTCTC**C**TGGC, this is normal

**type 1**

primer fwd gcatcgtctcatcggtctca**ccct**gaattcgcatctagaTGGTAGAGCCACAAACA

primer rev atgccgtctcaggtctca**cgtt**CGTCTGCAATTATCGGC

pYTK002

TGGTAGAGCCACAAACAGCCGGTACAAGCAACGATCTCCAGGACCATCTGAATCATGCGCGGATGACACGAACTCACGACGGCGATCACAGACATTAACCCACAGTACAGACACTGCGACAACGTGGCAATTCGTCGCAATACCGTCTCACTGAACTGGCCGATAATTGCAGACG

**type 2**

primer fwd gcatcgtctcatcggtctca**aacg**GTGAGTAAGGAAAGAGT

primer rev atgccgtctcaggtctca**cata**gatctTGTTTTATATTTGTTGT

pYTK011

GTGAGTAAGGAAAGAGTGAGGAACTATCGCATACCTGCATTTAAAGATGCCGATTTGGGCGCGAATCCTTTATTTTGGCTTCACCCTCATACTATTATCAGGGCCAGAAAAAGGAAGTGTTTCCCTCCTTCTTGAATTGATGTTACCCTCATAAAGCACGTGGCCTCTTATCGAGAAAGAAATTACCGTCGCTCGTGATTTGTTTGCAAAAAGAACAAAACTGAAAAAACCCAGACACGCTCGACTTCCTGTCATCCTATTGATTGCAGCTTCCAATTTCGTCACACAACAAGGTCCTAGCGACGGCTCACAGGTTTTGTAACAAGCAATCGAAGGTTCTGGAATGGCGGGAAAGGGTTTAGTACCACATGCTATGATGCCCACTGTGATCTCCAGAGCAAAGTTCGTTCGATCGTACTGTTACTCTCTCTCTTTCAAACAGAATTGTCCGAATCGTGTGACAACAACAGCCTGTTCTCACACACTCTTTTCTTCTAACCAAGGGGGTGGTTTAGTTTAGTAGAACCTCGTGAAACTTACATTTACATATATATAAACTTGCATAAATTGGTCAATGCAAGAAATACATATTTGGTCTTTTCTAATTCGTAGTTTTTCAAGTTCTTAGATGCTTTCTTTTTCTCTTTTTTACAGATCATCAAGGAAGTAATTATCTACTTTTTACAACAAATATAAAACA

**type 3**

primer fwd gcatcgtctcatcggtctca**tatg**AAGAACATCAAGAAGAA

Primer rev atgccgtctcaggtctca**ggat**ccTTACTTCAAGAAGGTTT

pYTK035

AAGAACATCAAGAAGAACCAAGTTATGAACTTGGGTCCAAACTCTAAGTTGTTGAAGGAATACAAGTCTCAATTGATCGAATTGAACATCGAACAATTCGAAGCTGGTATCGGTTTGATCTTGGGTGACGCTTACATCCGATCTCGCGACGAAGGTAAGACCTACTGTATGCAATTCGAATGGAAGAACAAGGCTTACATGGACCACGTTTGTTTGTTGTACGACCAATGGGTTTTGTCTCCACCACACAAGAAGGAAAGAGTTAACCACTTGGGTAACTTGGTTATCACCTGGGGTGCTCAAACCTTCAAGCACCAAGCTTTCAACAAGTTGGCTAACTTGTTCATCGTTAACAACAAGAAAACCATCCCAAACAACTTGGTTGAAAACTACTTGACCCCAATGTCTTTGGCTTACTGGTTCATGGACGACGGTGGTAAGTGGGACTACAACAAGAACTCTACCAACAAGTCTATCGTTTTGAACACCCAATCTTTCACCTTCGAAGAAGTTGAATACTTGGTTAAGGGTTTGAGAAACAAGTTCCAATTGAACTGTTACGTTAAGATCAACAAGAACAAGCCAATCATCTACATCGACTCTATGTCTTACTTGATCTTCTACAACTTGATCAAGCCATACTTGATCCCACAAATGATGTACAAGTTGCCAAACACCATCTCTTCTGAAACCTTCTTGAAGTAA

**type 3A**

primer fwd gcatcgtctcatcggtctca**tatg**GTTTCTAAAGGTGAAGA

primer rev atgccgtctcaggtctca**agaa**ccTTTGTACAATTCATCCA

pYTK037

GTTTCTAAAGGTGAAGAATTATTCACTGGTGTTGTCCCAATTTTGGTTGAATTAGATGGTGATGTTAATGGTCACAAATTTTCTGTCTCCGGTGAAGGTGAAGGTGATGCTACTTACGGTAAATTGACCTTAAAATTTATTTGTACTACTGGTAAATTGCCAGTTCCATGGCCAACCTTAGTCACTACTTTATCTTGGGGTGTTCAATGTTTTGCAAGATACCCAGATCATATGAAACAACATGACTTTTTCAAGTCTGCCATGCCAGAAGGTTATGTTCAAGAAAGAACTATTTTTTTCAAAGATGACGGTAACTACAAGACCAGAGCTGAAGTCAAGTTTGAAGGTGATACCTTAGTTAATAGAATCGAATTAAAAGGTATTGATTTTAAAGAAGATGGTAACATTTTAGGTCACAAATTGGAATACAATTATTTCTCTGACAATGTTTACATCACTGCTGACAAACAAAAGAATGGTATCAAAGCTAACTTCAAAATTAGACACAACATTGAAGATGGTGGTGTTCAATTAGCTGACCATTATCAACAAAATACTCCAATTGGTGATGGTCCAGTCTTGTTACCAGACAACCATTACTTATCCACTCAATCTAAGTTATCCAAAGATCCAAACGAAAAGAGGGACCACATGGTCTTGTTAGAATTTGTTACTGCTGCTGGTATTACCTTGGGTATGGATGAATTGTACAAA

**type 3B**

fwd primer gcatcgtctcatcggtctca**ttct**GTGTCCAAAGGAGAGGA

rev primer atgccgtctcaggtctca**ggat**ccCTTATACAATTCATCCA

pYTK046

GTGTCCAAAGGAGAGGAGTTAATCAAGGAAAACATGAGAATGAAAGTTGTCATGGAGGGCTCCGTTAATGGTCACCAATTCAAGTGTACAGGGGAAGGTGAAGGTAATCCTTACATGGGTACACAAACTATGAGAATTAAAGTAATTGAAGGCGGACCACTACCATTTGCATTTGACATTCTGGCAACGTCATTCATGTACGGATCACGAACTTTCATCAAGTACCCTAAAGGTATACCAGACTTTTTCAAGCAATCTTTTCCAGAGGGTTTTACATGGGAAAGGGTTACAAGATACGAAGATGGGGGTGTCGTCACAGTTATGCAAGATACTTCATTAGAAGATGGCTGCCTTGTCTATCATGTGCAAGTAAGAGGGGTGAATTTTCCTTCTAACGGACCTGTGATGCAGAAAAAGACCAAAGGTTGGGAACCAAATACTGAAATGATGTACCCAGCTGATGGAGGTTTGAGAGGCTACACACACATGGCGCTTAAAGTTGATGGTGGAGGTCATTTGTCTTGTAGTTTTGTTACCACTTATCGTTCTAAAAAGACTGTTGGCAATATCAAAATGCCAGGAATACATGCTGTAGACCACAGACTAGAAAGACTCGAAGAGAGCGATAACGAAATGTTCGTTGTACAGAGAGAGCATGCCGTAGCCAAATTTGCTGGCTTAGGCGGTGGTATGGATGAATTGTATAAG

**type 4**

fwd primer gcatcgtctcatcggtctca**atcc**taactcgagAGCTTTTGATTAAGCCT

rev primer atgccgtctcaggtctca**cagc**ATACATGGGTGACCAAA

pYTK051

AGCTTTTGATTAAGCCTTCTAGTCCAAAAAACACGTTTTTTTGTCATTTATTTCATTTTCTTAGAATAGTTTAGTTTATTCATTTTATAGTCACGAATGTTTTATGATTCTATATAGGGTTGCAAACAAGCATTTTTCATTTTATGTTAAAACAATTTCAGGTTTACCTTTTATTCTGCTTGTGGTGACGCGTGTATCCGCCCGCTCTTTTGGTCACCCATGTAT

**type 4A**

fwd primer gcatcgtctcatcggtctca**atcc**TCTAAAGGTGAAGAATT

rev primer atgccgtctcaggtctca**gcca**ctcgagttaTTTGTACAATTCATCCA

pYTK058

TCTAAAGGTGAAGAATTATTCACTGGTGTTGTCCCAATTTTGGTTGAATTAGATGGTGATGTTAATGGTCACAAATTTTCTGTCTCCGGTGAAGGTGAAGGTGATGCTACTTACGGTAAATTGACCTTAAAATTGATTTGTACTACTGGTAAATTGCCAGTTCCATGGCCAACCTTAGTCACTACTTTAGGTTATGGTTTGCAATGTTTTGCTAGATACCCAGATCATATGAAACAACATGACTTTTTCAAGTCTGCCATGCCAGAAGGTTATGTTCAAGAAAGAACTATTTTTTTCAAAGATGACGGTAACTACAAGACCAGAGCTGAAGTCAAGTTTGAAGGTGATACCTTAGTTAATAGAATCGAATTAAAAGGTATTGATTTTAAAGAAGGTGGTAACATTTTAGGTCACAAATTGGAATACAACTATAACTCTCACAATGTTTACATCACTGCTGACAAACAAAAGAATGGTATCAAAGCTAACTTCAAAATTAGACACAACATTGAAGATGGTGGTGTTCAATTAGCTGACCATTATCAACAAAATACTCCAATTGGTGATGGTCCAGTCTTGTTACCAGACAACCATTACTTATCCTATCAATCTGCCTTATCCAAAGATCCAAACGAAAAGAGAGATCACATGGTCTTGTTAGAATTTGTTACTGCTGCTGGTATTACCCATGGTATGGATGAATTGTACAAA

**type 4B**

primer fwd gcatcgtctcatcggtctca**tggc**AGCTTTTGATTAAGCCT

primer rev atgccgtctcaggtctca**cagc**ATACATGGGTGACCAAA

pYTK061

AGCTTTTGATTAAGCCTTCTAGTCCAAAAAACACGTTTTTTTGTCATTTATTTCATTTTCTTAGAATAGTTTAGTTTATTCATTTTATAGTCACGAATGTTTTATGATTCTATATAGGGTTGCAAACAAGCATTTTTCATTTTATGTTAAAACAATTTCAGGTTTACCTTTTATTCTGCTTGTGGTGACGCGTGTATCCGCCCGCTCTTTTGGTCACCCATGTAT

**type 5**

primer fwd gcatcgtctcatcggtctca**gctg**CCAATGAGACGACGGGG

primer rev atgccgtctcaggtctca**tgta**ctgcagtgcactagtTAACTGCCTTGATCTGT

pYTK067

CCAATGAGACGACGGGGTCATCACGGCTCATCATGCGCCAAACAAATGTGTGCAATACACGCTCGGATGACTGCATGATGACCGCACTGACTGGGGACAGCAGATCCACCTAAGCCTGTGAGAGAAGCAGACACCCGACAGATCAAGGCAGTTA

**type 6**

primer fwd gcatcgtctcatcggtctca**taca**CGGTTTCCTTGAAATTT

primer rev atgccgtctcaggtctca**actc**GGGTAATAACTGATATA

pYTK074

CGGTTTCCTTGAAATTTTTTTGATTCGGTAATCTCCGAACAGAAGGAAGAACGAAGGAAGGAGCACAGACTTAGATTGGTATATATACGCATATGTAGTGTTGAAGAAACATGAAATTGCCCAGTATTCTTAACCCAACTGCACAGAACAAAAACGTGCAGGAAACGAAGATAAATCATGTCGAAAGCTACATATAAGGAACGTGCTGCTACTCATCCTAGTCCTGTTGCTGCCAAGCTATTTAATATCATGCACGAAAAGCAAACAAACTTGTGTGCTTCATTGGATGTTCGTACCACCAAGGAATTACTGGAGTTAGTTGAAGCATTAGGTCCCAAAATTTGTTTACTAAAAACACATGTGGATATCTTGACTGATTTTTCCATGGAGGGCACAGTTAAGCCGCTAAAGGCATTATCCGCCAAGTACAATTTTTTACTCTTCGAGGACAGAAAATTTGCTGACATTGGTAATACAGTCAAATTGCAGTACTCTGCGGGTGTATACAGAATAGCAGAATGGGCAGACATTACGAATGCACACGGTGTGGTGGGCCCAGGTATTGTTAGCGGTTTGAAGCAGGCGGCAGAAGAAGTAACAAAGGAACCTAGAGGCCTTTTGATGTTAGCAGAATTGTCATGCAAGGGCTCCCTATCTACTGGAGAATATACTAAGGGTACTGTTGACATTGCGAAGAGCGACAAAGATTTTGTTATCGGCTTTATTGCTCAAAGAGACATGGGTGGAAGAGATGAAGGTTACGATTGGTTGATTATGACACCCGGTGTGGGTTTAGATGACAAGGGAGATGCATTGGGTCAACAGTATAGAACCGTGGATGATGTGGTTTCTACAGGATCTGACATTATTATTGTTGGAAGAGGACTATTTGCAAAGGGAAGGGATGCTAAGGTAGAGGGTGAACGTTACAGAAAAGCAGGCTGGGAAGCATATTTGAGAAGATGCGGCCAGCAAAACTAAAAAACTGTATTATAAGTAAATGCATGTATACTAAACTCACAAATTAGAGCTTCAATTTAATTATATCAGTTATTACCC

**type 7**

fwd primer gcatcgtctcatcggtctca**gagt**ATCACGTGCTATAAAAA

rev primer atgccgtctcaggtctca**tcgg**GACGGATCGCTTGCCTG

pYTK081

ATCACGTGCTATAAAAATAATTATAATTTAAATTTTTTAATATAAATATATAAATTAAAAATAGAAAGTAAAAAAAGAAATTAAAGAAAAAATAGTTTTTGTTTTCCGAAGATGTAAAAGACTCTAGGGGGATCGCCAACAAATACTACCTTTTATCTTGCTCTTCCTGCTCTCAGGTATTAATGCCGAATTGTTTCATCTTGTCTGTGTAGAAAACCACACACGAAAATCCTGTGATTTTACATTTTACTTATCGTTAATCGAATGTATATCTATTTAATCTGCTTTTCTTGTCTAATAAATATATATGTAAAGTACGCTTTTTGTTGAAATTTTTTAAACCTTTGTTTATTTTTTTTTCTTCATTCCGTAACTCTTCTACCTTCTTTATTTACTTTCTAAAATCCAAATACAAAACATAAAAATAAATAAACACAGAGTAAATTCCCAAATTATTCCATCATTAAAAGATACGAGGCGCGTGTAAGTTACAGGCAAGCGATCCGTC

**type 8**

primer fwd gcatcgtctcatcggtctca**ccga**gcggccgcGATTATCAAAAAGGATC

primer rev atgccgtctcaggtctca**aggg**gcggccgcACGGTTATCCACAGAAT

pYTK083

GATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTTAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTCGTTCATCCATAGTTGCCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGGGACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAACCAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGCGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTCACGCTCGTCGTTTGGTATGGCTTCATTCAGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAGAAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACCGAGTTGCTCTTGCCCGGCGTCAATACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTGGAAAACGTTCTTCGGGGCGAAAACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTCACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAGCATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTTCCCCGAAAAGTGCCACCTGTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGT

**type 8A**

fwd primer gcatcgtctcatcggtctca**ccga**gcggccgcGATTATCAAAAAGGATC

rev primer atgccgtctcaggtctca**attg**gcggccgcACGGTTATCCACAGAAT

pYTK089

GATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTTAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTCGTTCATCCATAGTTGCCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGGGACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAACCAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGCGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTCACGCTCGTCGTTTGGTATGGCTTCATTCAGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAGAAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACCGAGTTGCTCTTGCCCGGCGTCAATACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTGGAAAACGTTCTTCGGGGCGAAAACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTCACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAGCATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTTCCCCGAAAAGTGCCACCTGTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGT

**type 8B**

fwd primer gcatcgtctcatcggtctca**caat**GCTAAATTCGAGTGAAA

rev primer atgccgtctcaggtctca**aggg**GTAATGTTATCCATGTG

pYTK092

GCTAAATTCGAGTGAAACACAGGAAGATCAGAAAATCCTCATTTCATCCATATTAACAATAATTTCAAATGTTTATTTGCATTATTTGAAACTAGGCAAGACAAGCAACGAAACGTTTTTGAAAATTTTGAGTATTTTCAATAAATTTGTAGAGGACTCAGATATTGAAAAAAAGCTACAGCAATTAATACTTGATAAGAAGAGTATTGAGAAGGGCAACGGTTCATCATCTCATGGATCTGCACATGAACAAACACCAGAGTCAAACGACGTTGAAATTGAGGCTACTGCGCCAATTGATGACAATACAGACGATGATAACAAACCGAAGTTATCTGATGTAGAAAAGGATTAAAGATGCTAAGAGATAGTGATGATATTTCATAAATAATGTAATTCTATATATGTTAATTACCTTTTTTGCGAGGCATATTTATGGTGAAGGATAAGTTTTGACCATCAAAGAAGGTTAATGTGGCTGTGGTTTCAGGGTCCATAAAGCCCACATGGATAACATTAC