Parte 2

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hmp <- "ATGCTTGACGCTCAAACCATCGCTACAGTAAAAGCCACCATCCCTTTACTGGTGGAAACGGGGCCAAAGT  
TAACCGCCCATTTCTACGACCGTATGTTTACTCATAACCCAGAACTCAAAGAAATTTTTAACATGAGTAA  
CCAGCGTAATGGCGATCAACGTGAAGCCCTGTTTAACGCTATTGCCGCCTACGCCAGTAATATTGAAAAC  
CTGCCTGCGCTGCTGCCAGCGGTAGAAAAAATCGCGCAGAAGCACACCAGCTTCCAGATCAAACCGGAAC  
AGTACAACATCGTCGGTGAACACCTGTTGGCAACGCTGGACGAAATGTTCAGCCCGGGGCAGGAAGTGCT  
GGACGCGTGGGGTAAAGCCTATGGTGTACTGGCTAATGTATTTATCAATCGCGAGGCGGAAATCTATAAC  
GAAAACGCCAGCAAAGCCGGTGGTTGGGAAGGTACTCGCGATTTCCGCATTGTGGCTAAAACACCGCGCA  
GCGCGCTTATCACCAGCTTCGAACTGGAGCCGGTCGACGGTGGCGCAGTGGCAGAATACCGTCCGGGGCA  
ATATCTCGGCGTCTGGCTGAAGCCGGAAGGTTTCCCACATCAGGAAATTCGTCAGTACTCTTTGACTCGC  
AAACCGGATGGCAAAGGCTATCGTATTGCGGTGAAACGCGAAGAGGGTGGGCAGGTATCCAACTGGTTGC  
ACAATCACGCCAATGTTGGCGATGTCGTGAAACTGGTCGCTCCGGCAGGTGATTTCTTTATGGCTGTCGC  
AGATGACACACCAGTGACGTTAATCTCTGCCGGTGTTGGTCAAACGCCAATGCTGGCAATGCTCGACACG  
CTGGCAAAAGCAGGCCACACAGCACAAGTGAACTGGTTCCATGCGGCAGAAAATGGCGATGTTCACGCCT  
TTGCCGATGAAGTTAAGGAACTGGGGCAGTCACTGCCGCGCTTTACCGCGCACACCTGGTATCGTCAGCC  
GAGCGAAGCCGATCGCGCTAAAGGTCAGTTTGATAGCGAAGGTCTGATGGATTTGAGCAAACTGGAAGGT  
GCGTTCAGCGATCCGACAATGCAGTTCTATCTCTGCGGCCCGGTTGGCTTCATGCAGTTTACCGCGAAAC  
AGTTAGTGGATCTGGGCGTGAAGCAGGAAAACATTCATTACGAATGCTTTGGCCCGCATAAGGTGCTGTA  
A"  
  
gene\_hmp <- gsub(pattern = "\n", replacement = "", hmp)  
  
  
transcribir\_adn\_arn <- function(secuencia) {  
 arn <- ""  
 for(i in 1:nchar(secuencia)){  
 base <- substr(secuencia, i, i)  
 if(base == "T"){  
 arn <- paste0(arn, "U")  
 }else{  
 arn <- paste0(arn, base)  
 }  
 }  
 return(arn)  
}  
  
encontrar\_codones <- function(secuencia){  
 codon\_inicio = "AUG"  
 codon\_final = c("UAA", "UAG", "UGA")  
   
 secuencia <- paste0(codon\_inicio, secuencia, "UAAUAGUGA")  
   
 codones <- c();  
   
   
 for(i in seq(1, nchar(secuencia), by=3)){  
   
 j <- (i+2)/3;  
   
 codones[j] <- paste0(substr(secuencia, i, i), substr(secuencia, i+1, i+1), substr(secuencia, i+2, i+2));  
 }  
   
 return(codones)  
}  
  
  
traducir\_arn <- function(codones){  
 tabla\_aminoacidos <- data.frame(  
 codon = c("UUU", "UUC", "UUA", "UUG", "CUU", "CUC", "CUA", "CUG", "AUU", "AUC", "AUA", "AUG",  
 "GUU", "GUC", "GUA", "GUG", "UCU", "UCC", "UCA", "UCG", "CCU", "CCC", "CCA", "CCG",  
 "ACU", "ACC", "ACA", "ACG", "GCU", "GCC", "GCA", "GCG", "UAU", "UAC", "UAA", "UAG",  
 "CAU", "CAC", "CAA", "CAG", "AAU", "AAC", "AAA", "AAG", "GAU", "GAC", "GAA", "GAG",  
 "UGU", "UGC", "UGA", "UGG", "CGU", "CGC", "CGA", "CGG", "AGU", "AGC", "AGA", "AGG",  
 "GGU", "GGC", "GGA", "GGG"),  
 amino\_acido = c("F", "F", "L", "L", "L", "L", "L", "L", "I", "I", "I", "M",  
 "V", "V", "V", "V", "S", "S", "S", "S", "P", "P", "P", "P",  
 "T", "T", "T", "T", "A", "A", "A", "A", "Y", "Y", "STOP", "STOP",  
 "H", "H", "Q", "Q", "N", "N", "K", "K", "D", "D", "E", "E",  
 "C", "C", "STOP", "W", "R", "R", "R", "R", "S", "S", "R", "R",  
 "G", "G", "G", "G")  
 )  
   
 cat("Aminoacidos del gen hmp: \nSTART ")  
 for(i in 2:length(codones)){  
   
 codon\_encontrado <- codones[i] == tabla\_aminoacidos$codon  
 posicion <- which(codon\_encontrado == TRUE)  
   
  
 cat(tabla\_aminoacidos$amino\_acido[posicion], " ")  
 }   
   
}  
  
arn\_hmp <- transcribir\_adn\_arn(gene\_hmp)  
codones\_hmp <- encontrar\_codones(arn\_hmp)  
traducir\_arn(codones\_hmp)

## Aminoacidos del gen hmp:   
## START M L D A Q T I A T V K A T I P L L V E T G P K L T A H F Y D R M F T H N P E L K E I F N M S N Q R N G D Q R E A L F N A I A A Y A S N I E N L P A L L P A V E K I A Q K H T S F Q I K P E Q Y N I V G E H L L A T L D E M F S P G Q E V L D A W G K A Y G V L A N V F I N R E A E I Y N E N A S K A G G W E G T R D F R I V A K T P R S A L I T S F E L E P V D G G A V A E Y R P G Q Y L G V W L K P E G F P H Q E I R Q Y S L T R K P D G K G Y R I A V K R E E G G Q V S N W L H N H A N V G D V V K L V A P A G D F F M A V A D D T P V T L I S A G V G Q T P M L A M L D T L A K A G H T A Q V N W F H A A E N G D V H A F A D E V K E L G Q S L P R F T A H T W Y R Q P S E A D R A K G Q F D S E G L M D L S K L E G A F S D P T M Q F Y L C G P V G F M Q F T A K Q L V D L G V K Q E N I H Y E C F G P H K V L STOP STOP STOP STOP