

# Clustering Polypeptide motifs using the Hammock hidden Markov model peptide clustering

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*Tue Nov 10 16:16:08 2020*

This script clusters Polypeptide motifs using the Hammock hidden Markov model peptide clustering.

```
suppressPackageStartupMessages(library(knitr))
```

## Loading samples

```
all.samples <- readRDS("data/allSamplesDataTable.RDS")
all.samples[, `:=`(Peptide, as.character(Peptide)), ]

setkey(all.samples, Group)

select.samples <- all.samples[J(c("mRNA_30cpc_SN", "mRNA_3cpc_SN", "mRNA_30cpc_Th",
  "mRNA_3cpc_Th", "mRNA_30cpc_Ctx", "mRNA_3cpc_Ctx", "mRNA_30cpc_SN_4wks",
  "mRNA_3cpc_SN_4wks", "mRNA_30cpc_Th_4wks", "mRNA_3cpc_Th_4wks", "mRNA_30cpc_Ctx_4wks",
  "mRNA_3cpc_Ctx_4wks", "mRNA_30cpc_Organoid_MD114")))]

select.samples[, `:=`(BCcount, as.integer(mclapply(BC, function(x) length(table(strsplit(paste(t(x),
  collapse = ","), ","))), mc.cores = detectCores())))]
select.samples[, `:=`(Animalcount, as.integer(mclapply(Animals, function(x) length(table(strsplit(paste(t(x),
  collapse = ","), ","))), mc.cores = detectCores())))]
select.samples[, `:=`(Score, BCcount + Animalcount - 1), ]

select.samples.trsp <- unique(select.samples, by = c("Animals", "BC", "LUTnrs"))
setkey(select.samples.trsp, Sequence)

selected.peptides <- data.table(read.table("input/selectedPeptides.txt", header = TRUE,
  skip = 0, sep = "\t", stringsAsFactors = FALSE, fill = TRUE))
# Removed the first 2 serotypes selected for in vitro properties

selected.peptides <- selected.peptides[3:nrow(selected.peptides), ]
select.samples.main <- select.samples.trsp[J(selected.peptides$Sequence)]

select.samples.main[, `:=`(Group, as.character(lapply(Group, function(x) gsub("(_4wks)",
  "", x)))))]
select.samples.main <- select.samples.main[, sum(Score), by = c("Sequence",
  "Group", "Peptide")]
setnames(select.samples.main, "V1", "Score")
select.samples.main <- merge(selected.peptides, select.samples.main, by = "Sequence",
  all = FALSE)
select.samples.main[, `:=`(Peptide, as.character(Peptide)))]

out.table <- data.table(dcast(select.samples.main, Name + Peptide ~ Group, fun = sum,
  value.var = "Score"))
lastCount <- ncol(out.table)
out.table[, `:=`(alignment, paste("-----", Peptide, "-----",
  sep = ""))]
out.table <- transform(out.table, sum = rowSums(out.table[, 3:lastCount])) # Corrected to remove count hardc
out.table <- subset(out.table, select = c(1, 2, lastCount + 1, lastCount + 2,
```

```

    (3:lastCount))) # Corrected to remove count hardcoding
setnames(out.table, c("Name", "Peptide"), c("cluster_id", "sequence"))
write.table(out.table, file = "data/selectedPeptides.tsv", quote = FALSE, sep = "\t",
  row.names = FALSE)

# Generate Scoring table for Weblogo Weighting
select.samples.pepMerge <- select.samples.trsp[, sum(Score), by = c("Peptide")]
setnames(select.samples.pepMerge, "V1", "Score")

# removing the selected peptides from all sequences to allow for clustering
select.samples.trsp <- select.samples.trsp[!(select.samples.trsp$Peptide %in%
  out.table$sequence), ]

fasta.names <- paste(1:nrow(select.samples.trsp), select.samples.trsp$Score,
  select.samples.trsp$Group, sep = "|")
write.fasta(as.list(select.samples.trsp$Peptide), fasta.names, "data/trspSamplesPeptidesNonSelect.fasta",
  open = "w", nbchar = 60, as.string = TRUE)

```

## Executing Hammock Clustering

```

Sys.setenv(PATH = paste("/root/HMMER/binaries", Sys.getenv("PATH"), sep = ":"),
  HHLIB = "/home/rstudio/Hammock_v_1.1.1/hhsuite-2.0.16/lib/hh/")
unlink("/home/rstudio/data/HammockSelected", recursive = TRUE, force = FALSE)
sys.out <- system(paste("java -jar /home/rstudio/Hammock_v_1.1.1/dist/Hammock.jar cluster -i /home/rstudio/data/
  nrow(selected.peptides), " -t ", detectCores(), sep = ""), intern = TRUE,
  ignore.stdout = TRUE)
# Alternative parameters --use_clinkage --alignment_threshold 23 --max_shift
# 13 --max_aln_length 42 --count_threshold 50 --max_inner_gaps 0
# --assign_thresholds 14.1,10.5,7.0
hammock.log <- data.table(readLines("data/HammockSelected/run.log"))

colnames(hammock.log) <- c("Hammock log file")
knitr::kable(hammock.log, longtable = T)

```

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Hammock log file

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2020-11-10 16:16:18.979:

Hammock version 1.1.1 Run with `-help` for a brief description of command line parameters.

2020-11-10 16:16:19.123: Program started in mode “cluster”.

Command-line arguments:

cluster -i /home/rstudio/data/selectedPeptides.tsv -as /home/rstudio/data/trspSamplesPeptidesNonSelect.fasta -d  
 /home/rstudio/data/HammockSelected -use\_greedy -max\_shift 9 -assign\_thresholds 15,12,10 -max\_aln\_length 42  
 -c 27 -t 48

Complete list of input/output parameters:

-i, -input /home/rstudio/data/selectedPeptides.tsv  
 -d, -output\_directory /home/rstudio/data/HammockSelected  
 -t, -thread 48  
 -l, -labels null

2020-11-10 16:16:19.123:

Loading clusters...

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Hammock log file

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2020-11-10 16:16:19.130: Loading additional sequences...  
2020-11-10 16:16:19.198: Generating input statistics...  
2020-11-10 16:16:19.202: Minimal number of match states not set. Setting automatically to: 5  
2020-11-10 16:16:19.218: Overlap threshold not set. Setting automatically to:  
2020-11-10 16:16:19.221: 10.01,5.72,0.0,  
2020-11-10 16:16:19.221: Merge threshold not set. Setting automatically based on average sequence length to:  
2020-11-10 16:16:19.221: 14.3,12.87,11.44,

Complete list of HMM-based clustering parameters:

-a, -part\_threshold null  
-s, -size\_threshold null  
-c, -count\_threshold 27  
-n, -assign\_thresholds 15.0,12.0,10.0,  
-v, -overlap\_thresholds 10.01,5.72,0.0,  
-r, -merge\_thresholds 14.3,12.87,11.44,  
-e, -relative\_thresholds false  
-b, -absolute\_thresholds true  
-h, -min\_conserved\_positions 5  
-y, -max\_gap\_proportion 0.05  
-k, -min\_ic 1.2  
-j, -max\_aln\_length 42  
-u, -max\_inner\_gaps 0  
-q, -extension\_increase\_length false

2020-11-10 16:16:19.236:  
Clustering in 3 rounds...

2020-11-10 16:16:19.239:  
2020-11-10 16:16:19.239: Round 1:

2020-11-10 16:16:19.239: 27 clusters remaining  
2020-11-10 16:16:19.240: Building hmms and searching database...  
2020-11-10 16:16:19.644: Extending clusters...  
2020-11-10 16:16:19.648: 123 sequences to be inserted into clusters  
2020-11-10 16:16:19.649: 27 clusters to be extended  
2020-11-10 16:16:19.712: 4 sequences rejected  
2020-11-10 16:16:19.715: 1 cluster pairs to check and merge.  
2020-11-10 16:16:19.715: Merging clusters from 1 groups...  
2020-11-10 16:16:19.720: Building hhs...  
2020-11-10 16:16:19.733: HH clustering...  
2020-11-10 16:16:19.974:  
2020-11-10 16:16:19.974: Round 2:

2020-11-10 16:16:19.974: 27 clusters remaining  
2020-11-10 16:16:19.974: Building hmms and searching database...  
2020-11-10 16:16:20.256: Extending clusters...  
2020-11-10 16:16:20.261: 19 sequences to be inserted into clusters  
2020-11-10 16:16:20.262: 10 clusters to be extended  
2020-11-10 16:16:20.275: 1 sequences rejected  
2020-11-10 16:16:20.276: 27 cluster pairs to check and merge.  
2020-11-10 16:16:20.277: Merging clusters from 2 groups...  
2020-11-10 16:16:20.281: Building hhs...  
2020-11-10 16:16:20.300: HH clustering...  
2020-11-10 16:16:20.629:  
2020-11-10 16:16:20.629: Round 3:

2020-11-10 16:16:20.629: 27 clusters remaining

---

## Hammock log file

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2020-11-10 16:16:20.630: Building hmms and searching database...  
2020-11-10 16:16:20.871: Extending clusters...  
2020-11-10 16:16:20.874: 28 sequences to be inserted into clusters  
2020-11-10 16:16:20.874: 11 clusters to be extended  
2020-11-10 16:16:20.894: 7 sequences rejected  
2020-11-10 16:16:20.895: Overlap threshold is 0. Running full cluster merging.  
2020-11-10 16:16:20.899: Buiding hhs...  
2020-11-10 16:16:20.913: HH clustering...  
2020-11-10 16:16:21.267:  
Ready. Clustering time : 2030  
2020-11-10 16:16:21.267: Resulting clusers: 27  
2020-11-10 16:16:21.267: Containing 185 unique sequences and 613 total sequences.  
2020-11-10 16:16:21.273: Unique sequences not assigned: 5079, total sequences not assigned: 9761  
2020-11-10 16:16:21.273: Saving results to outupt files...  
2020-11-10 16:16:21.314: Results in: /home/rstudio/data/HammockSelected/final\_clusters\_sequences.tsv  
2020-11-10 16:16:21.315: and: /home/rstudio/data/HammockSelected/final\_clusters.tsv  
2020-11-10 16:16:21.315:  
Calculating KLD...  
2020-11-10 16:16:21.370: Final system KLD over match state MSA positions: 11.481803163199466  
2020-11-10 16:16:21.370: Final system KLD over all MSA positions: 19.98449350450404  
2020-11-10 16:16:21.371: Program successfully ended.

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## Generation of Weblogo visualization

```
ham.clusters <- data.table(read.table("/home/rstudio/data/HammockSelected/final_clusters.tsv",
  header = TRUE, skip = 0, sep = "\t", stringsAsFactors = FALSE, fill = TRUE))
id.order <- as.list(ham.clusters$cluster_id)
ham.clusters.all <- data.table(read.table("/home/rstudio/data/HammockSelected/final_clusters_sequences.tsv",
  header = TRUE, skip = 0, sep = "\t", stringsAsFactors = FALSE, fill = TRUE))
ham.clusters.all[, `:=`(alignment, gsub("\\-", "\\_", alignment))]
setkey(select.samples, Peptide)
setkey(select.samples.trsp, Peptide)
setkey(select.samples.pepMerge, Peptide)

unlink("/home/rstudio/data/WEBlogosSelected", recursive = TRUE, force = FALSE)
dir.create(file.path("/home/rstudio/data/", "WEBlogosSelected"), showWarnings = FALSE)
dir.create(file.path("/home/rstudio/data/HammockSelected/", "alignments_final_Scored"),
  showWarnings = FALSE)

setkey(ham.clusters.all, cluster_id)
setkey(ham.clusters, cluster_id)

opts_chunk$set(out.width = "100%", fig.align = "center")
generateWeblogo <- function(in.name) {
  # in.name <- ham.clusters$cluster_id[2] in.name <- 6777

  this.fa <- read.fasta(file = paste("/home/rstudio/data/HammockSelected/alignments_final/",
    in.name, ".aln", sep = ""))
  allSeqs <- unlist(getSequence(this.fa, as.string = TRUE))
  allSeqs <- data.table(unlist(lapply(allSeqs, function(x) gsub("([-])", "",
    toupper(x)))))
  allSeqs.out <- select.samples.pepMerge[J(allSeqs)]
  allSeqs.out$Annot <- data.table(getName(this.fa))
```

```

allSeqs.out[, `:=`(Annot, paste(Annot, "_", Score, sep = ""))]
allSeqs.out$Alignment <- data.table(toupper(unlist(getSequence(this.fa,
  as.string = TRUE))))
align.all <- strsplit(allSeqs.out$Alignment, "[A-Z]")
tail.length <- min(unlist(lapply(lapply(align.all, tail, n = 1L), nchar)))
head.length <- min(unlist(lapply(lapply(align.all, head, n = 1L), nchar)))
total.length <- max(nchar(allSeqs.out$Alignment))
allSeqs.out[, `:=`(Alignment, lapply(Alignment, function(x) substr(x, head.length +
  1, total.length - tail.length)))]
allSeqs.out <- allSeqs.out[rep(1:.N, Score)][, `:=`(Indx, 1:.N), by = Peptide]
allSeqs.out[, `:=`(Annot, paste(Annot, "_", Indx, sep = ""))]

write.fasta(as.list(allSeqs.out$Alignment), allSeqs.out$Annot, nbchar = 60,
  paste("/home/rstudio/data/HamcockSelected/alignments_final_Scored/",
    in.name, ".aln", sep = ""), open = "w")

this.main <- ham.clusters[J(in.name)]
main.gene <- select.samples[J(this.main$main_sequence)]$GeneName[1]
this.title <- paste("## Peptide ", this.main$main_sequence, " from ", main.gene,
  " used in serotype AAV-MNMO", in.name, sep = "")
tmp <- system(paste("weblog --format PDF --sequence-type protein --size large --stacks-per-line 48 --err",
  this.title, "' < /home/rstudio/data/HamcockSelected/alignments_final_Scored/",
  in.name, ".aln > /home/rstudio/data/WEBLogosSelected/", in.name, ".pdf",
  sep = ""), intern = TRUE, ignore.stdout = FALSE)

cat("\n")
cat(this.title, "\n")
cat("\n")
cat("\n")
cat(paste0("[Peptide: ", this.main$main_sequence, " from ", main.gene,
  " with cluster number ", in.name, "](/home/rstudio/data/WEBLogosSelected/",
  in.name, ".pdf)"))
cat("\n")
out.table <- knitr::kable(this.main[, c(1:9)], format = "latex")
print(column_spec(out.table, 1:9, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
  "scale_down", "repeat_header"))
cat("\n")
this.cluster <- ham.clusters.all[J(in.name)]
align.all <- strsplit(this.cluster$alignment, "[A-Z]")
tail.length <- min(unlist(lapply(lapply(align.all, tail, n = 1L), nchar)))
head.length <- min(unlist(lapply(lapply(align.all, head, n = 1L), nchar)))
total.length <- max(nchar(this.cluster$alignment))
this.cluster[, `:=`(alignment, lapply(alignment, function(x) substr(x, head.length +
  1, total.length - tail.length)))]

out.table <- knitr::kable(this.cluster[, c(1:7)], format = "latex")
print(column_spec(out.table, 1:7, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
  "scale_down", "repeat_header"))

this.found <- select.samples[J(this.cluster$sequence)]
setnames(this.cluster, "sequence", "Peptide")
this.found <- merge(this.found, this.cluster[, 2:3], by = "Peptide", all = FALSE)
cat("\n")
cat("\n")
output.order <- c("alignment", "LUTnrs", "GeneName", "start", "structure",
  "Group", "Score")
if (nrow(this.found) >= 48) {
  this.found.p1 <- this.found[1:47, ]

```

```

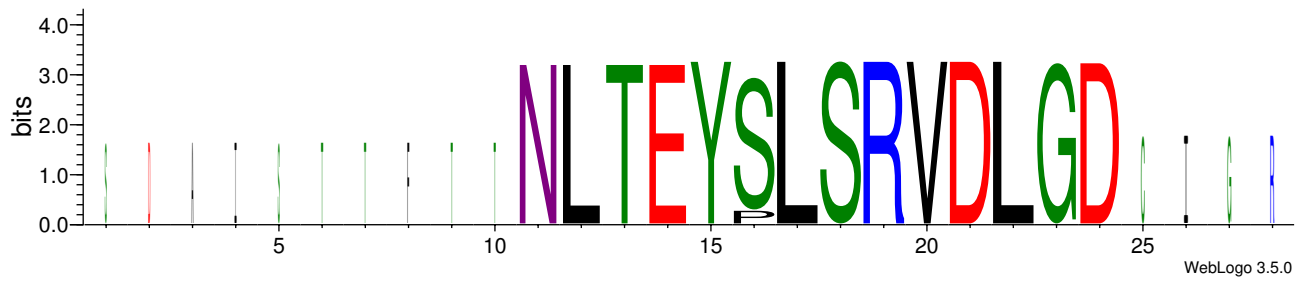
out.table <- knitr::kable(this.found.p1[, ..output.order], format = "latex")
print(column_spec(out.table, 1, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
  "scale_down", "repeat_header"))))
cat("\n")
cat("\n\n\\pagebreak\n")
cat("\n\n\\clearpage\n")
this.found <- this.found[48:nrow(this.found), ]
if (nrow(this.found) >= 48) {
  this.found.p2 <- this.found[1:47, ]
  out.table <- knitr::kable(this.found.p2[, ..output.order], format = "latex")
  print(column_spec(out.table, 1, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
    "scale_down", "repeat_header"))))
  cat("\n")
  cat("\n\n\\pagebreak\n")
  cat("\n\n\\clearpage\n")
  this.found <- this.found[48:nrow(this.found), ]
}
if (nrow(this.found) >= 48) {
  this.found.p2 <- this.found[1:47, ]
  out.table <- knitr::kable(this.found.p2[, ..output.order], format = "latex")
  print(column_spec(out.table, 1, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
    "scale_down", "repeat_header"))))
  cat("\n")
  cat("\n\n\\pagebreak\n")
  cat("\n\n\\clearpage\n")
  this.found <- this.found[48:nrow(this.found), ]
}
out.table <- knitr::kable(this.found[, ..output.order], format = "latex")
print(column_spec(out.table, 1, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
  "scale_down", "repeat_header"))))
cat("\n")
cat("\n\n\\clearpage\n")
cat("\n")
} else {
  out.table <- knitr::kable(this.found[, ..output.order], format = "latex")
  print(column_spec(out.table, 1, monospace = TRUE) %>% kable_styling(latex_options = c("striped",
    "scale_down", "repeat_header"))))
  cat("\n")
  cat("\n\n\\pagebreak\n")
  cat("\n\n\\clearpage\n")
}
}

id.order <- id.order[order(sapply(id.order, "[", 1))] #Comment out if you wish to have it sorted by total s
invisible(lapply(id.order, generateWeblogo))

```

# Peptide NLTEYSLSRVDLGD from HSV-1-pUL27 used in serotype AAV-MNM03

## Peptide NLTEYSLSRVDLGD from HSV-1-pUL27 used in serotype AAV-MNM03



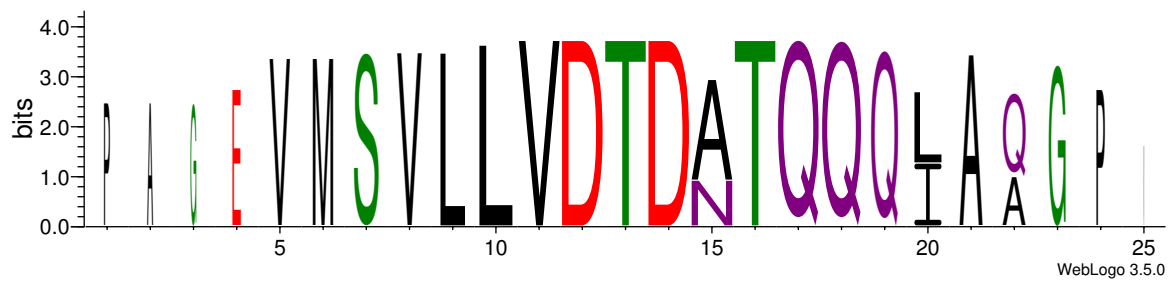
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
3	NLTEYSLSRVDLGD	21	3	5	5	4	1	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
3	NLTEYSLSRVDLGD	-----NLTEYSLSRVDLGD-----	17	3	4	4
3	YLSRVDLGDICGR	-----YLSRVDLGDICGR-----	2	0	1	1
3	SDAISTTFTTNLTEYPLSRVDL	SDAISTTFTTNLTEYPLSRVDL-----	1	0	0	0
3	NLTEYPLSRVDLGD	-----NLTEYPLSRVDLGD-----	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----NLTEYPLSRVDLGD-----	X1575	HSV-1-pUL27	398	14aa	mRNA_30cpc_Organoid_MD114	1
-----NLTEYPLSRVDLGD-----	X1575	HSV-2-pUL27	393	14aa	mRNA_30cpc_Organoid_MD114	1
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_30cpc_SN	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_30cpc_SN	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_3cpc_SN	1
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_3cpc_SN	1
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_30cpc_Th	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_30cpc_Th	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_3cpc_Th	3
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_3cpc_Th	3
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_30cpc_Ctx	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_30cpc_Ctx	4
-----NLTEYSLSRVDLGD-----	X1574	HSV-1-pUL27	398	14aa	mRNA_3cpc_Ctx	1
-----NLTEYSLSRVDLGD-----	X1574	HSV-2-pUL27	393	14aa	mRNA_3cpc_Ctx	1
SDAISTTFTTNLTEYPLSRVDL-----	X12537	HSV-1-pUL27	388	22aa	mRNA_30cpc_Organoid_MD114	1
SDAISTTFTTNLTEYPLSRVDL-----	X12537	HSV-2-pUL27	383	22aa	mRNA_30cpc_Organoid_MD114	1
-----YLSRVDLGDICGR-----	X90770	HSV-1-pUL27	402	14aaG4S	mRNA_30cpc_Th	1
-----YLSRVDLGDICGR-----	X90770	HSV-2-pUL27	397	14aaG4S	mRNA_30cpc_Th	1
-----YLSRVDLGDICGR-----	X90770	HSV-1-pUL27	402	14aaG4S	mRNA_30cpc_Ctx	1
-----YLSRVDLGDICGR-----	X90770	HSV-2-pUL27	397	14aaG4S	mRNA_30cpc_Ctx	1

## Peptide VMSVLLVDTDATQQ from HSV-1-pUL22 used in serotype AAV-MNM04

## Peptide VMSVLLVDTDATQQ from HSV-1-pUL22 used in serotype AAV-MNM04



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
4	VMSVLLVDTDATQQ	48	6	14	14	11	0	0

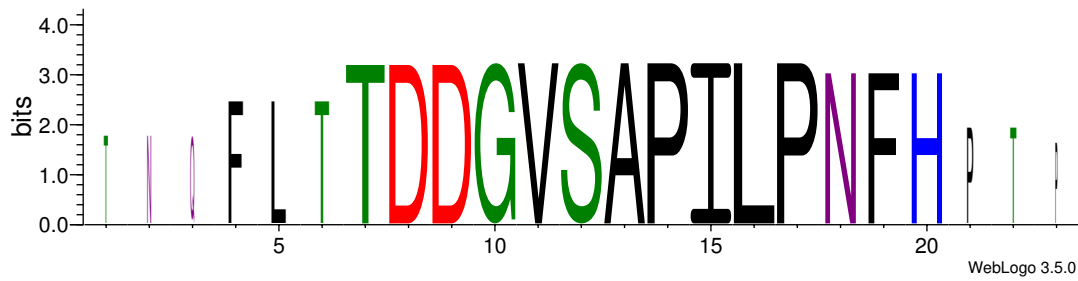
cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
4	VMSVLLVDTDATQQ	___VMSVLLVDTDATQQ_____	14	2	4	4
4	LVDTDATQQQLAQG	_____LVDTDATQQQLAQG__	8	1	2	2
4	VDTDATQQQLAQGP	_____VDTDATQQQLAQGP_	7	1	2	2
4	PAGEVMSVLLVDTDNTQQQIAA	PAGEVMSVLLVDTDNTQQQIAA__	6	1	2	2
4	SVLLVDTDNTQQQI	_____SVLLVDTDNTQQQI_____	5	0	2	2
4	VDTDNTQQQIAAGP	_____VDTDNTQQQIAAGP_	2	0	1	0
4	LVDTDNTQQQIAAG	_____LVDTDNTQQQIAAG__	2	1	0	1
4	EVMSVLLVDTDATQ	___EVMSVLLVDTDATQ_____	2	0	0	1
4	PAGEVMSVLLVDTDATQQQLAQ	PAGEVMSVLLVDTDATQQQLAQ__	1	0	1	0
4	EVMSVLLVDTDATQQQLAQGPV	___EVMSVLLVDTDATQQQLAQGPV	1	0	0	0



alignment	LUThrs	GeneName	start	structure	Group	Score
___EVMSVLLVDTDATQ_____	X86719	HSV-1-pUL22	742	14aaG4S	mRNA_30cpc_Th	1
___EVMSVLLVDTDATQ_____	X86719	HSV-2-pUL22	742	14aaG4S	mRNA_30cpc_Th	1
___EVMSVLLVDTDATQ_____	X86719	HSV-1-pUL22	742	14aaG4S	mRNA_30cpc_SN_4wks	1
___EVMSVLLVDTDATQ_____	X86719	HSV-2-pUL22	742	14aaG4S	mRNA_30cpc_SN_4wks	1
___EVMSVLLVDTDATQQQLAQGPV	X39265	HSV-2-pUL22	742	22aa	mRNA_30cpc_Th_4wks	1
_____LVDTDATQQQLAQG__	X53822	HSV-2-pUL22	748	14aaA5	mRNA_30cpc_SN	2
_____LVDTDATQQQLAQG__	X53822	HSV-2-pUL22	748	14aaA5	mRNA_30cpc_Th	2
_____LVDTDATQQQLAQG__	X53822	HSV-2-pUL22	748	14aaA5	mRNA_3cpc_Th	1
_____LVDTDATQQQLAQG__	X53822	HSV-2-pUL22	748	14aaA5	mRNA_30cpc_Ctx	2
_____LVDTDATQQQLAQG__	X53822	HSV-2-pUL22	748	14aaA5	mRNA_30cpc_SN_4wks	1
_____LVDTDNTQQQIAAG__	X32960	HSV-1-pUL22	748	14aa	mRNA_30cpc_Th	1
_____LVDTDNTQQQIAAG__	X32960	HSV-1-pUL22	748	14aa	mRNA_3cpc_Th	1
PAGEVMSVLLVDTDATQQQLAQ__	X23669	HSV-2-pUL22	739	22aa	mRNA_30cpc_Ctx	1
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-1-pUL22	739	22aa	mRNA_30cpc_SN	1
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-2-pUL22	739	22aa	mRNA_30cpc_SN	1
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-1-pUL22	739	22aa	mRNA_30cpc_Th	2
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-2-pUL22	739	22aa	mRNA_30cpc_Th	2
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-1-pUL22	739	22aa	mRNA_3cpc_Th	1
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-2-pUL22	739	22aa	mRNA_3cpc_Th	1
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-1-pUL22	739	22aa	mRNA_30cpc_Ctx	2
PAGEVMSVLLVDTDNTQQQIAA__	X23667	HSV-2-pUL22	739	22aa	mRNA_30cpc_Ctx	2
_____SVLLVDTDNTQQQI_____	X13577	HSV-1-pUL22	745	14aa	mRNA_30cpc_SN	1
_____SVLLVDTDNTQQQI_____	X13577	HSV-2-pUL22	745	14aa	mRNA_30cpc_SN	1
_____SVLLVDTDNTQQQI_____	X13577	HSV-1-pUL22	745	14aa	mRNA_30cpc_Th	2
_____SVLLVDTDNTQQQI_____	X13577	HSV-2-pUL22	745	14aa	mRNA_30cpc_Th	2
_____SVLLVDTDNTQQQI_____	X13577	HSV-1-pUL22	745	14aa	mRNA_30cpc_Ctx	2
_____SVLLVDTDNTQQQI_____	X13577	HSV-2-pUL22	745	14aa	mRNA_30cpc_Ctx	2
_____VDTDATQQQLAQGP_____	X68061	HSV-2-pUL22	749	14aa	mRNA_30cpc_SN	2
_____VDTDATQQQLAQGP_____	X68061	HSV-2-pUL22	749	14aa	mRNA_30cpc_Th	2
_____VDTDATQQQLAQGP_____	X68061	HSV-2-pUL22	749	14aa	mRNA_3cpc_Th	1
_____VDTDATQQQLAQGP_____	X68061	HSV-2-pUL22	749	14aa	mRNA_30cpc_Ctx	2
_____VDTDNTQQQIAAGP_____	X68060	HSV-1-pUL22	749	14aa	mRNA_30cpc_SN	1
_____VDTDNTQQQIAAGP_____	X68060	HSV-1-pUL22	749	14aa	mRNA_30cpc_Ctx	1
___VMSVLLVDTDATQQ_____	X66790	HSV-1-pUL22	743	14aa	mRNA_30cpc_SN	4
___VMSVLLVDTDATQQ_____	X66790	HSV-2-pUL22	743	14aa	mRNA_30cpc_SN	4
___VMSVLLVDTDATQQ_____	X66790	HSV-1-pUL22	743	14aa	mRNA_30cpc_Th	4
___VMSVLLVDTDATQQ_____	X66790	HSV-2-pUL22	743	14aa	mRNA_30cpc_Th	4
___VMSVLLVDTDATQQ_____	X66790	HSV-1-pUL22	743	14aa	mRNA_3cpc_Th	2
___VMSVLLVDTDATQQ_____	X66790	HSV-2-pUL22	743	14aa	mRNA_3cpc_Th	2
___VMSVLLVDTDATQQ_____	X66790	HSV-1-pUL22	743	14aa	mRNA_30cpc_Ctx	4
___VMSVLLVDTDATQQ_____	X66790	HSV-2-pUL22	743	14aa	mRNA_30cpc_Ctx	4

## Peptide TDDGVSAPILPNFH from EV71-VP3 used in serotype AAV-MNM05

## Peptide TDDGVSAPILPNFH from EV71-VP3 used in serotype AAV-MNM05



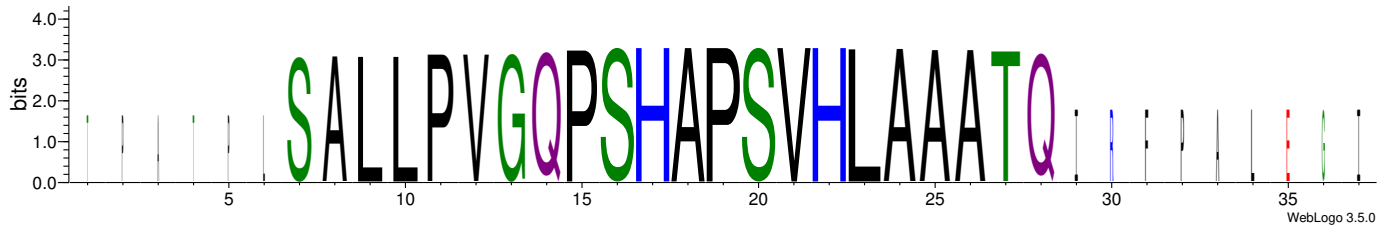
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5	TDDGVSAPILPNFH	20	4	5	6	2	0	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
5	TDDGVSAPILPNFH	_____TDDGVSAPILPNFH___	12	1	3	4
5	FLTTDDGVSAPILP	___FLTTDDGVSAPILP_____	5	3	1	0
5	TNQFLTTDDGVSAPILPNFHPT	TNQFLTTDDGVSAPILPNFHPT_	2	0	1	1
5	GVSAPILPNFHPTP	_____GVSAPILPNFHPTP	1	0	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___FLTTDDGVSAPILP_____	X75357	EV71-VP3	13	14aa	mRNA_3cpc_Th	3
___FLTTDDGVSAPILP_____	X75357	EV71-VP3	13	14aa	mRNA_30cpc_Ctx	1
___FLTTDDGVSAPILP_____	X75357	EV71-VP3	13	14aa	mRNA_3cpc_SN_4wks	1
_____GVSAPILPNFHPTP	X64798	EV71-VP3	19	14aa	mRNA_30cpc_Th	1
_____TDDGVSAPILPNFH___	X47355	EV71-VP3	16	14aaA5	mRNA_30cpc_SN	2
_____TDDGVSAPILPNFH___	X8142	EV71-VP3	16	14aa	mRNA_30cpc_Th	1
_____TDDGVSAPILPNFH___	X47355	EV71-VP3	16	14aaA5	mRNA_30cpc_Th	3
_____TDDGVSAPILPNFH___	X47355	EV71-VP3	16	14aaA5	mRNA_3cpc_Th	1
_____TDDGVSAPILPNFH___	X47355	EV71-VP3	16	14aaA5	mRNA_30cpc_Ctx	3
_____TDDGVSAPILPNFH___	X47355	EV71-VP3	16	14aaA5	mRNA_30cpc_Organoid_MD114	2
TNQFLTTDDGVSAPILPNFHPT_	X5571	EV71-VP3	10	22aa	mRNA_30cpc_Th	1
TNQFLTTDDGVSAPILPNFHPT_	X5571	EV71-VP3	10	22aa	mRNA_30cpc_Ctx	1

# Peptide SALLPVGQPSHAPSVHLAAATQ from HSV-1-pUL37 used in serotype AAV-MNM06

## Peptide SALLPVGQPSHAPSVHLAAATQ from HSV-1-pUL37 used in serotype AAV-MNM06



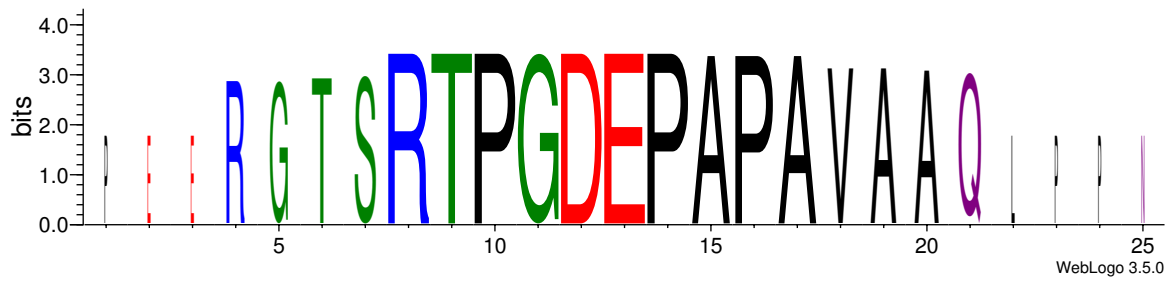
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6	SALLPVGQPSHAPSVHLAAATQ	22	4	4	3	2	3	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
6	SALLPVGQPSHAPSVHLAAATQ	-----SALLPVGQPSHAPSVHLAAATQ-----	15	4	2	2
6	SHAPSVHLAAATQIRFPALEGI	-----SHAPSVHLAAATQIRFPALEGI	2	0	1	1
6	TPATPLSALLPVGQPSHAPSVH	TPATPLSALLPVGQPSHAPSVH-----	1	0	1	0
6	QPSHAPSVHLAAAT	-----QPSHAPSVHLAAAT	1	0	0	0
6	PVGQPSHAPSVHLA	-----PVGQPSHAPSVHLA	1	0	0	0
6	PSHAPSVHLAAATQ	-----PSHAPSVHLAAATQ	1	0	0	0
6	GQPSHAPSVHLAAA	-----GQPSHAPSVHLAAA	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----GQPSHAPSVHLAAA-----	X88609	HSV-1-pUL37	586	14aaG4S	mRNA_30cpc_SN_4wks	1
-----PSHAPSVHLAAATQ-----	X21171	HSV-1-pUL37	588	14aa	mRNA_30cpc_Organoid_MD114	1
-----PVGQPSHAPSVHLA-----	X24308	HSV-1-pUL37	584	14aa	mRNA_30cpc_Organoid_MD114	1
-----QPSHAPSVHLAAAT-----	X19194	HSV-1-pUL37	587	14aa	mRNA_3cpc_Th_4wks	1
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_30cpc_SN	2
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_3cpc_SN	2
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_30cpc_Th	2
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_3cpc_Th	4
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_30cpc_Ctx	2
-----SALLPVGQPSHAPSVHLAAATQ-----	X12949	HSV-1-pUL37	580	22aa	mRNA_3cpc_Ctx	3
-----SHAPSVHLAAATQIRFPALEGI	X11302	HSV-1-pUL37	589	22aa	mRNA_30cpc_Th	1
-----SHAPSVHLAAATQIRFPALEGI	X11302	HSV-1-pUL37	589	22aa	mRNA_30cpc_Ctx	1
TPATPLSALLPVGQPSHAPSVH-----	X7369	HSV-1-pUL37	574	22aa	mRNA_30cpc_Ctx	1

## Peptide RTPGDEPAPAVAAQ from BV-G used in serotype AAV-MNM07

## Peptide RTPGDEPAPAVAAQ from BV-G used in serotype AAV-MNM07



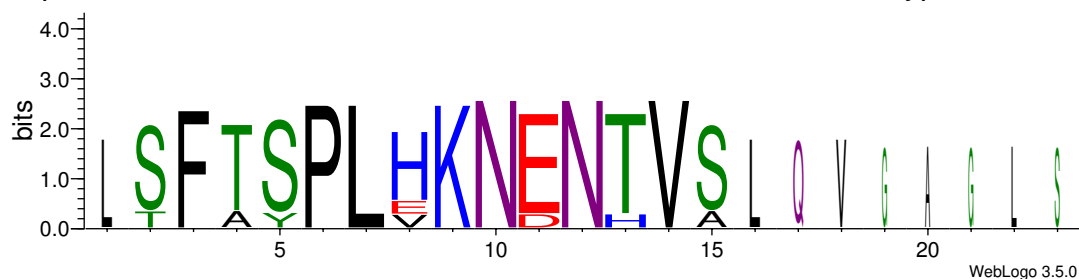
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7	RTPGDEPAPAVAAQ	27	12	5	3	2	2	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
7	RTPGDEPAPAVAAQ	_____RTPGDEPAPAVAAQ_____	13	7	1	1
7	RGTSRTPGDEPAPA	___RGTSRTPGDEPAPA_____	8	5	1	1
7	RGTSRTPGDEPAPAVAAQLPPN	___RGTSRTPGDEPAPAVAAQLPPN	2	0	1	1
7	PEERGTSRTPGDEP	PEERGTSRTPGDEP_____	2	0	1	0
7	TSRTPGDEPAPAVA	_____TSRTPGDEPAPAVA_____	1	0	1	0
7	SRTPGDEPAPAVAA	_____SRTPGDEPAPAVAA_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
PEERGTSRTPGDEP_____	X23187	BV-G	295	14aa	mRNA_30cpc_SN	1
PEERGTSRTPGDEP_____	X23187	BV-G	295	14aa	mRNA_30cpc_Ctx	1
___RGTSRTPGDEPAPA_____	X83630	BV-G	298	14aaG4S	mRNA_30cpc_Th	1
___RGTSRTPGDEPAPA_____	X27393	BV-G	298	14aa	mRNA_3cpc_Th	1
___RGTSRTPGDEPAPA_____	X83630	BV-G	298	14aaG4S	mRNA_3cpc_Th	4
___RGTSRTPGDEPAPA_____	X83630	BV-G	298	14aaG4S	mRNA_30cpc_Ctx	1
___RGTSRTPGDEPAPA_____	X83630	BV-G	298	14aaG4S	mRNA_3cpc_Ctx	1
___RGTSRTPGDEPAPAVAAQLPPN	X27394	BV-G	298	22aa	mRNA_30cpc_Th	1
___RGTSRTPGDEPAPAVAAQLPPN	X27394	BV-G	298	22aa	mRNA_30cpc_Ctx	1
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_30cpc_SN	1
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_3cpc_SN	2
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_30cpc_Th	1
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_3cpc_Th	6
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_30cpc_Ctx	1
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_3cpc_Ctx	1
_____RTPGDEPAPAVAAQ_____	X25013	BV-G	302	14aa	mRNA_3cpc_Th_4wks	1
_____SRTPGDEPAPAVAA_____	X79635	BV-G	301	14aaG4S	mRNA_3cpc_Th_4wks	1
_____TSRTPGDEPAPAVA_____	X6345	BV-G	300	14aa	mRNA_30cpc_Ctx	1

## Peptide SFTSPLHKNENTVS from CAV-2-F-SH01 used in serotype AAV-MNM08

## Peptide SFTSPLHKNENTVS from CAV-2-F-SH01 used in serotype AAV-MNM



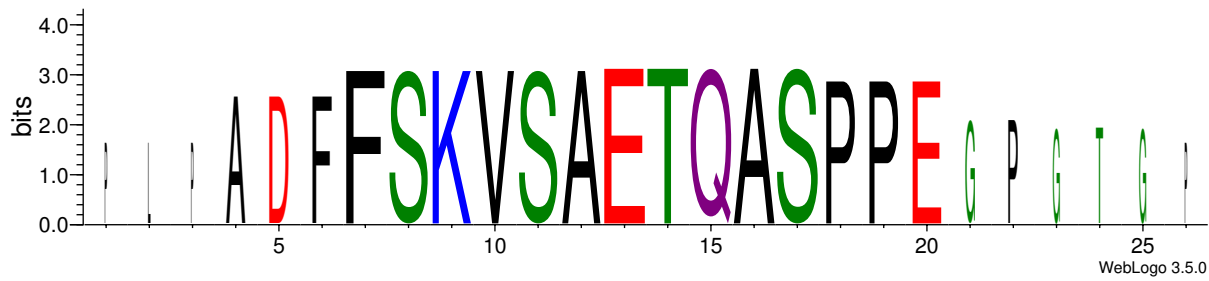
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
8	SFTSPLHKNENTVS	8	1	0	1	2	0	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
8	SFTSPLHKNENTVS	_SFTSPLHKNENTVS_	3	1	0	0
8	LSFTSPLHKNENTV	LSFTSPLHKNENTV_	2	0	0	1
8	TFAYPLVKNDNHVA	_TFAYPLVKNDNHVA_	1	0	0	0
8	SPLEKNENTVSLQV	____SPLEKNENTVSLQV____	1	0	0	0
8	NENTVSLQVGAGLS	____NENTVSLQVGAGLS	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
LSFTSPLHKNENTV_	X29479	CAV-2-F-SH01	100	14aa	mRNA_30cpc_SN	1
LSFTSPLHKNENTV_	X29479	CAV-2-F-Toronto-A26-61	100	14aa	mRNA_30cpc_SN	1
LSFTSPLHKNENTV_	X29479	CAV-2-F-SH01	100	14aa	mRNA_30cpc_Th	1
LSFTSPLHKNENTV_	X29479	CAV-2-F-Toronto-A26-61	100	14aa	mRNA_30cpc_Th	1
____NENTVSLQVGAGLS	X1903	CAV-2-F-SH01	253	14aa	mRNA_30cpc_Organoid_MD114	1
____NENTVSLQVGAGLS	X1903	CAV-2-F-Toronto-A26-61	253	14aa	mRNA_30cpc_Organoid_MD114	1
_SFTSPLHKNENTVS_	X14027	CAV-2-F-SH01	101	14aa	mRNA_3cpc_SN	2
_SFTSPLHKNENTVS_	X14027	CAV-2-F-Toronto-A26-61	101	14aa	mRNA_3cpc_SN	2
_SFTSPLHKNENTVS_	X14027	CAV-2-F-SH01	101	14aa	mRNA_3cpc_Th	1
_SFTSPLHKNENTVS_	X14027	CAV-2-F-Toronto-A26-61	101	14aa	mRNA_3cpc_Th	1
____SPLEKNENTVSLQV____	X11647	CAV-2-F-SH01	248	14aa	mRNA_30cpc_Organoid_MD114	1
____SPLEKNENTVSLQV____	X11647	CAV-2-F-Toronto-A26-61	248	14aa	mRNA_30cpc_Organoid_MD114	1
_TFAYPLVKNDNHVA_	X9750	CAV-2-F-SH01	281	14aa	mRNA_30cpc_SN	1
_TFAYPLVKNDNHVA_	X9750	CAV-2-F-Toronto-A26-61	281	14aa	mRNA_30cpc_SN	1

## Peptide FSKVSAETQASPPE from Tau used in serotype AAV-MNM09

## Peptide FSKVSAETQASPPE from Tau used in serotype AAV-MNM09



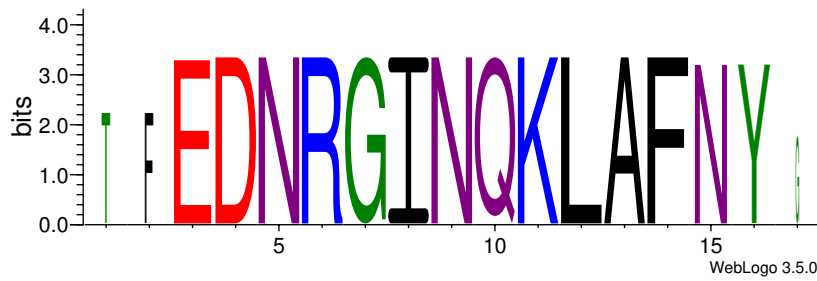
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9	FSKVSAETQASPPE	17	4	2	5	2	1	1

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
9	FSKVSAETQASPPE	_____FSKVSAETQASPPE_____	8	3	0	2
9	ADFFSKVSAETQAS	___ADFFSKVSAETQAS_____	5	1	2	1
9	ADFFSKVSAETQASPPEGPGTG	___ADFFSKVSAETQASPPEGPGTG_	2	0	0	1
9	PLPADFFSKVSAETQASPPEGP	PLPADFFSKVSAETQASPPEGP_	1	0	0	0
9	ETQASPPEGPGTGP	_____ETQASPPEGPGTGP	1	0	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___ADFFSKVSAETQAS_____	X43096	Tau	265	14aa	mRNA_30cpc_SN	1
___ADFFSKVSAETQAS_____	X43096	Tau	265	14aa	mRNA_30cpc_Th	1
___ADFFSKVSAETQAS_____	X43096	Tau	265	14aa	mRNA_3cpc_Th	1
___ADFFSKVSAETQAS_____	X43096	Tau	265	14aa	mRNA_30cpc_Ctx	2
___ADFFSKVSAETQASPPEGPGTG_	X43095	Tau	265	22aa	mRNA_30cpc_Th	1
___ADFFSKVSAETQASPPEGPGTG_	X43095	Tau	265	22aa	mRNA_30cpc_Th_4wks	1
_____ETQASPPEGPGTGP	X54884	Tau	274	14aaA5	mRNA_30cpc_Th	1
_____FSKVSAETQASPPE_____	X74747	Tau	268	14aa	mRNA_30cpc_SN	1
_____FSKVSAETQASPPE_____	X74747	Tau	268	14aa	mRNA_3cpc_SN	1
_____FSKVSAETQASPPE_____	X74747	Tau	268	14aa	mRNA_30cpc_Th	2
_____FSKVSAETQASPPE_____	X74747	Tau	268	14aa	mRNA_3cpc_Th	3
_____FSKVSAETQASPPE_____	X74747	Tau	268	14aa	mRNA_3cpc_Ctx	1
PLPADFFSKVSAETQASPPEGP_	X22668	Tau	262	22aa	mRNA_30cpc_Organoid_MD114	1

## Peptide EDNRGINQKLAIFY from BoNT-E-Hc used in serotype AAV-MNM010

EDNRGINQKLAIFY from BoNT-E-Hc used in serotype AA'



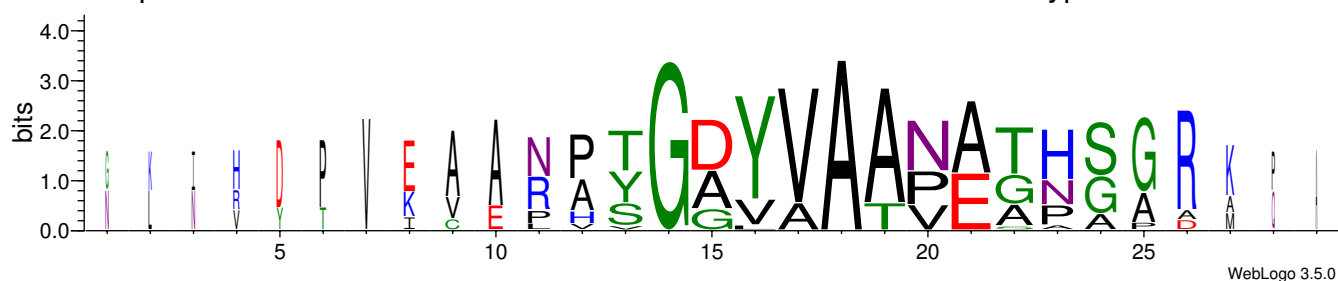
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10	EDNRGINQKLAIFY	24	7	3	3	3	5	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
10	EDNRGINQKLAIFY	__EDNRGINQKLAIFY_	17	4	3	3
10	TFEDNRGINQKLAF	TFEDNRGINQKLAF___	5	2	0	0
10	DNRGINQKLAIFYG	___DNRGINQKLAIFYG	2	1	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___DNRGINQKLAIFYG	X33773	BoNT-E-Hc	185	14aa	mRNA_3cpc_Th	1
___DNRGINQKLAIFYG	X33773	BoNT-E-Hc	185	14aa	mRNA_3cpc_Ctx	1
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_30cpc_SN	3
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_3cpc_SN	2
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_30cpc_Th	3
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_3cpc_Th	4
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_30cpc_Ctx	3
__EDNRGINQKLAIFY_	X38325	BoNT-E-Hc	184	14aa	mRNA_3cpc_Ctx	2
TFEDNRGINQKLAF___	X9739	BoNT-E-Hc	182	14aa	mRNA_3cpc_SN	1
TFEDNRGINQKLAF___	X9739	BoNT-E-Hc	182	14aa	mRNA_3cpc_Th	2
TFEDNRGINQKLAF___	X9739	BoNT-E-Hc	182	14aa	mRNA_3cpc_Ctx	2

# Peptide TGDYVAANETHSGR from TBEV-E-4387-B7 used in serotype AAV-MNM011

## Peptide TGDYVAANETHSGR from TBEV-E-4387-B7 used in serotype AAV-MNM011



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
11	TGDYVAANETHSGR	26	5	5	4	2	3	5

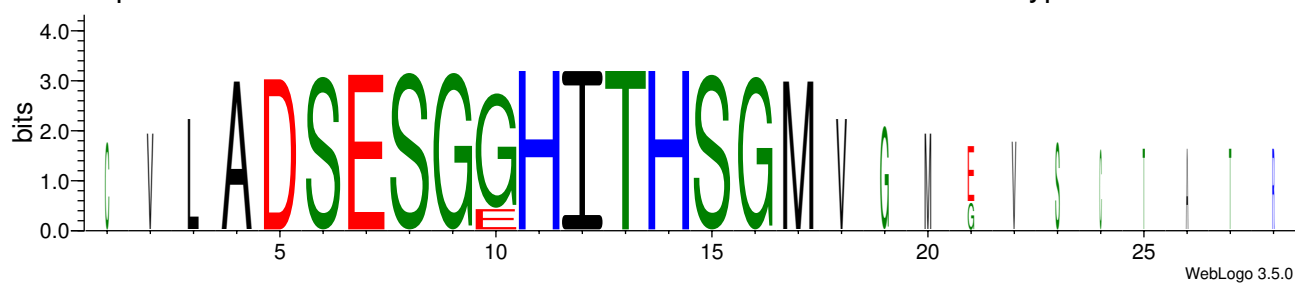
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11	TGDYVAANETHSGR	-----TGDYVAANETHSGR----	7	3	0	0
11	RASGGVAATVAANG	-----RASGGVAATVAANG-----	5	0	2	1
11	GDYVAANETHSGRK	-----GDYVAANETHSGRK----	3	0	1	1
11	HDPVEAANPYGAYVAAPAGPGA	---HDPVEAANPYGAYVAAPAGPGA---	2	0	1	1
11	AANPYGAYVAAPAG	-----AANPYGAYVAAPAG-----	2	1	0	0
11	VKVEPHTGDYVAAN	-----VKVEPHTGDYVAAN-----	1	0	0	1
11	PYGAYVAAPAGPAA	-----PYGAYVAAPAGPAA-----	1	0	1	0
11	NKIVYTVKVEPHTGDYVAANET	NKIVYTVKVEPHTGDYVAANET-----	1	1	0	0
11	ICALVVGALVA AVASAAPAAPA	-----ICALVVGALVA AVASAAPAAPA	1	0	0	0
11	GLNRDPVEAANPYGAYVAAPAG	GLNRDPVEAANPYGAYVAAPAG-----	1	0	0	0
11	EAANPYGAYVAAPA	-----EAANPYGAYVAAPA-----	1	0	0	0
11	AYVAAPAGPAADMQ	-----AYVAAPAGPAADMQ-----	1	0	0	0



alignment	LUThrs	GeneName	start	structure	Group	Score
_____AANPYGAYVAAPAG_____	X43370	HSV-1-pUL19	483	14aa	mRNA_3cpc_Th	1
_____AANPYGAYVAAPAG_____	X43370	HSV-2-pUL19	483	14aa	mRNA_3cpc_Th	1
_____AANPYGAYVAAPAG_____	X43370	HSV-1-pUL19	483	14aa	mRNA_3cpc_Th_4wks	1
_____AANPYGAYVAAPAG_____	X43370	HSV-2-pUL19	483	14aa	mRNA_3cpc_Th_4wks	1
_____AYVAAPAGPAADMQ_____	X44864	HSV-1-pUL19	489	14aa	mRNA_30cpc_Organoid_MD114	1
_____AYVAAPAGPAADMQ_____	X44864	HSV-2-pUL19	489	14aa	mRNA_30cpc_Organoid_MD114	1
_____EAANPYGAYVAAPA_____	X38905	HSV-1-pUL19	482	14aa	mRNA_30cpc_Th_4wks	1
_____EAANPYGAYVAAPA_____	X38905	HSV-2-pUL19	482	14aa	mRNA_30cpc_Th_4wks	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-4387-B7	148	14aaG4S	mRNA_30cpc_Th	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-80	148	14aaG4S	mRNA_30cpc_Th	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-Simo-9	104	14aaG4S	mRNA_30cpc_Th	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-4387-B7	148	14aaG4S	mRNA_30cpc_Ctx	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-80	148	14aaG4S	mRNA_30cpc_Ctx	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-Simo-9	104	14aaG4S	mRNA_30cpc_Ctx	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-4387-B7	148	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-80	148	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____GDYVAANETHSGRK_____	X88953	TBEV-E-Simo-9	104	14aaG4S	mRNA_30cpc_Organoid_MD114	1
GLNRDPVEAANPYGAYVAAPAG_____	X63079	HSV-1-pUL19	475	22aa	mRNA_30cpc_Organoid_MD114	1
GLNRDPVEAANPYGAYVAAPAG_____	X63079	HSV-2-pUL19	475	22aa	mRNA_30cpc_Organoid_MD114	1
____HDPVEAANPYGAYVAAPAGPGA_____	X17858	HSV-1-pUL19	478	22aa	mRNA_30cpc_Th	1
____HDPVEAANPYGAYVAAPAGPGA_____	X17858	HSV-2-pUL19	478	22aa	mRNA_30cpc_Th	1
____HDPVEAANPYGAYVAAPAGPGA_____	X17858	HSV-1-pUL19	478	22aa	mRNA_30cpc_Ctx	1
____HDPVEAANPYGAYVAAPAGPGA_____	X17858	HSV-2-pUL19	478	22aa	mRNA_30cpc_Ctx	1
_____ICALVVGALVAAVASAAPAAPA_____	X16834	HSV-2-pUL27	7	22aa	mRNA_30cpc_Organoid_MD114	1
NKIVYTVKVEPHTGDYVAANET_____	X299	TBEV-E-4387-B7	135	22aa	mRNA_3cpc_Th	1
NKIVYTVKVEPHTGDYVAANET_____	X299	TBEV-E-80	135	22aa	mRNA_3cpc_Th	1
NKIVYTVKVEPHTGDYVAANET_____	X299	TBEV-E-Simo-9	91	22aa	mRNA_3cpc_Th	1
_____PYGAYVAAPAGPAA_____	X24438	HSV-1-pUL19	486	14aa	mRNA_30cpc_Ctx	1
_____PYGAYVAAPAGPAA_____	X24438	HSV-2-pUL19	486	14aa	mRNA_30cpc_Ctx	1
_____RASGGVAATVAANG_____	X27064	HSV-2-pUL27	31	14aa	mRNA_30cpc_SN	2
_____RASGGVAATVAANG_____	X27064	HSV-2-pUL27	31	14aa	mRNA_30cpc_Th	1
_____RASGGVAATVAANG_____	X27064	HSV-2-pUL27	31	14aa	mRNA_30cpc_Ctx	2
_____TGDYVAANETHSGR_____	X8898	TBEV-E-4387-B7	147	14aa	mRNA_3cpc_Th	3
_____TGDYVAANETHSGR_____	X8898	TBEV-E-80	147	14aa	mRNA_3cpc_Th	3
_____TGDYVAANETHSGR_____	X8898	TBEV-E-Simo-9	103	14aa	mRNA_3cpc_Th	3
_____TGDYVAANETHSGR_____	X8898	TBEV-E-4387-B7	147	14aa	mRNA_3cpc_Ctx	3
_____TGDYVAANETHSGR_____	X8898	TBEV-E-80	147	14aa	mRNA_3cpc_Ctx	3
_____TGDYVAANETHSGR_____	X8898	TBEV-E-Simo-9	103	14aa	mRNA_3cpc_Ctx	3
_____TGDYVAANETHSGR_____	X47562	TBEV-E-4387-B7	147	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____TGDYVAANETHSGR_____	X47562	TBEV-E-80	147	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____TGDYVAANETHSGR_____	X47562	TBEV-E-Simo-9	103	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____VKVEPHTGDYVAAN_____	X65915	TBEV-E-4387-B7	141	14aa	mRNA_30cpc_Th	1
_____VKVEPHTGDYVAAN_____	X65915	TBEV-E-80	141	14aa	mRNA_30cpc_Th	1
_____VKVEPHTGDYVAAN_____	X65915	TBEV-E-Simo-9	97	14aa	mRNA_30cpc_Th	1

## Peptide ADSESGGHITHSGM from MV-H-Edmonston used in serotype AAV-MNM012

## Peptide ADSESGGHITHSGM from MV-H-Edmonston used in serotype AAV-MNM012



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
12	ADSESGGHITHSGM	19	5	4	1	4	3	1

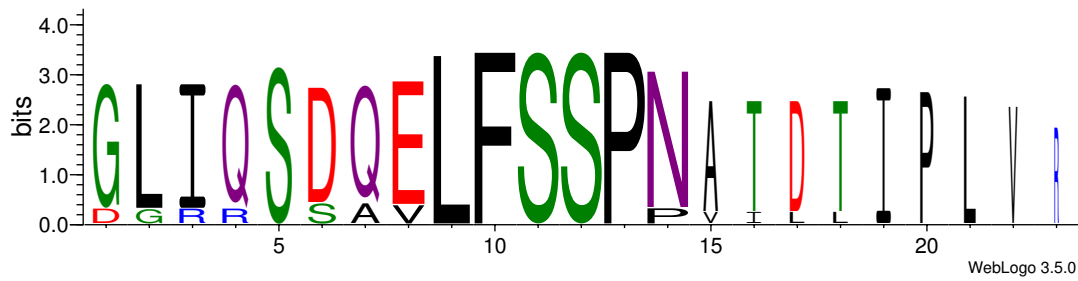
cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
12	ADSESGGHITHSGM	___ADSESGGHITHSGM_____	9	4	2	0
12	LADSESGGHITHSG	__LADSESGGHITHSG_____	2	0	1	0
12	CVLADSESGGHITH	CVLADSESGGHITH_____	2	0	1	0
12	VLADSESGGHITHS	_VLADSESGGHITHS_____	1	1	0	0
12	SGEHITHSGMVGME	____SGEHITHSGMVGME_____	1	0	0	0
12	SESGGHITHSGMVG	____SESGGHITHSGMVG_____	1	0	0	0
12	ESGGHITHSGMVGMGVSCATR	____ESGGHITHSGMVGMGVSCATR	1	0	0	0
12	EHITHSGMVGMEVS	____EHITHSGMVGMEVS_____	1	0	0	0
12	DSESGEHITHSGMV	____DSESGEHITHSGMV_____	1	0	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___ADSESGGHITHSGM_____	X42886	MV-H-Edmonston	586	14aa	mRNA_3cpc_Th	1
___ADSESGGHITHSGM_____	X56376	MV-H-Edmonston	586	14aaA5	mRNA_3cpc_Th	3
___ADSESGGHITHSGM_____	X42886	MV-H-Halle	586	14aa	mRNA_3cpc_Th	1
___ADSESGGHITHSGM_____	X56376	MV-H-Halle	586	14aaA5	mRNA_3cpc_Th	3
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Illinois.USA-50.99	586	14aa	mRNA_3cpc_Th	1
___ADSESGGHITHSGM_____	X56376	MV-H-MVi-Illinois.USA-50.99	586	14aaA5	mRNA_3cpc_Th	3
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Texas.USA-28.99	586	14aa	mRNA_3cpc_Th	1
___ADSESGGHITHSGM_____	X56376	MV-H-MVi-Texas.USA-28.99	586	14aaA5	mRNA_3cpc_Th	3
___ADSESGGHITHSGM_____	X42886	MV-H-Edmonston	586	14aa	mRNA_30cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-Halle	586	14aa	mRNA_30cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Illinois.USA-50.99	586	14aa	mRNA_30cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Texas.USA-28.99	586	14aa	mRNA_30cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-Edmonston	586	14aa	mRNA_3cpc_Ctx	1
___ADSESGGHITHSGM_____	X56376	MV-H-Edmonston	586	14aaA5	mRNA_3cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-Halle	586	14aa	mRNA_3cpc_Ctx	1
___ADSESGGHITHSGM_____	X56376	MV-H-Halle	586	14aaA5	mRNA_3cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Illinois.USA-50.99	586	14aa	mRNA_3cpc_Ctx	1
___ADSESGGHITHSGM_____	X56376	MV-H-MVi-Illinois.USA-50.99	586	14aaA5	mRNA_3cpc_Ctx	2
___ADSESGGHITHSGM_____	X42886	MV-H-MVi-Texas.USA-28.99	586	14aa	mRNA_3cpc_Ctx	1
___ADSESGGHITHSGM_____	X56376	MV-H-MVi-Texas.USA-28.99	586	14aaA5	mRNA_3cpc_Ctx	2
CVLADSESGGHITH_____	X60184	MV-H-CAM-70	583	14aaA5	mRNA_30cpc_SN	1
CVLADSESGGHITH_____	X60184	MV-H-Edmonston	583	14aaA5	mRNA_30cpc_SN	1
CVLADSESGGHITH_____	X60184	MV-H-Halle	583	14aaA5	mRNA_30cpc_SN	1
CVLADSESGGHITH_____	X60184	MV-H-MVi-Illinois.USA-50.99	583	14aaA5	mRNA_30cpc_SN	1
CVLADSESGGHITH_____	X60184	MV-H-MVi-Texas.USA-28.99	583	14aaA5	mRNA_30cpc_SN	1
CVLADSESGGHITH_____	X60184	MV-H-CAM-70	583	14aaA5	mRNA_30cpc_Ctx	1
CVLADSESGGHITH_____	X60184	MV-H-Edmonston	583	14aaA5	mRNA_30cpc_Ctx	1
CVLADSESGGHITH_____	X60184	MV-H-Halle	583	14aaA5	mRNA_30cpc_Ctx	1
CVLADSESGGHITH_____	X60184	MV-H-MVi-Illinois.USA-50.99	583	14aaA5	mRNA_30cpc_Ctx	1
CVLADSESGGHITH_____	X60184	MV-H-MVi-Texas.USA-28.99	583	14aaA5	mRNA_30cpc_Ctx	1
___DSESGEHITHSGMV_____	X34363	MV-H-CAM-70	587	14aa	mRNA_30cpc_Th	1
___DSESGEHITHSGMV_____	X34363	MV-H-Edmonston	587	14aa	mRNA_30cpc_Th	1
___DSESGEHITHSGMV_____	X34363	MV-H-Halle	587	14aa	mRNA_30cpc_Th	1
___DSESGEHITHSGMV_____	X34363	MV-H-MVi-Illinois.USA-50.99	587	14aa	mRNA_30cpc_Th	1
___DSESGEHITHSGMV_____	X34363	MV-H-MVi-Texas.USA-28.99	587	14aa	mRNA_30cpc_Th	1
_____EHITHSGMVGMEVS_____	X37585	MV-H-CAM-70	592	14aa	mRNA_30cpc_Organoid_MD114	1
_____EHITHSGMVGMEVS_____	X37585	MV-H-Edmonston	592	14aa	mRNA_30cpc_Organoid_MD114	1
_____EHITHSGMVGMEVS_____	X37585	MV-H-Halle	592	14aa	mRNA_30cpc_Organoid_MD114	1
_____EHITHSGMVGMEVS_____	X37585	MV-H-MVi-Illinois.USA-50.99	592	14aa	mRNA_30cpc_Organoid_MD114	1
_____EHITHSGMVGMEVS_____	X37585	MV-H-MVi-Texas.USA-28.99	592	14aa	mRNA_30cpc_Organoid_MD114	1
_____ESGGHITHSGMVGMGVSCTATR_____	X37360	MV-H-CAM-70	589	22aa	mRNA_30cpc_SN	1
_____ESGGHITHSGMVGMGVSCTATR_____	X37360	MV-H-Edmonston	589	22aa	mRNA_30cpc_SN	1
_____ESGGHITHSGMVGMGVSCTATR_____	X37360	MV-H-Halle	589	22aa	mRNA_30cpc_SN	1
_____ESGGHITHSGMVGMGVSCTATR_____	X37360	MV-H-MVi-Illinois.USA-50.99	589	22aa	mRNA_30cpc_SN	1
_____ESGGHITHSGMVGMGVSCTATR_____	X37360	MV-H-MVi-Texas.USA-28.99	589	22aa	mRNA_30cpc_SN	1
___LADSESGGHITHSG_____	X32033	MV-H-CAM-70	585	14aa	mRNA_30cpc_SN	1
___LADSESGGHITHSG_____	X32033	MV-H-Edmonston	585	14aa	mRNA_30cpc_SN	1

alignment	LUThrs	GeneName	start	structure	Group	Score
__LADSESGGHITHSG_____	X32033	MV-H-Halle	585	14aa	mRNA_30cpc_SN	1
__LADSESGGHITHSG_____	X32033	MV-H-MVi-Illinois.USA-50.99	585	14aa	mRNA_30cpc_SN	1
__LADSESGGHITHSG_____	X32033	MV-H-MVi-Texas.USA-28.99	585	14aa	mRNA_30cpc_SN	1
__LADSESGGHITHSG_____	X32033	MV-H-CAM-70	585	14aa	mRNA_30cpc_Ctx	1
__LADSESGGHITHSG_____	X32033	MV-H-Edmonston	585	14aa	mRNA_30cpc_Ctx	1
__LADSESGGHITHSG_____	X32033	MV-H-Halle	585	14aa	mRNA_30cpc_Ctx	1
__LADSESGGHITHSG_____	X32033	MV-H-MVi-Illinois.USA-50.99	585	14aa	mRNA_30cpc_Ctx	1
__LADSESGGHITHSG_____	X32033	MV-H-MVi-Texas.USA-28.99	585	14aa	mRNA_30cpc_Ctx	1
____SESGGHITHSGMVG_____	X12642	MV-H-CAM-70	588	14aa	mRNA_30cpc_SN	1
____SESGGHITHSGMVG_____	X12642	MV-H-Edmonston	588	14aa	mRNA_30cpc_SN	1
____SESGGHITHSGMVG_____	X12642	MV-H-Halle	588	14aa	mRNA_30cpc_SN	1
____SESGGHITHSGMVG_____	X12642	MV-H-MVi-Illinois.USA-50.99	588	14aa	mRNA_30cpc_SN	1
____SESGGHITHSGMVG_____	X12642	MV-H-MVi-Texas.USA-28.99	588	14aa	mRNA_30cpc_SN	1
____SGEHITHSGMVGME_____	X13283	MV-H-CAM-70	590	14aa	mRNA_30cpc_SN_4wks	1
____SGEHITHSGMVGME_____	X13283	MV-H-Edmonston	590	14aa	mRNA_30cpc_SN_4wks	1
____SGEHITHSGMVGME_____	X13283	MV-H-Halle	590	14aa	mRNA_30cpc_SN_4wks	1
____SGEHITHSGMVGME_____	X13283	MV-H-MVi-Illinois.USA-50.99	590	14aa	mRNA_30cpc_SN_4wks	1
____SGEHITHSGMVGME_____	X13283	MV-H-MVi-Texas.USA-28.99	590	14aa	mRNA_30cpc_SN_4wks	1
_VLADSESGGHITHS_____	X67898	MV-H-CAM-70	584	14aa	mRNA_3cpc_Th	1
_VLADSESGGHITHS_____	X67898	MV-H-Edmonston	584	14aa	mRNA_3cpc_Th	1
_VLADSESGGHITHS_____	X67898	MV-H-Halle	584	14aa	mRNA_3cpc_Th	1
_VLADSESGGHITHS_____	X67898	MV-H-MVi-Illinois.USA-50.99	584	14aa	mRNA_3cpc_Th	1
_VLADSESGGHITHS_____	X67898	MV-H-MVi-Texas.USA-28.99	584	14aa	mRNA_3cpc_Th	1

## Peptide GLIQSDQELFSSPN from HRP used in serotype AAV-MNM013

## Peptide GLIQSDQELFSSPN from HRP used in serotype AAV-MNM013



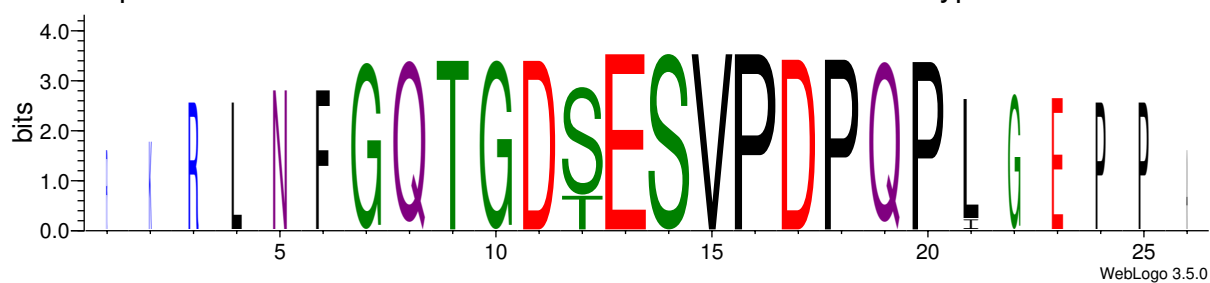
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13	GLIQSDQELFSSPN	28	6	5	11	3	2	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
13	GLIQSDQELFSSPN	GLIQSDQELFSSPN_____	16	5	3	5
13	LFSSPNATDTIPLV	_____LFSSPNATDTIPLV_	3	0	1	1
13	FSSPNATDTIPLVR	_____FSSPNATDTIPLVR	3	0	0	3
13	ELFSSPNATDTIPL	_____ELFSSPNATDTIPL__	2	0	1	1
13	DGRRSSAVLFSSPP	DGRRSSAVLFSSPP_____	2	0	0	1
13	SAVLFSSPPVILLI	_____SAVLFSSPPVILLI___	1	1	0	0
13	QELFSSPNATDTIP	_____QELFSSPNATDTIP___	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
DGRRSSAVLFSSPP_____	X36108	PrPc	227	14aa	mRNA_30cpc_SN	1
DGRRSSAVLFSSPP_____	X36108	PrPc	227	14aa	mRNA_30cpc_Th	1
_____ELFSSPNATDTIPL__	X86475	HRP	250	14aaG4S	mRNA_30cpc_Th	1
_____ELFSSPNATDTIPL__	X38318	HRP	250	14aa	mRNA_30cpc_Ctx	1
_____FSSPNATDTIPLVR	X74767	HRP	252	14aa	mRNA_30cpc_Th	3
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_3cpc_SN	1
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_30cpc_Th	4
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_3cpc_Th	5
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_30cpc_Ctx	3
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_3cpc_Ctx	2
GLIQSDQELFSSPN_____	X63143	HRP	243	14aa	mRNA_30cpc_Th_4wks	1
_____LFSSPNATDTIPLV_	X33533	HRP	251	14aa	mRNA_30cpc_SN	1
_____LFSSPNATDTIPLV_	X33533	HRP	251	14aa	mRNA_30cpc_Th	1
_____LFSSPNATDTIPLV_	X33533	HRP	251	14aa	mRNA_30cpc_Ctx	1
_____QELFSSPNATDTIP___	X19776	HRP	249	14aa	mRNA_30cpc_SN	1
_____SAVLFSSPPVILLI___	X48665	PrPc	232	14aaA5	mRNA_3cpc_Th	1

## Peptide GQTGDSESVDPDPQP from AAV1-VP1 used in serotype AAV-MNM014

## Peptide GQTGDSESVDPDPQP from AAV1-VP1 used in serotype AAV-MNM014



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
14	GQTGDSESVDPDPQP	33	5	7	8	6	3	1

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
14	GQTGDSESVDPDPQP	-----GQTGDSESVDPDPQP-----	13	4	2	2
14	SESVDPDPQLGEPP	-----SESVDPDPQLGEPP_	7	1	2	2
14	RLNFGQTGDTEVP	_RLNFGQTGDTEVP-----	6	0	2	1
14	QTGDSESVDPQPPL	-----QTGDSESVDPQPPL-----	2	0	0	1
14	RKRLNFGQTGDSESVDPDPQLG	RKRLNFGQTGDSESVDPDPQLG----	1	0	1	0
14	NFGQTGDTEVPDPQPIGEPPA	___NFGQTGDTEVPDPQPIGEPPA	1	0	0	0
14	NFGQTGDTEVPDP	___NFGQTGDTEVPDP-----	1	0	0	0
14	NFGQTGDSEVPDP	___NFGQTGDSEVPDP-----	1	0	0	1
14	KRLNFGQTGDSESVDPDPQLGE	_KRLNFGQTGDSESVDPDPQLGE---	1	0	0	1

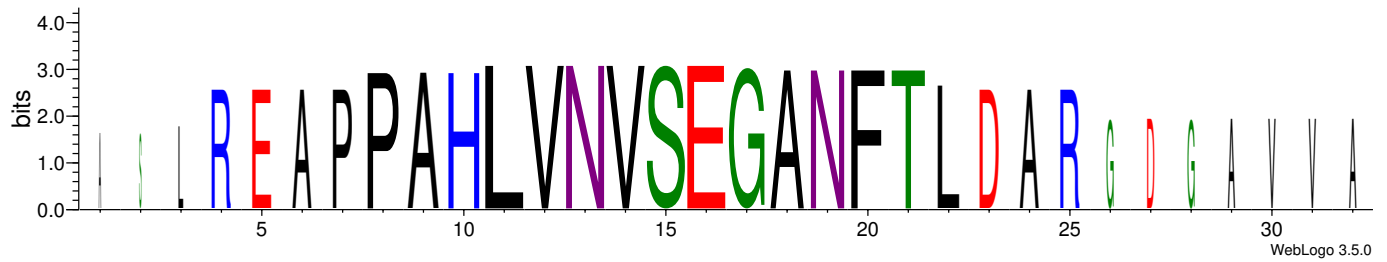
alignment	LUThrs	GeneName	start	structure	Group	Score
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_30cpc_SN	2
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_30cpc_SN	2
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_30cpc_SN	2
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_30cpc_SN	2
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_3cpc_SN	1
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_3cpc_SN	1
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_3cpc_SN	1
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_3cpc_SN	1
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_30cpc_Th	2
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_30cpc_Th	2
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_30cpc_Th	2
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_30cpc_Th	2
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_3cpc_Th	4
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_3cpc_Th	4
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_3cpc_Th	4
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_3cpc_Th	4
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_30cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_30cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_30cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_30cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV1-VP1	174	14aa	mRNA_3cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV6-VP1	174	14aa	mRNA_3cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV8-VP1	175	14aa	mRNA_3cpc_Ctx	2
_____GQTGDSESVDPDPQP_____	X62390	AAV9-VP1	174	14aa	mRNA_3cpc_Ctx	2
____KRLNFGQTGDSESVDPDPQPLGE____	X4103	AAV1-VP1	169	22aa	mRNA_30cpc_Th	1
____KRLNFGQTGDSESVDPDPQPLGE____	X4103	AAV6-VP1	169	22aa	mRNA_30cpc_Th	1
____KRLNFGQTGDSESVDPDPQPLGE____	X4103	AAV8-VP1	170	22aa	mRNA_30cpc_Th	1
____KRLNFGQTGDSESVDPDPQPLGE____	X4103	AAV9-VP1	169	22aa	mRNA_30cpc_Th	1
____NFGQTGDSESVDPDP_____	X2978	AAV1-VP1	172	14aa	mRNA_30cpc_Th	1
____NFGQTGDSESVDPDP_____	X2978	AAV6-VP1	172	14aa	mRNA_30cpc_Th	1
____NFGQTGDSESVDPDP_____	X2978	AAV8-VP1	173	14aa	mRNA_30cpc_Th	1
____NFGQTGDSESVDPDP_____	X2978	AAV9-VP1	172	14aa	mRNA_30cpc_Th	1
____NFGQTGDTESVPDP_____	X2976	AAV1-VP1	172	14aa	mRNA_30cpc_Ctx_4wks	1
____NFGQTGDTESVPDP_____	X2976	AAV6-VP1	172	14aa	mRNA_30cpc_Ctx_4wks	1
____NFGQTGDTESVPDP_____	X2976	AAV8-VP1	173	14aa	mRNA_30cpc_Ctx_4wks	1
____NFGQTGDTESVPDP_____	X2976	AAV9-VP1	172	14aa	mRNA_30cpc_Ctx_4wks	1
____NFGQTGDTESVPDPQPFIGEPPA_____	X2975	AAV1-VP1	172	22aa	mRNA_30cpc_Organoid_MD114	1
____NFGQTGDTESVPDPQPFIGEPPA_____	X2975	AAV6-VP1	172	22aa	mRNA_30cpc_Organoid_MD114	1
____NFGQTGDTESVPDPQPFIGEPPA_____	X2975	AAV8-VP1	173	22aa	mRNA_30cpc_Organoid_MD114	1
____NFGQTGDTESVPDPQPFIGEPPA_____	X2975	AAV9-VP1	172	22aa	mRNA_30cpc_Organoid_MD114	1
____QTGDSESVDPDPQPL_____	X18701	AAV1-VP1	175	14aa	mRNA_30cpc_Th	1
____QTGDSESVDPDPQPL_____	X18701	AAV6-VP1	175	14aa	mRNA_30cpc_Th	1
____QTGDSESVDPDPQPL_____	X18701	AAV8-VP1	176	14aa	mRNA_30cpc_Th	1
____QTGDSESVDPDPQPL_____	X18701	AAV9-VP1	175	14aa	mRNA_30cpc_Th	1
____QTGDSESVDPDPQPL_____	X18701	AAV1-VP1	175	14aa	mRNA_30cpc_Th_4wks	1
____QTGDSESVDPDPQPL_____	X18701	AAV6-VP1	175	14aa	mRNA_30cpc_Th_4wks	1
____QTGDSESVDPDPQPL_____	X18701	AAV8-VP1	176	14aa	mRNA_30cpc_Th_4wks	1

alignment	LUThrs	GeneName	start	structure	Group	Score
_____QTGDSSEVPDPQPL_____	X18701	AAV9-VP1	175	14aa	mRNA_30cpc_Th_4wks	1
RKRLNFGQTGDSSEVPDPQPLG_____	X24884	AAV1-VP1	168	22aa	mRNA_30cpc_Ctx	1
RKRLNFGQTGDSSEVPDPQPLG_____	X24884	AAV6-VP1	168	22aa	mRNA_30cpc_Ctx	1
RKRLNFGQTGDSSEVPDPQPLG_____	X24884	AAV8-VP1	169	22aa	mRNA_30cpc_Ctx	1
RKRLNFGQTGDSSEVPDPQPLG_____	X24884	AAV9-VP1	168	22aa	mRNA_30cpc_Ctx	1
__RLNFGQTGDTEVP_____	X26310	AAV1-VP1	170	14aa	mRNA_30cpc_SN	3
__RLNFGQTGDTEVP_____	X26310	AAV6-VP1	170	14aa	mRNA_30cpc_SN	3
__RLNFGQTGDTEVP_____	X26310	AAV8-VP1	171	14aa	mRNA_30cpc_SN	3
__RLNFGQTGDTEVP_____	X26310	AAV9-VP1	170	14aa	mRNA_30cpc_SN	3
__RLNFGQTGDTEVP_____	X26310	AAV1-VP1	170	14aa	mRNA_30cpc_Th	1
__RLNFGQTGDTEVP_____	X26310	AAV6-VP1	170	14aa	mRNA_30cpc_Th	1
__RLNFGQTGDTEVP_____	X26310	AAV8-VP1	171	14aa	mRNA_30cpc_Th	1
__RLNFGQTGDTEVP_____	X26310	AAV9-VP1	170	14aa	mRNA_30cpc_Th	1
__RLNFGQTGDTEVP_____	X26310	AAV1-VP1	170	14aa	mRNA_30cpc_Ctx	2
__RLNFGQTGDTEVP_____	X26310	AAV6-VP1	170	14aa	mRNA_30cpc_Ctx	2
__RLNFGQTGDTEVP_____	X26310	AAV8-VP1	171	14aa	mRNA_30cpc_Ctx	2
__RLNFGQTGDTEVP_____	X26310	AAV9-VP1	170	14aa	mRNA_30cpc_Ctx	2
_____SEVPDPQPLGEPP_	X12643	AAV1-VP1	179	14aa	mRNA_30cpc_SN	1
_____SEVPDPQPLGEPP_	X12643	AAV6-VP1	179	14aa	mRNA_30cpc_SN	1
_____SEVPDPQPLGEPP_	X12643	AAV8-VP1	180	14aa	mRNA_30cpc_SN	1
_____SEVPDPQPLGEPP_	X12643	AAV9-VP1	179	14aa	mRNA_30cpc_SN	1
_____SEVPDPQPLGEPP_	X12643	AAV1-VP1	179	14aa	mRNA_30cpc_Th	2
_____SEVPDPQPLGEPP_	X12643	AAV6-VP1	179	14aa	mRNA_30cpc_Th	2
_____SEVPDPQPLGEPP_	X12643	AAV8-VP1	180	14aa	mRNA_30cpc_Th	2
_____SEVPDPQPLGEPP_	X12643	AAV9-VP1	179	14aa	mRNA_30cpc_Th	2
_____SEVPDPQPLGEPP_	X12643	AAV1-VP1	179	14aa	mRNA_3cpc_Th	1
_____SEVPDPQPLGEPP_	X12643	AAV6-VP1	179	14aa	mRNA_3cpc_Th	1
_____SEVPDPQPLGEPP_	X12643	AAV8-VP1	180	14aa	mRNA_3cpc_Th	1
_____SEVPDPQPLGEPP_	X12643	AAV9-VP1	179	14aa	mRNA_3cpc_Th	1
_____SEVPDPQPLGEPP_	X12643	AAV1-VP1	179	14aa	mRNA_30cpc_Ctx	2
_____SEVPDPQPLGEPP_	X12643	AAV6-VP1	179	14aa	mRNA_30cpc_Ctx	2
_____SEVPDPQPLGEPP_	X12643	AAV8-VP1	180	14aa	mRNA_30cpc_Ctx	2
_____SEVPDPQPLGEPP_	X12643	AAV9-VP1	179	14aa	mRNA_30cpc_Ctx	2
_____SEVPDPQPLGEPP_	X12643	AAV1-VP1	179	14aa	mRNA_3cpc_Ctx	1
_____SEVPDPQPLGEPP_	X12643	AAV6-VP1	179	14aa	mRNA_3cpc_Ctx	1
_____SEVPDPQPLGEPP_	X12643	AAV8-VP1	180	14aa	mRNA_3cpc_Ctx	1
_____SEVPDPQPLGEPP_	X12643	AAV9-VP1	179	14aa	mRNA_3cpc_Ctx	1



## Peptide PAHLVNVSEGANFT from PRV-Becker-gE used in serotype AAV-MNM015

## Peptide PAHLVNVSEGANFT from PRV-Becker-gE used in serotype AAV-MNM015



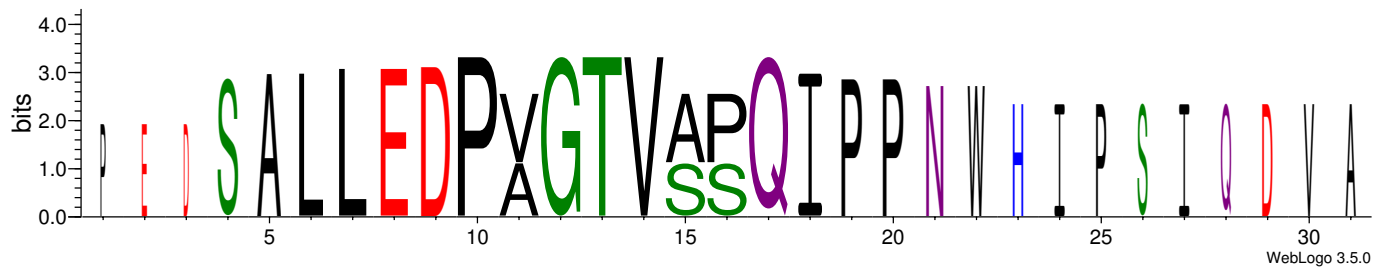
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15	PAHLVNVSEGANFT	16	5	5	2	2	1	1

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
15	REAPPAHLVNVSEGANFTLDAR	__REAPPAHLVNVSEGANFTLDAR____	5	4	0	0
15	PAHLVNVSEGANFT	_____PAHLVNVSEGANFT_____	5	1	2	1
15	LVNVSEGANFTLDARGDGAVVA	_____LVNVSEGANFTLDARGDGAVVA	3	0	3	0
15	REAPPAHLVNVSEG	__REAPPAHLVNVSEG_____	1	0	0	1
15	LREAPPAHLVNVSE	__LREAPPAHLVNVSE_____	1	0	0	0
15	ASLREAPPAHLVNVSEGANFTL	ASLREAPPAHLVNVSEGANFTL_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
ASLREAPPAHLVNVSEGANFTL_____	X40742	PRV-Becker-gE	75	22aa	mRNA_30cpc_Organoid_MD114	1
ASLREAPPAHLVNVSEGANFTL_____	X40742	PRV-TJ-gE	76	22aa	mRNA_30cpc_Organoid_MD114	1
__LREAPPAHLVNVSE_____	X30660	PRV-Becker-gE	77	14aa	mRNA_30cpc_SN	1
__LREAPPAHLVNVSE_____	X30660	PRV-TJ-gE	78	14aa	mRNA_30cpc_SN	1
_____LVNVSEGANFTLDARGDGAVVA	X32748	PRV-Becker-gE	85	22aa	mRNA_30cpc_Ctx	3
_____LVNVSEGANFTLDARGDGAVVA	X32748	PRV-TJ-gE	86	22aa	mRNA_30cpc_Ctx	3
_____PAHLVNVSEGANFT_____	X23396	PRV-Becker-gE	82	14aa	mRNA_30cpc_SN	1
_____PAHLVNVSEGANFT_____	X23396	PRV-TJ-gE	83	14aa	mRNA_30cpc_SN	1
_____PAHLVNVSEGANFT_____	X23396	PRV-Becker-gE	82	14aa	mRNA_30cpc_Th	1
_____PAHLVNVSEGANFT_____	X23396	PRV-TJ-gE	83	14aa	mRNA_30cpc_Th	1
_____PAHLVNVSEGANFT_____	X23396	PRV-Becker-gE	82	14aa	mRNA_3cpc_Th	1
_____PAHLVNVSEGANFT_____	X23396	PRV-TJ-gE	83	14aa	mRNA_3cpc_Th	1
_____PAHLVNVSEGANFT_____	X23396	PRV-Becker-gE	82	14aa	mRNA_30cpc_Ctx	2
_____PAHLVNVSEGANFT_____	X23396	PRV-TJ-gE	83	14aa	mRNA_30cpc_Ctx	2
__REAPPAHLVNVSEG_____	X26958	PRV-Becker-gE	78	14aa	mRNA_30cpc_Th	1
__REAPPAHLVNVSEG_____	X26958	PRV-TJ-gE	79	14aa	mRNA_30cpc_Th	1
__REAPPAHLVNVSEGANFTLDAR_____	X26959	PRV-Becker-gE	78	22aa	mRNA_3cpc_Th	4
__REAPPAHLVNVSEGANFTLDAR_____	X26959	PRV-TJ-gE	79	22aa	mRNA_3cpc_Th	4
__REAPPAHLVNVSEGANFTLDAR_____	X26959	PRV-Becker-gE	78	22aa	mRNA_3cpc_Ctx	1
__REAPPAHLVNVSEGANFTLDAR_____	X26959	PRV-TJ-gE	79	22aa	mRNA_3cpc_Ctx	1

## Peptide SALLEDPVGTVPAPQ from HSV-1-pUS6 used in serotype AAV-MNM016

## Peptide SALLEDPVGTVPAPQ from HSV-1-pUS6 used in serotype AAV-MNM016



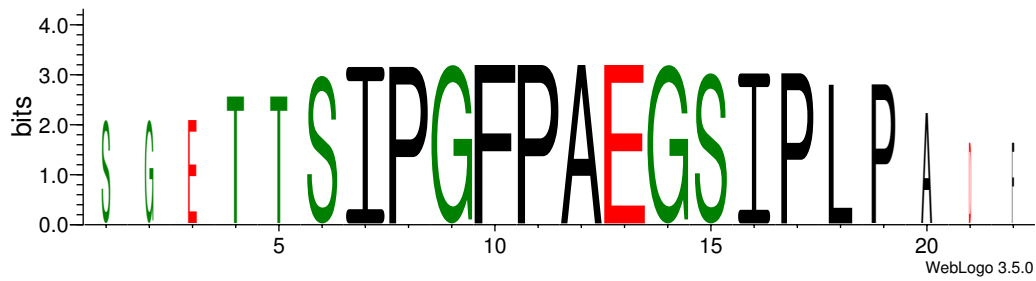
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
16	SALLEDPVGTVPAPQ	23	6	3	5	4	2	3

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
16	SALLEDPVGTVPAPQ	___SALLEDPVGTVPAPQ_____	7	4	0	1
16	PAGTVSSQIPPNWHIPSIQDVA	_____PAGTVSSQIPPNWHIPSIQDVA	6	1	2	1
16	PEDSALLEDPVGTVPAPQIPPNW	PEDSALLEDPVGTVPAPQIPPNW_____	3	0	0	1
16	SALLEDPAGTVSSQ	___SALLEDPAGTVSSQ_____	2	0	0	1
16	ALLEDPVGTVPAPQI	_____ALLEDPVGTVPAPQI_____	2	0	1	1
16	LEDPVGTVPAPQIPP	_____LEDPVGTVPAPQIPP_____	1	1	0	0
16	LEDPAGTVSSQIPP	_____LEDPAGTVSSQIPP_____	1	0	0	0
16	DPAGTVSSQIPPNW	_____DPAGTVSSQIPPNW_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___ALLEDPVGTVPAPQI_____	X42520	HSV-1-pUS6	302	14aa	mRNA_30cpc_Th	1
___ALLEDPVGTVPAPQI_____	X42520	HSV-1-pUS6	302	14aa	mRNA_30cpc_Ctx	1
_____DPAGTVSSQIPPNW_____	X34989	HSV-2-pUS6	306	14aa	mRNA_30cpc_Organoid_MD114	1
_____LEDPAGTVSSQIPP_____	X53482	HSV-2-pUS6	304	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____LEDPVGTVPAPQIPP_____	X84773	HSV-1-pUS6	304	14aaG4S	mRNA_3cpc_Th	1
_____PAGTVSSQIPPNWHIPSIQDVA	X23640	HSV-2-pUS6	307	22aa	mRNA_30cpc_SN	2
_____PAGTVSSQIPPNWHIPSIQDVA	X23640	HSV-2-pUS6	307	22aa	mRNA_30cpc_Th	1
_____PAGTVSSQIPPNWHIPSIQDVA	X23640	HSV-2-pUS6	307	22aa	mRNA_3cpc_Th	1
_____PAGTVSSQIPPNWHIPSIQDVA	X23640	HSV-2-pUS6	307	22aa	mRNA_30cpc_Ctx	2
PEDSALLEDPVGTVPAPQIPPNW_____	X23162	HSV-1-pUS6	298	22aa	mRNA_30cpc_SN	2
PEDSALLEDPVGTVPAPQIPPNW_____	X23162	HSV-2-pUS6	298	22aa	mRNA_30cpc_SN	2
PEDSALLEDPVGTVPAPQIPPNW_____	X23162	HSV-1-pUS6	298	22aa	mRNA_30cpc_Th	1
PEDSALLEDPVGTVPAPQIPPNW_____	X23162	HSV-2-pUS6	298	22aa	mRNA_30cpc_Th	1
___SALLEDPAGTVSSQ_____	X12952	HSV-2-pUS6	301	14aa	mRNA_30cpc_Th	1
___SALLEDPAGTVSSQ_____	X12952	HSV-2-pUS6	301	14aa	mRNA_30cpc_Organoid_MD114	1
___SALLEDPVGTVPAPQ_____	X12954	HSV-1-pUS6	301	14aa	mRNA_30cpc_Th	1
___SALLEDPVGTVPAPQ_____	X12954	HSV-1-pUS6	301	14aa	mRNA_3cpc_Th	4
___SALLEDPVGTVPAPQ_____	X12954	HSV-1-pUS6	301	14aa	mRNA_3cpc_Ctx	2

## Peptide SIPGFPAEGSIPLP from Tau used in serotype AAV-MNM017

## Peptide SIPGFPAEGSIPLP from Tau used in serotype AAV-MNM017



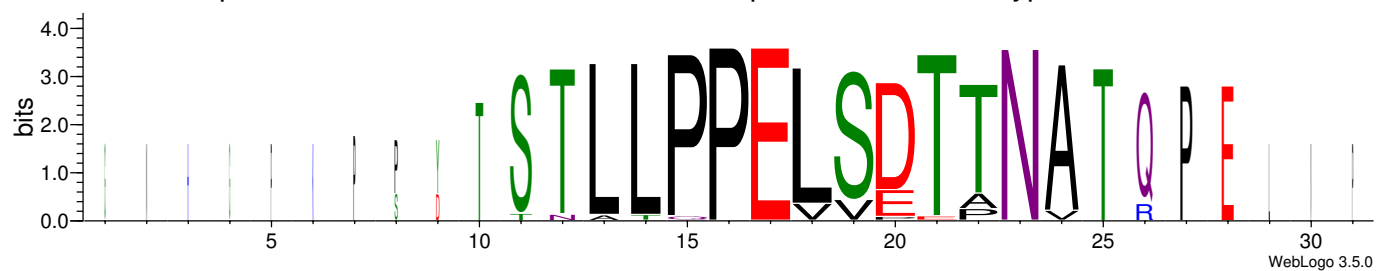
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
17	SIPGFPAEGSIPLP	19	4	6	3	3	0	3

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
17	SIPGFPAEGSIPLP	____SIPGFPAEGSIPLP____	6	4	0	1
17	TTSIPGFPAEGSIP	___TTSIPGFPAEGSIP_____	4	0	2	1
17	SGETTSIPGFPAEG	SGETTSIPGFPAEG_____	4	0	2	1
17	IPGFPAEGSIPLPA	____IPGFPAEGSIPLPA____	4	0	2	0
17	GFPAEGSIPLPADF	____GFPAEGSIPLPADF_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
____GFPAEGSIPLPADF	X65487	Tau	254	14aa	mRNA_30cpc_Organoid_MD114	1
____IPGFPAEGSIPLPA__	X15485	Tau	252	14aa	mRNA_30cpc_SN	2
____IPGFPAEGSIPLPA__	X15485	Tau	252	14aa	mRNA_30cpc_Ctx	2
SGETTSIPGFPAEG_____	X13281	Tau	246	14aa	mRNA_30cpc_Th	1
SGETTSIPGFPAEG_____	X13281	Tau	246	14aa	mRNA_30cpc_Ctx	2
SGETTSIPGFPAEG_____	X13281	Tau	246	14aa	mRNA_30cpc_Organoid_MD114	1
____SIPGFPAEGSIPLP____	X11013	Tau	251	14aa	mRNA_30cpc_SN	1
____SIPGFPAEGSIPLP____	X11013	Tau	251	14aa	mRNA_30cpc_Th	1
____SIPGFPAEGSIPLP____	X11013	Tau	251	14aa	mRNA_3cpc_Th	4
___TTSIPGFPAEGSIP_____	X5959	Tau	249	14aa	mRNA_30cpc_Th	1
___TTSIPGFPAEGSIP_____	X5959	Tau	249	14aa	mRNA_30cpc_Ctx	2
___TTSIPGFPAEGSIP_____	X5959	Tau	249	14aa	mRNA_30cpc_Organoid_MD114	1

## Peptide STLLPPELSDTTNA from HSV-1-pUS6 used in serotype AAV-MNM018

## Peptide STLLPPELSDTTNA from HSV-1-pUS6 used in serotype AAV-MNM018



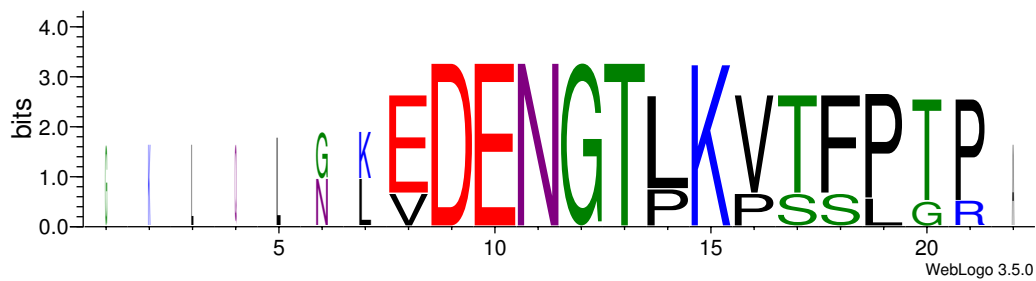
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
18	STLLPPELSDTTNA	36	7	9	9	7	2	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
18	STLLPPELSDTTNA	-----STLLPPELSDTTNA-----	13	1	4	4
18	PPELSDTTNATQPE	-----PPELSDTTNATQPE---	7	1	2	2
18	TLLPPELSDTTNAT	-----TLLPPELSDTTNAT-----	3	0	1	2
18	TSTLLPPEVVETAN	-----TSTLLPPEVVETAN-----	2	1	0	0
18	PPEVVETANVTRPE	-----PPEVVETANVTRPE---	2	1	0	0
18	LLPPELSETPNATQ	-----LLPPELSETPNATQ-----	2	0	1	0
18	LLPPELSDTTNATQ	-----LLPPELSDTTNATQ-----	2	1	1	0
18	TSTLLPPELSETPN	-----TSTLLPPELSETPN-----	1	0	0	0
18	TSTLLPPELSDTTNATQPELVP	-----TSTLLPPELSDTTNATQPELVP-----	1	0	0	0
18	SDTTNATQPELVPE	-----SDTTNATQPELVPE-----	1	1	0	0
18	PPYTSTLLPPELSDTTNATQPE	-----PPYTSTLLPPELSDTTNATQPE-----	1	0	0	1
18	GWHGPKPPYTSTLLPPELSDTT	GWHGPKPPYTSTLLPPELSDTT-----	1	1	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
GWHGPKPPYTSTLLPPELSDTT_____	X65370	HSV-1-pUS6	265	22aa	mRNA_3cpc_Th	1
GWHGPKPPYTSTLLPPELSDTT_____	X65370	HSV-2-pUS6	265	22aa	mRNA_3cpc_Th	1
_____LLPPELSDTTNATQ_____	X30911	HSV-1-pUS6	277	14aa	mRNA_3cpc_Th	1
_____LLPPELSDTTNATQ_____	X30911	HSV-2-pUS6	277	14aa	mRNA_3cpc_Th	1
_____LLPPELSDTTNATQ_____	X84578	HSV-1-pUS6	277	14aaG4S	mRNA_30cpc_Ctx	1
_____LLPPELSDTTNATQ_____	X84578	HSV-2-pUS6	277	14aaG4S	mRNA_30cpc_Ctx	1
_____LLPPELSETPNATQ_____	X30913	HSV-1-pUS6	277	14aa	mRNA_30cpc_SN	1
_____LLPPELSETPNATQ_____	X30913	HSV-2-pUS6	277	14aa	mRNA_30cpc_SN	1
_____LLPPELSETPNATQ_____	X30913	HSV-1-pUS6	277	14aa	mRNA_30cpc_Ctx	1
_____LLPPELSETPNATQ_____	X30913	HSV-2-pUS6	277	14aa	mRNA_30cpc_Ctx	1
_____PPELSDTTNATQPE_____	X22117	HSV-2-pUS6	279	14aa	mRNA_30cpc_SN	2
_____PPELSDTTNATQPE_____	X22117	HSV-2-pUS6	279	14aa	mRNA_30cpc_Th	2
_____PPELSDTTNATQPE_____	X22117	HSV-2-pUS6	279	14aa	mRNA_3cpc_Th	1
_____PPELSDTTNATQPE_____	X22117	HSV-2-pUS6	279	14aa	mRNA_30cpc_Ctx	2
_____PPEVETANVTRPE_____	X22129	BV-G	279	14aa	mRNA_3cpc_Th	1
_____PPEVETANVTRPE_____	X22129	BV-G	279	14aa	mRNA_3cpc_Ctx	1
_____PPYTSTLLPPELSDTTNATQPE_____	X22271	HSV-1-pUS6	271	22aa	mRNA_30cpc_Th	1
_____PPYTSTLLPPELSDTTNATQPE_____	X22271	HSV-2-pUS6	271	22aa	mRNA_30cpc_Th	1
_____SDTTNATQPELVPE_____	X12402	HSV-1-pUS6	283	14aa	mRNA_3cpc_Th	1
_____SDTTNATQPELVPE_____	X12402	HSV-2-pUS6	283	14aa	mRNA_3cpc_Th	1
_____STLLPPELSDTTNA_____	X10394	HSV-1-pUS6	275	14aa	mRNA_30cpc_SN	4
_____STLLPPELSDTTNA_____	X10394	HSV-2-pUS6	275	14aa	mRNA_30cpc_SN	4
_____STLLPPELSDTTNA_____	X10394	HSV-1-pUS6	275	14aa	mRNA_30cpc_Th	4
_____STLLPPELSDTTNA_____	X10394	HSV-2-pUS6	275	14aa	mRNA_30cpc_Th	4
_____STLLPPELSDTTNA_____	X10394	HSV-1-pUS6	275	14aa	mRNA_3cpc_Th	1
_____STLLPPELSDTTNA_____	X10394	HSV-2-pUS6	275	14aa	mRNA_3cpc_Th	1
_____STLLPPELSDTTNA_____	X10394	HSV-1-pUS6	275	14aa	mRNA_30cpc_Ctx	4
_____STLLPPELSDTTNA_____	X10394	HSV-2-pUS6	275	14aa	mRNA_30cpc_Ctx	4
_____TLLPPELSDTTNAT_____	X7845	HSV-1-pUS6	276	14aa	mRNA_30cpc_Th	2
_____TLLPPELSDTTNAT_____	X7845	HSV-2-pUS6	276	14aa	mRNA_30cpc_Th	2
_____TLLPPELSDTTNAT_____	X7845	HSV-1-pUS6	276	14aa	mRNA_30cpc_Ctx	1
_____TLLPPELSDTTNAT_____	X7845	HSV-2-pUS6	276	14aa	mRNA_30cpc_Ctx	1
_____TSTLLPPELSDTTNATQPELV_____	X6255	HSV-1-pUS6	274	22aa	mRNA_30cpc_Organoid_MD114	1
_____TSTLLPPELSDTTNATQPELV_____	X6255	HSV-2-pUS6	274	22aa	mRNA_30cpc_Organoid_MD114	1
_____TSTLLPPELSETPN_____	X46854	HSV-1-pUS6	274	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____TSTLLPPELSETPN_____	X46854	HSV-2-pUS6	274	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____TSTLLPPEVVETAN_____	X46855	BV-G	274	14aaA5	mRNA_3cpc_Th	1
_____TSTLLPPEVVETAN_____	X46855	BV-G	274	14aaA5	mRNA_3cpc_Ctx	1

## Peptide EDENGLTKVTFPTP from CAV-2-F-SH01 used in serotype AAV-MNM019

Peptide EDENGLTKVTFPTP from CAV-2-F-SH01 used in serotype AAV-MNI



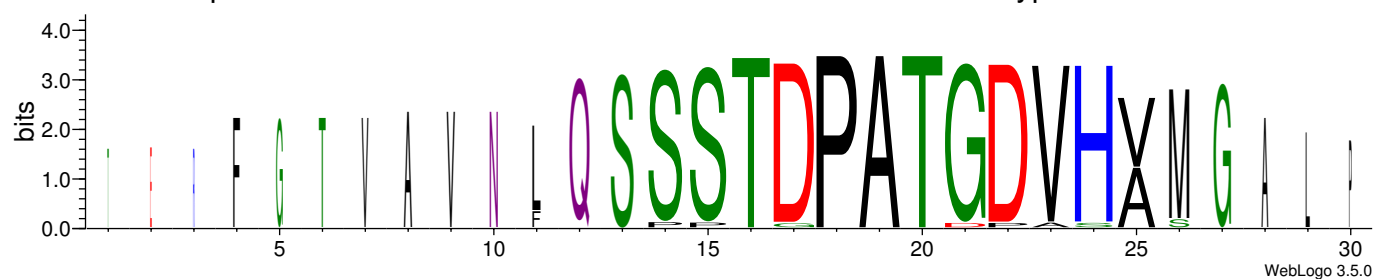
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
19	EDENGLTKVTFPTP	21	7	4	2	3	3	1

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
19	EDENGLTKVTFPTP	_____EDENGLTKVTFPTP_	12	5	2	1
19	GLEENGLTKVTFP	_____GLEENGLTKVTFP_	3	0	1	1
19	VDENGLTKPSSSLGR	_____VDENGLTKPSSSLGR_	2	1	0	0
19	NKVDENGLTKPSSSL	_____NKVDENGLTKPSSSL_	1	0	0	0
19	LNKVDENGLTKPSS	_____LNKVDENGLTKPSS_	1	1	0	0
19	GKLQLNKVDENGLTP	GKLQLNKVDENGLTP_	1	0	0	0
19	DENGLTKPSSSLGRA	_____DENGLTKPSSSLGRA	1	0	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____DENGLTKPSSSLGRA	X35637	SA	38	14aa	mRNA_30cpc_Ctx	1
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-SH01	122	14aa	mRNA_30cpc_SN	2
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-Toronto-A26-61	122	14aa	mRNA_30cpc_SN	2
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-SH01	122	14aa	mRNA_30cpc_Th	1
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-Toronto-A26-61	122	14aa	mRNA_30cpc_Th	1
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-SH01	122	14aa	mRNA_3cpc_Th	5
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-Toronto-A26-61	122	14aa	mRNA_3cpc_Th	5
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-SH01	122	14aa	mRNA_30cpc_Ctx	2
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-Toronto-A26-61	122	14aa	mRNA_30cpc_Ctx	2
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-SH01	122	14aa	mRNA_3cpc_Ctx	2
_____EDENGLTKVTFPTP_	X38436	CAV-2-F-Toronto-A26-61	122	14aa	mRNA_3cpc_Ctx	2
GKLQLNKVDENGLTP_	X61329	SA	30	14aa	mRNA_30cpc_Organoid_MD114	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-SH01	120	14aa	mRNA_30cpc_SN	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-Toronto-A26-61	120	14aa	mRNA_30cpc_SN	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-SH01	120	14aa	mRNA_30cpc_Th	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-Toronto-A26-61	120	14aa	mRNA_30cpc_Th	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-SH01	120	14aa	mRNA_30cpc_Ctx	1
_____GLEENGLTKVTFP_	X63297	CAV-2-F-Toronto-A26-61	120	14aa	mRNA_30cpc_Ctx	1
_____LNKVDENGLTKPSS_	X52582	SA	34	14aaA5	mRNA_3cpc_Th	1
_____NKVDENGLTKPSSSL_	X359	SA	35	14aa	mRNA_3cpc_SN	1
_____VDENGLTKPSSSLGR_	X58834	SA	37	14aaA5	mRNA_3cpc_Th	1
_____VDENGLTKPSSSLGR_	X58834	SA	37	14aaA5	mRNA_3cpc_Ctx	1

## Peptide QSSSTDPATGDVHV from AAV1-VP1 used in serotype AAV-MNM020

## Peptide QSSSTDPATGDVHV from AAV1-VP1 used in serotype AAV-MNM020



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
20	QSSSTDPATGDVHV	30	4	8	6	7	0	3

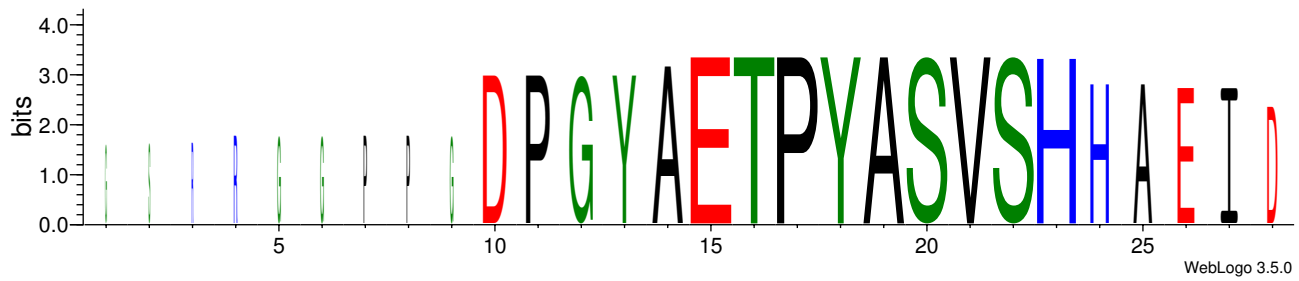
cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
20	QSSSTDPATGDVHV	-----QSSSTDPATGDVHV-----	9	3	2	2
20	SSTDPATGDVHAMG	-----SSTDPATGDVHAMG----	7	1	2	1
20	FGTVAVNLQSSSTDPATGDVHV	___FGTVAVNLQSSSTDPATGDVHV___	4	0	1	1
20	STDPATGDVHAMGA	-----STDPATGDVHAMGA__	2	0	1	1
20	SSSTDPATGDVHAM	-----SSSTDPATGDVHAM----	2	0	1	0
20	DPATGDVHVMGALP	-----DPATGDVHVMGALP----	2	0	1	1
20	TERFGTVAVNFQSSSTDPATGD	TERFGTVAVNFQSSSTDPATGD-----	1	0	0	0
20	TDPATGDVHAMGAL	-----TDPATGDVHAMGAL_	1	0	0	0
20	PPTGPATDPASASG	-----PPTGPATDPASASG---	1	0	0	0
20	AVNLQSSSTDPATG	-----AVNLQSSSTDPATG-----	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____AVNLQSSSTDPATG_____	X44332	AAV1-VP1	581	14aa	mRNA_30cpc_Organoid_MD114	1
_____AVNLQSSSTDPATG_____	X44332	AAV6-VP1	581	14aa	mRNA_30cpc_Organoid_MD114	1
_____DPATGDVHVMGALP_____	X34960	AAV1-VP1	590	14aa	mRNA_30cpc_Th	1
_____DPATGDVHVMGALP_____	X34960	AAV6-VP1	590	14aa	mRNA_30cpc_Th	1
_____DPATGDVHVMGALP_____	X34960	AAV1-VP1	590	14aa	mRNA_30cpc_Ctx	1
_____DPATGDVHVMGALP_____	X34960	AAV6-VP1	590	14aa	mRNA_30cpc_Ctx	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV1-VP1	577	22aa	mRNA_30cpc_SN	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV6-VP1	577	22aa	mRNA_30cpc_SN	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV1-VP1	577	22aa	mRNA_30cpc_Th	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV6-VP1	577	22aa	mRNA_30cpc_Th	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV1-VP1	577	22aa	mRNA_30cpc_Ctx	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV6-VP1	577	22aa	mRNA_30cpc_Ctx	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV1-VP1	577	22aa	mRNA_30cpc_Th_4wks	1
___FGTVAVNLQSSSTDPATGDVHV___	X75911	AAV6-VP1	577	22aa	mRNA_30cpc_Th_4wks	1
_____PPTGPATDPASASG_____	X21885	HSV-1-pUL14	197	14aa	mRNA_30cpc_SN	1
_____QSSSTDPATGDVHV_____	X18756	AAV1-VP1	585	14aa	mRNA_30cpc_SN	1
_____QSSSTDPATGDVHV_____	X18756	AAV6-VP1	585	14aa	mRNA_30cpc_SN	1
_____QSSSTDPATGDVHV_____	X18756	AAV1-VP1	585	14aa	mRNA_30cpc_Th	2
_____QSSSTDPATGDVHV_____	X18756	AAV6-VP1	585	14aa	mRNA_30cpc_Th	2
_____QSSSTDPATGDVHV_____	X18756	AAV1-VP1	585	14aa	mRNA_3cpc_Th	3
_____QSSSTDPATGDVHV_____	X18756	AAV6-VP1	585	14aa	mRNA_3cpc_Th	3
_____QSSSTDPATGDVHV_____	X18756	AAV1-VP1	585	14aa	mRNA_30cpc_Ctx	2
_____QSSSTDPATGDVHV_____	X18756	AAV6-VP1	585	14aa	mRNA_30cpc_Ctx	2
_____QSSSTDPATGDVHV_____	X18756	AAV1-VP1	585	14aa	mRNA_3cpc_Th_4wks	1
_____QSSSTDPATGDVHV_____	X18756	AAV6-VP1	585	14aa	mRNA_3cpc_Th_4wks	1
_____SSSTDPATGDVHAM_____	X10626	AAV1-VP1	586	14aa	mRNA_30cpc_SN	1
_____SSSTDPATGDVHAM_____	X10626	AAV6-VP1	586	14aa	mRNA_30cpc_SN	1
_____SSSTDPATGDVHAM_____	X10626	AAV1-VP1	586	14aa	mRNA_30cpc_Ctx	1
_____SSSTDPATGDVHAM_____	X10626	AAV6-VP1	586	14aa	mRNA_30cpc_Ctx	1
_____SSTDPATGDVHAMG_____	X10606	AAV1-VP1	587	14aa	mRNA_30cpc_SN	3
_____SSTDPATGDVHAMG_____	X10606	AAV6-VP1	587	14aa	mRNA_30cpc_SN	3
_____SSTDPATGDVHAMG_____	X10606	AAV1-VP1	587	14aa	mRNA_30cpc_Th	1
_____SSTDPATGDVHAMG_____	X10606	AAV6-VP1	587	14aa	mRNA_30cpc_Th	1
_____SSTDPATGDVHAMG_____	X10606	AAV1-VP1	587	14aa	mRNA_3cpc_Th	1
_____SSTDPATGDVHAMG_____	X10606	AAV6-VP1	587	14aa	mRNA_3cpc_Th	1
_____SSTDPATGDVHAMG_____	X10606	AAV1-VP1	587	14aa	mRNA_30cpc_Ctx	2
_____SSTDPATGDVHAMG_____	X10606	AAV6-VP1	587	14aa	mRNA_30cpc_Ctx	2
_____STD PATGDVHAMGA_____	X10423	AAV1-VP1	588	14aa	mRNA_30cpc_Th	1
_____STD PATGDVHAMGA_____	X10423	AAV6-VP1	588	14aa	mRNA_30cpc_Th	1
_____STD PATGDVHAMGA_____	X10423	AAV1-VP1	588	14aa	mRNA_30cpc_Ctx	1
_____STD PATGDVHAMGA_____	X10423	AAV6-VP1	588	14aa	mRNA_30cpc_Ctx	1
_____TDPATGDVHAMGAL_____	X78635	AAV1-VP1	589	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____TDPATGDVHAMGAL_____	X78635	AAV6-VP1	589	14aaG4S	mRNA_30cpc_Organoid_MD114	1
TERFGTVAVNFQSSSTDPATGD_____	X8301	AAV1-VP1	574	22aa	mRNA_30cpc_Organoid_MD114	1
TERFGTVAVNFQSSSTDPATGD_____	X8301	AAV6-VP1	574	22aa	mRNA_30cpc_Organoid_MD114	1



## Peptide DPGYAETPYASVSH from HSV-2-pUL10 used in serotype AAV-MNM021

## Peptide DPGYAETPYASVSH from HSV-2-pUL10 used in serotype AAV-MNM021



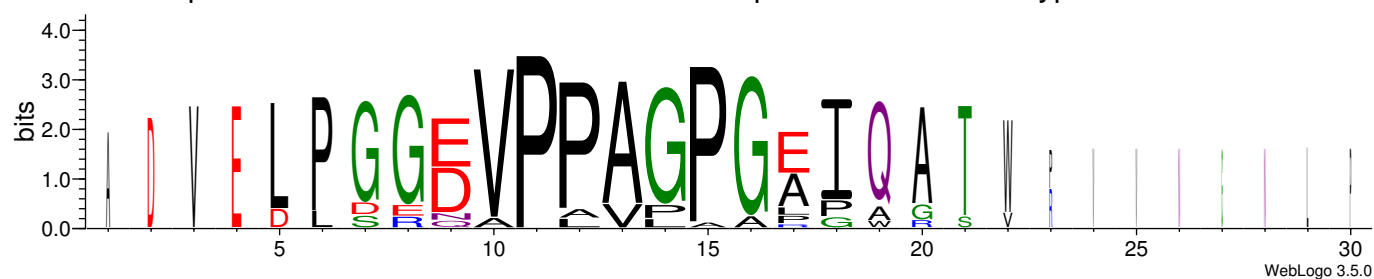
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
21	DPGYAETPYASVSH	24	7	5	6	4	0	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
21	DPGYAETPYASVSH	-----DPGYAETPYASVSH-----	12	2	4	3
21	ETPYASVSHHAEID	-----ETPYASVSHHAEID	6	1	1	2
21	AETPYASVSHHAEI	-----AETPYASVSHHAEI	4	3	0	0
21	RGGPPGDPGYAETPYASVSHHA	___RGGPPGDPGYAETPYASVSHHA___	1	1	0	0
21	GSRRGGPPGDPGYAETPYASVS	GSRRGGPPGDPGYAETPYASVS-----	1	0	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
-----AETPYASVSHHAEI	X43117	HSV-2-pUL10	392	14aa	mRNA_3cpc_Th	3
-----AETPYASVSHHAEI	X43117	HSV-2-pUL10	392	14aa	mRNA_30cpc_Th_4wks	1
-----DPGYAETPYASVSH	X35006	HSV-2-pUL10	388	14aa	mRNA_30cpc_SN	1
-----DPGYAETPYASVSH	X54361	HSV-2-pUL10	388	14aaA5	mRNA_30cpc_SN	2
-----DPGYAETPYASVSH	X35006	HSV-2-pUL10	388	14aa	mRNA_30cpc_Th	1
-----DPGYAETPYASVSH	X54361	HSV-2-pUL10	388	14aaA5	mRNA_30cpc_Th	2
-----DPGYAETPYASVSH	X35006	HSV-2-pUL10	388	14aa	mRNA_3cpc_Th	1
-----DPGYAETPYASVSH	X54361	HSV-2-pUL10	388	14aaA5	mRNA_3cpc_Th	1
-----DPGYAETPYASVSH	X35006	HSV-2-pUL10	388	14aa	mRNA_30cpc_Ctx	1
-----DPGYAETPYASVSH	X54361	HSV-2-pUL10	388	14aaA5	mRNA_30cpc_Ctx	2
-----DPGYAETPYASVSH	X85651	HSV-2-pUL10	388	14aaG4S	mRNA_30cpc_Ctx	1
-----ETPYASVSHHAEID	X37111	HSV-2-pUL10	393	14aa	mRNA_30cpc_SN	1
-----ETPYASVSHHAEID	X37111	HSV-2-pUL10	393	14aa	mRNA_30cpc_Th	2
-----ETPYASVSHHAEID	X37111	HSV-2-pUL10	393	14aa	mRNA_3cpc_Th	1
-----ETPYASVSHHAEID	X37111	HSV-2-pUL10	393	14aa	mRNA_30cpc_Ctx	1
-----ETPYASVSHHAEID	X37111	HSV-2-pUL10	393	14aa	mRNA_30cpc_SN_4wks	1
GSRRGGPPGDPGYAETPYASVS	X61846	HSV-2-pUL10	379	22aa	mRNA_30cpc_Th	1
___RGGPPGDPGYAETPYASVSHHA___	X27566	HSV-2-pUL10	382	22aa	mRNA_3cpc_Th	1

## Peptide DVPPAGPGGEIQATW from HSV-1-pUL19 used in serotype AAV-MNM022

## Peptide DVPPAGPGGEIQATW from HSV-1-pUL19 used in serotype AAV-MNM022



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
22	DVPPAGPGGEIQATW	30	2	8	6	11	0	2

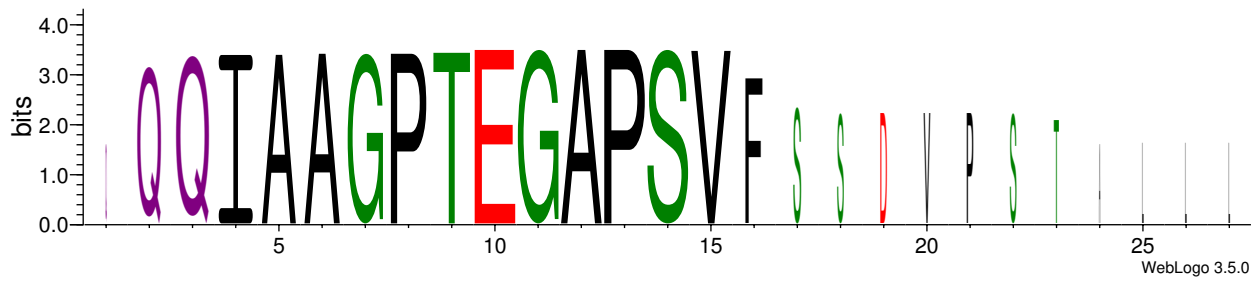
cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
22	DVPPAGPGGEIQATW	_____DVPPAGPGGEIQATW_____	5	0	2	1
22	LPGGEVPPAGPGAI	____LPGGEVPPAGPGAI_____	4	0	1	0
22	ADVELPGGEVPPAG	ADVELPGGEVPPAG_____	3	0	1	1
22	VELPGGEVPPAGPG	__VELPGGEVPPAGPG_____	2	0	1	1
22	PGGDVPPAGPGGEIQ	____PGGDVPPAGPGGEIQ_____	2	1	0	0
22	GGDVPPAGPGGEIQA	____GGDVPPAGPGGEIQA_____	2	0	1	1
22	GEVPPAGPGAIQAT	____GEVPPAGPGAIQAT_____	2	0	1	0
22	DVELPGGDVPPAGP	____DVELPGGDVPPAGP_____	2	0	1	0
22	DLSRQVPLVPPALG	____DLSRQVPLVPPALG_____	2	0	0	1
22	DENAPAVLPGPPAG	____DENAPAVLPGPPAG_____	2	1	0	0
22	VPPVPAGRPWRSVP	____VPPVPAGRPWRSVP_____	1	0	0	0
22	GGEVPPAGPGAIQA	____GGEVPPAGPGAIQA_____	1	0	0	0
22	GDVPPAGPGGEIQAT	____GDVPPAGPGGEIQAT_____	1	0	0	1
22	EVPPAGPGAIQATWRVVNGNLP	____EVPPAGPGAIQATWRVVNGNLP_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
ADVELPGGEVPPAG_____	X43071	HSV-1-pUL19	554	14aa	mRNA_30cpc_SN	1
ADVELPGGEVPPAG_____	X43071	HSV-2-pUL19	554	14aa	mRNA_30cpc_SN	1
ADVELPGGEVPPAG_____	X43071	HSV-1-pUL19	554	14aa	mRNA_30cpc_Th	1
ADVELPGGEVPPAG_____	X43071	HSV-2-pUL19	554	14aa	mRNA_30cpc_Th	1
ADVELPGGEVPPAG_____	X43071	HSV-1-pUL19	554	14aa	mRNA_30cpc_Ctx	1
ADVELPGGEVPPAG_____	X43071	HSV-2-pUL19	554	14aa	mRNA_30cpc_Ctx	1
____DENAPAVLPGPPAG_____	X35636	HSV-2-pUL22	303	14aa	mRNA_30cpc_SN	1
____DENAPAVLPGPPAG_____	X35636	HSV-2-pUL22	303	14aa	mRNA_3cpc_Th	1
____DLSRQVPLVPPALG_____	X54418	HSV-1-pUL19	982	14aaA5	mRNA_30cpc_SN	1
____DLSRQVPLVPPALG_____	X54418	HSV-2-pUL19	982	14aaA5	mRNA_30cpc_SN	1
____DLSRQVPLVPPALG_____	X54418	HSV-1-pUL19	982	14aaA5	mRNA_30cpc_Th	1
____DLSRQVPLVPPALG_____	X54418	HSV-2-pUL19	982	14aaA5	mRNA_30cpc_Th	1
____DVELPGGDVPPAGP_____	X36344	HSV-1-pUL19	555	14aa	mRNA_30cpc_SN	1
____DVELPGGDVPPAGP_____	X36344	HSV-2-pUL19	555	14aa	mRNA_30cpc_SN	1
____DVELPGGDVPPAGP_____	X36344	HSV-1-pUL19	555	14aa	mRNA_30cpc_Ctx	1
____DVELPGGDVPPAGP_____	X36344	HSV-2-pUL19	555	14aa	mRNA_30cpc_Ctx	1
____DVPPAGPGGEIQATW_____	X54669	HSV-1-pUL19	562	14aaA5	mRNA_30cpc_SN	1
____DVPPAGPGGEIQATW_____	X54669	HSV-2-pUL19	562	14aaA5	mRNA_30cpc_SN	1
____DVPPAGPGGEIQATW_____	X54669	HSV-1-pUL19	562	14aaA5	mRNA_30cpc_Th	1
____DVPPAGPGGEIQATW_____	X54669	HSV-2-pUL19	562	14aaA5	mRNA_30cpc_Th	1
____DVPPAGPGGEIQATW_____	X54669	HSV-1-pUL19	562	14aaA5	mRNA_30cpc_Ctx	2
____DVPPAGPGGEIQATW_____	X54669	HSV-2-pUL19	562	14aaA5	mRNA_30cpc_Ctx	2
____DVPPAGPGGEIQATW_____	X54669	HSV-1-pUL19	562	14aaA5	mRNA_30cpc_SN_4wks	1
____DVPPAGPGGEIQATW_____	X54669	HSV-2-pUL19	562	14aaA5	mRNA_30cpc_SN_4wks	1
____EVPPAGPGAIQATWRVVNGNLP_____	X39289	HSV-1-pUL19	562	22aa	mRNA_30cpc_Organoid_MD114	1
____EVPPAGPGAIQATWRVVNGNLP_____	X39289	HSV-2-pUL19	562	22aa	mRNA_30cpc_Organoid_MD114	1
____GDVPPAGPGGEIQAT_____	X63695	HSV-1-pUL19	561	14aa	mRNA_30cpc_Th	1
____GDVPPAGPGGEIQAT_____	X63695	HSV-2-pUL19	561	14aa	mRNA_30cpc_Th	1
____GEVPPAGPGAIQAT_____	X63937	HSV-1-pUL19	561	14aa	mRNA_30cpc_SN	1
____GEVPPAGPGAIQAT_____	X63937	HSV-2-pUL19	561	14aa	mRNA_30cpc_SN	1
____GEVPPAGPGAIQAT_____	X63937	HSV-1-pUL19	561	14aa	mRNA_30cpc_Ctx	1
____GEVPPAGPGAIQAT_____	X63937	HSV-2-pUL19	561	14aa	mRNA_30cpc_Ctx	1
____GGDVPPAGPGGEIQA_____	X64573	HSV-1-pUL19	560	14aa	mRNA_30cpc_Th	1
____GGDVPPAGPGGEIQA_____	X64573	HSV-1-pUL19	560	14aa	mRNA_30cpc_Ctx	1
____GGEVPPAGPGAIQA_____	X64590	HSV-2-pUL19	560	14aa	mRNA_30cpc_SN	1
____LPGGEVPPAGPGAI_____	X30373	HSV-1-pUL19	558	14aa	mRNA_30cpc_SN	3
____LPGGEVPPAGPGAI_____	X30373	HSV-2-pUL19	558	14aa	mRNA_30cpc_SN	3
____LPGGEVPPAGPGAI_____	X30373	HSV-1-pUL19	558	14aa	mRNA_30cpc_Ctx	1
____LPGGEVPPAGPGAI_____	X30373	HSV-2-pUL19	558	14aa	mRNA_30cpc_Ctx	1
____PGGDVPPAGPGGEIQ_____	X24018	HSV-1-pUL19	559	14aa	mRNA_30cpc_SN	1
____PGGDVPPAGPGGEIQ_____	X24018	HSV-2-pUL19	559	14aa	mRNA_30cpc_SN	1
____PGGDVPPAGPGGEIQ_____	X24018	HSV-1-pUL19	559	14aa	mRNA_3cpc_Th	1
____PGGDVPPAGPGGEIQ_____	X24018	HSV-2-pUL19	559	14aa	mRNA_3cpc_Th	1
____VELPGGEVPPAGPG_____	X58881	HSV-1-pUL19	556	14aaA5	mRNA_30cpc_Th	1
____VELPGGEVPPAGPG_____	X58881	HSV-2-pUL19	556	14aaA5	mRNA_30cpc_Th	1
____VELPGGEVPPAGPG_____	X58881	HSV-1-pUL19	556	14aaA5	mRNA_30cpc_Ctx	1
____VELPGGEVPPAGPG_____	X58881	HSV-2-pUL19	556	14aaA5	mRNA_30cpc_Ctx	1

alignment	LUThrs	GeneName	start	structure	Group	Score
-----VPPVPAGRPWRSVP-----	X67174	HSV-2-pUS4	219	14aa	mRNA_30cpc_Organoid_MD114	1

## Peptide QQIAAGPTEGAPSV from HSV-1-pUL22 used in serotype AAV-MNM023

## Peptide QQIAAGPTEGAPSV from HSV-1-pUL22 used in serotype AAV-MNM023



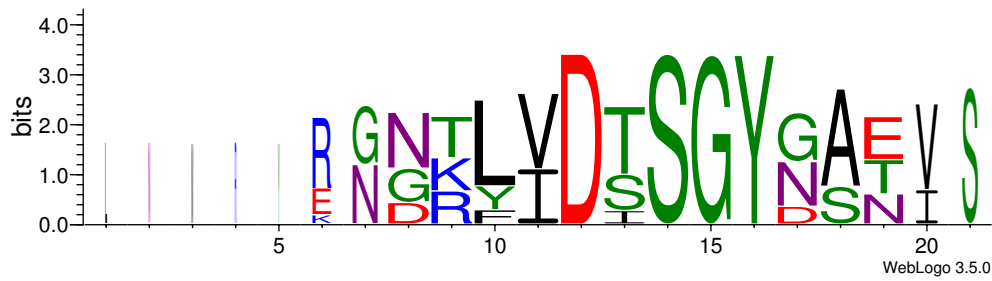
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23	QQIAAGPTEGAPSV	31	7	7	6	4	2	4

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
23	QQIAAGPTEGAPSV	_QQIAAGPTEGAPSV_	17	5	3	3
23	QIAAGPTEGAPSVF	_QIAAGPTEGAPSVF_	7	0	3	1
23	EGAPSVFSSDVPST	_____EGAPSVFSSDVPST_	3	1	0	2
23	TEGAPSVFSSDVPS	_____TEGAPSVFSSDVPS_	1	0	1	0
23	QQQIAAGPTEGAPS	QQQIAAGPTEGAPS_	1	1	0	0
23	IAAGPTEGAPSVFS	___IAAGPTEGAPSVFS_	1	0	0	0
23	AGPTEGAPSVFSSDVPSTALLL	_____AGPTEGAPSVFSSDVPSTALLL	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____AGPTEGAPSVFSSDVPSTALLL	X44043	HSV-1-pUL22	760	22aa	mRNA_30cpc_Organoid_MD114	1
_____EGAPSVFSSDVPST_	X39115	HSV-1-pUL22	764	14aa	mRNA_30cpc_Th	2
_____EGAPSVFSSDVPST_	X39115	HSV-1-pUL22	764	14aa	mRNA_3cpc_Th	1
___IAAGPTEGAPSVFS_	X16325	HSV-1-pUL22	758	14aa	mRNA_30cpc_Organoid_MD114	1
_QIAAGPTEGAPSVF_	X18980	HSV-1-pUL22	757	14aa	mRNA_30cpc_SN	1
_QIAAGPTEGAPSVF_	X81477	HSV-1-pUL22	757	14aaG4S	mRNA_30cpc_SN	1
_QIAAGPTEGAPSVF_	X81477	HSV-1-pUL22	757	14aaG4S	mRNA_30cpc_Th	1
_QIAAGPTEGAPSVF_	X18980	HSV-1-pUL22	757	14aa	mRNA_30cpc_Ctx	1
_QIAAGPTEGAPSVF_	X81477	HSV-1-pUL22	757	14aaG4S	mRNA_30cpc_Ctx	2
_QIAAGPTEGAPSVF_	X50187	HSV-1-pUL22	757	14aaA5	mRNA_30cpc_Organoid_MD114	1
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_30cpc_SN	2
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_3cpc_SN	1
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_30cpc_Th	3
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_3cpc_Th	4
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_30cpc_Ctx	3
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_3cpc_Ctx	2
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_3cpc_Th_4wks	1
_QQIAAGPTEGAPSV_	X19117	HSV-1-pUL22	756	14aa	mRNA_30cpc_Organoid_MD114	1
QQQIAAGPTEGAPS_	X19124	HSV-1-pUL22	755	14aa	mRNA_3cpc_Th	1
_____TEGAPSVFSSDVPS_	X8353	HSV-1-pUL22	763	14aa	mRNA_30cpc_Ctx	1

## Peptide NTLVDTSGYNAEVS from BoNT-C-Hc used in serotype AAV-MNM024

peptide NTLVDTSGYNAEVS from BoNT-C-Hc used in serotype AAV-MNM



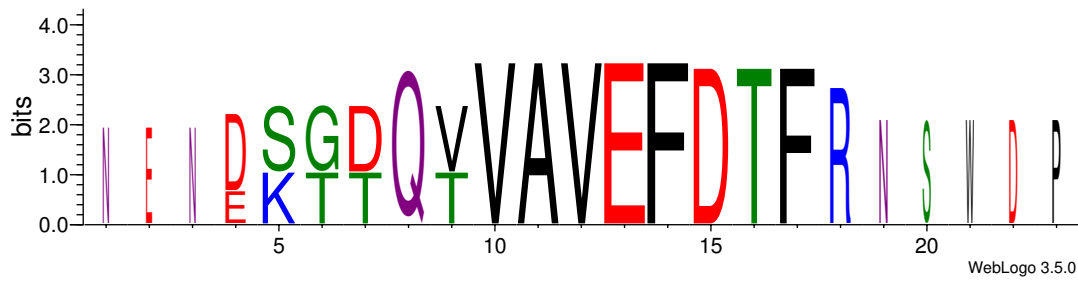
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24	NTLVDTSGYNAEVS	26	5	7	6	8	0	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
24	NTLVDTSGYNAEVS	-----NTLVDTSGYNAEVS	10	2	3	2
24	RGGRLIDSSGYGAT	-----RGGRLIDSSGYGAT__	8	1	2	2
24	NDKYVDTSGYDSNI	-----NDKYVDTSGYDSNI_	4	1	1	1
24	ENNKFIDISGYGSN	-----ENNKFIDISGYGSN__	3	0	1	1
24	LNMRKYNDKYVDTS	LNMRKYNDKYVDTS_-----	1	1	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----ENNKFIDISGYGSN__	X86079	BoNT-F-Hc	16	14aaG4S	mRNA_30cpc_SN	1
-----ENNKFIDISGYGSN__	X86079	BoNT-F-Hc	16	14aaG4S	mRNA_30cpc_Th	1
-----ENNKFIDISGYGSN__	X86079	BoNT-F-Hc	16	14aaG4S	mRNA_30cpc_Ctx	1
LNMRKYNDKYVDTS_-----	X52597	BoNT-E-Hc	73	14aaA5	mRNA_3cpc_Th	1
-----NDKYVDTSGYDSNI_	X1776	BoNT-E-Hc	79	14aa	mRNA_30cpc_SN	1
-----NDKYVDTSGYDSNI_	X45703	BoNT-E-Hc	79	14aaA5	mRNA_30cpc_Th	1
-----NDKYVDTSGYDSNI_	X45703	BoNT-E-Hc	79	14aaA5	mRNA_3cpc_Th	1
-----NDKYVDTSGYDSNI_	X45703	BoNT-E-Hc	79	14aaA5	mRNA_30cpc_Ctx	1
-----NTLVDTSGYNAEVS	X514	BoNT-C-Hc	21	14aa	mRNA_30cpc_SN	3
-----NTLVDTSGYNAEVS	X514	BoNT-D-Hc	14	14aa	mRNA_30cpc_SN	3
-----NTLVDTSGYNAEVS	X514	BoNT-C-Hc	21	14aa	mRNA_30cpc_Th	2
-----NTLVDTSGYNAEVS	X514	BoNT-D-Hc	14	14aa	mRNA_30cpc_Th	2
-----NTLVDTSGYNAEVS	X514	BoNT-C-Hc	21	14aa	mRNA_3cpc_Th	2
-----NTLVDTSGYNAEVS	X514	BoNT-D-Hc	14	14aa	mRNA_3cpc_Th	2
-----NTLVDTSGYNAEVS	X514	BoNT-C-Hc	21	14aa	mRNA_30cpc_Ctx	3
-----NTLVDTSGYNAEVS	X514	BoNT-D-Hc	14	14aa	mRNA_30cpc_Ctx	3
-----RGGRLIDSSGYGAT__	X27569	BoNT-G-Hc	10	14aa	mRNA_30cpc_SN	3
-----RGGRLIDSSGYGAT__	X27569	BoNT-G-Hc	10	14aa	mRNA_30cpc_Th	2
-----RGGRLIDSSGYGAT__	X27569	BoNT-G-Hc	10	14aa	mRNA_3cpc_Th	1
-----RGGRLIDSSGYGAT__	X27569	BoNT-G-Hc	10	14aa	mRNA_30cpc_Ctx	2

## Peptide DKTTQTVAVEFDTF from PSA-Chain-C used in serotype AAV-MNM025

### Peptide DKTTQTVAVEFDTF from PSA-Chain-C used in serotype AAV-MNM0



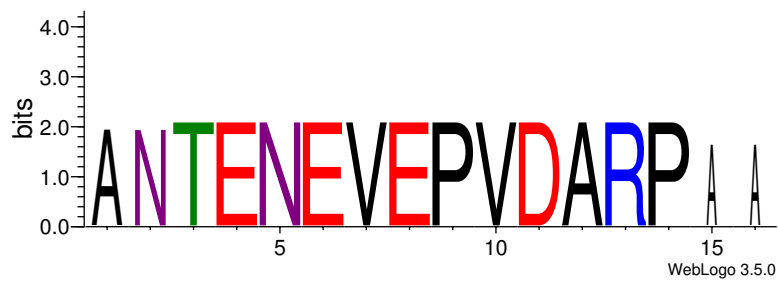
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25	DKTTQTVAVEFDTF	20	3	6	5	4	1	0

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
25	DKTTQTVAVEFDTF	___DKTTQTVAVEFDTF_____	7	1	2	2
25	SGDQVVAVEFDTFR	___SGDQVVAVEFDTFR_____	6	1	3	2
25	VAVEFDTFRNSWDP	_____VAVEFDTFRNSWDP	4	0	1	1
25	NENESGDQVVAVEF	NENESGDQVVAVEF_____	3	1	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___DKTTQTVAVEFDTF_____	X33863	PSA-Chain-C	110	14aa	mRNA_30cpc_SN	2
___DKTTQTVAVEFDTF_____	X33863	PSA-Chain-C	110	14aa	mRNA_30cpc_Th	2
___DKTTQTVAVEFDTF_____	X33863	PSA-Chain-C	110	14aa	mRNA_3cpc_Th	1
___DKTTQTVAVEFDTF_____	X33863	PSA-Chain-C	110	14aa	mRNA_30cpc_Ctx	2
NENESGDQVVAVEF_____	X45740	SA	112	14aaA5	mRNA_3cpc_SN	1
NENESGDQVVAVEF_____	X45740	SA	112	14aaA5	mRNA_3cpc_Th	1
NENESGDQVVAVEF_____	X45740	SA	112	14aaA5	mRNA_3cpc_Ctx	1
___SGDQVVAVEFDTFR_____	X13273	SA	116	14aa	mRNA_30cpc_Th	1
___SGDQVVAVEFDTFR_____	X13273	SA	116	14aa	mRNA_3cpc_Th	1
___SGDQVVAVEFDTFR_____	X13273	SA	116	14aa	mRNA_30cpc_Ctx	3
___SGDQVVAVEFDTFR_____	X13273	SA	116	14aa	mRNA_30cpc_Th_4wks	1
_____VAVEFDTFRNSWDP	X68842	SA	121	14aa	mRNA_30cpc_SN	1
_____VAVEFDTFRNSWDP	X59024	SA	121	14aaA5	mRNA_30cpc_SN	1
_____VAVEFDTFRNSWDP	X68842	SA	121	14aa	mRNA_30cpc_Th	1
_____VAVEFDTFRNSWDP	X68842	SA	121	14aa	mRNA_30cpc_Ctx	1

## Peptide ANTENEVEPVDARP from APP used in serotype AAV-MNM027

le ANTENEVEPVDARP from APP used in serotype AAV-



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
27	ANTENEVEPVDARP	4	0	0	0	0	0	4

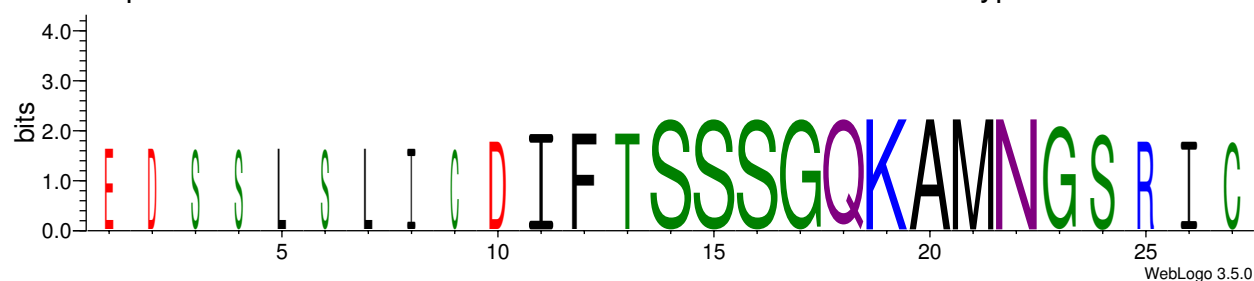
cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
27	ANTENEVEPVDARP	ANTENEVEPVDARP__	3	0	0	0
27	TENEVEPVDARPAA	__TENEVEPVDARPAA	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
ANTENEVEPVDARP__	X39803	APP	631	14aa	mRNA_30cpc_Organoid_MD114	1
ANTENEVEPVDARP__	X55577	APP	631	14aaA5	mRNA_30cpc_Organoid_MD114	1
ANTENEVEPVDARP__	X86867	APP	631	14aaG4S	mRNA_30cpc_Organoid_MD114	1
__TENEVEPVDARPAA	X8197	APP	633	14aa	mRNA_30cpc_Organoid_MD114	1



## Peptide SSSGQKAMNGSRIC from RV-G-Mocala used in serotype AAV-MNM028

## Peptide SSSGQKAMNGSRIC from RV-G-Mocala used in serotype AAV-MNM028

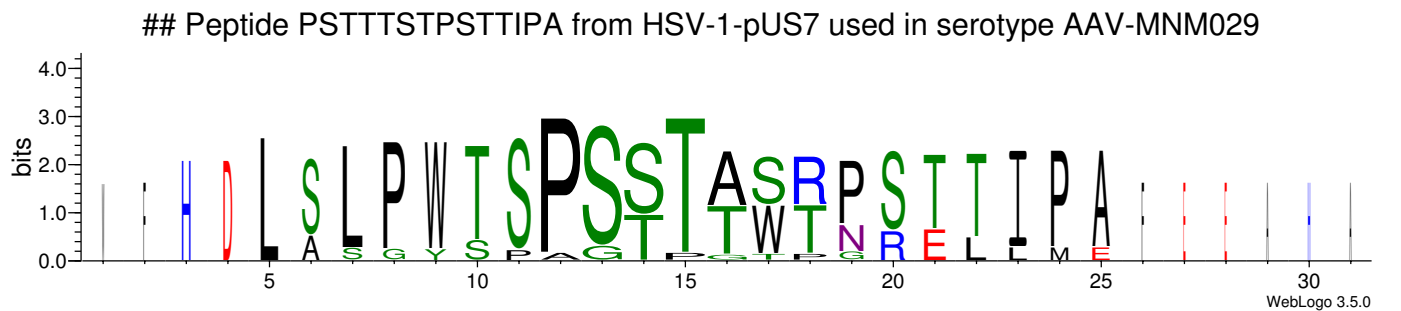


cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
28	SSSGQKAMNGSRIC	5	1	0	0	2	0	2

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
28	SSSGQKAMNGSRIC	-----SSSGQKAMNGSRIC	2	0	0	0
28	IFTSSSGQKAMNGS	-----IFTSSSGQKAMNGS__	1	0	0	0
28	EDSSLSLICDIFTSSSGQKAMN	EDSSLSLICDIFTSSSGQKAMN----	1	0	0	0
28	DIFTSSSGQKAMNG	-----DIFTSSSGQKAMNG----	1	1	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----DIFTSSSGQKAMNG----	X34605	RV-G-Mocala	190	14aa	mRNA_3cpc_Th	1
EDSSLSLICDIFTSSSGQKAMN----	X38349	RV-G-Mocala	181	22aa	mRNA_30cpc_SN	1
-----IFTSSSGQKAMNGS__	X16903	RV-G-Mocala	191	14aa	mRNA_30cpc_SN	1
-----SSSGQKAMNGSRIC	X10648	RV-G-Mocala	194	14aa	mRNA_30cpc_Organoid_MD114	2

Peptide PSTTTSTPSTTIPA from HSV-1-pUS7 used in serotype AAV-MNM029



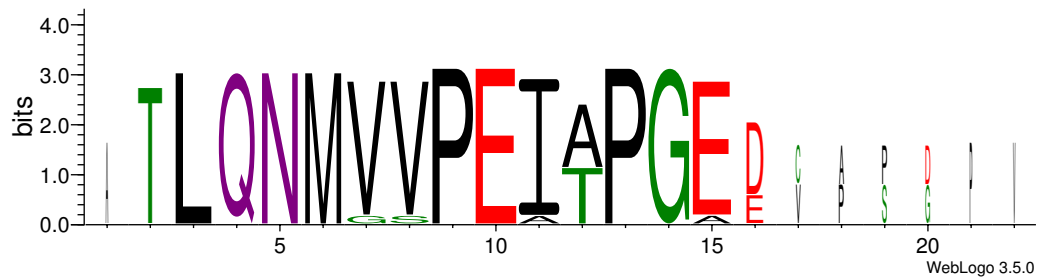
cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
29	PSTTTSTPSTTIPA	18	2	5	3	2	0	5

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
29	PSTTTSTPSTTIPA	_____PSTTTSTPSTTIPA_____	7	1	2	1
29	HDLSLPWTSPSSTA	__HDLSLPWTSPSSTA_____	3	0	1	1
29	LSLPWTSPSSTAWR	___LSLPWTSPSSTAWR_____	2	0	1	1
29	LALPWTSPSSTAWR	____LALPWTSPSSTAWR_____	2	0	0	0
29	WFHDLSLPWTSPSSTAWRNREL	WFHDLSLPWTSPSSTAWRNREL_____	1	0	0	0
29	TPPSSTAWRNRELLMEFEEAHA	_____TPPSSTAWRNRELLMEFEEAHA	1	1	0	0
29	SGYSSPGSPGTPGS	______SGYSSPGSPGTPGS_____	1	0	1	0
29	PWSSAGSTTWRNRE	_______PWSSAGSTTWRNRE_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
__HDLSPWTSPSSTA_____	X17861	JEV-E-KE-093	219	14aa	mRNA_30cpc_Th	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-SA14-5-3	219	14aa	mRNA_30cpc_Th	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-ThCMAr4492	219	14aa	mRNA_30cpc_Th	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-KE-093	219	14aa	mRNA_30cpc_Ctx	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-SA14-5-3	219	14aa	mRNA_30cpc_Ctx	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-ThCMAr4492	219	14aa	mRNA_30cpc_Ctx	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-KE-093	219	14aa	mRNA_30cpc_Organoid_MD114	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-SA14-5-3	219	14aa	mRNA_30cpc_Organoid_MD114	1
__HDLSPWTSPSSTA_____	X17861	JEV-E-ThCMAr4492	219	14aa	mRNA_30cpc_Organoid_MD114	1
___LALPWTSPSSTA___	X31994	JEV-E-BN19	221	14aa	mRNA_30cpc_Organoid_MD114	2
___LALPWTSPSSTA___	X31994	JEV-E-KE-093	221	14aa	mRNA_30cpc_Organoid_MD114	2
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___LALPWTSPSSTA___	X31994	JEV-E-ThCMAr4492	221	14aa	mRNA_30cpc_Organoid_MD114	2
___LALPWTSPSSTA___	X29312	JEV-E-BN19	221	14aa	mRNA_30cpc_Th	1
___LALPWTSPSSTA___	X29312	JEV-E-KE-093	221	14aa	mRNA_30cpc_Th	1
___LALPWTSPSSTA___	X29312	JEV-E-SA14-5-3	221	14aa	mRNA_30cpc_Th	1
___LALPWTSPSSTA___	X29312	JEV-E-ThCMAr4492	221	14aa	mRNA_30cpc_Th	1
___LALPWTSPSSTA___	X29312	JEV-E-BN19	221	14aa	mRNA_30cpc_Ctx	1
___LALPWTSPSSTA___	X29312	JEV-E-KE-093	221	14aa	mRNA_30cpc_Ctx	1
___LALPWTSPSSTA___	X29312	JEV-E-SA14-5-3	221	14aa	mRNA_30cpc_Ctx	1
___LALPWTSPSSTA___	X29312	JEV-E-ThCMAr4492	221	14aa	mRNA_30cpc_Ctx	1
____PSTTTSTPSTTIPA_____	X21109	HSV-1-pUS7	210	14aa	mRNA_30cpc_SN	2
____PSTTTSTPSTTIPA_____	X21109	HSV-1-pUS7	210	14aa	mRNA_30cpc_Th	1
____PSTTTSTPSTTIPA_____	X21109	HSV-1-pUS7	210	14aa	mRNA_30cpc_Th	1
____PSTTTSTPSTTIPA_____	X21109	HSV-1-pUS7	210	14aa	mRNA_30cpc_Ctx	2
____PSTTTSTPSTTIPA_____	X21109	HSV-1-pUS7	210	14aa	mRNA_30cpc_Organoid_MD114	1
____PWSSAGSTTWRNRE_____	X24556	WNV-E-AZ10-918	224	14aa	mRNA_30cpc_Organoid_MD114	1
____PWSSAGSTTWRNRE_____	X24556	WNV-E-ArD76104	220	14aa	mRNA_30cpc_Organoid_MD114	1
____PWSSAGSTTWRNRE_____	X24556	WNV-E-H-442	224	14aa	mRNA_30cpc_Organoid_MD114	1
____SGYSSPGSPGTPGS_____	X13369	Tau	440	14aa	mRNA_30cpc_Ctx	1
____TPPSSTAARNRELLMEFEEAHA_____	X7244	JEV-E-BN19	226	22aa	mRNA_30cpc_Th	1
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____TPPSSTAARNRELLMEFEEAHA_____	X7244	JEV-E-SA14-5-3	226	22aa	mRNA_30cpc_Th	1
____TPPSSTAARNRELLMEFEEAHA_____	X7244	JEV-E-ThCMAr4492	226	22aa	mRNA_30cpc_Th	1
WFHDLSPWTSPSSTAARNREL_____	X74320	JEV-E-BN19	217	22aa	mRNA_30cpc_Th_4wks	1
WFHDLSPWTSPSSTAARNREL_____	X74320	JEV-E-KE-093	217	22aa	mRNA_30cpc_Th_4wks	1
WFHDLSPWTSPSSTAARNREL_____	X74320	JEV-E-SA14-5-3	217	22aa	mRNA_30cpc_Th_4wks	1
WFHDLSPWTSPSSTAARNREL_____	X74320	JEV-E-ThCMAr4492	217	22aa	mRNA_30cpc_Th_4wks	1

## Peptide TLQNMVVPEIAPGE from HSV-1-pUL19 used in serotype AAV-MNM030

peptide TLQNMVVPEIAPGE from HSV-1-pUL19 used in serotype AAV-MNM



cluster_id	main_sequence	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th	mRNA_30cpc_SN	mRNA_3cpc_Ctx	mRNA_30cpc_Organoid_MD114
30	TLQNMVVPEIAPGE	17	3	2	3	2	0	7

cluster_id	sequence	alignment	sum	mRNA_3cpc_Th	mRNA_30cpc_Ctx	mRNA_30cpc_Th
30	TLQNMVVPEIAPGE	_TLQNMVVPEIAPGE_	5	1	0	1
30	TLQNMVVPEITPGE	_TLQNMVVPEITPGE_	4	0	1	2
30	LQNMVVPEITPGED	_LQNMVVPEITPGED_	3	2	0	0
30	LQNMVVPEIAPGEE	_LQNMVVPEIAPGEE_	2	0	0	0
30	PEITPGEDCPSDPV	____PEITPGEDCPSDPV	1	0	0	0
30	GSPEAAPGADVAPG	____GSPEAAPGADVAPG__	1	0	1	0
30	ATLQNMVVPEIAPG	ATLQNMVVPEIAPG_____	1	0	0	0

alignment	LUThrs	GeneName	start	structure	Group	Score
ATLQNMVVPEIAPG_____	X40328	HSV-1-pUL19	837	14aa	mRNA_30cpc_Organoid_MD114	1
ATLQNMVVPEIAPG_____	X40328	HSV-2-pUL19	837	14aa	mRNA_30cpc_Organoid_MD114	1
____GSPEAAPGADVAPG__	X61829	HSV-2-pUL10	8	14aa	mRNA_30cpc_Ctx	1
_LQNMVVPEIAPGEE_	X29938	HSV-1-pUL19	839	14aa	mRNA_30cpc_Organoid_MD114	2
_LQNMVVPEIAPGEE_	X29938	HSV-2-pUL19	839	14aa	mRNA_30cpc_Organoid_MD114	2
_LQNMVVPEITPGED_	X29937	HSV-1-pUL19	839	14aa	mRNA_3cpc_Th	2
_LQNMVVPEITPGED_	X29937	HSV-2-pUL19	839	14aa	mRNA_3cpc_Th	2
_LQNMVVPEITPGED_	X29937	HSV-1-pUL19	839	14aa	mRNA_30cpc_Organoid_MD114	1
_LQNMVVPEITPGED_	X29937	HSV-2-pUL19	839	14aa	mRNA_30cpc_Organoid_MD114	1
____PEITPGEDCPSDPV	X23096	HSV-1-pUL19	845	14aa	mRNA_30cpc_Organoid_MD114	1
_TLQNMVVPEIAPGE_	X7795	HSV-1-pUL19	838	14aa	mRNA_30cpc_SN	1
_TLQNMVVPEIAPGE_	X7795	HSV-2-pUL19	838	14aa	mRNA_30cpc_SN	1
_TLQNMVVPEIAPGE_	X7795	HSV-1-pUL19	838	14aa	mRNA_30cpc_Th	1
_TLQNMVVPEIAPGE_	X7795	HSV-2-pUL19	838	14aa	mRNA_30cpc_Th	1
_TLQNMVVPEIAPGE_	X7795	HSV-1-pUL19	838	14aa	mRNA_3cpc_Th	1
_TLQNMVVPEIAPGE_	X7795	HSV-2-pUL19	838	14aa	mRNA_3cpc_Th	1
_TLQNMVVPEIAPGE_	X7795	HSV-1-pUL19	838	14aa	mRNA_30cpc_Organoid_MD114	1
_TLQNMVVPEIAPGE_	X47264	HSV-1-pUL19	838	14aaA5	mRNA_30cpc_Organoid_MD114	1
_TLQNMVVPEIAPGE_	X7795	HSV-2-pUL19	838	14aa	mRNA_30cpc_Organoid_MD114	1
_TLQNMVVPEIAPGE_	X47264	HSV-2-pUL19	838	14aaA5	mRNA_30cpc_Organoid_MD114	1
_TLQNMVVPEITPGE_	X47263	HSV-1-pUL19	838	14aaA5	mRNA_30cpc_SN	1
_TLQNMVVPEITPGE_	X47263	HSV-2-pUL19	838	14aaA5	mRNA_30cpc_SN	1
_TLQNMVVPEITPGE_	X47263	HSV-1-pUL19	838	14aaA5	mRNA_30cpc_Th	2
_TLQNMVVPEITPGE_	X47263	HSV-2-pUL19	838	14aaA5	mRNA_30cpc_Th	2
_TLQNMVVPEITPGE_	X47263	HSV-1-pUL19	838	14aaA5	mRNA_30cpc_Ctx	1
_TLQNMVVPEITPGE_	X47263	HSV-2-pUL19	838	14aaA5	mRNA_30cpc_Ctx	1

```
# setkey(select.samples.trsp,Peptide) select.samples.trsp.select <-
# select.samples.trsp[J(c('PPDELNLTTASLPL'))]
```

```
print("Total analysis time:")
```

```
[1] "Total analysis time:"
```

```
print(Sys.time() - strt1)
```

```
Time difference of 33.75815 secs
```

```
devtools::session_info()
```

```
Session info -----
```

```
setting  value
version  R version 3.4.2 (2017-09-28)
system   x86_64, linux-gnu
ui        X11
language (EN)
collate   en_US.UTF-8
tz        UTC
date      2020-11-10
```

```
Packages -----
```

package	* version	date	source
ade4	1.7-8	2017-08-09	CRAN (R 3.4.2)
backports	1.1.1	2017-09-25	CRAN (R 3.4.2)
base	* 3.4.2	2017-10-06	local
compiler	3.4.2	2017-10-06	local
data.table	* 1.10.4-2	2017-10-12	url
datasets	* 3.4.2	2017-10-06	local
devtools	* 1.13.3	2017-08-02	CRAN (R 3.4.2)
digest	0.6.12	2017-01-27	CRAN (R 3.4.2)
evaluate	0.10.1	2017-06-24	CRAN (R 3.4.2)
formatR	1.5	2017-04-25	CRAN (R 3.4.2)
graphics	* 3.4.2	2017-10-06	local
grDevices	* 3.4.2	2017-10-06	local
highr	0.6	2016-05-09	CRAN (R 3.4.2)
hms	0.3	2016-11-22	CRAN (R 3.4.2)
htmltools	0.3.6	2017-04-28	CRAN (R 3.4.2)
httr	1.3.1	2017-08-20	CRAN (R 3.4.2)
kableExtra	* 0.5.2	2017-09-15	url
knitr	* 1.17	2017-08-10	CRAN (R 3.4.2)
magrittr	1.5	2014-11-22	CRAN (R 3.4.2)
memoise	1.1.0	2017-04-21	CRAN (R 3.4.2)
methods	3.4.2	2017-10-06	local
parallel	* 3.4.2	2017-10-06	local
plyr	1.8.4	2016-06-08	CRAN (R 3.4.2)
R6	2.2.2	2017-06-17	CRAN (R 3.4.2)
Rcpp	0.12.13	2017-09-28	url
readr	1.1.1	2017-05-16	CRAN (R 3.4.2)
reshape2	* 1.4.2	2016-10-22	CRAN (R 3.4.2)
rlang	0.1.2	2017-08-09	CRAN (R 3.4.2)
rmarkdown	1.6	2017-06-15	url
rprojroot	1.2	2017-01-16	CRAN (R 3.4.2)
rvest	0.3.2	2016-06-17	CRAN (R 3.4.2)
seqinr	* 3.4-5	2017-08-01	CRAN (R 3.4.2)

stats	* 3.4.2	2017-10-06	local
stringi	1.1.5	2017-04-07	url
stringr	1.2.0	2017-02-18	CRAN (R 3.4.2)
tibble	1.3.4	2017-08-22	CRAN (R 3.4.2)
tools	3.4.2	2017-10-06	local
utils	* 3.4.2	2017-10-06	local
withr	2.0.0	2017-07-28	url
xml2	1.1.1	2017-01-24	CRAN (R 3.4.2)
yaml	2.1.14	2016-11-12	CRAN (R 3.4.2)