

Clustering Polypeptide motifs using the Hammock hidden Markov model peptide clustering of organoid samples

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

```
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_Organoid_MD114", "mRNA_3000cpc_Organoid_MD101"))]

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[Animals == "mRNA_3000cpc_Organoid_MD101", `:=`(BCcount, as.integer(BCcount/6)),
] # Removes unclear 3000cpc reads
select.samples <- select.samples[BCcount >= 1]
select.samples[, `:=`(Score, BCcount + Animalcount - 1), ]
select.samples.trsp <- unique(select.samples, by = c("Animals", "BC", "LUTnrs"))

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/organoidPeptides.fasta",
open = "w", nbchar = 60, as.string = TRUE)

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

Executing Hammock Clustering

```
Sys.setenv(PATH = paste("/root/HMMER/binaries", Sys.getenv("PATH"), sep = ":"),
HHLIB = "/home/rstudio/Hammock_v_1.2.0/hhsuite-2.0.16/lib/hh/")
unlink("/home/rstudio/data/HammockOrganoids", recursive = TRUE, force = FALSE)
sys.out <- system(paste("java -jar /home/rstudio/Hammock_v_1.2.0/dist/Hammock.jar full -i /home/rstudio/data/
detectCores(), sep = ""), intern = TRUE, ignore.stdout = TRUE)
# Alternative parameters --use_clinkage --alignment_threshold 23 --max_shift
# 13 --max_aln_length 37 --count_threshold 50 --max_inner_gaps 0
# --assign_thresholds 14.1,10.5,7.0
hammock.log <- data.table(readLines("data/HammockOrganoids/run.log"))
```

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

Hammock log file

2020-11-09 23:03:32.265:

Hammock version 1.2.0 Run with `-help` for a brief description of command line parameters.

2020-11-09 23:03:32.402: Program started in mode “full”.

Command-line arguments:

full -i /home/rstudio/data/organoidPeptides.fasta -d /home/rstudio/data/HammockOrganoids -max_shift 7 -c 65 -t 48

Complete list of input/output parameters:

-i, -input /home/rstudio/data/organoidPeptides.fasta
 -d, -output_directory /home/rstudio/data/HammockOrganoids
 -t, -thread 48
 -l, -labels null

Complete list of clinkage clustering parameters:

-f, -file_format fasta
 -m, -matrix /home/rstudio/Hammock_v_1.2.0/matrices/blosum62.txt
 -g, -alignment_threshold (-greedy_threshold)null
 -x, -max_shift 7
 -p, -gap_penalty 0
 -C, -cache_size_limit 1

2020-11-09 23:03:32.403: Loading input sequences...

2020-11-09 23:03:32.435: 1600 unique sequences loaded.

2020-11-09 23:03:32.438: 1733 total sequences loaded.

2020-11-09 23:03:32.438: 1600 unique sequences after non-specified labels filtered out

2020-11-09 23:03:32.443: 1733 total sequences after non-specified labels filtered out

2020-11-09 23:03:32.443: Shortest sequence: 14 AA. Longest sequence: 22 AA.

2020-11-09 23:03:32.444: Up to 10 000 unique sequences. Using clinkage clustering. Use `-use_greedy` to force greedy clustering

2020-11-09 23:03:32.449: Generating input statistics...

2020-11-09 23:03:32.455: Clinkage clustering threshold not set. Setting automatically to: 26

2020-11-09 23:03:32.456: Clinkage clustering...

2020-11-09 23:03:38.387: Ready. Clustering time: 5930

2020-11-09 23:03:38.388: Resulting clusters: 926

2020-11-09 23:03:38.388: Building MSAs...

2020-11-09 23:03:38.691: Ready. Total time: 6233

2020-11-09 23:03:38.691: Saving results to output files...

2020-11-09 23:03:38.859: Clinkage clustering results in: /home/rstudio/data/HammockOrganoids/initial_clusters.tsv

2020-11-09 23:03:38.860: and: /home/rstudio/data/HammockOrganoids/initial_clusters_sequences.tsv

2020-11-09 23:03:38.860: and:

/home/rstudio/data/HammockOrganoids/initial_clusters_sequences_original_order.tsv

2020-11-09 23:03:38.860:

Loading clusters...

2020-11-09 23:03:38.880: Maximal alignment length not set. Setting automatically to: 30

2020-11-09 23:03:38.881: Minimal number of match states not set. Setting automatically to: 5

2020-11-09 23:03:38.947: Assign threshold not set. Setting automatically to:

2020-11-09 23:03:38.951: 14.42,11.38,8.35

2020-11-09 23:03:38.952: Overlap threshold not set. Setting automatically to:

2020-11-09 23:03:38.953: 10.62,6.07,0.0

Hammock log file

2020-11-09 23:03:38.953: Merge threshold not set. Setting automatically on the basis of average sequence length to:
2020-11-09 23:03:38.954: 15.18,13.66,12.14
2020-11-09 23:03:38.954: Initial extension threshold not set. Setting automatically on the basis of merge threshold
sequence to: 16.698

Complete list of HMM-based clustering parameters:

-a, -part_threshold null
-s, -size_threshold null
-c, -count_threshold 65
-n, -assign_thresholds 14.42,11.38,8.35,
-v, -overlap_thresholds 10.62,6.07,0.0,
-r, -merge_thresholds 15.18,13.66,12.14,
-e, -relative_thresholds false
-b, -absolute_thresholds true
-h, -min_conserved_positions 5
-y, -max_gap_proportion 0.2
-k, -min_ic 1.2
-j, -max_aln_length 30
-u, -max_inner_gaps 0
-q, -extension_increase_length false

2020-11-09 23:03:39.040: Initial cluster extension...
2020-11-09 23:04:04.346:
Clustering in 3 rounds...
2020-11-09 23:04:04.347:
2020-11-09 23:04:04.347: Round 1:

2020-11-09 23:04:04.347: 65 clusters remaining
2020-11-09 23:04:04.348: Building hmms and searching database...
2020-11-09 23:04:04.536: Extending clusters...
2020-11-09 23:04:04.538: 9 sequences to be inserted into clusters
2020-11-09 23:04:04.538: 7 clusters to be extended
2020-11-09 23:04:04.546: 8 sequences rejected
2020-11-09 23:04:04.547: 0 cluster pairs to check and merge.
2020-11-09 23:04:04.547: Merging clusters from 0 groups...
2020-11-09 23:04:04.555: Buiding hhs...
2020-11-09 23:04:04.555: HH clustering...
2020-11-09 23:04:04.564:
2020-11-09 23:04:04.564: Round 2:

2020-11-09 23:04:04.564: 65 clusters remaining
2020-11-09 23:04:04.564: Building hmms and searching database...
2020-11-09 23:04:04.609: Extending clusters...
2020-11-09 23:04:04.610: 9 sequences to be inserted into clusters
2020-11-09 23:04:04.610: 7 clusters to be extended
2020-11-09 23:04:04.617: 9 sequences rejected
2020-11-09 23:04:04.618: 14 cluster pairs to check and merge.
2020-11-09 23:04:04.618: Merging clusters from 7 groups...
2020-11-09 23:04:04.626: Buiding hhs...
2020-11-09 23:04:04.637: HH clustering...
2020-11-09 23:04:05.188:
2020-11-09 23:04:05.189: Round 3:

2020-11-09 23:04:05.189: 64 clusters remaining
2020-11-09 23:04:05.189: Building hmms and searching database...
2020-11-09 23:04:05.242: Extending clusters...

Hammock log file

2020-11-09 23:04:05.244: 33 sequences to be inserted into clusters
2020-11-09 23:04:05.244: 21 clusters to be extended
2020-11-09 23:04:05.258: 22 sequences rejected
2020-11-09 23:04:05.259: Overlap threshold is 0. Running full cluster merging.
2020-11-09 23:04:05.266: Buiding hhs...
2020-11-09 23:04:05.283: HH clustering...
2020-11-09 23:04:08.357:
Ready. Clustering time : 4010
2020-11-09 23:04:08.358: Resulting clusers: 58
2020-11-09 23:04:08.358: Containing 267 unique sequences and 348 total sequences.
2020-11-09 23:04:08.359: Unique sequences not assigned: 861, total sequences not assigned: 862
2020-11-09 23:04:08.359: Saving results to outupt files...
2020-11-09 23:04:08.389: Results in: /home/rstudio/data/HammockOrganoids/final_clusters_sequences.tsv
2020-11-09 23:04:08.389: and: /home/rstudio/data/HammockOrganoids/final_clusters.tsv
2020-11-09 23:04:08.390: and: /home/rstudio/data/HammockOrganoids/final_clusters_sequences_original_order.tsv
2020-11-09 23:04:08.390:
Calculating KLD...
2020-11-09 23:04:08.476: Final system KLD over match state MSA positions: 12.822032493387635
2020-11-09 23:04:08.476: Final system KLD over all MSA positions: 14.070203553630874
2020-11-09 23:04:08.476: Program successfully ended.

Generation of Weblogo visualization

```
ham.clusters <- data.table(read.table("/home/rstudio/data/HammockOrganoids/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/HammockOrganoids/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)

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

setkey(ham.clusters.all, cluster_id)
setkey(ham.clusters, cluster_id)
setkey(select.samples.pepMerge, Peptide)

opts_chunk$set(out.width = "100%", fig.align = "center")
generateWeblogo <- function(in.name) {
  # in.name <- ham.clusters$cluster_id[2] in.name <- 4352
  print(in.name)
  this.fa <- read.fasta(file = paste("/home/rstudio/data/HammockOrganoids/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))))

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/HamcockOrganoids/alignments_final_Scored/",
    in.name, ".aln", sep = ""), open = "w")

this.main <- ham.clusters[J(in.name)]
main.gene <- select.samples.trsp[J(this.main$main_sequence)]$GeneName[1]
this.title <- paste("## Peptide", this.main$main_sequence, "from", main.gene,
  "with cluster number", in.name, sep = " ")

tmp <- system(paste("weblogo --format PDF --sequence-type protein --size large --errorbars NO --resolution",
  this.title, "' < /home/rstudio/data/HamcockOrganoids/alignments_final_Scored/",
  in.name, ".aln > /home/rstudio/data/WEBlogosOrganoids/", 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/WEBlogosOrganoids/",
  in.name, ".pdf)"))
cat("\n")
out.table <- knitr::kable(this.main, format = "latex")
print(column_spec(out.table, 1:ncol(this.main), monospace = TRUE) %>% kable_styling(latex_options = c("striped",
  "scale_down", "repeat_header"))))
cat("\n")
this.cluster <- ham.clusters.all[J(in.name)]
out.table <- knitr::kable(this.cluster, format = "latex")
print(column_spec(out.table, 1:ncol(this.cluster), 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",

```

```

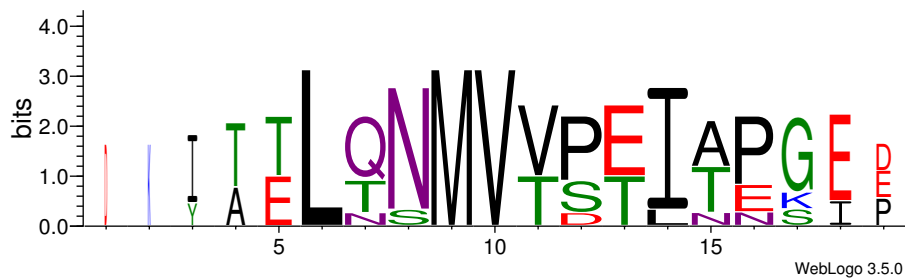
      "scale_down", "repeat_header"))))
cat("\n")
cat("\n\n\\pagebreak\n")
cat("\n\n\\clearpage\n")
this.found <- this.found[48:nrow(this.found), ]
}
if (nrow(this.found) >= 48) {
  this.found.p2 <- this.found[1:47, ]
  out.table <- knitr::kable(this.found.p2[, ..output.order], format = "latex")
  print(column_spec(out.table, 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")
}
}
invisible(lapply(id.order, generateWeblogo))

```

[1] 1769

Peptide TLQNMVVPEIAPGE from HSV-1-pUL19 with cluster number 1769

ptide TLQNMVVPEIAPGE from HSV-1-pUL19 with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1769	TLQNMVVPEIAPGE	17	10	7

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1769	TLQNMVVPEIAPGE	___TLQNMVVPEIAPGE_	3	2	1
1769	TELTNMTSTITEK	___TELTNMTSTITEK__	2	1	1
1769	LQNMVVPEITPGED	____LQNMVVPEITPGED	2	1	1
1769	LQNMVVPEIAPGEE	____LQNMVVPEIAPGEE	2	2	0
1769	LNSMVTDTLNN SIP	____LNSMVTDTLNN SIP	2	1	1
1769	ITELTNMTSTITE	__ITELTNMTSTITE__	2	2	0
1769	ATLQNMVVPEIAPG	___ATLQNMVVPEIAPG__	2	1	1
1769	YATLQNMVVPEITP	__YATLQNMVVPEITP__	1	0	1
1769	DKITELTNMTSTI	DKITELTNMTSTI_____	1	0	1

alignment	LUTnrs	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
___ATLQNMVVPEIAPG__	X40328	HSV-1-pUL19	837	14aa	mRNA_3000cpc_Organoid_MD101	1
___ATLQNMVVPEIAPG__	X40328	HSV-2-pUL19	837	14aa	mRNA_3000cpc_Organoid_MD101	1
DKITELTNMTSTI_____	X33879	PV1-VP1	474	14aa	mRNA_3000cpc_Organoid_MD101	1
__ITELTNMTSTITE__	X14645	PV1-VP1	476	14aa	mRNA_30cpc_Organoid_MD114	2
____LNSMVTDTLNN SIP	X28344	BoNT-E-Hc	31	14aa	mRNA_30cpc_Organoid_MD114	1
____LNSMVTDTLNN SIP	X28344	BoNT-E-Hc	31	14aa	mRNA_3000cpc_Organoid_MD101	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_30cpc_Organoid_MD114	1
____LQNMVVPEITPGED	X29937	HSV-2-pUL19	839	14aa	mRNA_30cpc_Organoid_MD114	1
____LQNMVVPEITPGED	X29937	HSV-1-pUL19	839	14aa	mRNA_3000cpc_Organoid_MD101	1
____LQNMVVPEITPGED	X29937	HSV-2-pUL19	839	14aa	mRNA_3000cpc_Organoid_MD101	1
___TELTNMTSTITEK__	X8305	PV1-VP1	477	14aa	mRNA_30cpc_Organoid_MD114	1
___TELTNMTSTITEK__	X8305	PV1-VP1	477	14aa	mRNA_3000cpc_Organoid_MD101	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
____TLQNMVVPEIAPGE_	X47264	HSV-1-pUL19	838	14aaA5	mRNA_3000cpc_Organoid_MD101	1
____TLQNMVVPEIAPGE_	X47264	HSV-2-pUL19	838	14aaA5	mRNA_3000cpc_Organoid_MD101	1
__YATLQNMVVPEITP__	X71450	HSV-1-pUL19	836	14aa	mRNA_3000cpc_Organoid_MD101	1
__YATLQNMVVPEITP__	X71450	HSV-2-pUL19	836	14aa	mRNA_3000cpc_Organoid_MD101	1

bits

4.0
3.0
2.0
1.0
0.0

5 10 15 20 25

L A G P D E A P M R F V A H R D A G N S L P A P T P M P D A G

WebLogo 3.5.0

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2239	RDAGNSLPAPTPMD	_____RDAGNSLPAPTPMD__	2	1	1
2239	LEVRDAGNSLPAPT	_____LEVRDAGNSLPAPT_____	2	1	1
2239	VRDAGNSLPAPTPM	_____VRDAGNSLPAPTPM_____	1	1	0
2239	VMERFAAHAGDLVPAPGHPDPR	_____VMERFAAHAGDLVPAPGHPDPR_____	1	1	0
2239	RVSVGEDVSLLPAP	_____RVSVGEDVSLLPAP_____	1	0	1
2239	RFAAHAGDLVPAPG	_____RFAAHAGDLVPAPG_____	1	1	0
2239	PLAGPEAPRDLEVRDAGNSLPA	PLAGPEAPRDLEVRDAGNSLPA_____	1	0	1
2239	LGLFNPAmerFAAHAGDLVPAP	_LGLFNPAmerFAAHAGDLVPAP_____	1	1	0
2239	EVRDAGNSLPAPTP	_____EVRDAGNSLPAPTP_____	1	0	1
2239	DVSLLPAPGPTGRG	_____DVSLLPAPGPTGRG_____	1	0	1
2239	DAGNSLPAPTPMDA	_____DAGNSLPAPTPMDA_____	1	0	1
2239	AHAGDLVPAPGHPE	_____AHAGDLVPAPGHPE_____	1	1	0
2239	AHAGDLVPAPGHPD	_____AHAGDLVPAPGHPD_____	1	0	1

8

[1] 1634

Peptide VGPNTMAAGGGAPM from AAV8-VP1 with cluster number 1634

Peptide VGPNTMAAGGGAPM from AAV8-VP1 with cluster number 1634



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1634	VGPNTMAAGGGAPM	14	10	4

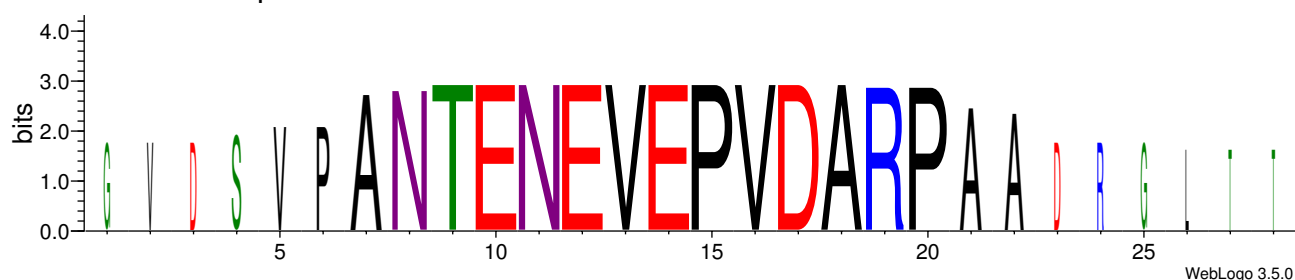
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1634	VGPNTMAAGGGAPM	____VGPNTMAAGGGAPM_____	3	2	1
1634	TSRDALPNTTEASGP	_TSRDALPNTTEASGP_____	1	1	0
1634	SGVGPNTMAAGGGA	___SGVGPNTMAAGGGA_____	1	0	1
1634	PSGVGPNTMAAGGGAPMADNNE	__PSGVGPNTMAAGGGAPMADNNE__	1	1	0
1634	PDTQSSGPAHSKET	____PDTQSSGPAHSKET_____	1	1	0
1634	PANNLPDTQSSGPA	__PANNLPDTQSSGPA_____	1	0	1
1634	NTEASGPTHKEIP	____NTEASGPTHKEIP_____	1	1	0
1634	NNLPDTQSSGPAHSKETPALTA	___NNLPDTQSSGPAHSKETPALTA__	1	0	1
1634	NNLPDTQSSGPAHS	____NNLPDTQSSGPAHS_____	1	1	0
1634	GVGPNTMAAGGGAP	____GVGPNTMAAGGGAP_____	1	1	0
1634	AAVGPTTMASSGGGA	___AAVGPTTMASSGGGA_____	1	1	0
1634	AAPSGVGPNTMAAG	____AAPSGVGPNTMAAG_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
AAPSGVGPNTMAAG_____	X43545	AAV8-VP1	194	14aa	mRNA_30cpc_Organoid_MD114	1
___AAVGPTTMASSGGGA_____	X87907	AAV1-VP1	196	14aaG4S	mRNA_30cpc_Organoid_MD114	1
___AAVGPTTMASSGGGA_____	X87907	AAV6-VP1	196	14aaG4S	mRNA_30cpc_Organoid_MD114	1
____GVGPNTMAAGGGAP_____	X64974	AAV8-VP1	198	14aa	mRNA_30cpc_Organoid_MD114	1
____NNLPDTQSSGPAHS_____	X142	PV2-VP1	25	14aa	mRNA_30cpc_Organoid_MD114	1
____NNLPDTQSSGPAHSKETPALTA	X141	PV2-VP1	25	22aa	mRNA_3000cpc_Organoid_MD101	1
____NTEASGPTHKEIP_____	X528	PV1-VP1	29	14aa	mRNA_30cpc_Organoid_MD114	1
__PANNLPDTQSSGPA_____	X23293	PV2-VP1	23	14aa	mRNA_3000cpc_Organoid_MD101	1
____PDTQSSGPAHSKET_____	X22894	PV2-VP1	28	14aa	mRNA_30cpc_Organoid_MD114	1
__PSGVGPNTMAAGGGAPMADNNE__	X21320	AAV1-VP1	195	22aa	mRNA_30cpc_Organoid_MD114	1
__PSGVGPNTMAAGGGAPMADNNE__	X21320	AAV6-VP1	195	22aa	mRNA_30cpc_Organoid_MD114	1
__PSGVGPNTMAAGGGAPMADNNE__	X21320	AAV8-VP1	196	22aa	mRNA_30cpc_Organoid_MD114	1
___SGVGPNTMAAGGGA_____	X13360	AAV8-VP1	197	14aa	mRNA_3000cpc_Organoid_MD101	1
_TSRDALPNTTEASGP_____	X6352	PV1-VP1	22	14aa	mRNA_30cpc_Organoid_MD114	1
____VGPNTMAAGGGAPM_____	X69003	AAV8-VP1	199	14aa	mRNA_30cpc_Organoid_MD114	2
____VGPNTMAAGGGAPM_____	X69003	AAV8-VP1	199	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2256

Peptide ANTENEVEPVDARP from APP with cluster number 2256

Peptide ANTENEVEPVDARP from APP with cluster number 2256



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2256	ANTENEVEPVDARP	13	4	9

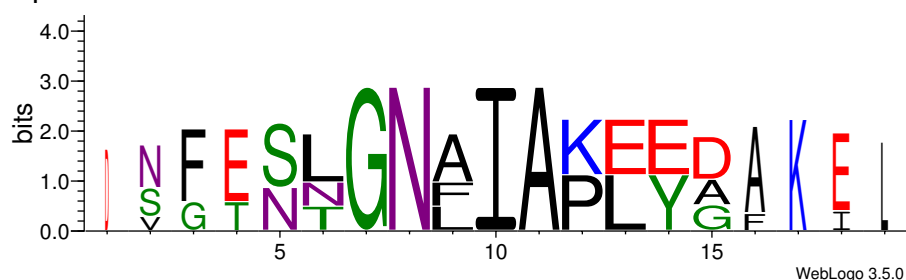
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2256	ANTENEVEPVDARP	-----ANTENEVEPVDARP-----	5	3	2
2256	TENEVEPVDARPA	-----TENEVEPVDARPA-----	2	1	1
2256	GVDSVPANTENEVEPVDARPA	GVDSVPANTENEVEPVDARPA-----	2	0	2
2256	VPANTENEVEPVDA	-----VPANTENEVEPVDA-----	1	0	1
2256	SVPANTENEVEPVDARPAADRG	___SVPANTENEVEPVDARPAADRG___	1	0	1
2256	NTENEVEPVDARPA	-----NTENEVEPVDARPA-----	1	0	1
2256	ANTENEVEPVDARPAADRGLTT	-----ANTENEVEPVDARPAADRGLTT	1	0	1

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
-----ANTENEVEPVDARP-----	X39803	APP	631	14aa	mRNA_3000cpc_Organoid_MD101	2
-----ANTENEVEPVDARPAADRGLTT	X39804	APP	631	22aa	mRNA_3000cpc_Organoid_MD101	1
GVDSVPANTENEVEPVDARPA	X64911	APP	625	22aa	mRNA_3000cpc_Organoid_MD101	2
-----NTENEVEPVDARPA-----	X524	APP	632	14aa	mRNA_3000cpc_Organoid_MD101	1
___SVPANTENEVEPVDARPAADRG___	X13535	APP	628	22aa	mRNA_3000cpc_Organoid_MD101	1
-----TENEVEPVDARPA-----	X8197	APP	633	14aa	mRNA_30cpc_Organoid_MD114	1
-----TENEVEPVDARPA-----	X8197	APP	633	14aa	mRNA_3000cpc_Organoid_MD101	1
-----VPANTENEVEPVDA-----	X67260	APP	629	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2273

Peptide NFESNGNFIAPEYA from H5N1-HA with cluster number 2273

Peptide NFESNGNFIAPEYA from H5N1-HA with cluster number 2:



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2273	NFESNGNFIAPEYA	12	6	6

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2273	NFESNGNFIAPEYA	_NFESNGNFIAPEYA_	3	1	2
2273	SFESTGNLIAPEYG	_SFESTGNLIAPEYG_	2	1	1
2273	NLGNAIAKLEDAKE	___NLGNAIAKLEDAKE_	2	1	1
2273	LGNAIAKLEDAKEL	____LGNAIAKLEDAKEL	2	1	1
2273	STGNLIAPEYGFKI	___STGNLIAPEYGFKI_	1	1	0
2273	GTNLGNIAKLEDA	__GTNLGNIAKLEDA__	1	0	1
2273	DVGTNLGNIAIAKLE	DVGTNLGNIAIAKLE_	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
DVGTNLGNIAIAKLE_	X36365	MV-F-CAM-70	461	14aa	mRNA_30cpc_Organoid_MD114	1
DVGTNLGNIAIAKLE_	X36365	MV-F-Edmonston	461	14aa	mRNA_30cpc_Organoid_MD114	1
DVGTNLGNIAIAKLE_	X36365	MV-F-Halle	461	14aa	mRNA_30cpc_Organoid_MD114	1
__GTNLGNIAIAKLEDA__	X57096	MV-F-CAM-70	463	14aaA5	mRNA_3000cpc_Organoid_MD101	1
__GTNLGNIAIAKLEDA__	X57096	MV-F-Edmonston	463	14aaA5	mRNA_3000cpc_Organoid_MD101	1
__GTNLGNIAIAKLEDA__	X57096	MV-F-Halle	463	14aaA5	mRNA_3000cpc_Organoid_MD101	1
____LGNAIAKLEDAKEL	X32295	MV-F-CAM-70	466	14aa	mRNA_30cpc_Organoid_MD114	1
____LGNAIAKLEDAKEL	X32295	MV-F-Edmonston	466	14aa	mRNA_30cpc_Organoid_MD114	1
____LGNAIAKLEDAKEL	X32295	MV-F-Halle	466	14aa	mRNA_30cpc_Organoid_MD114	1
____LGNAIAKLEDAKEL	X32295	MV-F-CAM-70	466	14aa	mRNA_3000cpc_Organoid_MD101	1
____LGNAIAKLEDAKEL	X32295	MV-F-Edmonston	466	14aa	mRNA_3000cpc_Organoid_MD101	1
____LGNAIAKLEDAKEL	X32295	MV-F-Halle	466	14aa	mRNA_3000cpc_Organoid_MD101	1
NFESNGNFIAPEYA	X2967	H5N1-HA	256	14aa	mRNA_30cpc_Organoid_MD114	1
NFESNGNFIAPEYA	X2967	H5N1-HA	256	14aa	mRNA_3000cpc_Organoid_MD101	1
NFESNGNFIAPEYA	X46009	H5N1-HA	256	14aaA5	mRNA_3000cpc_Organoid_MD101	1
___NLGNAIAKLEDAKE_	X1704	MV-F-CAM-70	465	14aa	mRNA_30cpc_Organoid_MD114	1
___NLGNAIAKLEDAKE_	X1704	MV-F-Edmonston	465	14aa	mRNA_30cpc_Organoid_MD114	1
___NLGNAIAKLEDAKE_	X1704	MV-F-Halle	465	14aa	mRNA_30cpc_Organoid_MD114	1
___NLGNAIAKLEDAKE_	X1704	MV-F-CAM-70	465	14aa	mRNA_3000cpc_Organoid_MD101	1
___NLGNAIAKLEDAKE_	X1704	MV-F-Edmonston	465	14aa	mRNA_3000cpc_Organoid_MD101	1
___NLGNAIAKLEDAKE_	X1704	MV-F-Halle	465	14aa	mRNA_3000cpc_Organoid_MD101	1
SFESTGNLIAPEYG	X14087	H2N2-HA	254	14aa	mRNA_30cpc_Organoid_MD114	1
SFESTGNLIAPEYG	X14087	H2N2-HA	254	14aa	mRNA_3000cpc_Organoid_MD101	1
___STGNLIAPEYGFKI_	X10468	H2N2-HA	257	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1864

Peptide AHAVSNAINAGSAA from HSV-1-pUL36 with cluster number 1864

Peptide AHAVSNAINAGSAA from HSV-1-pUL36 with cluster number 1864



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1864	AHAVSNAINAGSAA	11	6	5

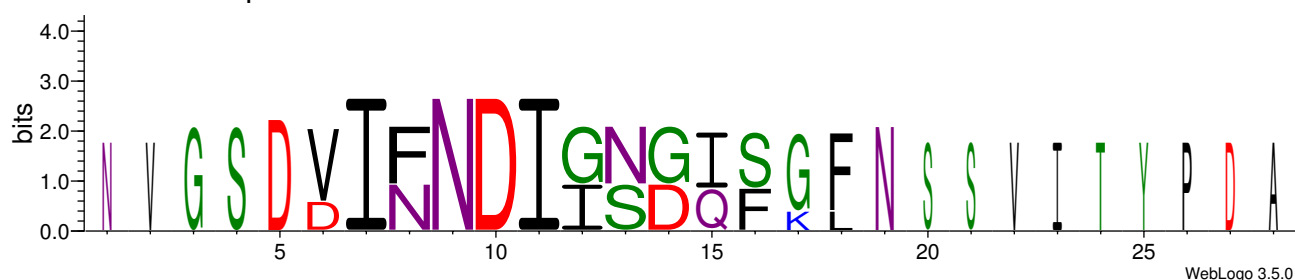
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1864	AHAVSNAINAGSAA	___AHAVSNAINAGSAA_____	4	2	2
1864	VSNAINAGSAAVAT	_____VSNAINAGSAAVAT_____	2	1	1
1864	AHAVSNAINAGSAAVATADPAS	___AHAVSNAINAGSAAVATADPAS___	2	1	1
1864	VSNAINAGSAAVATADPASTVD	_____VSNAINAGSAAVATADPASTVD	1	1	0
1864	PIIAHAVSNAINAGSAAVATAD	PIIAHAVSNAINAGSAAVATAD_____	1	0	1
1864	INAGSAAVATADPA	_____INAGSAAVATADPA_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___AHAVSNAINAGSAA_____	X41348	HSV-1-pUL36	1138	14aa	mRNA_30cpc_Organoid_MD114	2
___AHAVSNAINAGSAA_____	X41348	HSV-1-pUL36	1138	14aa	mRNA_3000cpc_Organoid_MD101	2
___AHAVSNAINAGSAAVATADPAS___	X41349	HSV-1-pUL36	1138	22aa	mRNA_30cpc_Organoid_MD114	1
___AHAVSNAINAGSAAVATADPAS___	X41349	HSV-1-pUL36	1138	22aa	mRNA_3000cpc_Organoid_MD101	1
_____INAGSAAVATADPA_____	X14290	HSV-1-pUL36	1145	14aa	mRNA_30cpc_Organoid_MD114	1
PIIAHAVSNAINAGSAAVATAD_____	X21423	HSV-1-pUL36	1135	22aa	mRNA_3000cpc_Organoid_MD101	1
_____VSNAINAGSAAVAT_____	X66274	HSV-1-pUL36	1141	14aa	mRNA_30cpc_Organoid_MD114	1
_____VSNAINAGSAAVAT_____	X66274	HSV-1-pUL36	1141	14aa	mRNA_3000cpc_Organoid_MD101	1
_____VSNAINAGSAAVATADPASTVD	X66275	HSV-1-pUL36	1141	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 2138

Peptide DINNDIISDISGFN from TeNT-Hc with cluster number 2138

Peptide DINNDIISDISGFN from TeNT-Hc with cluster number 2138



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2138	DINNDIISDISGFN	9	5	4

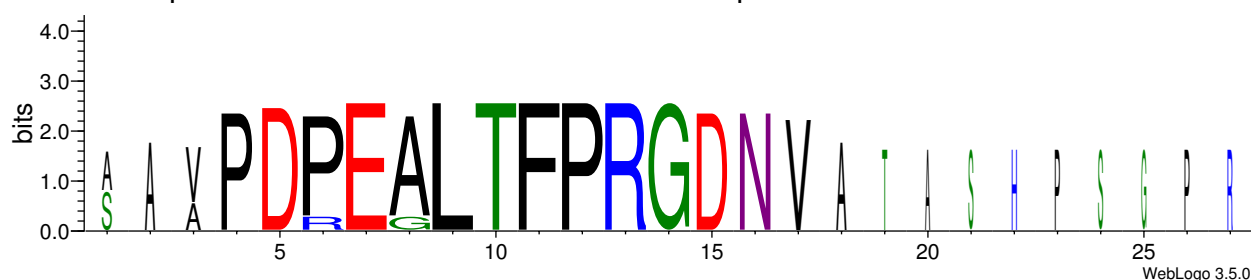
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2138	NVGSDVIFNDIGNG	NVGSDVIFNDIGNG_____	2	1	1
2138	INNDIISDISGFNSSVITYPDA	_____INNDIISDISGFNSSVITYPDA	2	1	1
2138	GSDVIFNDIGNGQF	__GSDVIFNDIGNGQF_____	2	1	1
2138	DINNDIISDISGFN	_____DINNDIISDISGFN_____	2	2	0
2138	DVIFNDIGNGQFKL	____DVIFNDIGNGQFKL_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
_____DINNDIISDISGFN_____	X34449	TeNT-Hc	27	14aa	mRNA_30cpc_Organoid_MD114	2
____DVIFNDIGNGQFKL_____	X36259	BoNT-G-Hc	29	14aa	mRNA_3000cpc_Organoid_MD101	1
__GSDVIFNDIGNGQF_____	X61902	BoNT-G-Hc	27	14aa	mRNA_30cpc_Organoid_MD114	1
__GSDVIFNDIGNGQF_____	X61902	BoNT-G-Hc	27	14aa	mRNA_3000cpc_Organoid_MD101	1
_____INNDIISDISGFNSSVITYPDA	X14169	TeNT-Hc	28	22aa	mRNA_30cpc_Organoid_MD114	1
_____INNDIISDISGFNSSVITYPDA	X14169	TeNT-Hc	28	22aa	mRNA_3000cpc_Organoid_MD101	1
NVGSDVIFNDIGNG_____	X45919	BoNT-G-Hc	25	14aaA5	mRNA_30cpc_Organoid_MD114	1
NVGSDVIFNDIGNG_____	X45919	BoNT-G-Hc	25	14aaA5	mRNA_3000cpc_Organoid_MD101	1

[1] 2263

Peptide PDPEALTFPRGDNV from HSV-1-pUL22 with cluster number 2263

Peptide PDPEALTFPRGDNV from HSV-1-pUL22 with cluster number 2263



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2263	PDPEALTFPRGDNV	8	6	2

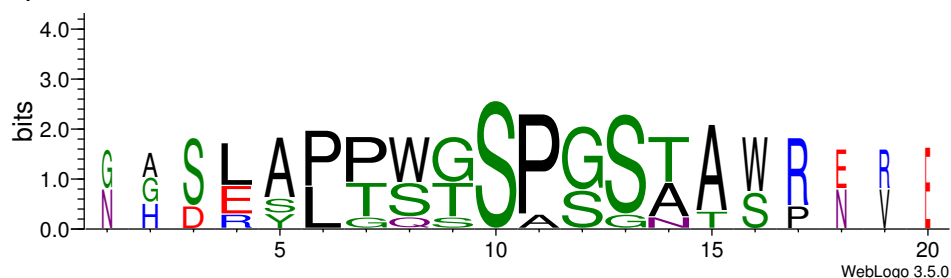
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2263	PDPEALTFPRGDNV	___PDPEALTFPRGDNV_____	3	2	1
2263	VPDPEALTFPRGDN	__VPDPEALTFPRGDN_____	1	1	0
2263	SAVPDPEALTFPRG	SAVPDPEALTFPRG_____	1	0	1
2263	PEALTFPRGDNVATASHPSGPR	_____PEALTFPRGDNVATASHPSGPR	1	1	0
2263	DPEALTFPRGDNVA	____DPEALTFPRGDNVA_____	1	1	0
2263	AAAPDREGLTFPRG	AAAPDREGLTFPRG_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
AAAPDREGLTFPRG_____	X43740	HSV-2-pUL22	164	14aa	mRNA_30cpc_Organoid_MD114	1
____DPEALTFPRGDNVA_____	X34957	HSV-1-pUL22	168	14aa	mRNA_30cpc_Organoid_MD114	1
___PDPEALTFPRGDNV_____	X22953	HSV-1-pUL22	167	14aa	mRNA_30cpc_Organoid_MD114	2
___PDPEALTFPRGDNV_____	X22953	HSV-1-pUL22	167	14aa	mRNA_3000cpc_Organoid_MD101	1
_____PEALTFPRGDNVATASHPSGPR	X23218	HSV-1-pUL22	169	22aa	mRNA_30cpc_Organoid_MD114	1
SAVPDPEALTFPRG_____	X13061	HSV-1-pUL22	164	14aa	mRNA_3000cpc_Organoid_MD101	1
__VPDPEALTFPRGDN_____	X67221	HSV-1-pUL22	166	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2102

Peptide LALPWTSPSSTAWR from JEV-E-BN19 with cluster number 2102

Peptide LALPWTSPSSTAWR from JEV-E-BN19 with cluster number 2



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2102	LALPWTSPSSTAWR	8	5	3

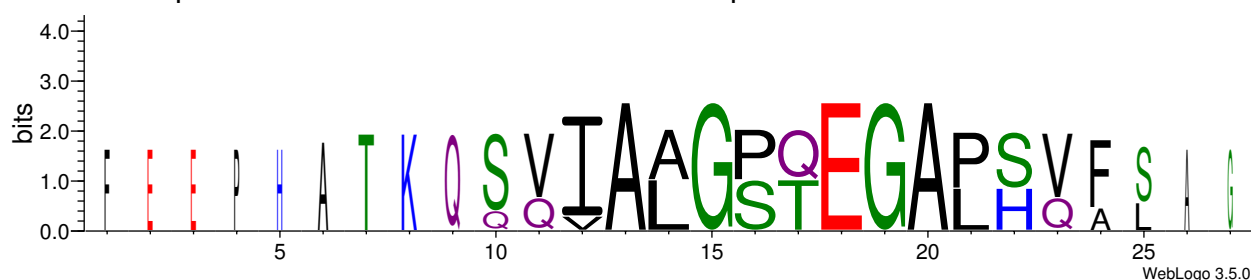
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2102	LALPWTSPSSTAWR	___LALPWTSPSSTAWR___	2	2	0
2102	SEAPTSGSPGSAAS	__SEAPTSGSPGSAAS____	1	0	1
2102	PWSSAGSTTWRNRE	_____PWSSAGSTTWRNRE	1	1	0
2102	PTSGSPGSAASPEV	_____PTSGSPGSAASPEV_	1	0	1
2102	NASEAPTSGSPGSA	NASEAPTSGSPGSA_____	1	0	1
2102	HDSLPLWTSPSSTA	_HDSLPLWTSPSSTA_____	1	1	0
2102	GGSRYPGQGSPGGN	GGSRYPGQGSPGGN_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
GGSRYPGQGSPGGN_____	X57862	PrPc	34	14aaA5	mRNA_30cpc_Organoid_MD114	1
_HDSLPLWTSPSSTA_____	X17861	JEV-E-KE-093	219	14aa	mRNA_30cpc_Organoid_MD114	1
_HDSLPLWTSPSSTA_____	X17861	JEV-E-SA14-5-3	219	14aa	mRNA_30cpc_Organoid_MD114	1
_HDSLPLWTSPSSTA_____	X17861	JEV-E-ThCMAR4492	219	14aa	mRNA_30cpc_Organoid_MD114	1
___LALPWTSPSSTAWR___	X31994	JEV-E-BN19	221	14aa	mRNA_30cpc_Organoid_MD114	2
___LALPWTSPSSTAWR___	X31994	JEV-E-KE-093	221	14aa	mRNA_30cpc_Organoid_MD114	2
___LALPWTSPSSTAWR___	X31994	JEV-E-SA14-5-3	221	14aa	mRNA_30cpc_Organoid_MD114	2
___LALPWTSPSSTAWR___	X31994	JEV-E-ThCMAR4492	221	14aa	mRNA_30cpc_Organoid_MD114	2
NASEAPTSGSPGSA_____	X2101	HSV-1-pUL44	42	14aa	mRNA_3000cpc_Organoid_MD101	1
_____PTSGSPGSAASPEV_	X20852	HSV-1-pUL44	47	14aa	mRNA_3000cpc_Organoid_MD101	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
__SEAPTSGSPGSAAS_____	X12719	HSV-1-pUL44	44	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2041

Peptide IAAGPTEGAPSVFS from HSV-1-pUL22 with cluster number 2041

Peptide IAAGPTEGAPSVFS from HSV-1-pUL22 with cluster number 2041



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2041	IAAGPTEGAPSVFS	8	5	3

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2041	IAAGPTEGAPSVFS	-----IAAGPTEGAPSVFS--	2	1	1
2041	TKQSVIALGSQEGA	-----TKQSVIALGSQEGA-----	1	0	1
2041	SVIALGSQEGALHQ	-----SVIALGSQEGALHQ-----	1	0	1
2041	QQIAAGPTEGAPSV	-----QQIAAGPTEGAPSV-----	1	1	0
2041	QIAAGPTEGAPSVF	-----QIAAGPTEGAPSVF-----	1	1	0
2041	FEEPHTKQSVVALGSQEGALH	FEEPHTKQSVVALGSQEGALH-----	1	1	0
2041	ATKQSVIALGSQEGALHQALAG	-----ATKQSVIALGSQEGALHQALAG	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----ATKQSVIALGSQEGALHQALAG	X40164	JEV-E-BN19	247	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	JEV-E-KE-093	247	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	JEV-E-SA14-5-3	247	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	JEV-E-ThCMAR4492	247	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	WNV-E-AZ10-918	247	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	WNV-E-ArD76104	243	22aa	mRNA_30cpc_Organoid_MD114	1
-----ATKQSVIALGSQEGALHQALAG	X40164	WNV-E-H-442	247	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	JEV-E-BN19	242	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	JEV-E-KE-093	242	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	JEV-E-SA14-5-3	242	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	JEV-E-ThCMAR4492	242	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	WNV-E-AZ10-918	242	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	WNV-E-ArD76104	238	22aa	mRNA_30cpc_Organoid_MD114	1
FEEPHTKQSVVALGSQEGALH-----	X75711	WNV-E-H-442	242	22aa	mRNA_30cpc_Organoid_MD114	1
-----IAAGPTEGAPSVFS--	X16325	HSV-1-pUL22	758	14aa	mRNA_30cpc_Organoid_MD114	1
-----IAAGPTEGAPSVFS--	X16325	HSV-1-pUL22	758	14aa	mRNA_3000cpc_Organoid_MD101	1
-----QIAAGPTEGAPSVF---	X50187	HSV-1-pUL22	757	14aaA5	mRNA_30cpc_Organoid_MD114	1
-----QQIAAGPTEGAPSV-----	X19117	HSV-1-pUL22	756	14aa	mRNA_30cpc_Organoid_MD114	1
-----SVIALGSQEGALHQ-----	X13495	WNV-E-AZ10-918	251	14aa	mRNA_3000cpc_Organoid_MD101	1
-----SVIALGSQEGALHQ-----	X13495	WNV-E-ArD76104	247	14aa	mRNA_3000cpc_Organoid_MD101	1
-----SVIALGSQEGALHQ-----	X13495	WNV-E-H-442	251	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	JEV-E-BN19	248	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	JEV-E-KE-093	248	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	JEV-E-SA14-5-3	248	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	JEV-E-ThCMAR4492	248	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	WNV-E-AZ10-918	248	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	WNV-E-ArD76104	244	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TKQSVIALGSQEGA-----	X5751	WNV-E-H-442	248	14aa	mRNA_3000cpc_Organoid_MD101	1

Peptide AVGLLVLAGLVAAF from HSV-1-pUL27 with cluster number 2269

Peptide AVGLLVLAGLVAAF from HSV-1-pUL27 with cluster number 2269



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2269	AVGLLVLAGLVAAF	7	6	1

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2269	QTGVRVALALVAAFALAMAVLR	QTGVRVALALVAAFALAMAVLR__	1	1	0
2269	QTGVRVALALVAAF	QTGVRVALALVAAF_____	1	1	0
2269	NENDVLVALVASSP	_NENDVLVALVASSP_____	1	0	1
2269	ICALVVGALVA AVASAAPAAPA	_ICALVVGALVA AVASAAPAAPA_	1	1	0
2269	GLLVLAGLVAAFFAFRYVLQLQ	__GLLVLAGLVAAFFAFRYVLQLQ	1	1	0
2269	GLLVLAGLVAAFFA	__GLLVLAGLVAAFFA_____	1	1	0
2269	AVGLLVLAGLVAAF	AVGLLVLAGLVAAF_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
AVGLLVLAGLVAAF_____	X44643	HSV-1-pUL27	779	14aa	mRNA_30cpc_Organoid_MD114	1
AVGLLVLAGLVAAF_____	X44643	HSV-2-pUL27	776	14aa	mRNA_30cpc_Organoid_MD114	1
__GLLVLAGLVAAFFA_____	X57542	HSV-1-pUL27	781	14aaA5	mRNA_30cpc_Organoid_MD114	1
__GLLVLAGLVAAFFA_____	X57542	HSV-2-pUL27	778	14aaA5	mRNA_30cpc_Organoid_MD114	1
__GLLVLAGLVAAFFAFRYVLQLQ	X63279	HSV-1-pUL27	781	22aa	mRNA_30cpc_Organoid_MD114	1
__GLLVLAGLVAAFFAFRYVLQLQ	X63279	HSV-2-pUL27	778	22aa	mRNA_30cpc_Organoid_MD114	1
ICALVVGALVA AVASAAPAAPA	X16834	HSV-2-pUL27	7	22aa	mRNA_30cpc_Organoid_MD114	1
_NENDVLVALVASSP_____	X45739	HSV-1-pUL36	2098	14aaA5	mRNA_3000cpc_Organoid_MD101	1
QTGVRVALALVAAF_____	X50108	HSV-1-pUL10	319	14aaA5	mRNA_30cpc_Organoid_MD114	1
QTGVRVALALVAAF_____	X50108	HSV-2-pUL10	319	14aaA5	mRNA_30cpc_Organoid_MD114	1
QTGVRVALALVAAFALAMAVLR__	X18706	HSV-1-pUL10	319	22aa	mRNA_30cpc_Organoid_MD114	1
QTGVRVALALVAAFALAMAVLR__	X18706	HSV-2-pUL10	319	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 1859

Peptide ALGQQLDSDAAFVP from HSV-1-pUL36 with cluster number 1859

Peptide ALGQQLDSDAAFVP from HSV-1-pUL36 with cluster number 1859



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1859	ALGQQLDSDAAFVP	7	3	4

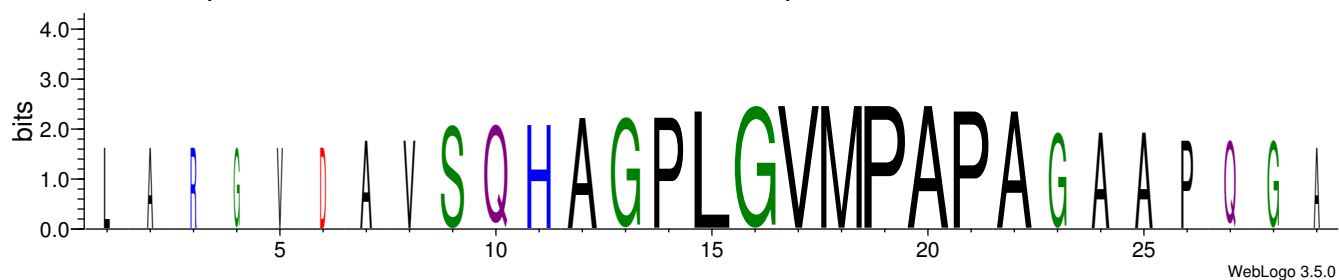
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1859	ALGQQLDSDAAFVP	_ALGQQLDSDAAFVP_____	3	2	1
1859	SDAAFVPAPGASPY	_____SDAAFVPAPGASPY_____	1	0	1
1859	LGQQLDSDAAFVPA	__LGQQLDSDAAFVPA_____	1	0	1
1859	DSDAAFVPAPGASPYDDGGLS	_____DSDAAFVPAPGASPYDDGGLS	1	0	1
1859	AALGQQLDSDAAVF	AALGQQLDSDAAVF_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
AALGQQLDSDAAVF_____	X43643	HSV-1-pUL36	933	14aa	mRNA_30cpc_Organoid_MD114	1
_ALGQQLDSDAAFVP_____	X42683	HSV-1-pUL36	934	14aa	mRNA_30cpc_Organoid_MD114	1
_ALGQQLDSDAAFVP_____	X56327	HSV-1-pUL36	934	14aaA5	mRNA_30cpc_Organoid_MD114	1
_ALGQQLDSDAAFVP_____	X56327	HSV-1-pUL36	934	14aaA5	mRNA_3000cpc_Organoid_MD101	1
_____DSDAAFVPAPGASPYDDGGLS	X34355	HSV-1-pUL36	940	22aa	mRNA_3000cpc_Organoid_MD101	1
__LGQQLDSDAAFVPA_____	X32402	HSV-1-pUL36	935	14aa	mRNA_3000cpc_Organoid_MD101	1
_____SDAAFVPAPGASPY_____	X12547	HSV-1-pUL36	941	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1854

Peptide SQHAGPLGVMPAPA from HSV-1-pUL36 with cluster number 1854

Peptide SQHAGPLGVMPAPA from HSV-1-pUL36 with cluster number 1854



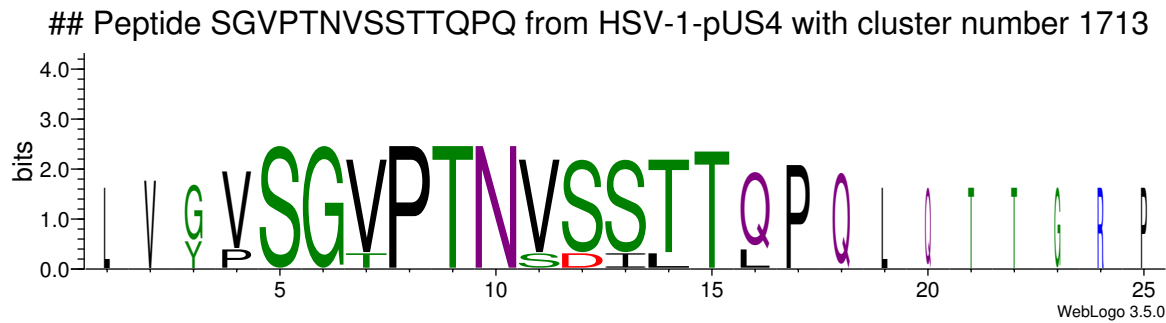
cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1854	SQHAGPLGVMPAPA	7	4	3

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1854	SQHAGPLGVMPAPA	-----SQHAGPLGVMPAPA-----	2	1	1
1854	LGVPAPAGAAPQG	-----LGVPAPAGAAPQG_	1	0	1
1854	LARGVDAVSQHAGPLGVMPAPA	LARGVDAVSQHAGPLGVMPAPA-----	1	0	1
1854	GVMPAPAGAAPQGA	-----GVMPAPAGAAPQGA	1	1	0
1854	AVSQHAGPLGVMPA	-----AVSQHAGPLGVMPA-----	1	1	0
1854	AGPLGVMPAPAGAA	-----AGPLGVMPAPAGAA_	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----AGPLGVMPAPAGAA_	X44054	HSV-1-pUL36	744	14aa	mRNA_30cpc_Organoid_MD114	1
-----AVSQHAGPLGVMPA-----	X56752	HSV-1-pUL36	739	14aaA5	mRNA_30cpc_Organoid_MD114	1
-----GVMPAPAGAAPQGA	X57955	HSV-1-pUL36	748	14aaA5	mRNA_30cpc_Organoid_MD114	1
LARGVDAVSQHAGPLGVMPAPA-----	X31969	HSV-1-pUL36	733	22aa	mRNA_3000cpc_Organoid_MD101	1
-----LGVPAPAGAAPQG_	X32660	HSV-1-pUL36	747	14aa	mRNA_3000cpc_Organoid_MD101	1
-----SQHAGPLGVMPAPA-----	X11365	HSV-1-pUL36	741	14aa	mRNA_30cpc_Organoid_MD114	1
-----SQHAGPLGVMPAPA-----	X11365	HSV-1-pUL36	741	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1713

Peptide SGVPTNVSSTTQPQ from HSV-1-pUS4 with cluster number 1713



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1713	SGVPTNVSSTTQPQ	7	3	4

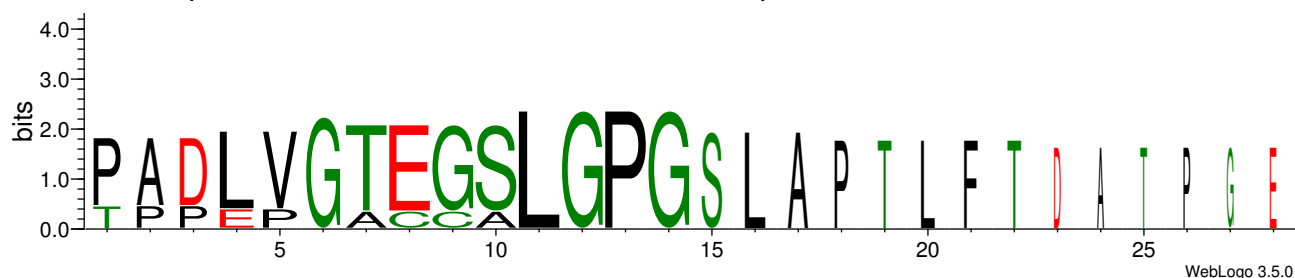
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1713	SGVPTNVSSTTQPQ	___SGVPTNVSSTTQPQ_____	2	2	0
1713	YPSGTPTNSDILTL	__YPSGTPTNSDILTL_____	1	0	1
1713	VSGVPTNVSSTTQPQLQTGRP	___VSGVPTNVSSTTQPQLQTGRP	1	0	1
1713	VSGVPTNVSSTTQP	___VSGVPTNVSSTTQP_____	1	0	1
1713	VGVS	__VGVS	1	0	1
1713	LVGV	LVGV	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
LVGV	X33077	HSV-1-pUS4	19	14aa	mRNA_30cpc_Organoid_MD114	1
___SGVPTNVSSTTQPQ_____	X13347	HSV-1-pUS4	23	14aa	mRNA_30cpc_Organoid_MD114	2
_VGVS	X69188	HSV-1-pUS4	20	14aa	mRNA_3000cpc_Organoid_MD101	1
___VSGVPTNVSSTTQP_____	X66506	HSV-1-pUS4	22	14aa	mRNA_3000cpc_Organoid_MD101	1
___VSGVPTNVSSTTQPQLQTGRP	X66505	HSV-1-pUS4	22	22aa	mRNA_3000cpc_Organoid_MD101	1
__YPSGTPTNSDILTL_____	X70871	TMEV-VP3	198	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2272

Peptide PADLVGTEGSLGPG from HSV-1-pUL36 with cluster number 2272

Peptide PADLVGTEGSLGPG from HSV-1-pUL36 with cluster number 2272



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2272	PADLVGTEGSLGPG	6	3	3

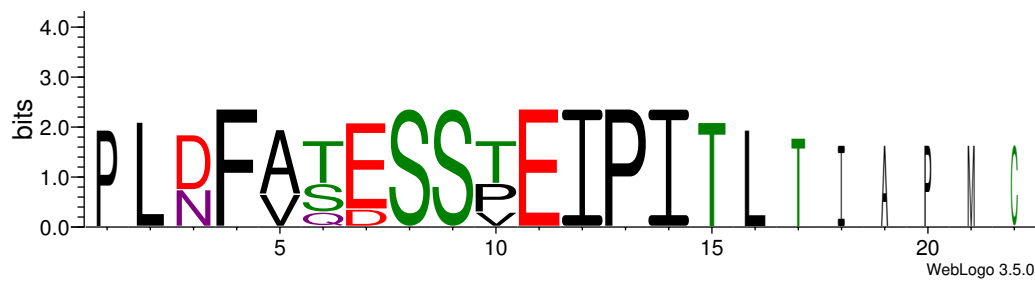
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2272	PADLVGTEGSLGPG	PADLVGTEGSLGPG_	2	1	1
2272	TPPEPGACCALGPG	TPPEPGACCALGPG	1	1	0
2272	TEGSLGPGSLAPTLFTDTPGE	_____TEGSLGPGSLAPTLFTDTPGE	1	1	0
2272	PADLVGTEGSLGPGSLAPTLFT	PADLVGTEGSLGPGSLAPTLFT_____	1	0	1
2272	LVGTEGSLGPGSLA	___LVGTEGSLGPGSLA_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___LVGTEGSLGPGSLA_____	X53845	HSV-1-pUL36	2512	14aaA5	mRNA_3000cpc_Organoid_MD101	1
PADLVGTEGSLGPG_	X23551	HSV-1-pUL36	2509	14aa	mRNA_30cpc_Organoid_MD114	1
PADLVGTEGSLGPG_____	X23551	HSV-1-pUL36	2509	14aa	mRNA_3000cpc_Organoid_MD101	1
PADLVGTEGSLGPGSLAPTLFT_____	X23550	HSV-1-pUL36	2509	22aa	mRNA_3000cpc_Organoid_MD101	1
_____TEGSLGPGSLAPTLFTDTPGE	X8346	HSV-1-pUL36	2515	22aa	mRNA_30cpc_Organoid_MD114	1
TPPEPGACCALGPG_____	X7282	HSV-1-pUL16	185	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2267

Peptide FATESSTEIPITLT from PV1-VP2 with cluster number 2267

Peptide FATESSTEIPITLT from PV1-VP2 with cluster number 2267



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2267	FATESSTEIPITLT	6	3	3

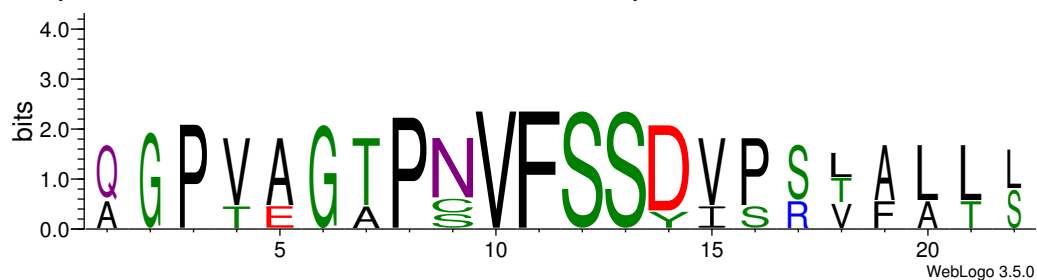
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2267	PLDFATESSTEIPITLTIAPMC	PLDFATESSTEIPITLTIAPMC	1	1	0
2267	PLDFATESSTEIPI	PLDFATESSTEIPI_	1	1	0
2267	PLDFAQDSSVEIPI	PLDFAQDSSVEIPI_	1	1	0
2267	NFVSESSPEIPITL	_NFVSESSPEIPITL_	1	0	1
2267	LNFVSESSPEIPIT	_LNFVSESSPEIPIT_	1	0	1
2267	FATESSTEIPITLT	__FATESSTEIPITLT__	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
__FATESSTEIPITLT__	X75762	PV1-VP2	238	14aa	mRNA_3000cpc_Organoid_MD101	1
__FATESSTEIPITLT__	X75762	PV2-VP2	238	14aa	mRNA_3000cpc_Organoid_MD101	1
LNFVSESSPEIPIT	X28523	PV1-VP2	236	14aa	mRNA_3000cpc_Organoid_MD101	1
NFVSESSPEIPITL	X2982	PV1-VP2	237	14aa	mRNA_3000cpc_Organoid_MD101	1
PLDFAQDSSVEIPI_	X82418	PV3-VP1	304	14aaG4S	mRNA_30cpc_Organoid_MD114	1
PLDFATESSTEIPI_	X22728	PV2-VP2	235	14aa	mRNA_30cpc_Organoid_MD114	1
PLDFATESSTEIPITLTIAPMC	X22727	PV1-VP2	235	22aa	mRNA_30cpc_Organoid_MD114	1
PLDFATESSTEIPITLTIAPMC	X22727	PV2-VP2	235	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 2266

Peptide QGPVAGTPNVFSSD from HSV-2-pUL22 with cluster number 2266

Peptide QGPVAGTPNVFSSD from HSV-2-pUL22 with cluster number 2266



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2266	QGPVAGTPNVFSSD	6	4	2

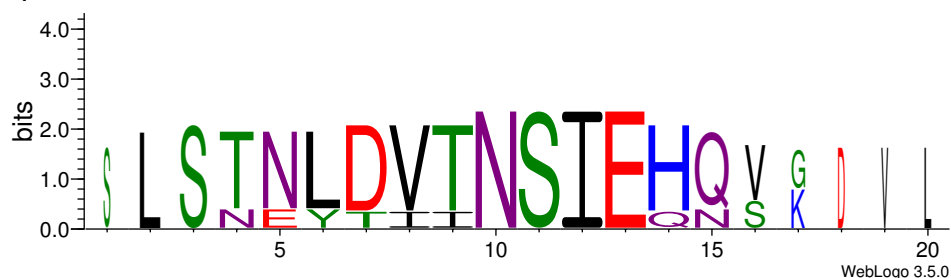
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2266	QGPVAGTPNVFSSD	QGPVAGTPNVFSSD_____	2	1	1
2266	PVAGTPNVFSSDVP	__PVAGTPNVFSSDVP_____	1	0	1
2266	PNVFSSDVPSTALL	_____PNVFSSDVPSTALL_	1	1	0
2266	CVFSSYISRLFATS	_____CVFSSYISRLFATS	1	1	0
2266	AGPTEGAPSVFSSDVPSTALL	AGPTEGAPSVFSSDVPSTALL	1	1	0

alignment	LUTnrs	GeneName	start	structure	Group	Score
AGPTEGAPSVFSSDVPSTALL	X44043	HSV-1-pUL22	760	22aa	mRNA_30cpc_Organoid_MD114	1
_____CVFSSYISRLFATS	X73281	HSV-1-pUL16	343	14aa	mRNA_30cpc_Organoid_MD114	1
_____PNVFSSDVPSTALL_	X20600	HSV-1-pUL22	767	14aa	mRNA_30cpc_Organoid_MD114	1
_____PNVFSSDVPSTALL_	X20600	HSV-2-pUL22	767	14aa	mRNA_30cpc_Organoid_MD114	1
__PVAGTPNVFSSDVP_____	X24297	HSV-2-pUL22	762	14aa	mRNA_3000cpc_Organoid_MD101	1
QGPVAGTPNVFSSD_____	X50456	HSV-2-pUL22	760	14aaA5	mRNA_30cpc_Organoid_MD114	1
QGPVAGTPNVFSSD_____	X50456	HSV-2-pUL22	760	14aaA5	mRNA_3000cpc_Organoid_MD101	1

[1] 2255

Peptide LSTNLDVTNSIEHQ from MV-H-CAM-70 with cluster number 2255

Peptide LSTNLDVTNSIEHQ from MV-H-CAM-70 with cluster number 2255



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2255	LSTNLDVTNSIEHQ	6	2	4

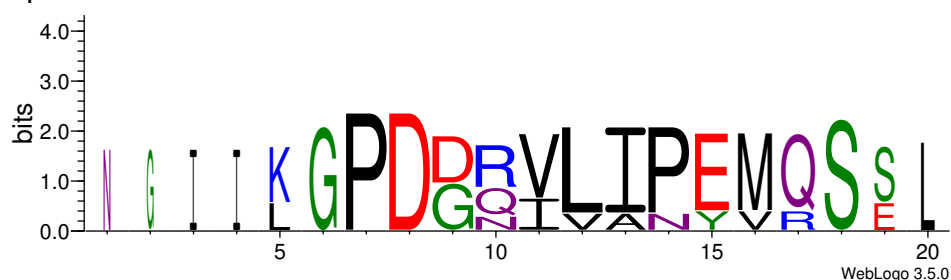
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2255	LSTNLDVTNSIEHQ	_LSTNLDVTNSIEHQ_	2	1	1
2255	STNLDVTNSIEHQV	_STNLDVTNSIEHQV_	1	0	1
2255	SLSTNLDVTNSIEH	SLSTNLDVTNSIEH_	1	0	1
2255	NEYTIINSIEQNSG	__NEYTIINSIEQNSG__	1	1	0
2255	DVTNSIEHQVKDVL	____DVTNSIEHQVKDVL	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
____DVTNSIEHQVKDVL	X36230	MV-H-CAM-70	79	14aa	mRNA_3000cpc_Organoid_MD101	1
____DVTNSIEHQVKDVL	X36230	MV-H-Edmonston	79	14aa	mRNA_3000cpc_Organoid_MD101	1
____DVTNSIEHQVKDVL	X36230	MV-H-Halle	79	14aa	mRNA_3000cpc_Organoid_MD101	1
____DVTNSIEHQVKDVL	X36230	MV-H-MVi-Illinois.USA-50.99	79	14aa	mRNA_3000cpc_Organoid_MD101	1
____DVTNSIEHQVKDVL	X36230	MV-H-MVi-Texas.USA-28.99	79	14aa	mRNA_3000cpc_Organoid_MD101	1
LSTNLDVTNSIEHQ	X29145	MV-H-CAM-70	74	14aa	mRNA_30cpc_Organoid_MD114	1
LSTNLDVTNSIEHQ	X29145	MV-H-Edmonston	74	14aa	mRNA_30cpc_Organoid_MD114	1
LSTNLDVTNSIEHQ	X29145	MV-H-Halle	74	14aa	mRNA_30cpc_Organoid_MD114	1
LSTNLDVTNSIEHQ	X29145	MV-H-MVi-Illinois.USA-50.99	74	14aa	mRNA_30cpc_Organoid_MD114	1
LSTNLDVTNSIEHQ	X29145	MV-H-MVi-Texas.USA-28.99	74	14aa	mRNA_30cpc_Organoid_MD114	1
LSTNLDVTNSIEHQ	X29145	MV-H-CAM-70	74	14aa	mRNA_3000cpc_Organoid_MD101	1
LSTNLDVTNSIEHQ	X29145	MV-H-Edmonston	74	14aa	mRNA_3000cpc_Organoid_MD101	1
LSTNLDVTNSIEHQ	X29145	MV-H-Halle	74	14aa	mRNA_3000cpc_Organoid_MD101	1
LSTNLDVTNSIEHQ	X29145	MV-H-MVi-Illinois.USA-50.99	74	14aa	mRNA_3000cpc_Organoid_MD101	1
LSTNLDVTNSIEHQ	X29145	MV-H-MVi-Texas.USA-28.99	74	14aa	mRNA_3000cpc_Organoid_MD101	1
__NEYTIINSIEQNSG__	X77063	BoNT-A-Hc	127	14aaG4S	mRNA_30cpc_Organoid_MD114	1
__NEYTIINSIEQNSG__	X77063	BoNT-D-Hc	85	14aaG4S	mRNA_30cpc_Organoid_MD114	1
SLSTNLDVTNSIEH	X48400	MV-H-CAM-70	73	14aaA5	mRNA_3000cpc_Organoid_MD101	1
SLSTNLDVTNSIEH	X48400	MV-H-Edmonston	73	14aaA5	mRNA_3000cpc_Organoid_MD101	1
SLSTNLDVTNSIEH	X48400	MV-H-Halle	73	14aaA5	mRNA_3000cpc_Organoid_MD101	1
SLSTNLDVTNSIEH	X48400	MV-H-MVi-Illinois.USA-50.99	73	14aaA5	mRNA_3000cpc_Organoid_MD101	1
SLSTNLDVTNSIEH	X48400	MV-H-MVi-Texas.USA-28.99	73	14aaA5	mRNA_3000cpc_Organoid_MD101	1
STNLDVTNSIEHQV	X10229	MV-H-CAM-70	75	14aa	mRNA_3000cpc_Organoid_MD101	1
STNLDVTNSIEHQV	X10229	MV-H-Edmonston	75	14aa	mRNA_3000cpc_Organoid_MD101	1
STNLDVTNSIEHQV	X10229	MV-H-Halle	75	14aa	mRNA_3000cpc_Organoid_MD101	1
STNLDVTNSIEHQV	X10229	MV-H-MVi-Illinois.USA-50.99	75	14aa	mRNA_3000cpc_Organoid_MD101	1
STNLDVTNSIEHQV	X10229	MV-H-MVi-Texas.USA-28.99	75	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2192

Peptide KGPDPGQILIPEMQS from RV-G-Mocala with cluster number 2192

Peptide KGPDPGQILIPEMQS from RV-G-Mocala with cluster number 2



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2192	KGPDPGQILIPEMQS	6	4	2

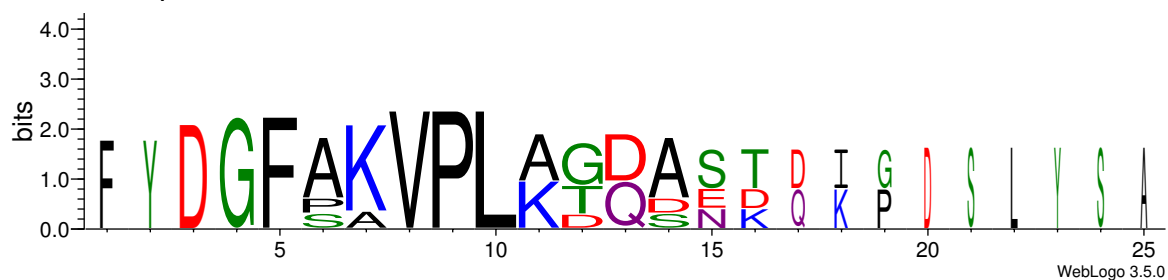
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2192	KGPDPGQILIPEMQS	___KGPDPGQILIPEMQS__	2	2	0
2192	PDDRVVANYVRSEL	_____PDDRVVANYVRSEL	1	0	1
2192	PDDRVLIPEMQSSL	_____PDDRVLIPEMQSSL	1	1	0
2192	NGIILGPDDRVLIP	NGIILGPDDRVLIP_____	1	1	0
2192	GPDGNVLIPEMQSS	_____GPDGNVLIPEMQSS_	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
_____GPDGNVLIPEMQSS_	X62680	RV-G-B19	366	14aa	mRNA_3000cpc_Organoid_MD101	1
_____GPDGNVLIPEMQSS_	X62680	RV-G-B2c	366	14aa	mRNA_3000cpc_Organoid_MD101	1
_____GPDGNVLIPEMQSS_	X62680	RV-G-N2c	385	14aa	mRNA_3000cpc_Organoid_MD101	1
_____GPDGNVLIPEMQSS_	X62680	RV-G-PV	366	14aa	mRNA_3000cpc_Organoid_MD101	1
___KGPDPGQILIPEMQS__	X4926	RV-G-Mocala	365	14aa	mRNA_30cpc_Organoid_MD114	2
NGIILGPDDRVLIP_____	X45853	RV-G-B19	361	14aaA5	mRNA_30cpc_Organoid_MD114	1
NGIILGPDDRVLIP_____	X45853	RV-G-B2c	361	14aaA5	mRNA_30cpc_Organoid_MD114	1
NGIILGPDDRVLIP_____	X45853	RV-G-N2c	380	14aaA5	mRNA_30cpc_Organoid_MD114	1
NGIILGPDDRVLIP_____	X45853	RV-G-PV	361	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____PDDRVLIPEMQSSL	X82482	RV-G-B19	367	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____PDDRVLIPEMQSSL	X82482	RV-G-B2c	367	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____PDDRVLIPEMQSSL	X82482	RV-G-N2c	386	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____PDDRVLIPEMQSSL	X82482	RV-G-PV	367	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____PDDRVVANYVRSEL	X22978	HSV-1-pUL21	59	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2176

Peptide DGFAKVPLAGQAST from PV2-VP1 with cluster number 2176

Peptide DGFAKVPLAGQAST from PV2-VP1 with cluster number 2176



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2176	DGFAKVPLAGQAST	6	6	0

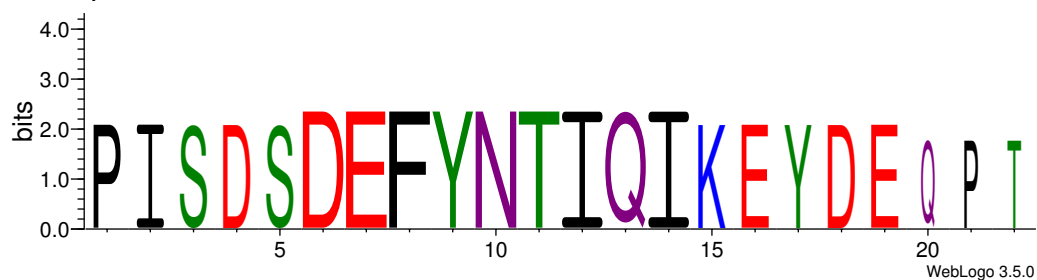
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2176	DGFAKVPLAGQAST	__DGFAKVPLAGQAST_____	2	2	0
2176	PAVPLAGDDEKDKP	____PAVPLAGDDEKDKP_____	1	1	0
2176	GFAKVPLKTDANDQIGDSLISA	___GFAKVPLKTDANDQIGDSLISA	1	1	0
2176	FYDGFSAKVLKDKS	FYDGFSAKVLKDKS_____	1	1	0
2176	FYDGFSAKVLKTD	FYDGFSAKVLKTD_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
__DGFAKVPLAGQAST_____	X36211	PV2-VP1	210	14aa	mRNA_30cpc_Organoid_MD114	2
FYDGFSAKVLKTD_____	X60984	PV3-VP1	784	14aaA5	mRNA_30cpc_Organoid_MD114	1
FYDGFSAKVLKDKS_____	X76306	PV1-VP1	208	14aa	mRNA_30cpc_Organoid_MD114	1
___GFAKVPLKTDANDQIGDSLISA	X65528	PV3-VP1	787	22aa	mRNA_30cpc_Organoid_MD114	1
____PAVPLAGDDEKDKP_____	X23690	HSV-1-pUS4	110	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2121

Peptide DEFYNTIQIKEYDE from BoNT-B-Hc with cluster number 2121

Peptide DEFYNTIQIKEYDE from BoNT-B-Hc with cluster number 2121



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2121	DEFYNTIQIKEYDE	6	4	2

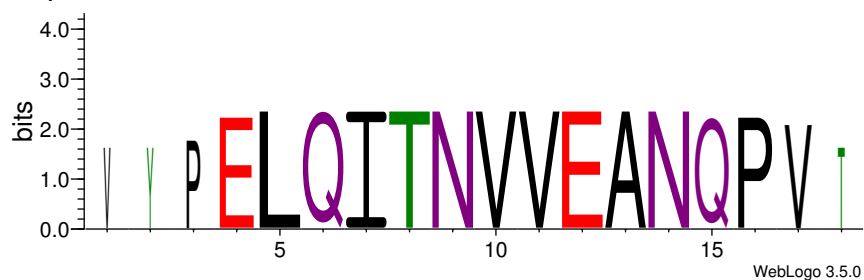
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2121	PISDSDEFYNTIQIKEYDEQPT	PISDSDEFYNTIQIKEYDEQPT	2	1	1
2121	PISDSDEFYNTIQI	PISDSDEFYNTIQI_____	2	1	1
2121	DEFYNTIQIKEYDE	____DEFYNTIQIKEYDE__	2	2	0

alignment	LUThrs	GeneName	start	structure	Group	Score
____DEFYNTIQIKEYDE__	X35767	BoNT-B-Hc	378	14aa	mRNA_30cpc_Organoid_MD114	2
PISDSDEFYNTIQI_____	X21416	BoNT-B-Hc	373	14aa	mRNA_30cpc_Organoid_MD114	1
PISDSDEFYNTIQI_____	X50793	BoNT-B-Hc	373	14aaA5	mRNA_3000cpc_Organoid_MD101	1
PISDSDEFYNTIQIKEYDEQPT	X21415	BoNT-B-Hc	373	22aa	mRNA_30cpc_Organoid_MD114	1
PISDSDEFYNTIQIKEYDEQPT	X21415	BoNT-B-Hc	373	22aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2098

Peptide ELQITNVVEANQPV from APP with cluster number 2098

Peptide ELQITNVVEANQPV from APP with cluster number 20



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2098	ELQITNVVEANQPV	6	5	1

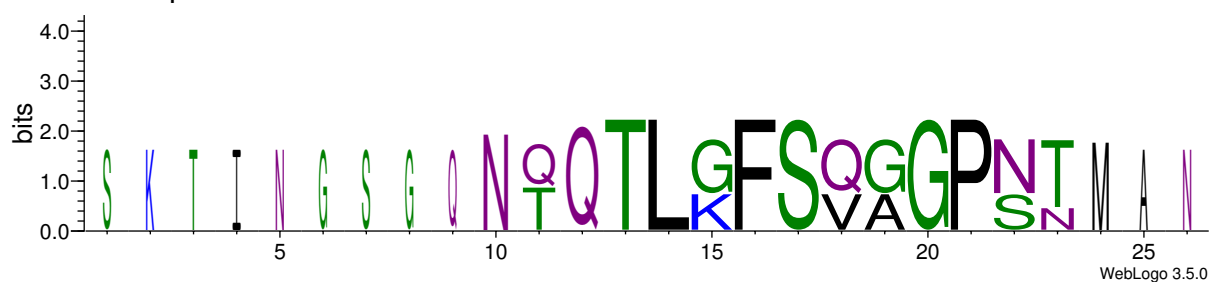
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2098	ELQITNVVEANQPV	___ELQITNVVEANQPV_	3	2	1
2098	VYPELQITNVVEAN	VYPELQITNVVEAN_____	1	1	0
2098	PELQITNVVEANQP	__PELQITNVVEANQP__	1	1	0
2098	LQITNVVEANQPVT	____LQITNVVEANQPVT	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___ELQITNVVEANQPV_	X38162	APP	79	14aa	mRNA_30cpc_Organoid_MD114	1
___ELQITNVVEANQPV_	X86438	APP	79	14aaG4S	mRNA_30cpc_Organoid_MD114	1
___ELQITNVVEANQPV_	X38162	APP	79	14aa	mRNA_3000cpc_Organoid_MD101	1
____LQITNVVEANQPVT	X29973	APP	80	14aa	mRNA_30cpc_Organoid_MD114	1
__PELQITNVVEANQP__	X23144	APP	78	14aa	mRNA_30cpc_Organoid_MD114	1
VYPELQITNVVEAN_____	X59232	APP	76	14aaA5	mRNA_30cpc_Organoid_MD114	1

[1] 2264

Peptide NQQLKFSVAGPSN from AAV9-VP1 with cluster number 2264

Peptide NQQLKFSVAGPSN from AAV9-VP1 with cluster number 2264



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2264	NQQLKFSVAGPSN	5	3	2

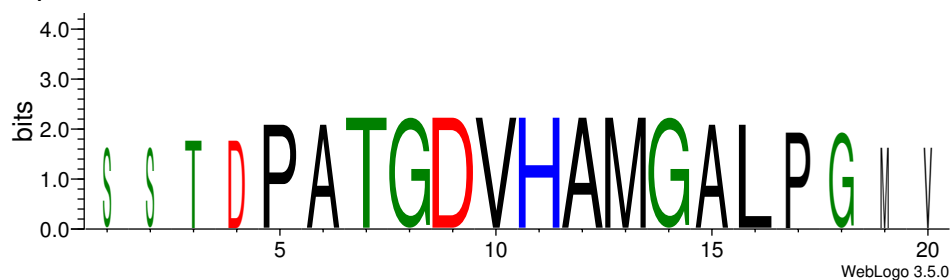
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2264	TQTLGFSQGGPNTM	-----TQTLGFSQGGPNTM--	1	1	0
2264	TLGFSQGGPNTMAN	-----TLGFSQGGPNTMAN	1	0	1
2264	SKTINGSGQNQQLKFSVAGPS	SKTINGSGQNQQLKFSVAGPS----	1	1	0
2264	NTQTLGFSQGGPNT	-----NTQTLGFSQGGPNT--	1	0	1
2264	NQQLKFSVAGPSN	-----NQQLKFSVAGPSN---	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----NQQLKFSVAGPSN---	X1142	AAV9-VP1	457	14aa	mRNA_30cpc_Organoid_MD114	1
-----NTQTLGFSQGGPNT---	X463	AAV8-VP1	459	14aa	mRNA_3000cpc_Organoid_MD101	1
SKTINGSGQNQQLKFSVAGPS----	X10032	AAV9-VP1	448	22aa	mRNA_30cpc_Organoid_MD114	1
-----TLGFSQGGPNTMAN	X7945	AAV8-VP1	462	14aa	mRNA_3000cpc_Organoid_MD101	1
-----TQTLGFSQGGPNTM--	X6974	AAV8-VP1	460	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2262

Peptide PATGDVHAMGALPG from AAV1-VP1 with cluster number 2262

Peptide PATGDVHAMGALPG from AAV1-VP1 with cluster number 2262



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2262	PATGDVHAMGALPG	5	1	4

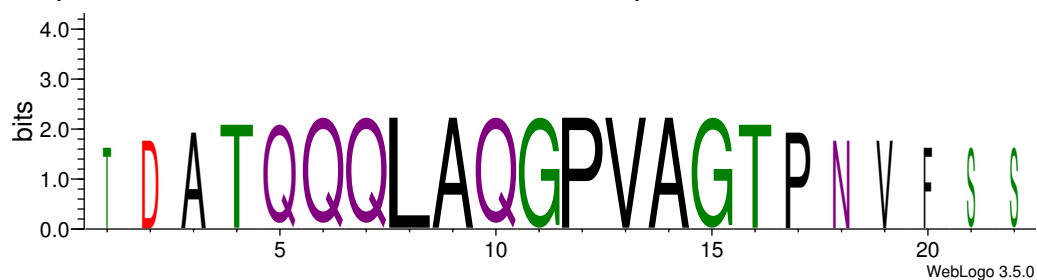
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2262	PATGDVHAMGALPG	___PATGDVHAMGALPG__	2	0	2
2262	TGDVHAMGALPGMV	_____TGDVHAMGALPGMV	1	0	1
2262	TDPATGDVHAMGAL	__TDPATGDVHAMGAL_____	1	1	0
2262	SSTDPATGDVHAMG	SSTDPATGDVHAMG_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___PATGDVHAMGALPG__	X23344	AAV1-VP1	591	14aa	mRNA_3000cpc_Organoid_MD101	2
___PATGDVHAMGALPG__	X23344	AAV6-VP1	591	14aa	mRNA_3000cpc_Organoid_MD101	2
SSTDPATGDVHAMG_____	X10606	AAV1-VP1	587	14aa	mRNA_3000cpc_Organoid_MD101	1
SSTDPATGDVHAMG_____	X10606	AAV6-VP1	587	14aa	mRNA_3000cpc_Organoid_MD101	1
__TDPATGDVHAMGAL_____	X78635	AAV1-VP1	589	14aaG4S	mRNA_30cpc_Organoid_MD114	1
__TDPATGDVHAMGAL_____	X78635	AAV6-VP1	589	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_____TGDVHAMGALPGMV	X8895	AAV1-VP1	593	14aa	mRNA_3000cpc_Organoid_MD101	1
_____TGDVHAMGALPGMV	X8895	AAV6-VP1	593	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2246

Peptide ATQQQLAQGPVAGT from HSV-2-pUL22 with cluster number 2246

‡ Peptide ATQQQLAQGPVAGT from HSV-2-pUL22 with cluster number 224



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2246	ATQQQLAQGPVAGT	5	1	4

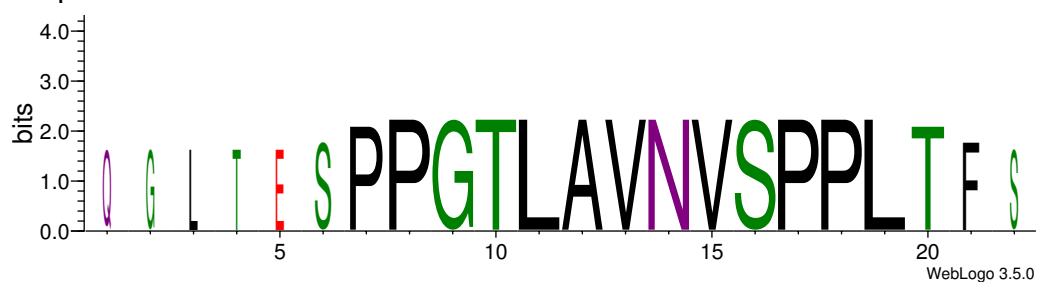
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2246	TQQQLAQGPVAGTP	___TQQQLAQGPVAGTP_____	1	0	1
2246	TDATQQQLAQGPVAGTPNVFSS	TDATQQQLAQGPVAGTPNVFSS	1	0	1
2246	QQLAQGPVAGTPNV	____QQLAQGPVAGTPNV___	1	0	1
2246	DATQQQLAQGPVAG	_DATQQQLAQGPVAG_____	1	0	1
2246	ATQQQLAQGPVAGT	__ATQQQLAQGPVAGT_____	1	1	0

alignment	LUTnrs	GeneName	start	structure	Group	Score
__ATQQQLAQGPVAGT_____	X40235	HSV-2-pUL22	753	14aa	mRNA_30cpc_Organoid_MD114	1
_DATQQQLAQGPVAG_____	X35790	HSV-2-pUL22	752	14aa	mRNA_3000cpc_Organoid_MD101	1
____QQLAQGPVAGTPNV___	X19148	HSV-2-pUL22	756	14aa	mRNA_3000cpc_Organoid_MD101	1
TDATQQQLAQGPVAGTPNVFSS	X8153	HSV-2-pUL22	751	22aa	mRNA_3000cpc_Organoid_MD101	1
___TQQQLAQGPVAGTP_____	X7009	HSV-2-pUL22	754	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2231

Peptide PPGTLAVNVSPPLT from CAV-2-F-SH01 with cluster number 2231

Peptide PPGTLAVNVSPPLT from CAV-2-F-SH01 with cluster number 2231



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2231	PPGTLAVNVSPPLT	5	1	4

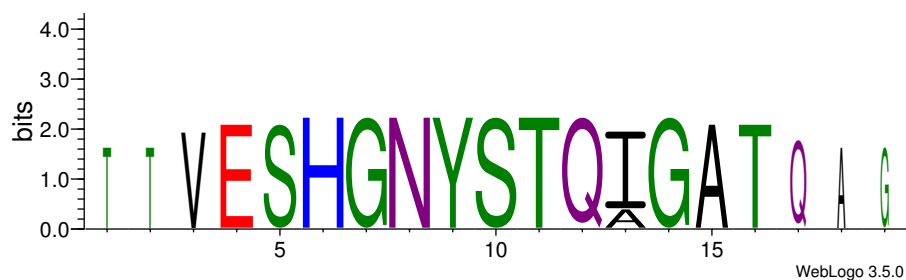
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2231	PPGTLAVNVSPPLT	_____PPGTLAVNVSPPLT__	2	1	1
2231	SPPGTLAVNVSPPL	_____SPPGTLAVNVSPPL__	1	0	1
2231	QGLTESPPGTLAVNVSPPLTFS	QGLTESPPGTLAVNVSPPLTFS	1	0	1
2231	PGTLAVNVSPPLTF	_____PGTLAVNVSPPLTF_	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
_____PGTLAVNVSPPLTF_	X23756	CAV-2-F-SH01	41	14aa	mRNA_3000cpc_Organoid_MD101	1
_____PGTLAVNVSPPLTF_	X23756	CAV-2-F-Toronto-A26-61	41	14aa	mRNA_3000cpc_Organoid_MD101	1
_____PPGTLAVNVSPPLT__	X22192	CAV-2-F-SH01	40	14aa	mRNA_30cpc_Organoid_MD114	1
_____PPGTLAVNVSPPLT__	X22192	CAV-2-F-Toronto-A26-61	40	14aa	mRNA_30cpc_Organoid_MD114	1
_____PPGTLAVNVSPPLT__	X22192	CAV-2-F-SH01	40	14aa	mRNA_3000cpc_Organoid_MD101	1
_____PPGTLAVNVSPPLT__	X22192	CAV-2-F-Toronto-A26-61	40	14aa	mRNA_3000cpc_Organoid_MD101	1
QGLTESPPGTLAVNVSPPLTFS	X20051	CAV-2-F-SH01	34	22aa	mRNA_3000cpc_Organoid_MD101	1
QGLTESPPGTLAVNVSPPLTFS	X20051	CAV-2-F-Toronto-A26-61	34	22aa	mRNA_3000cpc_Organoid_MD101	1
_____SPPGTLAVNVSPPL__	X11599	CAV-2-F-SH01	39	14aa	mRNA_3000cpc_Organoid_MD101	1
_____SPPGTLAVNVSPPL__	X11599	CAV-2-F-Toronto-A26-61	39	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2224

Peptide VESHGNYSTQIGAT from WNV-E-AZ10-918 with cluster number 2224

Peptide VESHGNYSTQIGAT from WNV-E-AZ10-918 with cluster number 2224



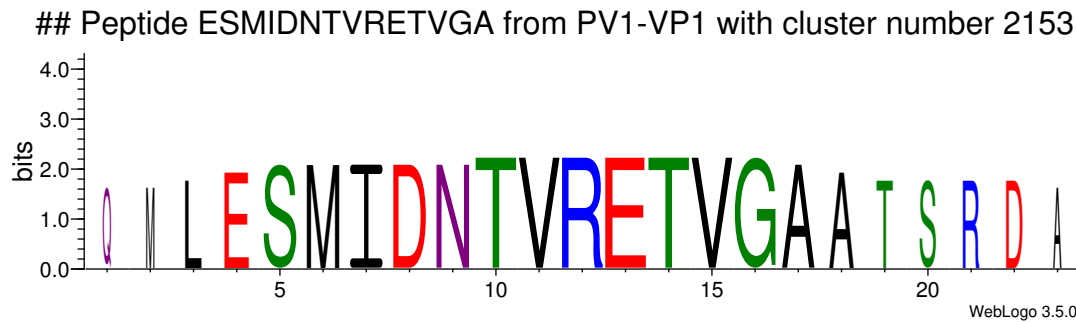
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2224	VESHGNYSTQIGAT	5	2	3

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2224	VESHGNYSTQIGAT	__VESHGNYSTQIGAT__	2	0	2
2224	TTVESHGNYSTQAG	TTVESHGNYSTQAG_____	1	1	0
2224	HGNYSTQIGATQAG	_____HGNYSTQIGATQAG	1	1	0
2224	ESHGNYSTQIGATQ	___ESHGNYSTQIGATQ__	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___ESHGNYSTQIGATQ__	X37279	WNV-E-AZ10-918	150	14aa	mRNA_3000cpc_Organoid_MD101	1
___ESHGNYSTQIGATQ__	X37279	WNV-E-H-442	150	14aa	mRNA_3000cpc_Organoid_MD101	1
_____HGNYSTQIGATQAG	X18087	WNV-E-AZ10-918	152	14aa	mRNA_30cpc_Organoid_MD114	1
_____HGNYSTQIGATQAG	X18087	WNV-E-H-442	152	14aa	mRNA_30cpc_Organoid_MD114	1
TTVESHGNYSTQAG_____	X6160	WNV-E-AZ10-918	147	14aa	mRNA_30cpc_Organoid_MD114	1
TTVESHGNYSTQAG_____	X6160	WNV-E-H-442	147	14aa	mRNA_30cpc_Organoid_MD114	1
__VESHGNYSTQIGAT__	X68261	WNV-E-AZ10-918	149	14aa	mRNA_3000cpc_Organoid_MD101	2
__VESHGNYSTQIGAT__	X68261	WNV-E-H-442	149	14aa	mRNA_3000cpc_Organoid_MD101	2

[1] 2153

Peptide ESMIDNTVRETVGA from PV1-VP1 with cluster number 2153



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2153	ESMIDNTVRETVGA	5	2	3

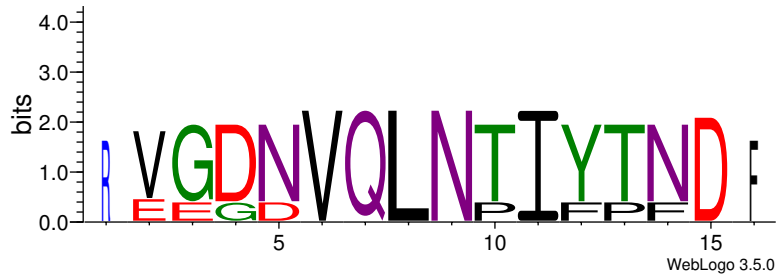
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2153	TVRETVGAATSRDA	_____TVRETVGAATSRDA	1	1	0
2153	SMIDNTVRETVGAA	____SMIDNTVRETVGAA_____	1	1	0
2153	QMLESIDNTVRETVGAATSRD	QMLESIDNTVRETVGAATSRD_	1	0	1
2153	LESMIDNTVRETVG	__LESMIDNTVRETVG_____	1	0	1
2153	ESMIDNTVRETVGA	___ESMIDNTVRETVGA_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
___ESMIDNTVRETVGA_____	X37273	PV1-VP1	7	14aa	mRNA_3000cpc_Organoid_MD101	1
__LESMIDNTVRETVG_____	X31535	PV1-VP1	6	14aa	mRNA_3000cpc_Organoid_MD101	1
QMLESIDNTVRETVGAATSRD_	X19027	PV1-VP1	4	22aa	mRNA_3000cpc_Organoid_MD101	1
____SMIDNTVRETVGAA_____	X11154	PV1-VP1	8	14aa	mRNA_30cpc_Organoid_MD114	1
_____TVRETVGAATSRDA	X9166	PV1-VP1	13	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2126

Peptide VGDNVQLNTIYTND from BoNT-D-Hc with cluster number 2126

le VGDNVQLNTIYTND from BoNT-D-Hc with cluster num



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2126	VGDNVQLNTIYTND	5	4	1

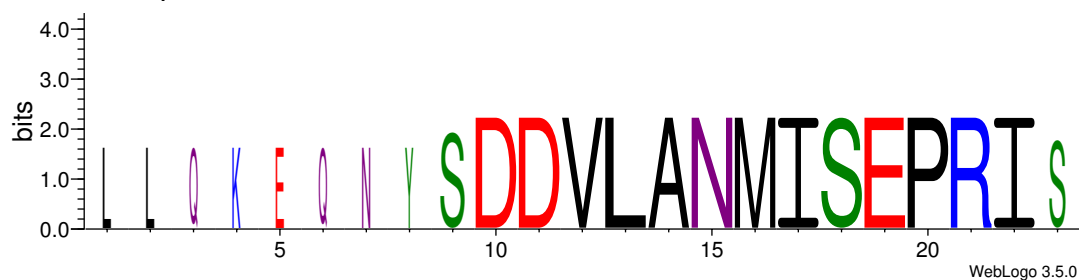
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2126	VGDNVQLNTIYTND	_VGDNVQLNTIYTND_	2	1	1
2126	RVGDNVQLNTIYTN	RVGDNVQLNTIYTN_	1	1	0
2126	GDNVQLNTIYTND	_GDNVQLNTIYTND	1	1	0
2126	EEGDVQLNPIFPFD	_EEGDVQLNPIFPFD_	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
EEGDVQLNPIFPFD	X38657	BoNT-C-Hc	35	14aa	mRNA_30cpc_Organoid_MD114	1
_GDNVQLNTIYTND	X63483	BoNT-D-Hc	29	14aa	mRNA_30cpc_Organoid_MD114	1
RVGDNVQLNTIYTN_	X27836	BoNT-D-Hc	27	14aa	mRNA_30cpc_Organoid_MD114	1
VGDNVQLNTIYTND	X69090	BoNT-D-Hc	28	14aa	mRNA_30cpc_Organoid_MD114	1
VGDNVQLNTIYTND	X69090	BoNT-D-Hc	28	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2099

Peptide DDVLANMISEPRIS from APP with cluster number 2099

Peptide DDVLANMISEPRIS from APP with cluster number 2099



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2099	DDVLANMISEPRIS	5	2	3

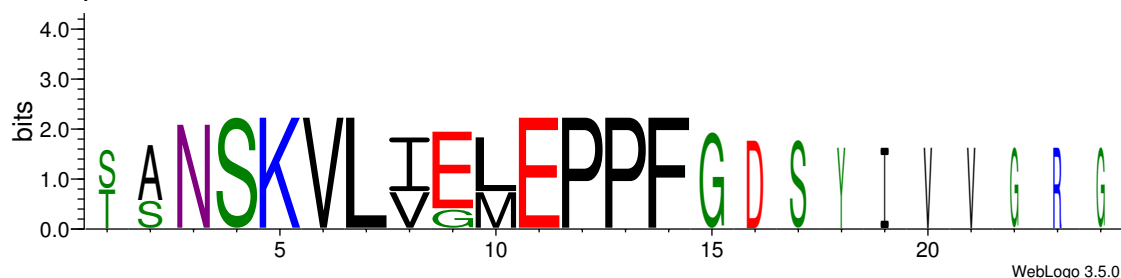
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2099	SDDVLANMISEPRI	-----SDDVLANMISEPRI_	2	1	1
2099	DDVLANMISEPRIS	-----DDVLANMISEPRIS	2	1	1
2099	LLQKEQNYSDDVLANMISEPRI	LLQKEQNYSDDVLANMISEPRI_	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
-----DDVLANMISEPRIS	X54506	APP	574	14aaA5	mRNA_30cpc_Organoid_MD114	1
-----DDVLANMISEPRIS	X35610	APP	574	14aa	mRNA_3000cpc_Organoid_MD101	1
LLQKEQNYSDDVLANMISEPRI_	X30879	APP	565	22aa	mRNA_3000cpc_Organoid_MD101	1
-----SDDVLANMISEPRI_	X12510	APP	573	14aa	mRNA_30cpc_Organoid_MD114	1
-----SDDVLANMISEPRI_	X12510	APP	573	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2057

Peptide ANSKVLIELEPPFG from WNV-E-ArD76104 with cluster number 2057

Peptide ANSKVLIELEPPFG from WNV-E-ArD76104 with cluster number 2057



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2057	ANSKVLIELEPPFG	5	5	0

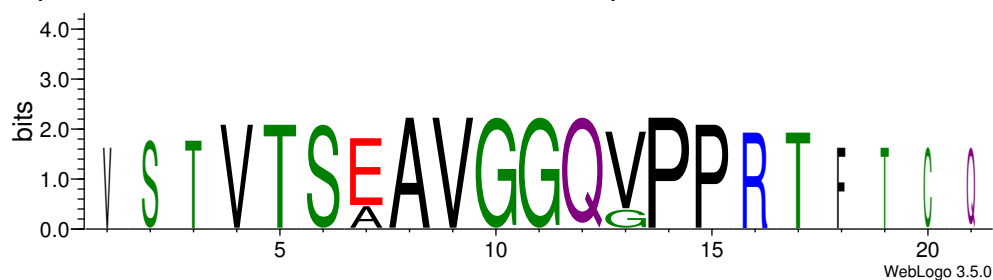
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2057	TANSKVLIELEPPF	TANSKVLIELEPPF_____	1	1	0
2057	SSNSKVLVGMEPPF	SSNSKVLVGMEPPF_____	1	1	0
2057	SKVLVEMEPPFGDS	__SKVLVEMEPPFGDS_____	1	1	0
2057	NSKVLIELEPPFGDSYIVVGRG	__NSKVLIELEPPFGDSYIVVGRG	1	1	0
2057	ANSKVLIELEPPFG	_ANSKVLIELEPPFG_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_ANSKVLIELEPPFG_____	X39811	WNV-E-ArD76104	363	14aa	mRNA_30cpc_Organoid_MD114	1
_ANSKVLIELEPPFG_____	X39811	WNV-E-H-442	367	14aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	JEV-E-BN19	367	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	JEV-E-KE-093	367	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	JEV-E-SA14-5-3	367	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	JEV-E-ThCMAr4492	367	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	WNV-E-AZ10-918	368	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	WNV-E-ArD76104	364	22aa	mRNA_30cpc_Organoid_MD114	1
__NSKVLIELEPPFGDSYIVVGRG	X594	WNV-E-H-442	368	22aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	JEV-E-BN19	368	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	JEV-E-KE-093	368	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	JEV-E-SA14-5-3	368	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	JEV-E-ThCMAr4492	368	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	WNV-E-AZ10-918	369	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	WNV-E-ArD76104	365	14aa	mRNA_30cpc_Organoid_MD114	1
___SKVLVEMEPPFGDS_____	X10181	WNV-E-H-442	369	14aa	mRNA_30cpc_Organoid_MD114	1
SSNSKVLVGMEPPF_____	X10547	JEV-E-KE-093	365	14aa	mRNA_30cpc_Organoid_MD114	1
SSNSKVLVGMEPPF_____	X10547	JEV-E-ThCMAr4492	365	14aa	mRNA_30cpc_Organoid_MD114	1
TANSKVLIELEPPF_____	X8387	WNV-E-ArD76104	362	14aa	mRNA_30cpc_Organoid_MD114	1
TANSKVLIELEPPF_____	X8387	WNV-E-H-442	366	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1926

Peptide VTSEAVGGQVPRT from HSV-1-pUL44 with cluster number 1926

Peptide VTSEAVGGQVPVRT from HSV-1-pUL44 with cluster number 19



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1926	VTSEAVGGQVPVRT	5	4	1

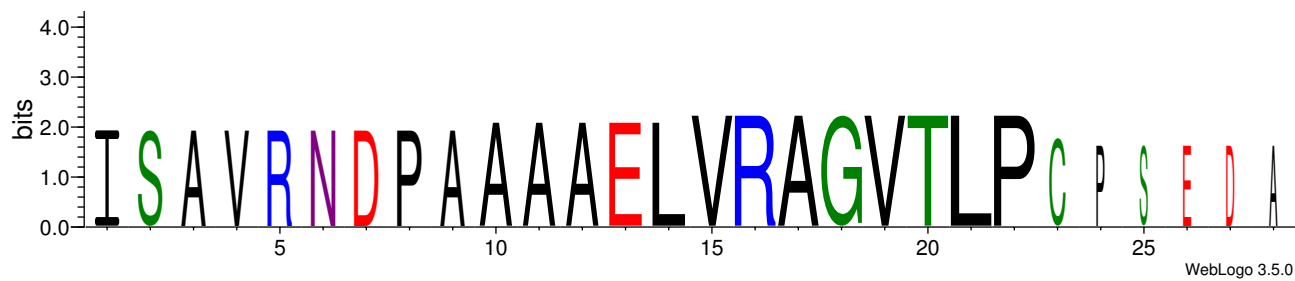
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1926	VTSEAVGGQVPVRT	___VTSEAVGGQVPVRT___	2	2	0
1926	VSTVTSEAVGGQVP	VSTVTSEAVGGQVP_____	1	1	0
1926	STVTSAAVGGQGPP	_STVTSAAVGGQGPP_____	1	0	1
1926	AVGGQVPVRTFTCQ	_____AVGGQVPVRTFTCQ	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____AVGGQVPPRTFTCQ	X44657	HSV-1-pUL44	335	14aa	mRNA_30cpc_Organoid_MD114	1
_____AVGGQVPPRTFTCQ	X44657	HSV-2-pUL44	304	14aa	mRNA_30cpc_Organoid_MD114	1
_STVTSAAVGGQGPP_____	X10486	HSV-2-pUL44	298	14aa	mRNA_3000cpc_Organoid_MD101	1
VSTVTSEAVGGQVP_____	X66304	HSV-1-pUL44	328	14aa	mRNA_30cpc_Organoid_MD114	1
___VTSEAVGGQVPPRT___	X58274	HSV-1-pUL44	331	14aaA5	mRNA_30cpc_Organoid_MD114	1
___VTSEAVGGQVPPRT___	X89564	HSV-1-pUL44	331	14aaG4S	mRNA_30cpc_Organoid_MD114	1

[1] 1872

Peptide ISAVRNDPAAAAELVRAGVTLP from HSV-1-pUL36 with cluster number 1872

Peptide ISAVRNDPAAAAELVRAGVTLP from HSV-1-pUL36 with cluster number 1872



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1872	ISAVRNDPAAAAELVRAGVTLP	5	3	2

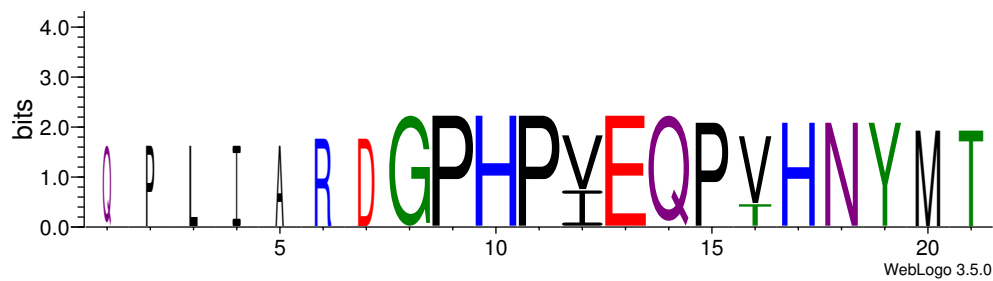
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1872	ISAVRNDPAAAAELVRAGVTLP	ISAVRNDPAAAAELVRAGVTLP-----	3	1	2
1872	VRAGVTLP CPSEDA	-----VRAGVTLP CPSEDA	1	1	0
1872	AAAELVRAGVTLP C	-----AAAELVRAGVTLP C	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----AAAELVRAGVTLP C	X43771	HSV-1-pUL36	1534	14aa	mRNA_30cpc_Organoid_MD114	1
ISAVRNDPAAAAELVRAGVTLP-----	X14875	HSV-1-pUL36	1525	22aa	mRNA_30cpc_Organoid_MD114	1
ISAVRNDPAAAAELVRAGVTLP-----	X14875	HSV-1-pUL36	1525	22aa	mRNA_3000cpc_Organoid_MD101	2
-----VRAGVTLP CPSEDA	X67562	HSV-1-pUL36	1539	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1750

Peptide GPHPVEQPVHNYMT from HSV-2-pUL19 with cluster number 1750

Peptide GPHPVEQPVHNYMT from HSV-2-pUL19 with cluster number 1`



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1750	GPHPVEQPVHNYMT	5	4	1

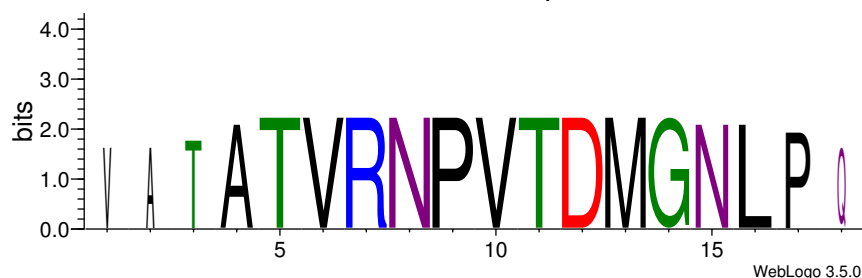
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1750	GPHPVEQPVHNYMT	_____GPHPVEQPVHNYMT	2	1	1
1750	RDGPHPVEQPVHNY	_____RDGPHPVEQPVHNY__	1	1	0
1750	QPLIARDGPHPIEQ	QPLIARDGPHPIEQ_____	1	1	0
1750	GPHPVEQPVHNYMT	_____GPHPVEQPVHNYMT	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____GPHPVEQPVHNYMT	X62586	HSV-1-pUL19	108	14aa	mRNA_30cpc_Organoid_MD114	1
_____GPHPVEQPVHNYMT	X62589	HSV-2-pUL19	108	14aa	mRNA_30cpc_Organoid_MD114	1
_____GPHPVEQPVHNYMT	X62589	HSV-2-pUL19	108	14aa	mRNA_3000cpc_Organoid_MD101	1
QPLIARDGPHPIEQ_____	X19271	HSV-1-pUL19	101	14aa	mRNA_30cpc_Organoid_MD114	1
QPLIARDGPHPIEQ_____	X19271	HSV-2-pUL19	101	14aa	mRNA_30cpc_Organoid_MD114	1
_____RDGPHPVEQPVHNY__	X26778	HSV-2-pUL19	106	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1673

Peptide ATVRNPVTDMGNLP from HSV-1-pUL19 with cluster number 1673

ide ATVRNPVTDMGNLP from HSV-1-pUL19 with cluster numb



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1673	ATVRNPVTDMGNLP	5	4	1

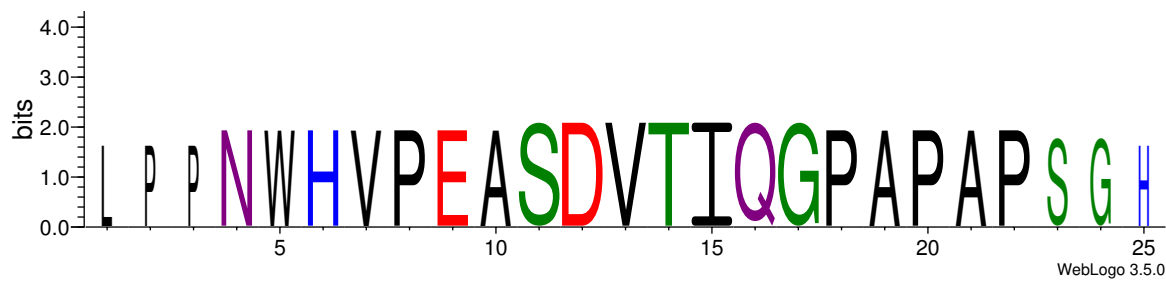
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1673	ATVRNPVTDMGNLP	___ATVRNPVTDMGNLP_	2	1	1
1673	VATATVRNPVTDMG	VATATVRNPVTDMG_____	1	1	0
1673	TVRNPVTDMGNLPQ	_____TVRNPVTDMGNLPQ	1	1	0
1673	TATVRNPVTDMGNL	__TATVRNPVTDMGNL__	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___ATVRNPVTDMGNLP_	X40482	HSV-1-pUL19	1113	14aa	mRNA_30cpc_Organoid_MD114	1
___ATVRNPVTDMGNLP_	X40482	HSV-2-pUL19	1113	14aa	mRNA_30cpc_Organoid_MD114	1
___ATVRNPVTDMGNLP_	X40482	HSV-1-pUL19	1113	14aa	mRNA_3000cpc_Organoid_MD101	1
___ATVRNPVTDMGNLP_	X40482	HSV-2-pUL19	1113	14aa	mRNA_3000cpc_Organoid_MD101	1
__TATVRNPVTDMGNL__	X8426	HSV-1-pUL19	1112	14aa	mRNA_30cpc_Organoid_MD114	1
__TATVRNPVTDMGNL__	X8426	HSV-2-pUL19	1112	14aa	mRNA_30cpc_Organoid_MD114	1
_____TVRNPVTDMGNLPQ	X9157	HSV-1-pUL19	1114	14aa	mRNA_30cpc_Organoid_MD114	1
_____TVRNPVTDMGNLPQ	X9157	HSV-2-pUL19	1114	14aa	mRNA_30cpc_Organoid_MD114	1
VATATVRNPVTDMG_____	X68514	HSV-1-pUL19	1110	14aa	mRNA_30cpc_Organoid_MD114	1
VATATVRNPVTDMG_____	X68514	HSV-2-pUL19	1110	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2233

Peptide LPPNWHVPEASDVTIQGPAPAP from BV-G with cluster number 2233

Peptide LPPNWHVPEASDVTIQGPAPAP from BV-G with cluster number 2233



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2233	LPPNWHVPEASDVTIQGPAPAP	4	1	3

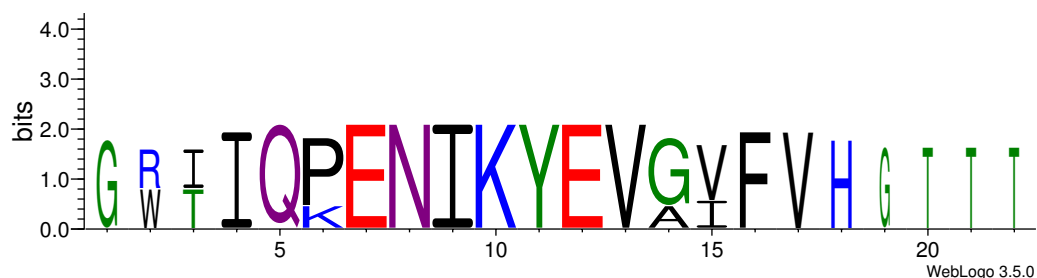
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2233	SDVTIQGPAPAPSG	-----SDVTIQGPAPAPSG_	1	0	1
2233	NWHVPEASDVTIQGPAPAPSGH	___NWHVPEASDVTIQGPAPAPSGH	1	0	1
2233	NWHVPEASDVTIQG	___NWHVPEASDVTIQG-----	1	0	1
2233	LPPNWHVPEASDVTIQGPAPAP	LPPNWHVPEASDVTIQGPAPAP___	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
LPPNWHVPEASDVTIQGPAPAP___	X30205	BV-G	316	22aa	mRNA_30cpc_Organoid_MD114	1
___NWHVPEASDVTIQG-----	X45983	BV-G	319	14aaA5	mRNA_3000cpc_Organoid_MD101	1
___NWHVPEASDVTIQGPAPAPSGH	X2856	BV-G	319	22aa	mRNA_3000cpc_Organoid_MD101	1
-----SDVTIQGPAPAPSG_	X12562	BV-G	326	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2225

Peptide GRTIQPENIKYEVGVFVHGTTT from JEV-E-BN19 with cluster number 2225

Peptide GRTIQPENIKYEVGVFVHGTTT from JEV-E-BN19 with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2225	GRTIQPENIKYEVGVFVHGTTT	4	4	0

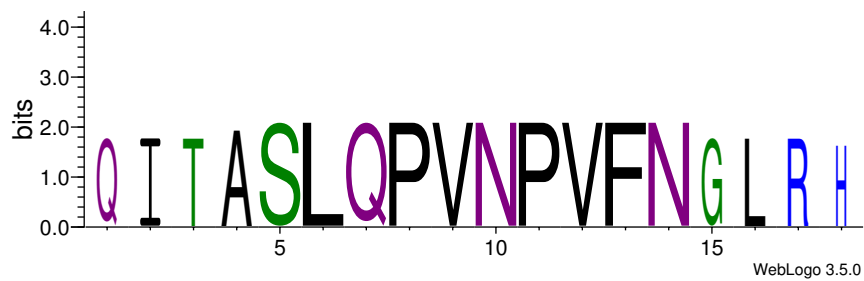
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2225	QPENIKYEVGVFVH	____QPENIKYEVGVFVH____	1	1	0
2225	IQPENIKYEVGIFV	___IQPENIKYEVGIFV_____	1	1	0
2225	GWIIQKENIKYEVA	GWIIQKENIKYEVA_____	1	1	0
2225	GRTIQPENIKYEVGVFVHGTTT	GRTIQPENIKYEVGVFVHGTTT	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
GRTIQPENIKYEVGVFVHGTTT	X62833	JEV-E-BN19	127	22aa	mRNA_30cpc_Organoid_MD114	1
GRTIQPENIKYEVGVFVHGTTT	X62833	JEV-E-KE-093	127	22aa	mRNA_30cpc_Organoid_MD114	1
GRTIQPENIKYEVGVFVHGTTT	X62833	JEV-E-SA14-5-3	127	22aa	mRNA_30cpc_Organoid_MD114	1
GRTIQPENIKYEVGVFVHGTTT	X62833	JEV-E-ThCMAr4492	127	22aa	mRNA_30cpc_Organoid_MD114	1
GWIIQKENIKYEVA_____	X58105	WNV-E-AZ10-918	127	14aaA5	mRNA_30cpc_Organoid_MD114	1
GWIIQKENIKYEVA_____	X58105	WNV-E-ArD76104	127	14aaA5	mRNA_30cpc_Organoid_MD114	1
GWIIQKENIKYEVA_____	X58105	WNV-E-H-442	127	14aaA5	mRNA_30cpc_Organoid_MD114	1
___IQPENIKYEVGIFV_____	X15275	JEV-E-BN19	130	14aa	mRNA_30cpc_Organoid_MD114	1
___IQPENIKYEVGIFV_____	X15275	JEV-E-KE-093	130	14aa	mRNA_30cpc_Organoid_MD114	1
___IQPENIKYEVGIFV_____	X15275	JEV-E-SA14-5-3	130	14aa	mRNA_30cpc_Organoid_MD114	1
___IQPENIKYEVGIFV_____	X15275	JEV-E-ThCMAr4492	130	14aa	mRNA_30cpc_Organoid_MD114	1
____QPENIKYEVGVFVH_____	X19292	JEV-E-BN19	131	14aa	mRNA_30cpc_Organoid_MD114	1
____QPENIKYEVGVFVH_____	X19292	JEV-E-KE-093	131	14aa	mRNA_30cpc_Organoid_MD114	1
____QPENIKYEVGVFVH_____	X19292	JEV-E-SA14-5-3	131	14aa	mRNA_30cpc_Organoid_MD114	1
____QPENIKYEVGVFVH_____	X19292	JEV-E-ThCMAr4492	131	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2211

Peptide QITASLQPVNPVFN from TMEV-VP2 with cluster number 2211

ptide QITASLQPVNPVFN from TMEV-VP2 with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2211	QITASLQPVNPVFN	4	4	0

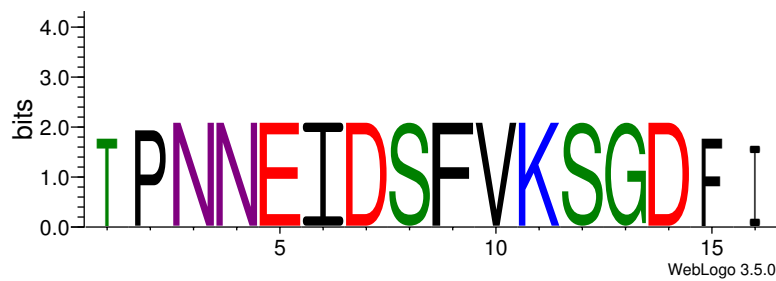
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2211	QITASLQPVNPVFN	QITASLQPVNPVFN_	2	2	0
2211	SLQPVNPVFNGLRH	_SLQPVNPVFNGLRH	1	1	0
2211	ASLQPVNPVFNGLR	_ASLQPVNPVFNGLR_	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
ASLQPVNPVFNGLR	X87108	TMEV-VP2	247	14aaG4S	mRNA_30cpc_Organoid_MD114	1
QITASLQPVNPVFN_	X18890	TMEV-VP2	244	14aa	mRNA_30cpc_Organoid_MD114	2
_SLQPVNPVFNGLRH	X12143	TMEV-VP2	248	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2142

Peptide TPNNEIDSFVKSGD from TeNT-Hc with cluster number 2142

ide TPNNEIDSFVKSGD from TeNT-Hc with cluster numb



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2142	TPNNEIDSFVKSGD	4	3	1

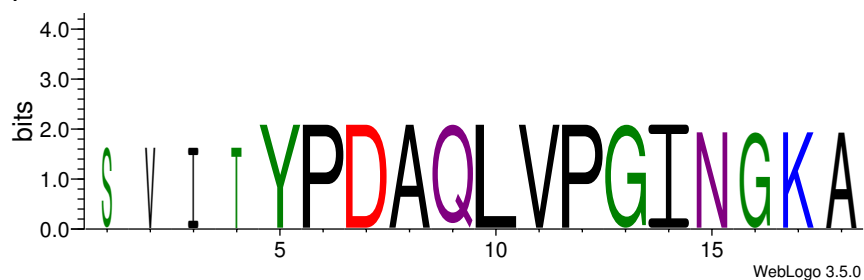
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2142	TPNNEIDSFVKSGD	TPNNEIDSFVKSGD__	2	2	0
2142	PNNEIDSFVKSGDF	_PNNEIDSFVKSGDF_	1	0	1
2142	NNEIDSFVKSGDFI	__NNEIDSFVKSGDFI	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
__NNEIDSFVKSGDFI	X169	TeNT-Hc	320	14aa	mRNA_30cpc_Organoid_MD114	1
PNNEIDSFVKSGDF	X20476	TeNT-Hc	319	14aa	mRNA_3000cpc_Organoid_MD101	1
TPNNEIDSFVKSGD__	X7129	TeNT-Hc	318	14aa	mRNA_30cpc_Organoid_MD114	2

[1] 2140

Peptide YPDAQLVPGINGKA from TeNT-Hc with cluster number 2140

Peptide YPDAQLVPGINGKA from TeNT-Hc with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2140	YPDAQLVPGINGKA	4	3	1

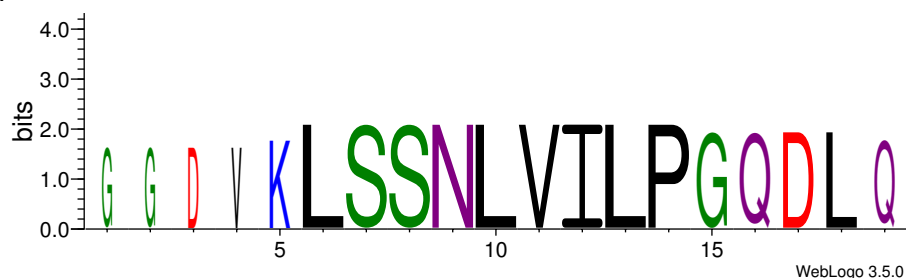
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2140	YPDAQLVPGINGKA	____YPDAQLVPGINGKA	3	2	1
2140	SVITYPDAQLVPGI	SVITYPDAQLVPGI____	1	1	0

alignment	LUTnrs	GeneName	start	structure	Group	Score
SVITYPDAQLVPGI____	X13484	TeNT-Hc	42	14aa	mRNA_30cpc_Organoid_MD114	1
____YPDAQLVPGINGKA	X70921	TeNT-Hc	46	14aa	mRNA_30cpc_Organoid_MD114	1
____YPDAQLVPGINGKA	X59590	TeNT-Hc	46	14aaA5	mRNA_30cpc_Organoid_MD114	1
____YPDAQLVPGINGKA	X59590	TeNT-Hc	46	14aaA5	mRNA_3000cpc_Organoid_MD101	1

[1] 2089

Peptide LSSNLVILPGQDLQ from MV-H-CAM-70 with cluster number 2089

ptide LSSNLVILPGQDLQ from MV-H-CAM-70 with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2089	LSSNLVILPGQDLQ	4	2	2

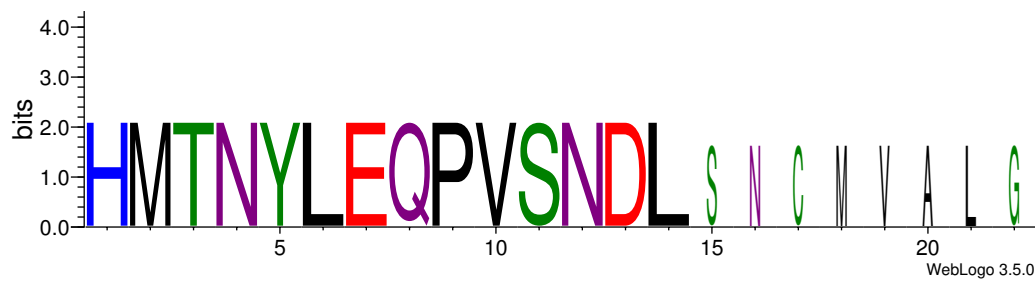
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2089	LSSNLVILPGQDLQ	____LSSNLVILPGQDLQ	2	1	1
2089	KLSSNLVILPGQDL	____KLSSNLVILPGQDL_	1	0	1
2089	GGDVKLSSNLVILP	GGDVKLSSNLVILP_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
GGDVKLSSNLVILP_____	X89184	MV-H-CAM-70	505	14aaG4S	mRNA_30cpc_Organoid_MD114	1
GGDVKLSSNLVILP_____	X89184	MV-H-Edmonston	505	14aaG4S	mRNA_30cpc_Organoid_MD114	1
GGDVKLSSNLVILP_____	X89184	MV-H-Halle	505	14aaG4S	mRNA_30cpc_Organoid_MD114	1
GGDVKLSSNLVILP_____	X89184	MV-H-MVi-Illinois.USA-50.99	505	14aaG4S	mRNA_30cpc_Organoid_MD114	1
GGDVKLSSNLVILP_____	X89184	MV-H-MVi-Texas.USA-28.99	505	14aaG4S	mRNA_30cpc_Organoid_MD114	1
____KLSSNLVILPGQDL_	X4231	MV-H-CAM-70	509	14aa	mRNA_3000cpc_Organoid_MD101	1
____KLSSNLVILPGQDL_	X4231	MV-H-Edmonston	509	14aa	mRNA_3000cpc_Organoid_MD101	1
____KLSSNLVILPGQDL_	X4231	MV-H-Halle	509	14aa	mRNA_3000cpc_Organoid_MD101	1
____KLSSNLVILPGQDL_	X4231	MV-H-MVi-Illinois.USA-50.99	509	14aa	mRNA_3000cpc_Organoid_MD101	1
____KLSSNLVILPGQDL_	X4231	MV-H-MVi-Texas.USA-28.99	509	14aa	mRNA_3000cpc_Organoid_MD101	1
____LSSNLVILPGQDLQ	X29170	MV-H-CAM-70	510	14aa	mRNA_30cpc_Organoid_MD114	1
____LSSNLVILPGQDLQ	X29170	MV-H-Edmonston	510	14aa	mRNA_30cpc_Organoid_MD114	1
____LSSNLVILPGQDLQ	X29170	MV-H-Halle	510	14aa	mRNA_30cpc_Organoid_MD114	1
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____LSSNLVILPGQDLQ	X29170	MV-H-CAM-70	510	14aa	mRNA_3000cpc_Organoid_MD101	1
____LSSNLVILPGQDLQ	X29170	MV-H-Edmonston	510	14aa	mRNA_3000cpc_Organoid_MD101	1
____LSSNLVILPGQDLQ	X29170	MV-H-Halle	510	14aa	mRNA_3000cpc_Organoid_MD101	1
____LSSNLVILPGQDLQ	X29170	MV-H-MVi-Illinois.USA-50.99	510	14aa	mRNA_3000cpc_Organoid_MD101	1
____LSSNLVILPGQDLQ	X29170	MV-H-MVi-Texas.USA-28.99	510	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2081

Peptide HMTNYLEQPVSNDL from MV-H-CAM-70 with cluster number 2081

Peptide HMTNYLEQPVSNDL from MV-H-CAM-70 with cluster number 2081



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2081	HMTNYLEQPVSNDL	4	3	1

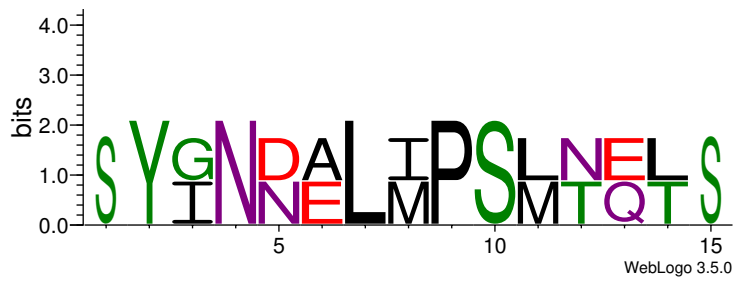
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2081	HMTNYLEQPVSNDL	HMTNYLEQPVSNDL_____	3	2	1
2081	HMTNYLEQPVSNDLSNCMVALG	HMTNYLEQPVSNDLSNCMVALG	1	1	0

alignment	LUTnrs	GeneName	start	structure	Group	Score
HMTNYLEQPVSNDL_____	X17313	MV-H-CAM-70	271	14aa	mRNA_30cpc_Organoid_MD114	2
HMTNYLEQPVSNDL_____	X17313	MV-H-Edmonston	271	14aa	mRNA_30cpc_Organoid_MD114	2
HMTNYLEQPVSNDL_____	X17313	MV-H-Halle	271	14aa	mRNA_30cpc_Organoid_MD114	2
HMTNYLEQPVSNDL_____	X17313	MV-H-CAM-70	271	14aa	mRNA_3000cpc_Organoid_MD101	1
HMTNYLEQPVSNDL_____	X17313	MV-H-Edmonston	271	14aa	mRNA_3000cpc_Organoid_MD101	1
HMTNYLEQPVSNDL_____	X17313	MV-H-Halle	271	14aa	mRNA_3000cpc_Organoid_MD101	1
HMTNYLEQPVSNDLSNCMVALG	X17312	MV-H-CAM-70	271	22aa	mRNA_30cpc_Organoid_MD114	1
HMTNYLEQPVSNDLSNCMVALG	X17312	MV-H-Edmonston	271	22aa	mRNA_30cpc_Organoid_MD114	1
HMTNYLEQPVSNDLSNCMVALG	X17312	MV-H-Halle	271	22aa	mRNA_30cpc_Organoid_MD114	1
HMTNYLEQPVSNDLSNCMVALG	X17312	MV-H-MVi-Illinois.USA-50.99	271	22aa	mRNA_30cpc_Organoid_MD114	1
HMTNYLEQPVSNDLSNCMVALG	X17312	MV-H-MVi-Texas.USA-28.99	271	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 2078

Peptide SYGNDALMPSLTET from APP with cluster number 2078

Peptide SYGNDALMPSLTET from APP with cluster number 2078



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2078	SYGNDALMPSLTET	4	3	1

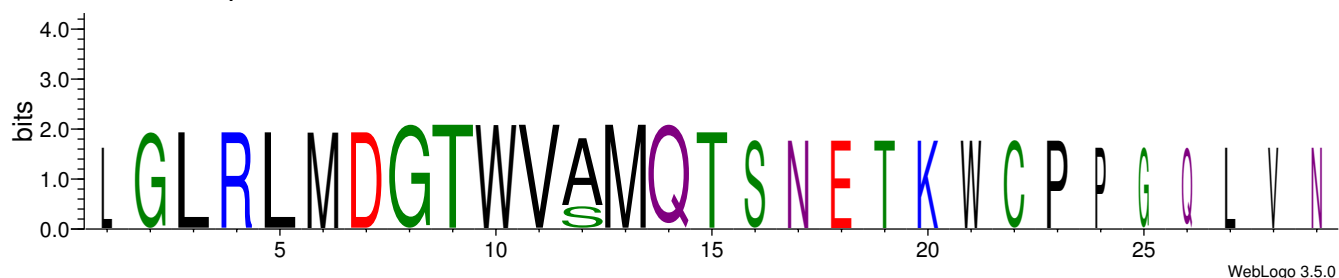
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2078	YINNELIPSMNQLS	_YINNELIPSMNQLS	2	2	0
2078	SYGNDALMPSLTET	SYGNDALMPSLTET_	2	1	1

alignment	LUThrs	GeneName	start	structure	Group	Score
SYGNDALMPSLTET_	X13829	APP	587	14aa	mRNA_30cpc_Organoid_MD114	1
SYGNDALMPSLTET_	X13829	APP	587	14aa	mRNA_3000cpc_Organoid_MD101	1
_YINNELIPSMNQLS	X59499	MV-F-CAM-70	184	14aaA5	mRNA_30cpc_Organoid_MD114	1
_YINNELIPSMNQLS	X90789	MV-F-CAM-70	184	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_YINNELIPSMNQLS	X59499	MV-F-Edmonston	184	14aaA5	mRNA_30cpc_Organoid_MD114	1
_YINNELIPSMNQLS	X90789	MV-F-Edmonston	184	14aaG4S	mRNA_30cpc_Organoid_MD114	1
_YINNELIPSMNQLS	X59499	MV-F-Halle	184	14aaA5	mRNA_30cpc_Organoid_MD114	1
_YINNELIPSMNQLS	X90789	MV-F-Halle	184	14aaG4S	mRNA_30cpc_Organoid_MD114	1

[1] 2072

Peptide GLRLMDGTWVAMQT from RV-G-B19 with cluster number 2072

Peptide GLRLMDGTWVAMQT from RV-G-B19 with cluster number 2072



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2072	GLRLMDGTWVAMQT	4	4	0

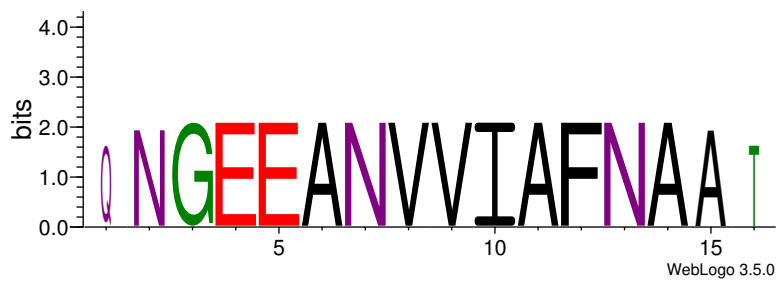
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2072	LGLRLMDGTWVAMQ	LGLRLMDGTWVAMQ_____	1	1	0
2072	GTWVAMQTSNETKWCPPGQLVN	_____GTWVAMQTSNETKWCPPGQLVN	1	1	0
2072	GLRLMDGTWVSMQTSNETKWCP	_GLRLMDGTWVSMQTSNETKWCP_____	1	1	0
2072	GLRLMDGTWVAMQT	_GLRLMDGTWVAMQT_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_GLRLMDGTWVAMQT_____	X57527	RV-G-B19	232	14aaA5	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVAMQT_____	X57527	RV-G-B2c	232	14aaA5	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVAMQT_____	X57527	RV-G-N2c	251	14aaA5	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVAMQT_____	X57527	RV-G-PV	232	14aaA5	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVSMQTSNETKWCP_____	X63218	RV-G-B19	232	22aa	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVSMQTSNETKWCP_____	X63218	RV-G-B2c	232	22aa	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVSMQTSNETKWCP_____	X63218	RV-G-N2c	251	22aa	mRNA_30cpc_Organoid_MD114	1
_GLRLMDGTWVSMQTSNETKWCP_____	X63218	RV-G-PV	232	22aa	mRNA_30cpc_Organoid_MD114	1
_____GTWVAMQTSNETKWCPPGQLVN	X61707	RV-G-B19	238	22aa	mRNA_30cpc_Organoid_MD114	1
_____GTWVAMQTSNETKWCPPGQLVN	X61707	RV-G-B2c	238	22aa	mRNA_30cpc_Organoid_MD114	1
_____GTWVAMQTSNETKWCPPGQLVN	X61707	RV-G-N2c	257	22aa	mRNA_30cpc_Organoid_MD114	1
_____GTWVAMQTSNETKWCPPGQLVN	X61707	RV-G-PV	238	22aa	mRNA_30cpc_Organoid_MD114	1
LGLRLMDGTWVAMQ_____	X32500	RV-G-B19	231	14aa	mRNA_30cpc_Organoid_MD114	1
LGLRLMDGTWVAMQ_____	X32500	RV-G-B2c	231	14aa	mRNA_30cpc_Organoid_MD114	1
LGLRLMDGTWVAMQ_____	X32500	RV-G-N2c	250	14aa	mRNA_30cpc_Organoid_MD114	1
LGLRLMDGTWVAMQ_____	X32500	RV-G-PV	231	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 2063

Peptide NGEEANVVIAFNAA from PSA-Chain-C with cluster number 2063

» NGEEANVVIAFNAA from PSA-Chain-C with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2063	NGEEANVVIAFNAA	4	1	3

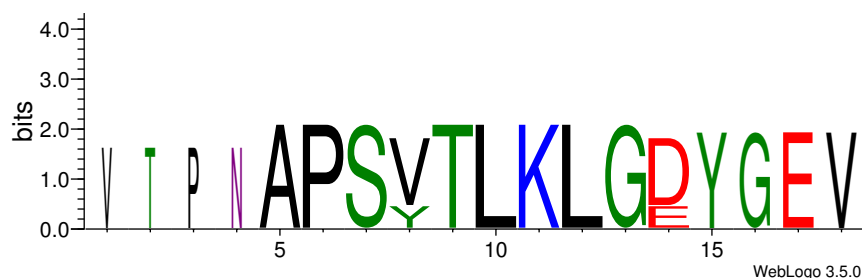
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2063	NGEEANVVIAFNAA	_NGEEANVVIAFNAA_	2	0	2
2063	QNGEEANVVIAFNA	QNGEEANVVIAFNA__	1	0	1
2063	GEEANVVIAFNAAT	__GEEANVVIAFNAAT	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_GEEANVVIAFNAAT	X63883	PSA-Chain-C	157	14aa	mRNA_30cpc_Organoid_MD114	1
NGEEANVVIAFNAA	X2412	PSA-Chain-C	156	14aa	mRNA_3000cpc_Organoid_MD101	2
QNGEEANVVIAFNA__	X18495	PSA-Chain-C	155	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 2051

Peptide APSVTLKLGDYGEV from JEV-E-BN19 with cluster number 2051

Peptide APSVTLKLGDYGEV from JEV-E-BN19 with cluster number 2051



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2051	APSVTLKLGDYGEV	4	3	1

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2051	APSVTLKLGDYGEV	___APSVTLKLGDYGEV	2	1	1
2051	VTPNAPSVTLKLGD	VTPNAPSVTLKLGD___	1	1	0
2051	APSYTLKLGEYGEV	___APSYTLKLGEYGEV	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
___APSVTLKLGDYGEV	X41617	JEV-E-BN19	173	14aa	mRNA_30cpc_Organoid_MD114	1
___APSVTLKLGDYGEV	X41617	JEV-E-KE-093	173	14aa	mRNA_30cpc_Organoid_MD114	1
___APSVTLKLGDYGEV	X41617	JEV-E-SA14-5-3	173	14aa	mRNA_30cpc_Organoid_MD114	1
___APSVTLKLGDYGEV	X41617	JEV-E-ThCMAr4492	173	14aa	mRNA_30cpc_Organoid_MD114	1
___APSVTLKLGDYGEV	X41617	JEV-E-BN19	173	14aa	mRNA_3000cpc_Organoid_MD101	1
___APSVTLKLGDYGEV	X41617	JEV-E-KE-093	173	14aa	mRNA_3000cpc_Organoid_MD101	1
___APSVTLKLGDYGEV	X41617	JEV-E-SA14-5-3	173	14aa	mRNA_3000cpc_Organoid_MD101	1
___APSVTLKLGDYGEV	X41617	JEV-E-ThCMAr4492	173	14aa	mRNA_3000cpc_Organoid_MD101	1
___APSYTLKLGEYGEV	X41628	WNV-E-AZ10-918	173	14aa	mRNA_30cpc_Organoid_MD114	1
___APSYTLKLGEYGEV	X41628	WNV-E-ArD76104	169	14aa	mRNA_30cpc_Organoid_MD114	1
___APSYTLKLGEYGEV	X41628	WNV-E-H-442	173	14aa	mRNA_30cpc_Organoid_MD114	1
VTPNAPSVTLKLGD___	X58291	JEV-E-BN19	169	14aaA5	mRNA_30cpc_Organoid_MD114	1
VTPNAPSVTLKLGD___	X58291	JEV-E-KE-093	169	14aaA5	mRNA_30cpc_Organoid_MD114	1
VTPNAPSVTLKLGD___	X58291	JEV-E-SA14-5-3	169	14aaA5	mRNA_30cpc_Organoid_MD114	1
VTPNAPSVTLKLGD___	X58291	JEV-E-ThCMAr4492	169	14aaA5	mRNA_30cpc_Organoid_MD114	1

[1] 2016

Peptide LVLLVSLGAISFWM from H1N1-HA with cluster number 2016

Peptide LVLLVSLGAISFWM from H1N1-HA with cluster number 2016



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2016	LVLLVSLGAISFWM	4	4	0

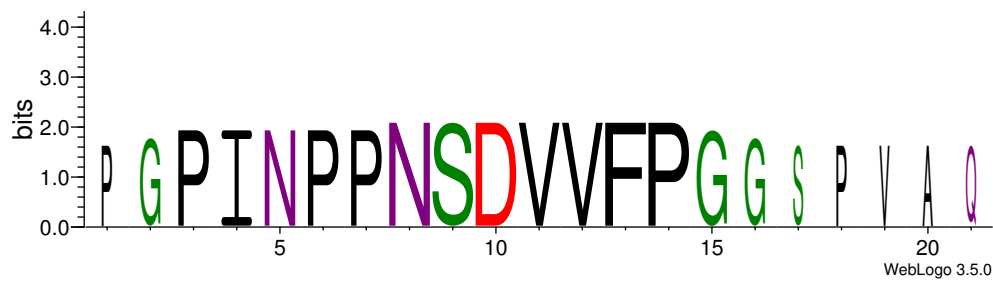
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
2016	VLLVSLGAISFWMC	___VLLVSLGAISFWMC_____	1	1	0
2016	SSLVLLVSLGAISFWMCNGL	SSLVLLVSLGAISFWMCNGL	1	1	0
2016	SLVLLVSLGAISFW	_SLVLLVSLGAISFW_____	1	1	0
2016	LVLLVSLGAISFWM	__LVLLVSLGAISFWM_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
__LVLLVSLGAISFWM_____	X32923	H1N1-HA	540	14aa	mRNA_30cpc_Organoid_MD114	1
_SLVLLVSLGAISFW_____	X12341	H1N1-HA	539	14aa	mRNA_30cpc_Organoid_MD114	1
SSLVLLVSLGAISFWMCNGL	X10767	H1N1-HA	538	22aa	mRNA_30cpc_Organoid_MD114	1
___VLLVSLGAISFWMC_____	X58757	H1N1-HA	541	14aaA5	mRNA_30cpc_Organoid_MD114	1

[1] 1991

Peptide GPINPPNSDVVFPG from HSV-2-pUS4 with cluster number 1991

Peptide GPINPPNSDVVFPG from HSV-2-pUS4 with cluster number 1991



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1991	GPINPPNSDVVFPG	4	4	0

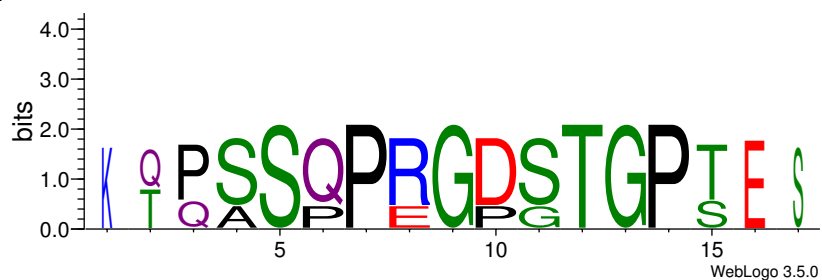
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1991	PINPPNSDVVFPGG	__PINPPNSDVVFPGG_____	1	1	0
1991	PGPINPPNSDVVF	PGPINPPNSDVVF_____	1	1	0
1991	NSDVVFPGGSPVAQ	_____NSDVVFPGGSPVAQ	1	1	0
1991	GPINPPNSDVVFPG	_GPINPPNSDVVFPG_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_GPINPPNSDVVFPG_____	X57364	HSV-2-pUS4	28	14aaA5	mRNA_30cpc_Organoid_MD114	1
_____NSDVVFPGGSPVAQ	X45446	HSV-2-pUS4	34	14aaA5	mRNA_30cpc_Organoid_MD114	1
PGPINPPNSDVVF_____	X23843	HSV-2-pUS4	27	14aa	mRNA_30cpc_Organoid_MD114	1
__PINPPNSDVVFPGG_____	X21380	HSV-2-pUS4	29	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1971

Peptide KQPSSQPRGDSTGP from HIV-tat with cluster number 1971

ptide KQPSSQPRGDSTGP from HIV-tat with cluster number



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1971	KQPSSQPRGDSTGP	4	3	1

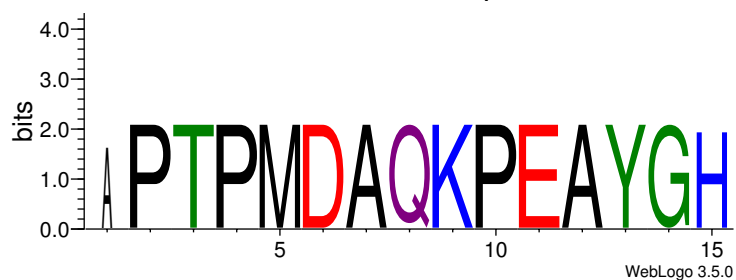
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1971	TQASPPEGPGTGPS	_TQASPPEGPGTGPS__	1	0	1
1971	SSQPRGDSTGPTE	___SSQPRGDSTGPTE	1	1	0
1971	PSSQPRGDSTGPTE	__PSSQPRGDSTGPTE_	1	1	0
1971	KQPSSQPRGDSTGP	KQPSSQPRGDSTGP___	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
KQPSSQPRGDSTGP___	X3874	HIV-tat	71	14aa	mRNA_30cpc_Organoid_MD114	1
__PSSQPRGDSTGPTE_	X21128	HIV-tat	73	14aa	mRNA_30cpc_Organoid_MD114	1
___SSQPRGDSTGPTE	X10707	HIV-tat	74	14aa	mRNA_30cpc_Organoid_MD114	1
_TQASPPEGPGTGPS__	X7067	Tau	275	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1916

Peptide PTPMDAQKPEAYGH from HSV-1-pUL37 with cluster number 1916

'TPMDAQKPEAYGH from HSV-1-pUL37 with cluster r



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1916	PTPMDAQKPEAYGH	4	3	1

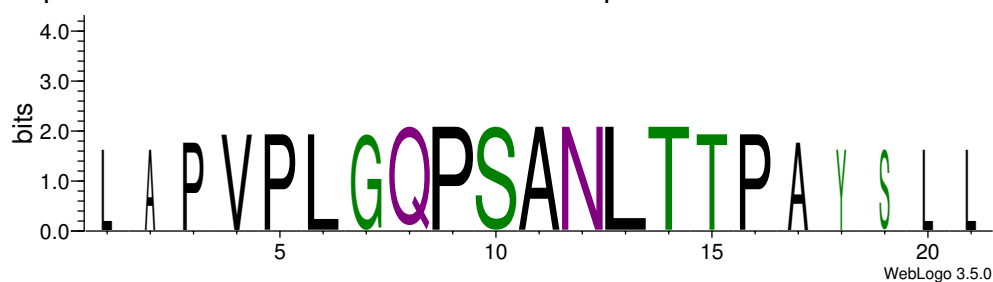
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1916	PTPMDAQKPEAYGH	_PTPMDAQKPEAYGH	3	2	1
1916	APTPMDAQKPEAYG	APTPMDAQKPEAYG_	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
APTPMDAQKPEAYG_	X41558	HSV-1-pUL37	1069	14aa	mRNA_30cpc_Organoid_MD114	1
_PTPMDAQKPEAYGH	X20913	HSV-1-pUL37	1070	14aa	mRNA_30cpc_Organoid_MD114	2
_PTPMDAQKPEAYGH	X20913	HSV-1-pUL37	1070	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1894

Peptide LAPVPLGQPSANLT from HSV-1-pUL37 with cluster number 1894

Peptide LAPVPLGQPSANLT from HSV-1-pUL37 with cluster number 18



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1894	LAPVPLGQPSANLT	4	1	3

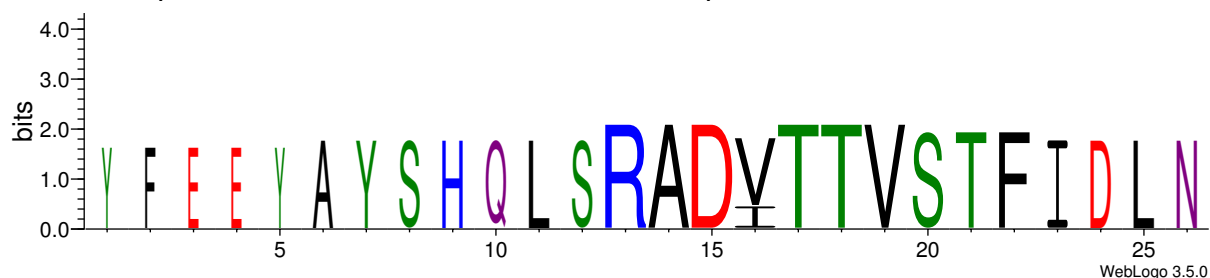
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1894	VPLGQPSANLTTPA	___VPLGQPSANLTTPA___	1	0	1
1894	QPSANLTTPAYSLL	_____QPSANLTTPAYSLL	1	1	0
1894	PVPLGQPSANLTTP	__PVPLGQPSANLTTP_____	1	0	1
1894	LAPVPLGQPSANLT	LAPVPLGQPSANLT_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
LAPVPLGQPSANLT_____	X53552	HSV-1-pUL37	205	14aaA5	mRNA_3000cpc_Organoid_MD101	1
__PVPLGQPSANLTTP_____	X24172	HSV-1-pUL37	207	14aa	mRNA_3000cpc_Organoid_MD101	1
_____QPSANLTTPAYSLL	X19197	HSV-1-pUL37	212	14aa	mRNA_30cpc_Organoid_MD114	1
___VPLGQPSANLTTPA___	X67210	HSV-1-pUL37	208	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1834

Peptide RADVTTVSTFIDLN from HSV-1-pUL27 with cluster number 1834

Peptide RADVTTVSTFIDLN from HSV-1-pUL27 with cluster number 1834



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1834	RADVTTVSTFIDLN	4	3	1

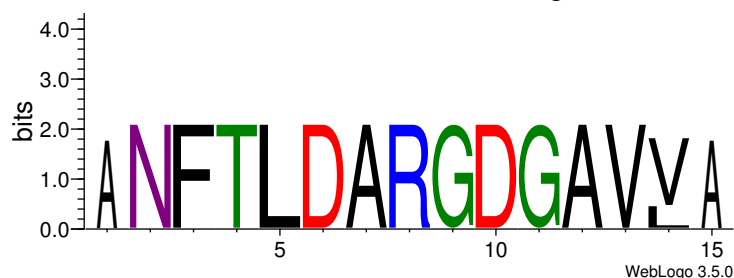
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1834	RADVTTVSTFIDLN	_____RADVTTVSTFIDLN	2	1	1
1834	YFEEYAYSHQLSRADITTVSTF	YFEEYAYSHQLSRADITTVSTF_____	1	1	0
1834	AYSHQLSRADVTTV	_____AYSHQLSRADVTTV_____	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
_____AYSHQLSRADVTTV_____	X44782	HSV-1-pUL27	654	14aa	mRNA_30cpc_Organoid_MD114	1
_____AYSHQLSRADVTTV_____	X44782	HSV-2-pUL27	651	14aa	mRNA_30cpc_Organoid_MD114	1
_____RADVTTVSTFIDLN	X27231	HSV-1-pUL27	661	14aa	mRNA_30cpc_Organoid_MD114	1
_____RADVTTVSTFIDLN	X27231	HSV-2-pUL27	658	14aa	mRNA_30cpc_Organoid_MD114	1
_____RADVTTVSTFIDLN	X27231	HSV-1-pUL27	661	14aa	mRNA_3000cpc_Organoid_MD101	1
_____RADVTTVSTFIDLN	X27231	HSV-2-pUL27	658	14aa	mRNA_3000cpc_Organoid_MD101	1
YFEEYAYSHQLSRADITTVSTF_____	X72148	HSV-1-pUL27	649	22aa	mRNA_30cpc_Organoid_MD114	1
YFEEYAYSHQLSRADITTVSTF_____	X72148	HSV-2-pUL27	646	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 1823

Peptide NFTLDARGDGAVVA from PRV-Becker-gE with cluster number 1823

FTLDARGDGAVVA from PRV-Becker-gE with cluster



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1823	NFTLDARGDGAVVA	4	2	2

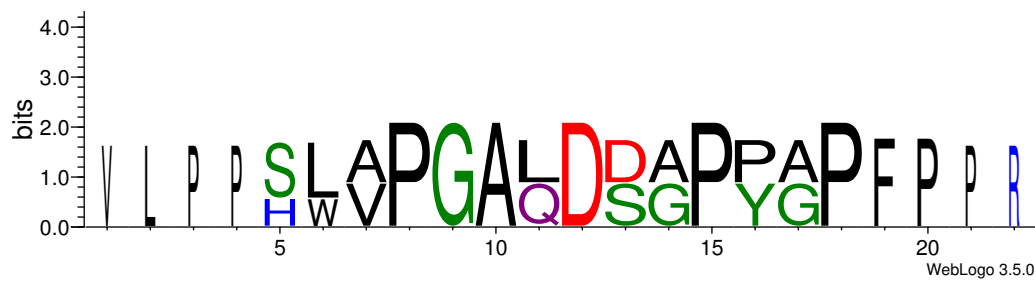
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1823	NFTLDARGDGAVVA	_NFTLDARGDGAVVA	2	1	1
1823	ANFTLDARGDGAVV	ANFTLDARGDGAVV_	1	1	0
1823	ANFTLDARGDGAVL	ANFTLDARGDGAVL_	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
ANFTLDARGDGAVL_	X39958	PRV-Becker-gE	92	14aa	mRNA_3000cpc_Organoid_MD101	1
ANFTLDARGDGAVL_	X39958	PRV-TJ-gE	93	14aa	mRNA_3000cpc_Organoid_MD101	1
ANFTLDARGDGAVV_	X39959	PRV-Becker-gE	92	14aa	mRNA_30cpc_Organoid_MD114	1
ANFTLDARGDGAVV_	X39959	PRV-TJ-gE	93	14aa	mRNA_30cpc_Organoid_MD114	1
_NFTLDARGDGAVVA	X2904	PRV-Becker-gE	93	14aa	mRNA_30cpc_Organoid_MD114	1
_NFTLDARGDGAVVA	X2904	PRV-TJ-gE	94	14aa	mRNA_30cpc_Organoid_MD114	1
_NFTLDARGDGAVVA	X2904	PRV-Becker-gE	93	14aa	mRNA_3000cpc_Organoid_MD101	1
_NFTLDARGDGAVVA	X2904	PRV-TJ-gE	94	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1792

Peptide SLVPGAQDSAPPGP from HSV-1-pUL21 with cluster number 1792

Peptide SLVPGAQDSAPPGP from HSV-1-pUL21 with cluster number 1792



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1792	SLVPGAQDSAPPGP	4	2	2

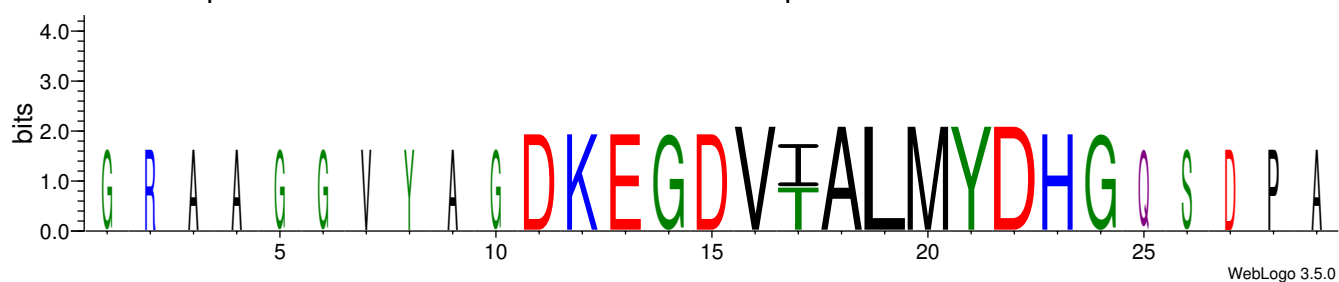
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1792	SLVPGAQDSAPPGP	____SLVPGAQDSAPPGP____	2	1	1
1792	VLPPHWAPGALDDGPYAPFPPR	VLPPHWAPGALDDGPYAPFPPR	1	1	0
1792	APGALDDGPYAPFP	______APGALDDGPYAPFP__	1	0	1

alignment	LUTnrs	GeneName	start	structure	Group	Score
______APGALDDGPYAPFP__	X41944	HSV-2-pUS4	301	14aa	mRNA_3000cpc_Organoid_MD101	1
____SLVPGAQDSAPPGP____	X12339	HSV-1-pUL21	269	14aa	mRNA_30cpc_Organoid_MD114	1
____SLVPGAQDSAPPGP____	X12339	HSV-1-pUL21	269	14aa	mRNA_3000cpc_Organoid_MD101	1
VLPPHWAPGALDDGPYAPFPPR	X67733	HSV-2-pUS4	295	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 1779

Peptide DKEGDVTALMYDHG from HSV-1-pUL19 with cluster number 1779

Peptide DKEGDVTALMYDHG from HSV-1-pUL19 with cluster number 1779



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1779	DKEGDVTALMYDHG	4	3	1

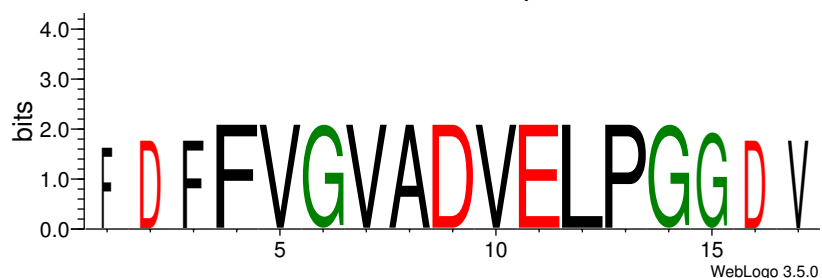
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1779	DKEGDVTALMYDHG	-----DKEGDVTALMYDHG-----	2	1	1
1779	VIALMYDHGQSDPA	-----VIALMYDHGQSDPA-----	1	1	0
1779	GRAAGGVYAGDKEGDVIALMYD	GRAAGGVYAGDKEGDVIALMYD-----	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----DKEGDVTALMYDHG-----	X33947	HSV-1-pUL19	1217	14aa	mRNA_30cpc_Organoid_MD114	1
-----DKEGDVTALMYDHG-----	X33947	HSV-2-pUL19	1217	14aa	mRNA_30cpc_Organoid_MD114	1
-----DKEGDVTALMYDHG-----	X33947	HSV-1-pUL19	1217	14aa	mRNA_3000cpc_Organoid_MD101	1
-----DKEGDVTALMYDHG-----	X33947	HSV-2-pUL19	1217	14aa	mRNA_3000cpc_Organoid_MD101	1
GRAAGGVYAGDKEGDVIALMYD-----	X62981	HSV-1-pUL19	1207	22aa	mRNA_30cpc_Organoid_MD114	1
GRAAGGVYAGDKEGDVIALMYD-----	X62981	HSV-2-pUL19	1207	22aa	mRNA_30cpc_Organoid_MD114	1
-----VIALMYDHGQSDPA-----	X66720	HSV-1-pUL19	1222	14aa	mRNA_30cpc_Organoid_MD114	1
-----VIALMYDHGQSDPA-----	X66720	HSV-2-pUL19	1222	14aa	mRNA_30cpc_Organoid_MD114	1

[1] 1763

Peptide FVGADVLPGGDV from HSV-1-pUL19 with cluster number 1763

e FVGADVLPGGDV from HSV-1-pUL19 with cluster numr



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1763	FVGADVLPGGDV	4	2	2

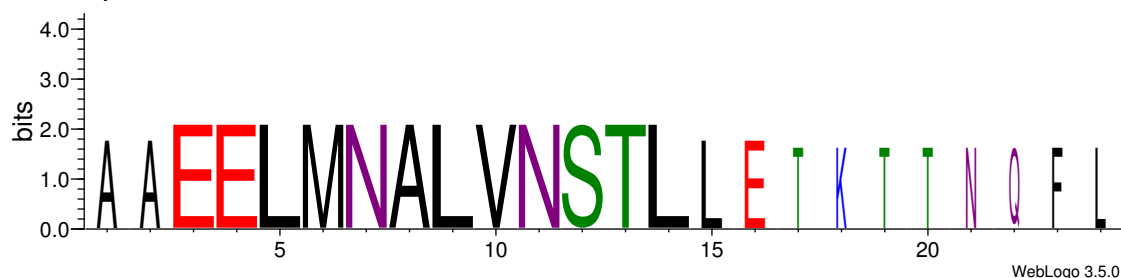
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1763	FVGADVLPGGDV	___FVGADVLPGGDV	2	1	1
1763	FDFFVGADVLP	FDFFVGADVLP___	1	1	0
1763	DFFVGADVLP	_DFFVGADVLP__	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
_DFFVGADVLP	X36741	HSV-1-pUL19	548	14aa	mRNA_3000cpc_Organoid_MD101	1
_DFFVGADVLP	X36741	HSV-2-pUL19	548	14aa	mRNA_3000cpc_Organoid_MD101	1
FDFFVGADVLP	X75650	HSV-1-pUL19	547	14aa	mRNA_30cpc_Organoid_MD114	1
FDFFVGADVLP	X75650	HSV-2-pUL19	547	14aa	mRNA_30cpc_Organoid_MD114	1
___FVGADVLP	X76206	HSV-1-pUL19	550	14aa	mRNA_30cpc_Organoid_MD114	1
___FVGADVLP	X76206	HSV-2-pUL19	550	14aa	mRNA_30cpc_Organoid_MD114	1
___FVGADVLP	X76206	HSV-1-pUL19	550	14aa	mRNA_3000cpc_Organoid_MD101	1
___FVGADVLP	X76206	HSV-2-pUL19	550	14aa	mRNA_3000cpc_Organoid_MD101	1

[1] 1736

Peptide AAEELMNALVNSTL from MV-H-CAM-70 with cluster number 1736

Peptide AAEELMNALVNSTL from MV-H-CAM-70 with cluster number 1736



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1736	AAEELMNALVNSTL	4	2	2

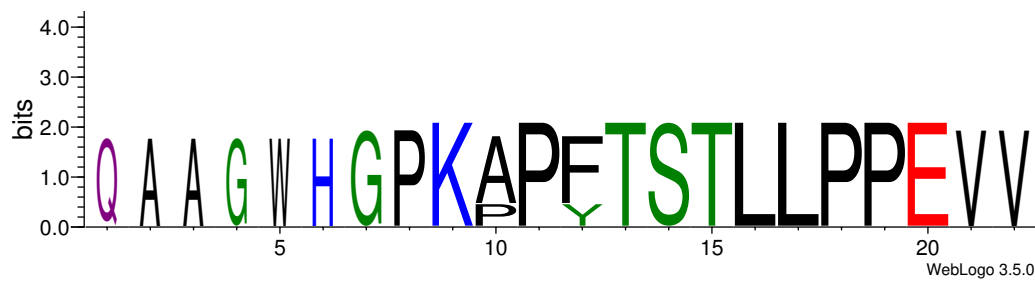
cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1736	AAEELMNALVNSTL	AAEELMNALVNSTL_____	2	1	1
1736	EELMNALVNSTLLETKTNQFL	__EELMNALVNSTLLETKTNQFL	1	1	0
1736	EELMNALVNSTLLE	__EELMNALVNSTLLE_____	1	0	1

alignment	LUThrs	GeneName	start	structure	Group	Score
AAEELMNALVNSTL_____	X43711	MV-H-CAM-70	158	14aa	mRNA_30cpc_Organoid_MD114	1
AAEELMNALVNSTL_____	X43711	MV-H-Edmonston	158	14aa	mRNA_30cpc_Organoid_MD114	1
AAEELMNALVNSTL_____	X43711	MV-H-Halle	158	14aa	mRNA_30cpc_Organoid_MD114	1
AAEELMNALVNSTL_____	X43711	MV-H-MVi-Illinois.USA-50.99	158	14aa	mRNA_30cpc_Organoid_MD114	1
AAEELMNALVNSTL_____	X43711	MV-H-MVi-Texas.USA-28.99	158	14aa	mRNA_30cpc_Organoid_MD114	1
AAEELMNALVNSTL_____	X43711	MV-H-CAM-70	158	14aa	mRNA_3000cpc_Organoid_MD101	1
AAEELMNALVNSTL_____	X43711	MV-H-Edmonston	158	14aa	mRNA_3000cpc_Organoid_MD101	1
AAEELMNALVNSTL_____	X43711	MV-H-Halle	158	14aa	mRNA_3000cpc_Organoid_MD101	1
AAEELMNALVNSTL_____	X43711	MV-H-MVi-Illinois.USA-50.99	158	14aa	mRNA_3000cpc_Organoid_MD101	1
AAEELMNALVNSTL_____	X43711	MV-H-MVi-Texas.USA-28.99	158	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLE_____	X38580	MV-H-CAM-70	160	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLE_____	X38580	MV-H-Edmonston	160	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLE_____	X38580	MV-H-Halle	160	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLE_____	X38580	MV-H-MVi-Illinois.USA-50.99	160	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLE_____	X38580	MV-H-MVi-Texas.USA-28.99	160	14aa	mRNA_3000cpc_Organoid_MD101	1
__EELMNALVNSTLLETKTNQFL	X38578	MV-H-CAM-70	160	22aa	mRNA_30cpc_Organoid_MD114	1
__EELMNALVNSTLLETKTNQFL	X38578	MV-H-Edmonston	160	22aa	mRNA_30cpc_Organoid_MD114	1
__EELMNALVNSTLLETKTNQFL	X38578	MV-H-Halle	160	22aa	mRNA_30cpc_Organoid_MD114	1
__EELMNALVNSTLLETKTNQFL	X38578	MV-H-MVi-Illinois.USA-50.99	160	22aa	mRNA_30cpc_Organoid_MD114	1
__EELMNALVNSTLLETKTNQFL	X38578	MV-H-MVi-Texas.USA-28.99	160	22aa	mRNA_30cpc_Organoid_MD114	1

[1] 1722

Peptide QAAGWHGPKAPFTSTLLPPEVV from BV-G with cluster number 1722

Peptide QAAGWHGPKAPFTSTLLPPEVV from BV-G with cluster number 1`



cluster_id	main_sequence	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1722	QAAGWHGPKAPFTSTLLPPEVV	4	4	0

cluster_id	sequence	alignment	sum	mRNA_30cpc_Organoid_MD114	mRNA_3000cpc_Organoid_MD101
1722	QAAGWHGPKAPFTSTLLPPEVV	QAAGWHGPKAPFTSTLLPPEVV	2	2	0
1722	KAPFTSTLLPPEVV	-----KAPFTSTLLPPEVV	1	1	0
1722	GPKPPYTSTLLPPE	-----GPKPPYTSTLLPPE__	1	1	0

alignment	LUThrs	GeneName	start	structure	Group	Score
-----GPKPPYTSTLLPPE__	X62510	BV-G	268	14aa	mRNA_30cpc_Organoid_MD114	1
-----GPKPPYTSTLLPPE__	X62510	HSV-1-pUS6	268	14aa	mRNA_30cpc_Organoid_MD114	1
-----GPKPPYTSTLLPPE__	X62510	HSV-2-pUS6	268	14aa	mRNA_30cpc_Organoid_MD114	1
-----KAPFTSTLLPPEVV	X4768	BV-G	270	14aa	mRNA_30cpc_Organoid_MD114	1
QAAGWHGPKAPFTSTLLPPEVV	X19942	BV-G	262	22aa	mRNA_30cpc_Organoid_MD114	2


```
# 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 1.519162 mins
```

```
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      2020-11-09
```

```
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)