Figure 1D

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General directory setting

```r
wd <- here::here()
shared <- fs::path(fs::path_dir(wd), "shared")
```

Loading packages

```r
library(magrittr)
library(ggplot2)
```

Load common R scripts

```r
#source(fs::path(wd, "script_r", "MISC.R"))
#source(fs::path(here::here(), "script_r", "MISC_PALETTE.R"))
```

Load script

```r
source(fs::path(wd, "script_r", "MISC_FIG.R"))
readLines(fs::path(wd, "script_r", "MISC_FIG.R")) %>% cat(sep = "\n")
```

```r
library(magrittr)
library(ggplot2)

COL_PALETTE <-
  viridis::inferno(6, begin = .1, end = .9) %>%
  rev() %>%
  setNames(nm = c("ZT0", "ZT3", "ZT6", "ZT12", "ZT18", "ZT21"))

LABEL_PALETTE <-
  COL_PALETTE %>%
  prismatic::clr_darken(shift = .15) %>%
  setNames(names(COL_PALETTE))

label_number_si <-
  purrr::partial(scales::label_number, scale_cut = scales::cut_short_scale())

ggsave_single <- function(..., width = 86, height = 230, dpi = 300) {
  f <- purrr::partial(ggsave, width = width, height = height, dpi = dpi, units = "mm")
  f(...)
}

ggsave_double <- function(..., width = 178, height = 230, dpi = 300) {
  f <- purrr::partial(ggsave, width = width, height = height, dpi = dpi, units = "mm")
  f(...)
}

#' Utility functions for making secondary y-axis
#' @param y1 numeric vector
#' @param y2 numeric vector
#' @name util_2nd_axis
```

```
#' @examples
#' make_scale_y1_to_y2(1:5, 6:10)(1:10)
#' make_scale_y2_to_y1(1:5, 6:10)(1:10)
#'
#' iris_ <- dplyr::select(iris, x = Sepal.Length, y1 = Petal.Length, y2 = Petal.Width)
#' gp1 <-
#'   iris_ %>%
#'   ggplot() +
#'   geom_point(aes(x, y1), color = "#CD3700") +
#'   geom_point(aes(x, y2), color = "#473C8B")
#'
#' to_y1 <- with(iris_, {make_scale_y2_to_y1(y1, y2)})
#' to_y2 <- with(iris_, {make_scale_y1_to_y2(y1, y2)})
#' gp2 <-
#'   iris_ %>%
#'   ggplot() +
#'   geom_point(aes(x, y1), color = "#CD3700") +
#'   geom_point(aes(x, y = to_y1(y2)), color = "#473C8B") +
#'   scale_y_continuous(sec.axis = sec_axis(trans = to_y2, name = "y2"))
#' patchwork::wrap_plots(gp1, gp2)
#'
NULL

#' Create transformation function of range(y1) to range(y2)
#' @rdname util_2nd_axis
#' @export
#'
make_scale_y1_to_y2 <- function(y1, y2) {
  function(n) {
    scales:::rescale.numeric(
      n,
      to = range(y2, na.rm = TRUE, finite = TRUE),
      from = range(y1, na.rm = TRUE, finite = TRUE)
    )
  }
}

#' Create transformation function of range(y2) to range(y1)
#' @rdname util_2nd_axis
#' @export
#'
make_scale_y2_to_y1 <- function(y1, y2) {
  function(n) {
    scales:::rescale.numeric(
      n,
      to = range(y1, na.rm = TRUE, finite = TRUE),
      from = range(y2, na.rm = TRUE, finite = TRUE)
    )
  }
}

#' Create transformation function of range(y2) to range(y1)
#' @rdname util_2nd_axis
#' @export
#'
make_scale_y2_to_y1_se <- function(y1, y2) {
  to <- range(y1, na.rm = TRUE, finite = TRUE)
  from <- range(y2, na.rm = TRUE, finite = TRUE)
  function(n) n / (diff(from) / diff(to))
}
```

Directory setting

```r
dir_output <- fs::path("analysis", "fig", "fig01D")
path_out <- function(...) fs::path(wd, dir_output, ...)
fs::dir_create(path_out())
```

Load input data

```r
li_tbl_plot <-
  fs::path(wd, "analysis", "out_ribowaltz", "region_psite") %>%
  fs::dir_ls(regexp = ".csv$") %>%
  purrr::map(readr::read_csv, show_col_types = FALSE)

tbl_plot_len <-
  li_tbl_plot[[1]] %>%
  dplyr::filter(sample == "RNAs") %>%
  dplyr::mutate(region = forcats::fct_inorder(region))

tbl_plot <-
  li_tbl_plot %>%
  purrr::map(dplyr::filter, sample != "RNAs") %>%
  dplyr::bind_rows() %>%
  dplyr::mutate(region = forcats::fct_inorder(region))

tbl_plot <-
  tbl_plot %>%
  dplyr::mutate(
    fname = stringr::str_extract(sample, "zt\\d+_[12]") %>%
      stringr::str_to_upper(),
    cond = stringr::str_extract(fname, "ZT\\d+") %>%
      forcats::fct_relevel(paste0("ZT", c(0, 3, 6,12, 18, 21))),
    rep = stringr::str_extract(fname, "[12]$")
  )
```

Plotting

```r
theme_fig01D <- function(base_size = 10, base_line_size = 1/22) {
  list(
    theme_linedraw(
      base_size = base_size,
      base_line_size = base_line_size
    ),
    theme(
      axis.ticks.y = element_line(color = "black", size = .1)
    )
  )
}
```

Fig. 1D

```r
gp1 <-
  tbl_plot_len %>%
  ggplot(aes(sample, percentage)) +
  geom_col(aes(alpha = region)) +
  scale_fill_grey() +
  scale_alpha_discrete(range = c(.3, 1)) +
  scale_x_discrete(expand = expansion(0)) +
  scale_y_continuous(breaks = c(0, 25, 50, 75, 100),
                     expand = expansion(1E-10)) +
  labs(x = "", y = "Length (%)") +
  theme_fig01D(base_size = 10) +
  theme(
```

```
    panel.grid = element_blank(),
    panel.border = element_blank()
  )
```

```
Warning: Using alpha for a discrete variable is not advised.
```

```
Warning: The `size` argument of `element_line()` is deprecated as of ggplot2 3.4.0.
ℹ Please use the `linewidth` argument instead.
```

```
gp2 <-
  tbl_plot %>%
  ggplot(aes(rep, percentage)) +
  geom_col(aes(alpha = region)) +
  scale_fill_grey() +
  scale_alpha_discrete(range = c(.3, 1)) +
  scale_x_discrete(expand = expansion(0)) +
  scale_y_continuous(breaks = c(0, 25, 50, 75, 100),
                     expand = expansion(0), position = "right") +
  labs(x = "", y = "P-site (%)") +
  facet_grid(cols = vars(cond), scales = "free_x",
             switch = "x") +
  theme_fig01D(base_size = 10) +
  theme(
    panel.grid = element_blank(),
    strip.placement = "outside",
    panel.spacing = unit(1, "mm"),
    strip.background = ggh4x::element_part_rect(side = "t", colour = "black", fill = NA),
    strip.text = element_text(color = "black"),
    panel.border = element_blank()
  ) +
  guides(
    fill = guide_none()
  )
```

```
Warning: Using alpha for a discrete variable is not advised.
```
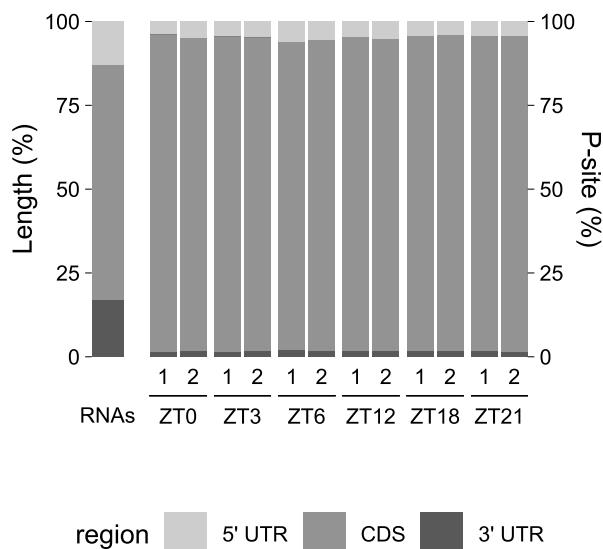
```
pgp <-
  patchwork::wrap_plots(gp1, gp2, widths = c(1/13, 12/13), guides = "collect") &
  theme(
    legend.position = "bottom",
    axis.ticks.x = element_blank()
  )
ggsave_single(pgp, filename = path_out("fig01D_type2_s.png"), height = 80)
ggsave_single(pgp, filename = path_out("fig01D_type2_s.svg"), height = 80)
```

```
knitr::include_graphics(path_out("fig01D_type2_s.svg"))
```

region ▢ 5' UTR   ▢ CDS   ▢ 3' UTR

Sessioninfo

```
sessionInfo()
```

```
R version 4.2.1 (2022-06-23)
Platform: aarch64-apple-darwin20 (64-bit)
Running under: macOS Ventura 13.1

Matrix products: default
BLAS:   /Library/Frameworks/R.framework/Versions/4.2-arm64/Resources/lib/libRblas.0.dylib
LAPACK: /Library/Frameworks/R.framework/Versions/4.2-arm64/Resources/lib/libRlapack.dylib

locale:
[1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8

attached base packages:
[1] stats     graphics  grDevices datasets  utils     methods   base

other attached packages:
[1] ggplot2_3.4.2  magrittr_2.0.3

loaded via a namespace (and not attached):
 [1] tidyselect_1.2.0    xfun_0.40           ggh4x_0.2.3
 [4] purrr_1.0.1         colorspace_2.0-3    vctrs_0.6.1
 [7] generics_0.1.3      htmltools_0.5.3     viridisLite_0.4.1
[10] yaml_2.3.6          utf8_1.2.2          rlang_1.1.0
[13] pillar_1.9.0        glue_1.6.2          withr_2.5.0
[16] bit64_4.0.5         lifecycle_1.0.3     stringr_1.5.0
[19] munsell_0.5.0       gtable_0.3.1        ragg_1.2.5
[22] evaluate_0.20       knitr_1.42          forcats_1.0.0
[25] tzdb_0.3.0          fastmap_1.1.0       parallel_4.2.1
[28] fansi_1.0.3         readr_2.1.4         renv_1.0.3
[31] scales_1.2.1        BiocManager_1.30.18 vroom_1.6.0
[34] jsonlite_1.8.4      systemfonts_1.0.4   farver_2.1.1
[37] fs_1.5.2            bit_4.0.5           textshaping_0.3.6
[40] gridExtra_2.3       hms_1.1.3           digest_0.6.31
[43] stringi_1.7.12      dplyr_1.1.1         grid_4.2.1
[46] rprojroot_2.0.3     here_1.0.1          cli_3.6.0
[49] tools_4.2.1         patchwork_1.1.2     tibble_3.2.1
[52] crayon_1.5.2        pkgconfig_2.0.3     svglite_2.1.0
[55] rmarkdown_2.24      rstudioapi_0.14     viridis_0.6.2
[58] R6_2.5.1            prismatic_1.1.1     compiler_4.2.1
```