# 加载必要的包

library(ggplot2)

library(readxl) # 读取Excel文件

# 读入数据

data <- read\_excel("data\_1.xlsx")

# 转换为长格式

data\_long <- data.frame(

time = c(data$`Time (s)`, data$`Time (s)`),

group = rep(c("Fasted", "4 weeks HPD"), each = nrow(data)),

average = c(data$Fasted\_Average, data$HPD\_Average),

SEM = c(data$Fasted\_SEM, data$HPD\_SEM)

)

# 定义分组的展示顺序

data\_long$group <- factor(data\_long$group, levels = c("4 weeks HPD", "Fasted"))

# 定义颜色

my\_color = c("#c1966b", "#642e8e")

# 绘制时间序列图

ggplot(data\_long, aes(x = time, y = average, fill = group, color = group)) +

# 误差带

geom\_ribbon(aes(ymin = average - SEM, ymax = average + SEM), # 误差带上下边界（均值±标准误）

alpha = 0.2, color = NA) + # 透明度（20%），无边框线

# 均值线

geom\_line(linewidth = 0.7) + # 线宽

# 垂直参考线

geom\_vline(xintercept = c(20, 30), linetype = "dashed", color = "grey50") + # 在x=20和x=30处添加灰色虚线

# 自定义颜色

scale\_fill\_manual(values = my\_color) + # 填充色

scale\_color\_manual(values = my\_color) + # 线条色

# 设置图例样式

guides(fill = guide\_legend(override.aes = list(color = my\_color, fill = my\_color, # 覆盖默认图例样式

alpha = 0.3, linewidth = 0.6)),

color = "none") + # 隐藏线条颜色的图例

# 调整坐标轴：固定坐标范围并设置刻度

scale\_x\_continuous(limits = c(0, 50), expand = c(0, 0)) + # X轴范围，无扩展空间

scale\_y\_continuous(limits = c(-6, 8), breaks = seq(-6, 8, 2), expand = c(0, 0)) + # Y轴范围，无扩展空间

# 坐标轴名称和标题

labs(x = "Time (s)", y = "ΔF/F (%)") + # 带下标的标签

# 设置主题

theme\_classic(base\_size = 12) +

theme(axis.title = element\_text(size = 11), # 坐标轴标题大小

axis.text = element\_text(size = 11, color = "black"), # 刻度标签大小和颜色

axis.ticks.length = unit(-3, "pt"), # 刻度线长度(负值表示向内)

legend.title = element\_blank(), # 不显示图例标题

legend.text = element\_text(size = 11), # 图例文字大小

legend.position = c(0.9, 0.95), # 图例位置(右上角)

legend.key.size = unit(10,