## Gene Expression Differences in Diurnal and Nocturnal Cichlids

This study aims to identify genes implicated in diurnal and nocturnal activity patterns in cichlid fish by analyzing differential gene expression (DEG) across four species:

- Diurnal species: Tropheops kumwera and Astatotilapia calliptera
- Nocturnal species: Astatotilapia labrosus and Aulonocara stuartgranti



T. kumwera



A. calliptera



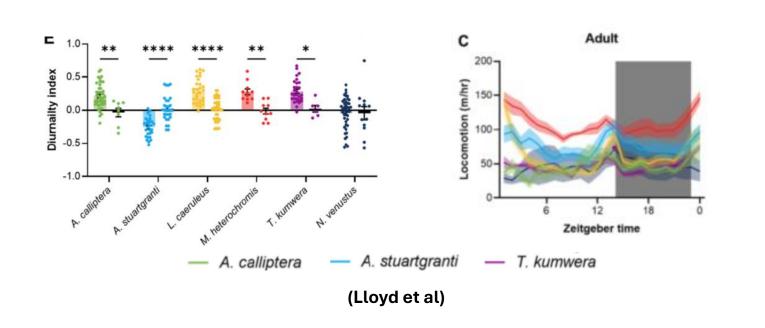
A. labrosus

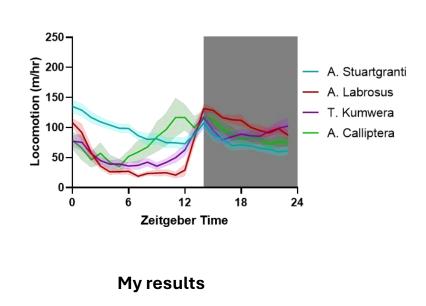


A. stuartgranti

# Cichlids: Diurnality and Nocturnality

Species	Larva (Lloyd e <i>t al</i> )	Adults (Lloyd et al)	My results
T_kumwera	Diurnal	Diurnal	Nocturnal
A_calliptera	Diurnal	Diurnal	Diurnal
A_labrosus	-	Nocturnal	Nocturnal
A_stuartgranti	Nocturnal	Nocturnal	Diurnal





# **DESeq Design**

```
• coldata <- data.frame(row.names = colnames(raw_counts),
                                  species,
                                  activity_pattern)
• dds <- DESeqDataSetFromMatrix(countData = raw_counts,
                                           colData = coldata,
                                        design = ~ activity_pattern)
```

# GO analysis: Diurnal vs Nocturnal

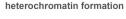
#### Upregulated

# **GO Enrichment (Biological Process)**

#### chromatin remodeling negative regulation of nucleobase-containing compound metabolic process negative regulation of gene negative regulation of RNA

#### metabolic process nucleobase-containing compound catabolic process

chromatin organization



expression, epigenetic epigenetic regulation of nucleoside phosphate

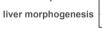
#### catabolic process

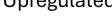
#### nucleotide catabolic process nucleoside diphosphate

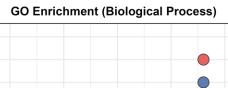
#### cell fate determination protein quality control for misfolded or incompletely synthesized proteins regulation of transcription

#### microtubule organizing center localization



















p.adjust

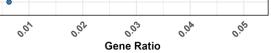




#### by RNA polymerase I centrosome localization

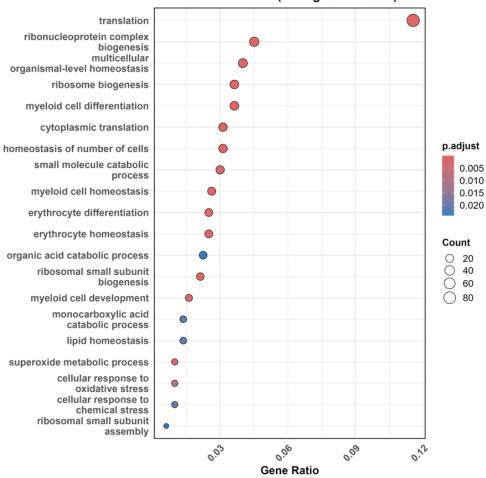






### Downregulated





# Genes in rhythmic process

SN	Gene	Function	
1	btbd9	Sleep & locomotion	
2	mtnr1aa	Melatonin receptor	
3	nfil3-5	Circadian & immune regulation	
4	nampt1	NAD+ metabolism	
5	ezh2	Epigenetic regulation	
6	bmal1a	Core circadian clock	
7	prkaa2	Energy homeostasis	
8	ncoa2	Hormone & metabolism regulation	
9	timeless	Circadian clock regulation	

