SEXUAL DIFFERENCES IN THE CIRCADIAN SYSTEM OF ZEBRAFISH

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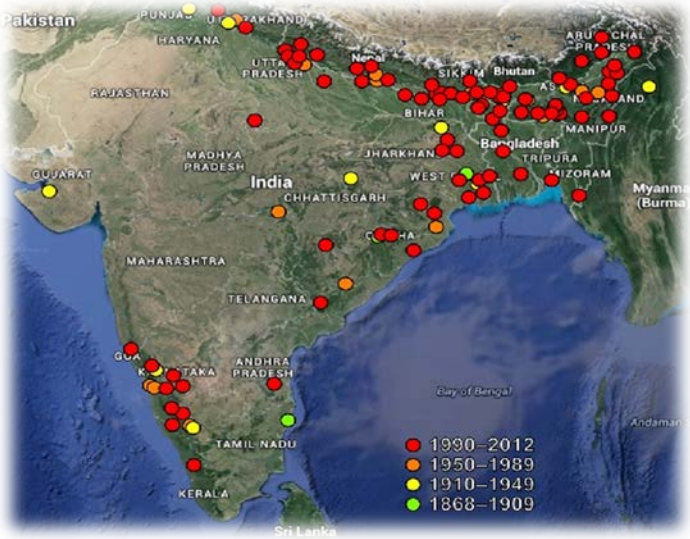
Why zebrafish?

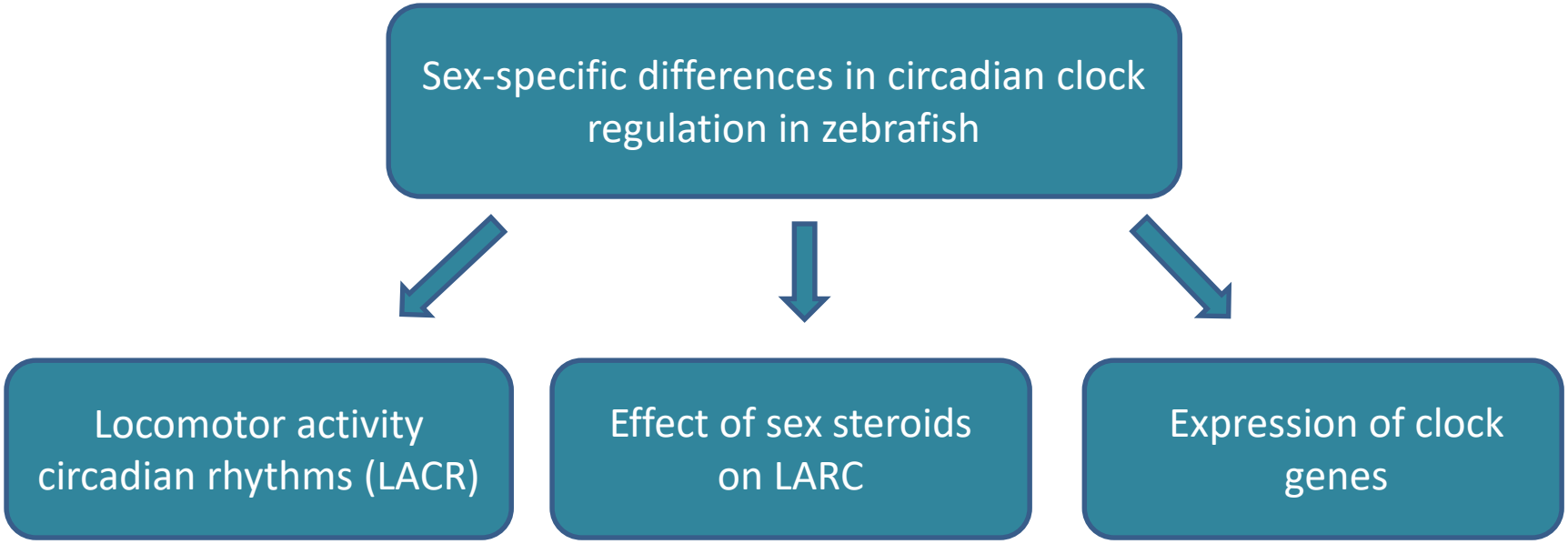
The zebrafish (*Danio rerio*) is used as a model organism in biomedicine.
Zebrafish can easily be maintained and bred in the laboratory.
Zebrafish are shoaling fish.



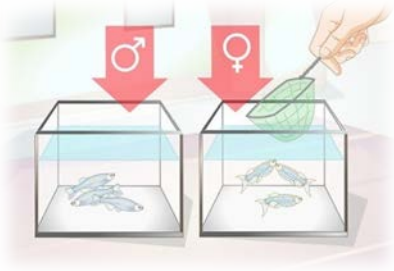
Presence of zebrafish on the Indian subcontinent

Zebrafish are tropical fish.
Danio is a genus of small freshwater fish in the family Cyprinidae found in South and Southeast Asia, commonly kept in aquaria. Zebrafish are found in secondary or tertiary channels connected with a river, adjacent to wetlands and rice paddies.

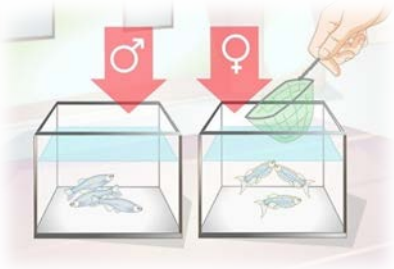
Objective


Sex-specific differences in circadian clock regulation in zebrafish
Locomotor activity circadian rhythms (LACR)
Effect of sex steroids on LARC
Expression of clock genes

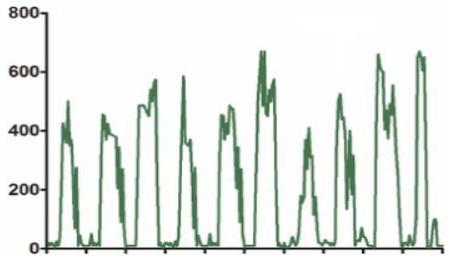
Locomotor activity circadian rhythms



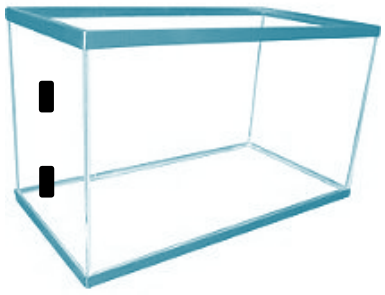
Control group



Experimental group

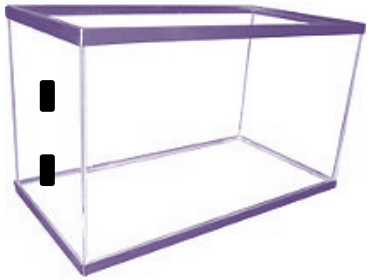


Study circadian rhythm of the locomotor activity and the effects of steroids

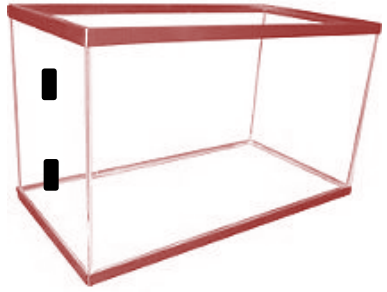


CONTROL

CONTROL



ESTRADIOL

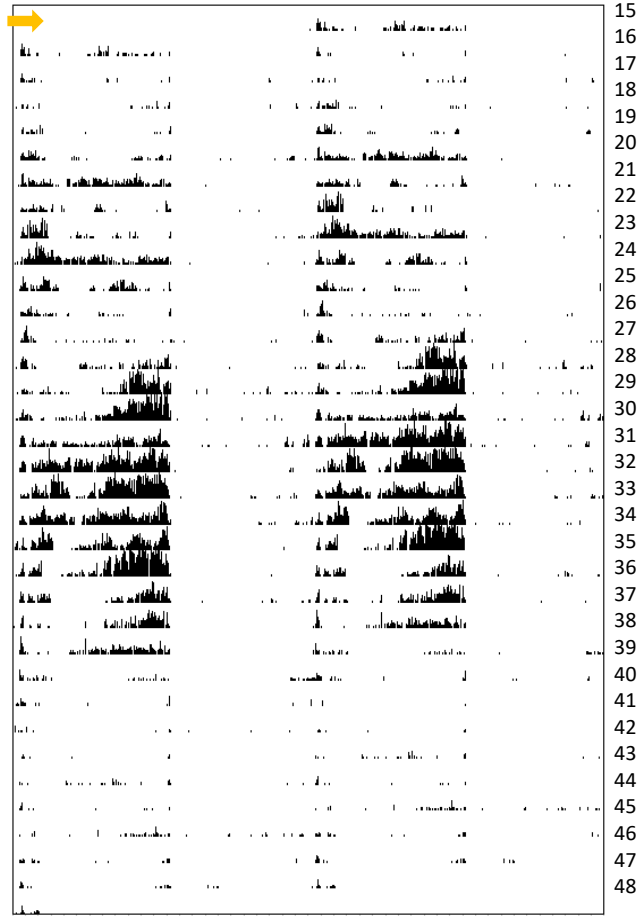


11-KETO-
ANDROSTENEDIONE

- This food was supplied regularly to the fish at the same time of day.
- Locomotor activity in each group was registered by two photoelectric cell (▮).
- LARC was analyzed during 7 consecutive days prior to the steroid administration and for 33 consecutive days after.

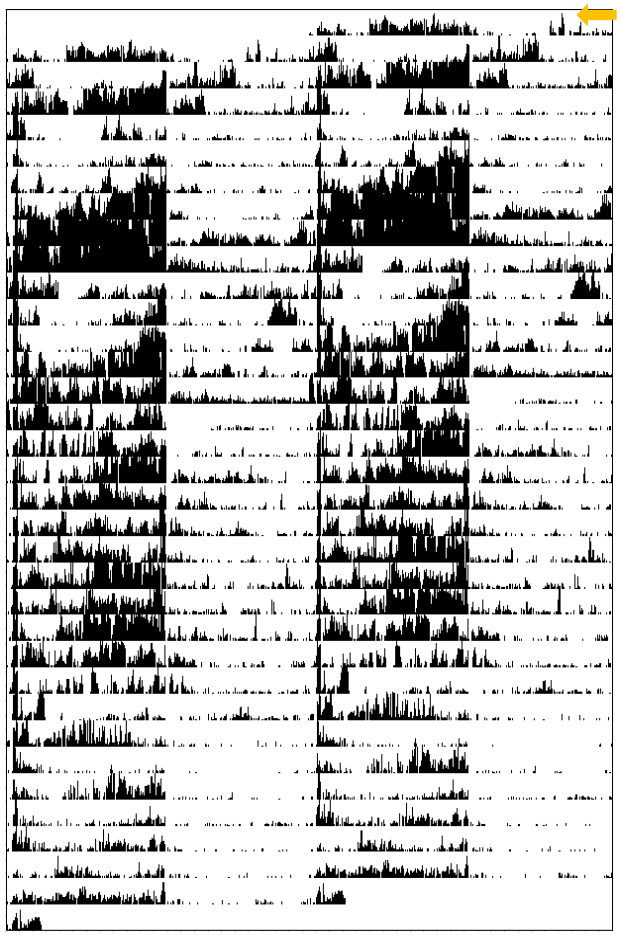
CONTROL

Day



Surface

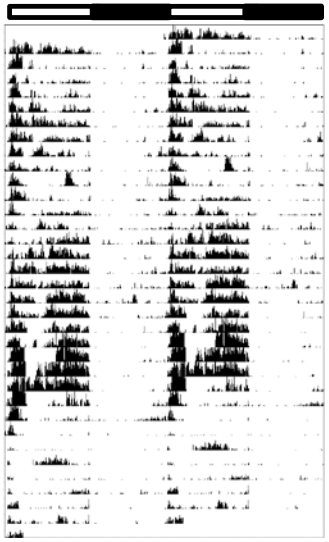
CONTROL



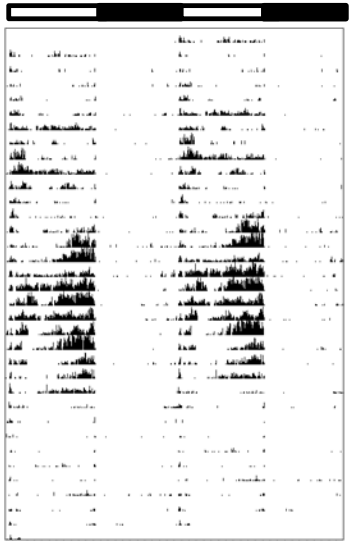
Day

Surface

♂ CONTROL

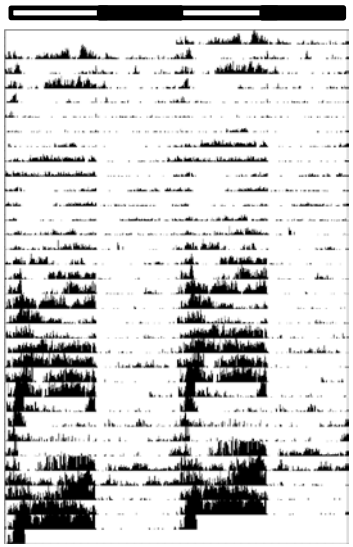


Depths

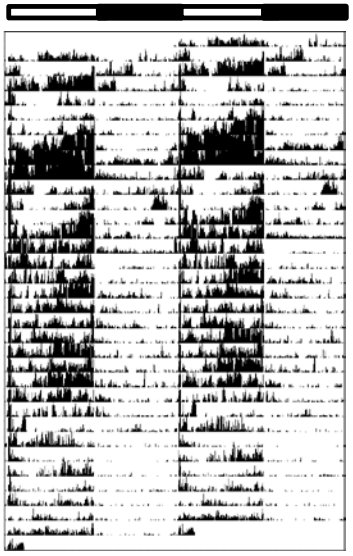


Surface

♀ CONTROL

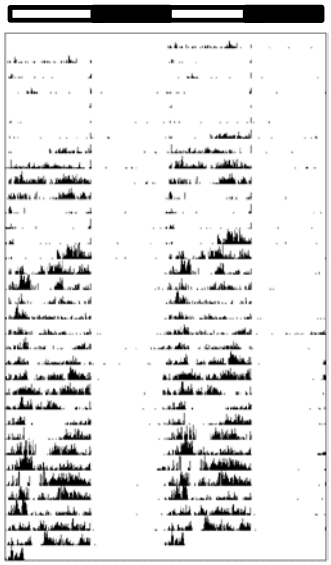


Depths

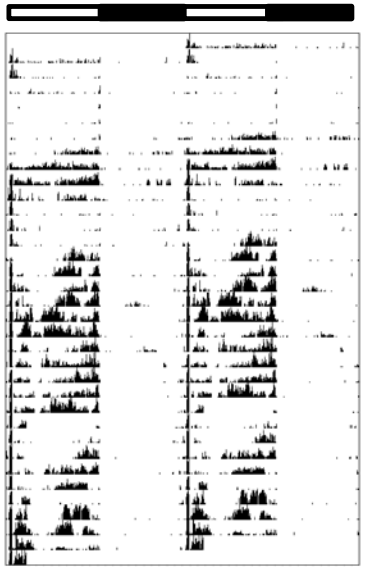


Surface

♀ 11-KETO-ANDROSTENEDIONE

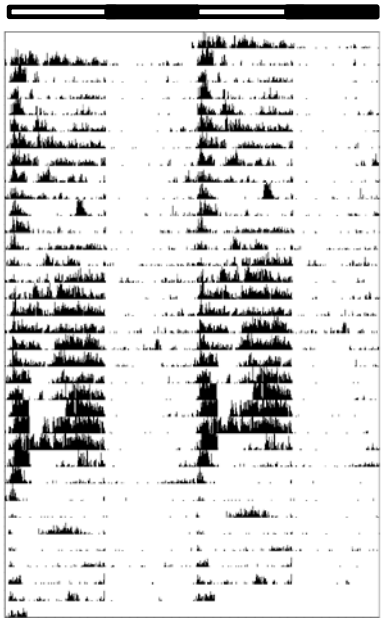


Depths

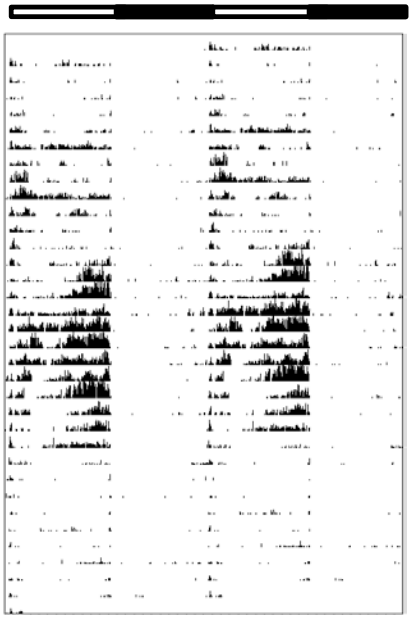


Surface

CONTROL

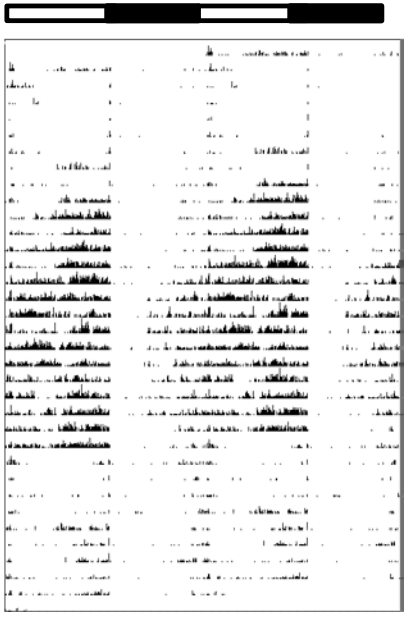


Depths

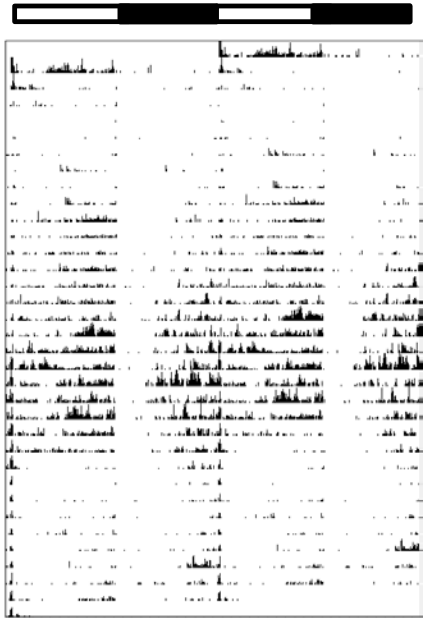


Surface

ESTRADIOL

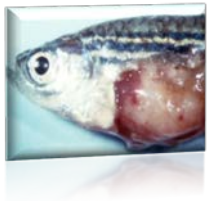


Depths



Surface

Zebrafish dissection



Zt 3
Zt 9
Zt 15
Zt 21

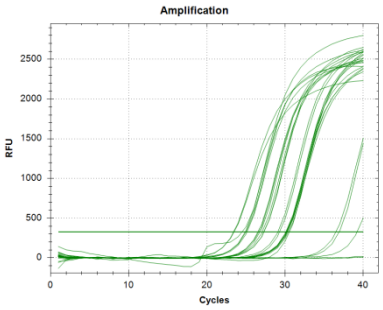
Brain

Liver

Gonad

Real-time PCR

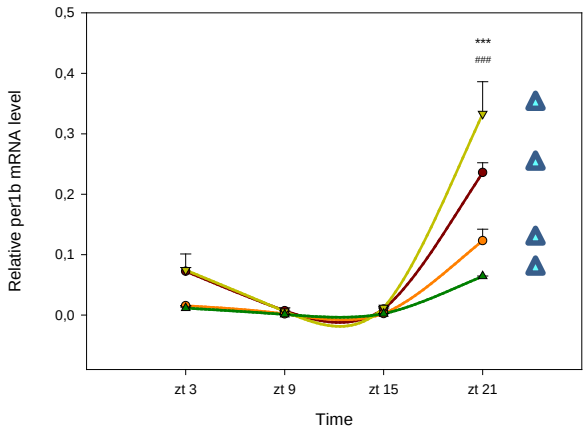
96 well microplate for qPCR



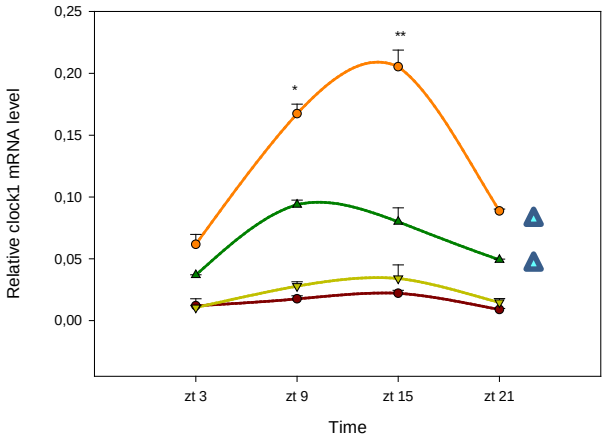
Per1b
Clock1
Bmal1
Cry1a

BRAIN

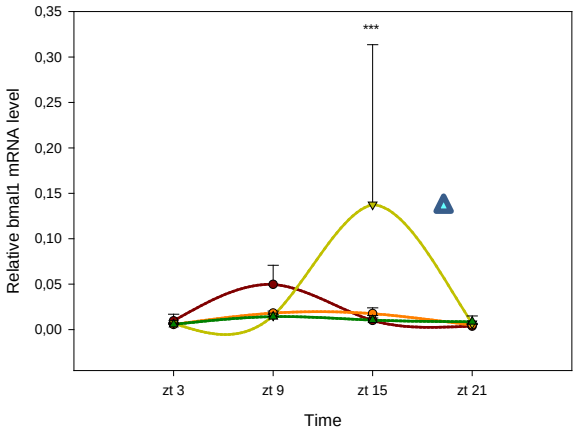
Per1b



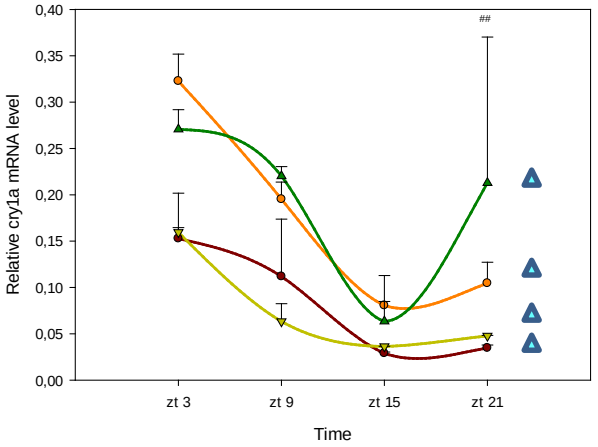
Clock1



Bmal1



Cry1a



∗ Male # Female
△ Statistical different

* P<0.05
** P<0.01
*** P<0.001

Control male
Control female
Estradiol male
11-keto- androstenedione

Concluding remarks

Females have higher night locomotor activity and surface movement than males.

11-Keto androstenedione reverts the pattern of locomotor activity of the female to a male.

Estradiol could inhibit the general locomotor activity in males

Hormonal treatments may alter the temporal expression of genes implicated in the circadian rhythmicity control.

Thank you for your attention

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