Introduction to Circadian Biology – GS21 1361

This is a nano course aimed at students who would like to familiarize themselves with the concept of circadian timing. The course will introduce the students to the anatomical, biochemical, and molecular bases of circadian clocks, with an emphasis on the mammalian circadian system. The course will bring an understanding on how circadian rhythms are a fundamental property of living beings. Events underlying dysregulated clock function and subsequent impact on health will also be covered. The course will alternate lectures and student presentations of significant articles in the field. Active involvement of the students in class is expected.

Course directors: Christophe P. Ribelayga, Ph.D. and Ghislain Breton, Ph.D.

Lecturers: Christophe P. Ribelayga, Ph.D., Ghislain Breton, Ph.D., Kristin Mahan, Ph.D., Zheng (Jake) Chen, Ph.D., Seung-Hee (Sally) Yoo, Ph.D.

Class meets on Tuesday (11.00 a.m. - 12.30 pm) and Thursday (11.00 a.m. - 01.00 p.m.) via WebEx

Specific course objectives:

1. To understand key concepts of the physiological basis underlying circadian clocks and organization and homeostasis of the circadian system.
2. To identify key pathways involved in the entrainment of circadian clocks as well as key effectors of circadian clocks associated with the control of specific functions or behavior.
3. To learn how the daily changes in environmental factors and circadian clocks interact to modulate function and behavior on a daily or a seasonal basis.
4. To gain a working understanding of application and interpretation of experimental tests of circadian clock function that impinge on physiological processes.
5. To gain knowledge of emerging topics and techniques in the field of Circadian Biology.
6. To gain knowledge of the basis of diseases and behavior disorders linked to circadian dysfunction.

Offering: 1 semester hour. Summer annually. 16 lecture/exam days
Expected outside class hours: ~6 h/week.
Pre-requisite: None
Attendance < 30 students.
Possibility to audit the course: YES
Recommended book: TBD.

Course evaluation:

PASS/FAIL
Course Outline

**Summer Semester Academic Classes Begin on May 17th, 2021**

**Week 1: May 18/20**
Tu: Lecture: A brief history of circadian biology and basic definitions
Th: Article discussion

**Week 2: May 25/27**
Tu: Lecture: A review of the model systems and techniques used in circadian biology
Th: Article discussion

**Week 3: June 1/3**
Tu: Lecture: Anatomical features, and genetic and biochemical basis of the mammalian circadian system
Th: Article discussion

**Week 4: June 8/10**
Tu: Lecture: Entrainment of circadian clocks and masking mechanisms
Th: Article discussion

**Week 5: June 15/17**
Tu: Lecture: Circadian clocks and metabolism
Th: Article discussion

**Week 6: June 22/24**
Tu: Lecture: Circadian clocks and cancer
Th: Article discussion

**Week 7: June 29/July 1**
Tu: Lecture: Social life, work schedule, and clock dysfunction in humans
Th: Article discussion

**Week 8: July 6/8**
Tu: REVIEW
Th: Final Exam (take-home exam)

**Last Day of Classes: August 06, 2021; Final Exams: August 9-10, 2021**
**End of Summer Semester: August 10, 2021**