

CS 341

Systems Biology I

Intro Lecture

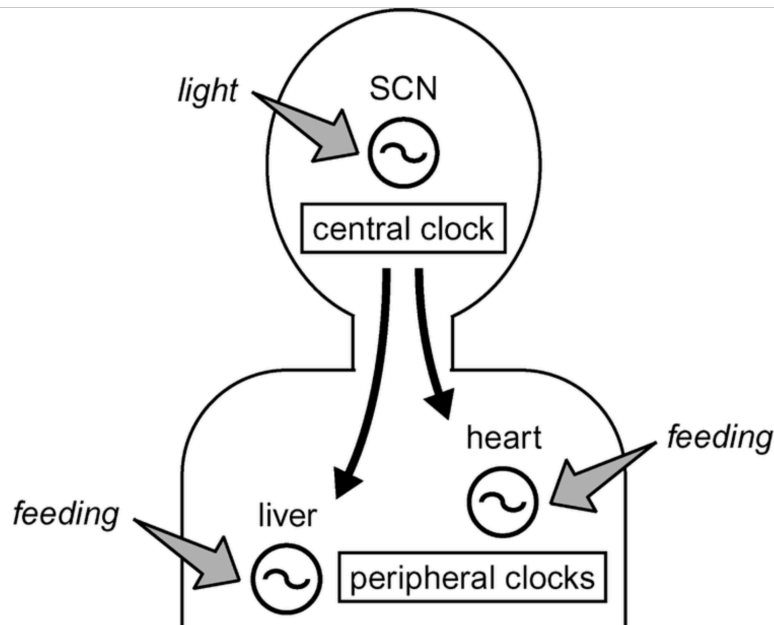
Who Am I?

Computational Chronobiologist

Use computational methods
(mathematical models and
computer simulation and analysis)

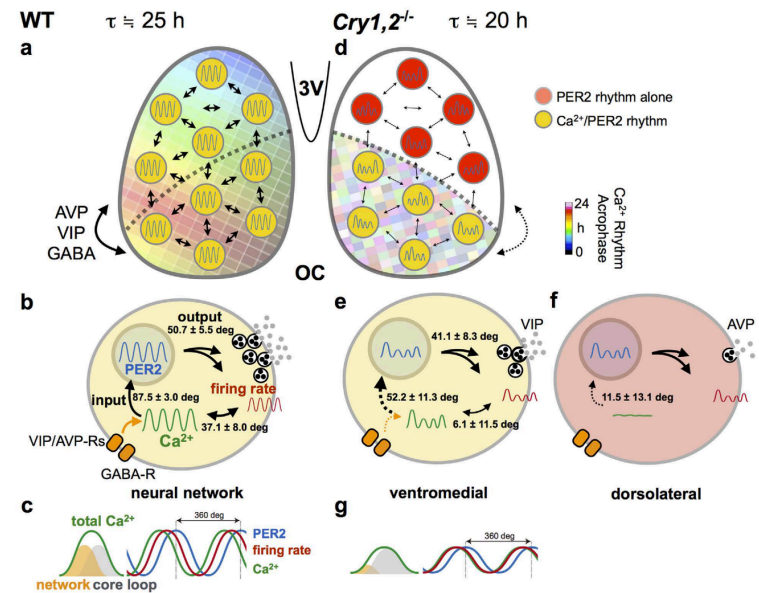
to study the biology
of time(-keepers)

Mammalian Circadian Clock



(Hirota & Fukada, *Zoological Science*, 2004)

SCN: Suprachiasmatic Nucleus



(Enoki et al, *Scientific Reports*, 2017)

Systems Biology: the study of an organism, viewed as an integrated and interacting network of genes, proteins, and chemical reactions which give rise to life.

Institute for Systems Biology

Data-Driven Modeling

- Learn about a system for which there is
 - Lots of data
 - Not a lot of understanding
- Construct data-driven models that can
 - Make predictions
 - Generate insights

Mechanistic Modeling

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- Learn about a system for which there is
 - relatively well-established understanding of components and connectivity
- Construct models that capture the known interactions that can
 - Make specific molecular predictions
 - Generate insights