

# Department of Biological Sciences

## *Graduate Seminar*

Speaker – Nevedha R

Advisor – Dr. Sourav Datta

Date/Time – 5<sup>th</sup> May. 2017, at 10.00 AM

Venue – 402, AB-2

### **Characterization of *AtBBX8* a potential clock gene also conferring cold-protection in plants**

Earth rotates on its axis every 24 hour that makes any point on earth to face day and night alternatively. The organisms living on earth evolved a 24 hour rhythm in its physiological events according to the day and night cycle. This 24 hour rhythm is called circadian rhythm [1]. The cellular mechanism that generates the circadian rhythm is called circadian clock. It allows the organisms to anticipate the environmental change and coordinate their physiological processes. The chief entraining stimulus that can synchronize the internal clock to external environment is light.

In plants, circadian clock regulates many of the light mediated physiological responses such as germination, hypocotyl elongation, flowering and stress tolerance to occur in a rhythmic fashion [2]. *CCA1* (Circadian Clock Associated 1) is a core component of the circadian clock machinery in plants. The B-Box transcription factor *BBX8* was recently identified as one of the direct downstream targets of *CCA1* [3]. *BBX* proteins have been characterized as major players of light signaling, however the role of *BBX8* is unknown. We found that the mRNA expression of *AtBBX8* is regulated by the circadian clock. Analysis of the promoter of *BBX8* revealed the presence of ‘evening elements’ that play important roles in both circadian and cold stress regulation [4]. Our results show that *BBX8* expression is highly upregulated after cold treatment. Overexpression of *BBX8* enhances cold stress tolerance in *Arabidopsis* seedlings. We are currently trying to elucidate the mechanism of the circadian clock mediated regulation of *BBX8* and the potential role of *BBX8* in cold stress tolerance.

#### **References**

- [1] McClung, C. R. (2006). Plant circadian rhythms. *The Plant Cell*, 18(4), 792-803.
- [2] de Montaigu, A., Tóth, R., & Coupland, G. (2010). Plant development goes like clockwork. *Trends in Genetics*, 26(7), 296-306.
- [3] Kamioka, M., Takao, S., Suzuki, T., Taki, K., Higashiyama, T., Kinoshita, T., & Nakamichi, N. (2016). Direct repression of evening genes by CIRCADIAN CLOCK-ASSOCIATED1 in the *Arabidopsis* circadian clock. *The Plant Cell*, 28(3), 696-711.
- [4] Mikkelsen, M. D., & Thomashow, M. F. (2009). A role for circadian evening elements in cold-regulated gene expression in *Arabidopsis*. *The Plant Journal*, 60(2), 328-339.