Dr. Julia Zeitlinger

from Stowers Institute for Medical Research

Presents

Analyzing RNA polymerase II with genomics approaches: an old dog with new tricks?

Thursday November 16th

4pm SCEN 604

Meet and Greet at 3:30pm in 502

Transcription of protein-coding genes by RNA polymerase II (Pol II) has long been known to be regulated at the level of initiation. However, genomics approaches show that Pol II also pauses downstream of the transcription initiation site, and the release from this pause is also a key component of metazoan gene expression regulation. How to integrate the old and new models of transcriptional regulation is not entirely clear. Here we take advantage of the high resolution of our recently developed ChIP-nexus method, which we show detects footprints of Pol II and basal transcription factors consistent with the known structure of the pre-initiation complex. Using this technology, we re-examine the relationship between Pol II initiation and pausing, identify core promoter sequences that influence Pol II pausing, and discover a mechanism by which Pol II pausing is globally regulated during Drosophila embryogenesis in vivo. We find that a single-rate limiting step cannot adequately explain current models of transcription and propose that paused Pol II helps prevent new initiation between transcription bursts, while providing a platform for engagement with enhancers.