Restricting and directing transcription by RNA polymerase II

Transcription by RNA polymerase II (RNAPII) is essential for all cellular functions. In humans, RNAPII initiates from tens or hundreds of thousands of promoters. This is usually unproductive: most initiated transcription is quickly terminated, and results in a rapidly degraded non-coding RNA. RNAPII must escape this fate at protein-coding genes to transcribe a full-length messenger RNA, which can require transcription of hundreds of kilobases. As such, premature transcriptional termination restricts and limits coding and non-coding transcription. It also contributes to the polarity of mammalian promoters, which are often transcribed bidirectionally. The mechanisms and control of unproductive transcription carry significant regulatory potential yet received little attention until recently. In my seminar, I will present our latest research into premature transcriptional termination mechanisms, promoter directionality, and how these processes may affect transcriptome output.

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