



Universität
Basel

Research Project

Exploration of novel pathways for rapid gene regulation during neuronal plasticity

Third-party funded project

Project title Exploration of novel pathways for rapid gene regulation during neuronal plasticity

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Organisation / Research unit

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Neuronal circuits in the brain process internal and external stimuli that enable higher organisms to learn and adapt to their environment. Understanding the molecular mechanisms linking the resultant neuronal activity and modifications in cellular networks represents a major challenge for neurobiologists. A significant extent of structural and functional plasticity relies on the initiation of new transcriptional programs. However, the elongation rate of RNA polymerases imposes a significant temporal constraint for transcript synthesis, in particular for long genes where new synthesis requires hours. We recently revealed a novel, transcription-independent mechanism that releases transcripts within minutes of neuronal stimulation. We observed that a substantial population of transcripts retaining select introns are stably maintained in the nucleus at rest, while neuronal activity elicits splicing completion, thereby, producing functional mRNAs. This novel mechanism is likely to participate to cellular programs initiated for neuronal plasticity, however to which extend this activity-dependent intron excision mechanism is employed by neurons and how this process is regulated remains to be uncovered.

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