

Publication

Contribution of RNA Degradation to Intrinsic and Extrinsic Noise in Gene Expression

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4500744**Author(s)** Baudrimont, Antoine; Jaquet, Vincent; Wallerich, Sandrine; Voegeli, Sylvia; Becskei, Attila**Author(s) at UniBasel** [Becskei, Attila](#) ; [Baudrimont, Antoine](#) ; [Jaquet, Vincent](#) ; [Wallerich, Sandrine](#) ; [Vögeli, Sylvia](#) ;**Year** 2019**Title** Contribution of RNA Degradation to Intrinsic and Extrinsic Noise in Gene Expression**Journal** Cell reports**Volume** 26**Number** 13**Pages / Article-Number** 3752-3761.e5

Genetically identical cells contain variable numbers of molecules, even if the cells share the same environment. This stochastic variability is prominent when molecules have low abundance, which is the case for mRNA noise. Most studies focused on how transcription affects mRNA noise, and little is known about the role of RNA degradation. To discriminate the fluctuations in these processes during the decay of a pair of reporter mRNAs, we quantified the uncorrelated intrinsic and the correlated extrinsic noise using single-molecule RNA FISH. Intrinsic noise converges to the Poisson level during the decay. mRNAs that have a short half-life are more susceptible to extrinsic noise than stable mRNAs. However, the Xrn1 exonuclease and the NMD pathways, which degrade mRNAs rapidly, were found to have lower fluctuation, which mitigates the noise of the short-lived mRNAs. This permits low variability across the entire range of mRNA half-lives.

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