

Cite this as: Li-ting ZHAI, Song XIANG, 2014. mRNA quality control at the 5' end. *Journal of Zhejiang University-SCIENCE B (Biomedicine & Biotechnology)*, 15(5):438-443. [doi:10.1631/jzus.B1400070]

mRNA quality control at the 5' end

Key words: mRNA capping, mRNA capping quality control, Rai1, Dxo1, DXO

- All eukaryotic mRNAs are capped at their 5' end, and the mature cap is essential for the stability, export and translation of the mRNA.
- Capping of mRNAs takes place co-transcriptionally and involves three steps. The intermediates and the uncapped 5' tri-phosphate RNA are resistant to decapping by decapping enzymes Dcp2/Nudt16, and degradation by the 5'-3' exoribonuclease Xrn1.
- Recently, a novel family of enzymes have been identified, which catalyze the conversion of the improperly capped mRNAs to 5' mono-phosphate RNA, allowing them to be degraded by 5'-3' exoribonucleases. Several of these enzymes also possess 5'-3' exoribonuclease activities themselves, and can singlehandedly clear the improperly capped mRNAs. Such discoveries lead to the identification of a mRNA capping quality control mechanism in eukaryotes.
- Structural studies of these enzymes provided molecular insights into their function.

