Fine-tuning site-directed RNA editing: controlled gRNA synthesis with T7 RNA polymerase

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I.C. Nass Kebapcioglu1[I,II], U. Munagala[I,II], **S. Conticello**[I,II]

[I]Institute of Clinical Physiology, National Research Council, Firenze, Italy, [II]Core Research Laboratory, ISPRO, Firenze, Italy

Efficient synthesis of components for site-directed RNA editing is crucial, yet existing approaches lack modulation. To address this, we devised a system for controlled guide RNA (gRNA) synthesis in the cytosol, achieved through transcription under the control of the T7 promoter. This approach allows modulation of gRNA expression only in presence of exogenous T7 RNA polymerase. To prevent read-through transcription, we have also incorporated an engineered termination sequence with high termination efficiency. We tested our system using the LEAPER RNA editing system and demonstrated controlled induction of gRNA expression without leakage. In conclusion, development of our system could provide an easy solution to modulate site-directed RNA editing.