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(54) Title: DEAMINASE-BASED RNA SENSORS

(57) Abstract: RNA editing tools for use in systems designed to measure RNA in vivo and manipulate specific cell types are disclosed herein. An RNA sensor system comprising a) a single-stranded RNA (ssRNA) sensor comprising a stop codon and a payload; optionally wherein the ssRNA sensor further comprises a normalizing gene; and b) an adenosine deaminase acting on RNA (ADAR) deaminase; wherein the sensor is capable of binding to a ssRNA target to form a double-stranded RNA (dsRNA) duplex that becomes a substrate for the ADAR deaminase; wherein the substrate comprises a mispairing within the stop codon; and wherein the mispairing is editable by the ADAR deaminase, which editing can effectively remove the stop codon so as to enable translation and expression of the payload. A method of quantifying ribonucleic acid (RNA) levels using the RNA sensor system is also disclosed.



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