



# Explore the RNA Universe!

RNA function	RNA type	Detailed role in the cell
Protein synthesis	<b>Messenger RNA</b> (mRNA)	Carrying the genetic information copied from DNA in the form of three-nucleotide bases "codon," each specifying a particular amino acid for protein synthesis at the ribosomes. <b>Purify with:</b> RNeasy® Plus Kits*, RNeasy Kits*, QIAamp® RNA Blood Kit*, QIAcube® Connect <b>Assay using:</b> QuantiNova® Kits, QuantiNova LNA PCR with probe system (assays and panels), Rotor-Gene® Q, QIAseq® Targeted RNA Panels, QIAseq Stranded mRNA Select Library Kit, QIAseq UPX 3' Targeted RNA Panel, QIAseq UPX 3' Transcriptome RNA Library Kit, QIAseq Targeted RNAscan Panels, QIAseq FX Single Cell RNA Library Kit, QIAquant®
	<b>Transfer RNA</b> (tRNA)	Adapter molecule bringing the amino acid corresponding to a specific mRNA codon to the ribosome. Having an anticodon (complementary to the codon), a site binding a specific amino acid and a site binding aminoacyl-tRNA synthetase (enzyme catalyzing amino acid-tRNA binding).
	<b>Ribosomal RNA</b> (rRNA)	RNA component of the ribosome, where protein is translated. Ribosomes align the anticodon of tRNA with the mRNA codon and are required for the peptidyl transferase activity catalyzing the assembly of amino acids into protein chains.
RNA interference (RNAi)/Gene silencing	<b>MicroRNA</b> (miRNA)	Endogenous, small, single-stranded RNAs inducing gene silencing by binding to target sites found within the 3' UTR of the targeted mRNA, resulting in translation repression or mRNA degradation. Regulating processes, such as cell cycle, apoptosis, etc., and implicated in a number of diseases. <b>Purify with:</b> miRNeasy Tissue/Cells Advanced Mini Kit†, miRNeasy Serum/Plasma Advanced Kit, miRNeasy FFPE Kit, QIAcube Connect <b>Assay using:</b> miRCURY® LNA® miRNA PCR with probe system (assays and panels), miRCURY LNA miRNA Mimics, miRCURY LNA miRNA Inhibitors, miRCURY LNA miRNA Target Site Blockers, Rotor-Gene Q, QIAseq miRNA Library Kit
	<b>Small (short) interfering RNA</b> (siRNA)	Exogenous, short, double-stranded RNAs interfering with the expression of specific genes with complementary nucleotide sequences by inducing mRNA cleavage, resulting in no translation. <b>siRNA solutions:</b> FlexiTube® siRNA, FlexiTube siRNA Premix, FlexiPlate siRNA <b>Transfect with:</b> HiPerFect® Transfection Reagent
	<b>Piwi-interacting RNA</b> (piRNA)	Short, single-stranded RNAs that are part of riboprotein complexes active in the germ line, ensuring germ-line stability by silencing transposons within germ cells. Occurring in clusters encoding 10 to thousands of individual piRNAs throughout the mammalian genome
Gene regulation	<b>Long non-coding RNA</b> (lncRNA; includes lincRNA and long RNA pseudogenes)	Non-protein coding transcripts >200 nt in length having diverse roles, including epigenetic regulation, post-transcriptional regulation, transcription, alternative splicing and nuclear import. Implicated in various diseases, such as cardiovascular diseases, neurological disorders, tumorigenesis, etc. <b>Purify with:</b> RNeasy Plus Kits*, RNeasy Kits*, QIAamp RNA Blood Kit*, QIAcube Connect <b>Assay using:</b> QuantiNova Kits, Rotor-Gene Q, QuantiNova LNA PCR with probe system (assays and panels), QIAseq Targeted RNA Panels, QIAseq Stranded Total RNA Library kit, QIAquant
Intercellular signaling	<b>Circulating cell-free RNA</b> (ccfRNA)	Extracellular, circulating RNA in biological fluids mostly originating from dying cells and offering a non-invasive and cost-effective tool for disease monitoring, e.g., in early cancer detection. Stable when bound to large protein complexes, such as Ago2, or contained within vesicles. Having roles in cell-cell communication through RNA-mediated signaling. <b>Purify with:</b> miRNeasy Serum/Plasma Advanced Kit, QIAamp ccfDNA/RNA Kit <b>Assay using:</b> miRCURY LNA miRNA Assays, QIAseq miRNA Library Kit
	<b>Exosomal RNA</b> (exRNA)	RNA contained in exosomes and other extracellular vesicles (EVs) released into the interstitial fluid from normal or diseased cells. Correlated with changes in cellular signaling, indicating specific disease states, e.g., neurodegeneration and tumor metastasis. <b>Purify with:</b> exoRNeasy Kits <b>Assay using:</b> QuantiNova LNA PCR with probe system, QIAseq Targeted RNA Panels, QIAseq miRNA Library Kit, QIAseq Stranded Total RNA Library Kit
RNA maturation and stability	<b>Small nuclear RNA</b> (snRNA)	RNA component of the spliceosome, an RNA-protein complex called snRNPs (small nuclear ribonucleoproteins) made up of over 20 proteins and 5 small nuclear RNAs (snRNAs). Spliceosome removes regions of non-coding mRNA (introns) from pre-mRNA, giving rise to mature mRNA.
	<b>Small nucleolar RNA</b> (snoRNA)	Guiding chemical modifications of other RNAs, mainly rRNA, tRNA and snRNA. Two main classes are: H/ACA box snoRNAs, directing conversion of uridine to pseudouridine and C/D box snoRNAs, guiding the addition of methyl groups to RNAs.
	<b>Ribonuclease P</b> (RNaseP)	RNA component of an RNA enzyme (ribozyme), cleaving a precursor sequence from tRNA molecules, generating mature tRNA. Required for RNA Pol III transcription of various small ncRNA genes (e.g., tRNA, 5S rRNA, SRP RNA and U6 snRNA genes).
	<b>Y RNA</b>	Part of the Ro small ribonucleoprotein complex (RoRNP), involved in RNA stability. Important in resistance to UV irradiation and DNA replication initiation. Upregulated in human tumors and required for cell proliferation.
	<b>Ribonuclease MRP</b> (RNase MRP)	RNA component of RNase MRP, an enzymatically active ribonucleoprotein playing a direct role in the initiation of mitochondrial DNA replication. Involved in precursor rRNA processing in the nucleus.
Protein translocation	<b>Signal recognition particle RNA</b> (7SL RNA or SRP RNA)	RNA component of the signal recognition particle (SRP), functioning in co-translational protein targeting. Associating with the ribosome and targeting nascent proteins to the endoplasmic reticulum for secretion or membrane insertion.
Telomere synthesis	<b>Telomerase RNA</b> (Telomerase RNA component, TERC)	RNA component of telomerase, extending the ends of DNA molecules, preventing DNA loss during replication. Serving as a template for telomere replication (reverse transcription) by telomerase. Misregulated in cancers.

\* RNeasy purifies total RNA (>200 nt) to enrich mRNA and lncRNA.

† miRNeasy purifies total RNA (>18 nt), including small non-coding RNAs, such as microRNA.



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