Liste de bibliographie : Direct-zol RNA Kits :

Researchers used the Direct-zol™ RNA MiniPrep for heterologous E. coli expression of the FnCpf1 locus by means of RNA-seq and discovered a new endonuclease, Cpf1, which further improves upon the widely used CRISPR-Cas9 genome editing system. Cpf1 targets distinct PAM sequences, requires no tracrRNA, and cleaves DNA with staggered overhangs.

Zetsche B, et. al. (2015). Cpf1 is a Single RNA-Guided Endonuclease of a Class 2 CRISPR-Cas System. Cell. 163(3): 759-71.

RNA from primary fibroblasts originating from Aicardi-Goutières syndrome (AGS) patients was purified using the Direct-zol™ RNA MiniPrep and subsequently used for reverse transcription to cDNA and RT-qPCR. Results showed that the genomes of AGS patients with TREX1, RNASEH2, and SAMHD1 mutations experience significant RNA:DNA hybrids accumulation.

Lim YW, et. al. (2015). Genome-wide DNA hypomethylation and RNA:DNA hybrid accumulation in Aicardi-Goutières syndrome. Elife.

Scientists used the Direct-zol RNA MiniPrep kit to investigate the role of miRNAs in an alcohol-induced inflammatory response in the brains of mice. They found that one miRNA in particular, miR-155, is upregulated following chronic ethanol feeding and plays an important role in neuroinflammation. Furthermore, the induction of miR-155 was dependent on Toll-like receptor 4 (TLR4), and mice with miR-155 or TLR4 knockouts were protected from alcohol-induced inflammation, highlighting possible pathways for alcohol abuse therapy.

Lippai D, Bala S, Csak T, Kurt-Jones EA, Szabo G (2013) Chronic Alcohol-Induced microRNA-155 Contributes to Neuroinflammation in a TLR4-Dependent Manner in Mice. PLoS ONE 8(8): e70945.

Researchers used the Direct-zol RNA MiniPrep kit to identify that Kv1.1, an essential voltage-gated potassium channel that controls action potentials in neurons, can be repressed by a specific miRNA, miR-129, and that this regulatory mechanism is dependent on the activity of the kinase mTORC1. When the mTORC1 complex is catalytically active, the translation of Kv1.1 is repressed by miR-129. However, when mTORC1 activity is inhibited, translation of Kv1.1 is enhanced due to the presence of HuD, an RNA-binding protein, at the miR-129 binding sites in the Kv1.1 mRNA, preventing miRNA binding and inhibition. These results have important implications for the regulation of learning and memory.

Sosanya et al. (2013) Degradation of high affinity HuD targets releases Kv1.1 mRNA from miR-129 repression by mTORC1. J. Cell Biol. 202(1):53-69.

In synthetic biology, experiments are often designed to express genes in a controllable manner so that researchers can manipulate the system to meet their needs. Researchers in Germany recently developed a mechanism to control translation in E. coli using a modified hammerhead ribozyme and small trans-acting RNAs, and they used the Direct-zol RNA MiniPrep kit in their studies. This RNA-mediated system can potentially be expanded to regulate the expression of many genes in a complex synthetic biology network.

Klauser and Hartig (2013) An engineered small RNA-mediated genetic switch based on a ribozyme expression platform. Nucleic Acids Res. 41(10):5542-5552.

Researchers used the Direct-zol RNA MiniPrep kit from Zymo Research to purify virally-expressed microRNAs and demonstrated that microRNAs play critical roles in regulating polyomavirus replication.

Broekema NM, Imperiale MJ. (2013) miRNA regulation of BK polyomavirus replication during early infection. Proc Natl Acad Sci U S A. 110(20):8200-5.

Total RNA was extracted from human, rat, and mouse cortical neurons using the Direct-zol™ RNA MiniPrep Kit. The high-quality RNA was reverse transcribed into cDNA and used to investigate the effect of BPA exposure on neurodevelopment by real-time PCR analysis.

Yeo M, et. al. (2013) Bisphenol A delays the perinatal chloride shift in cortical neurons by epigenetic effects on the Kcc2 promoter. Proc Natl Acad Sci U S A. 110(11):4315-20.

High-quality RNA isolated with the Direct-zol™ RNA MiniPrep from fecal and culture samples were shown to be instrumental in the development of a rotavirus early detection system using RT-PCR. The efficient RNA isolation helps in identification of severe gastroenteritis in infants and young children.

Yoshiki F, Takashi S, Takagi H, et al. Amplification of all 11 RNA segments of group A rotaviruses based on reverse transcription polymerase chain reaction Microbiol Immunol 2012; 56:

The Direct-zol™ RNA MiniPrep isolated RNA from Vibrio cholerae has been used for next-gen sequencing, ChIP-Seq, RNA-Seq, qPCR and Northern-blot analysis. The high-quality RNA helped to characterize gene expression profiles of virulence factors in RpoN regulon of the cholera pathogen.

Dong TG, Mekalanos JJ. Characterization of the RpoN regulon reveals differential regulation of T6SS and new flagellar operons in Vibrio cholera O37 strain V52 Nucleic Acids Research 20

The Direct-zol RNA Miniprep kit was used to isolate pure total RNA from Rat cells, and the high quality RNA was used to create a cDNA library for RT-qPCR analysis of several genes related to hematopoietic Stem Cell (HSC) Development. The consistent RNA extraction allowed the scientists to determine that HSC cells do not significantly contribute to kidney repair following acute kidney injuries.

Burst V. et al. (2012) Survival and distribution of injected haematopoietic stem cells in acute kidney injury. Nephrol Dial Transplant 0: 1–8

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