

Recombinant Rat PER1 Protein

For Research Use Only

1. Basic Product Information

Catalog No.: REP52546

Size: 10ug, 100ug

Protein Name: Period circadian protein homolog 1 (rPER1) (Circadian clock protein PERIOD 1)

Synonym: Per1

UniProt ID: Q8CHI5

UniProt Link: www.uniprot.org/uniprotkb/Q8CHI5/entry

Species Source: Rat

Expression System: HEK293T eukaryotic cell expression system Sequence

Length: 1293 AA

Molecular Weight: 136 KD

Protein Tag: C-terminal His6

2. Amino Acid Sequence

MSGPLEGADGGGDPRPGEPFCPGGVPSPGAPQHRPCPGPSLADDTDANSNGSSGNESNGHESR
GASQRSSHSSSSSGNGKDSALLETTESSKSTNSQSPSPSSSIAYSLLSASSEQDNPSTSGCSSEQS
ARARTQKELMTALRELKLRLPPERRGKGRSGTLATLQYALACVKQVQANQEYYQQWSLEEGERCA
MDMSTYLTLEELEHITSEYTLRNQDTSFVAVSFLTGRIVYISEQAGVLLRCKRDVFRGARFSELLAPQD
VGVFYGSTTPSRLPTWGTGTSAGSGLKDFTQEKSVCIRIRGGPDRDPGPRYQPFRLTPYVTKIRVS
DGAPAQPCCLLIAERIHSGYEAPRIPDKRIFTTRHTPSCLFQDQVDERAAPLLGYLPQDLLGAPVLLFL
HPEDRPLMLAIHKILQLAGQPFHDSPIRFCARNGEYVTMDTSWAGFVHPWSRKVAFVLGRHKVRT
APLNEDVFTPPVPSPAPSLDSDIQELSEQIHRLLLQPVHSSSTTGLCGVGPLMSPGPLHSPGSSSDS
NGGDAEGPGPPAPVTFQQICKDVHLVKHQGQQLFIESRAKPPPRPRLLATGTFKAKVLPCQSPNPE
LEVAPAPDQASLALAPEEPERKESGCSYQQINCLDSILRYLESCNIPNTTKRKCASSSCTASSASDD
DKQRAGVPVPGAKKDTSSAVLSGEGATPRKEPVVGGTSLPLALANKAESVSVTSQCSFSSTIVHV
GDKKPPESDIIMMEDLPGLAPGPAPSPAPSPVAPDPAPDAYRPVGLTKAVLSLHTQKEEQAFLSRF
RDLGRLRLGLDTSSVAPSAPGCHHGPIPSGRRHHCRSKAKRSRHHQTPRPETPCYVSHPSVPSSG
PWPPPPATTPFPAVVQPYPLPVFSPRGGPQPLPPAPTSVSPATFPSPPLVTPMVALVLPNYLFPSPTS
YPYGVSQAPVEGPPTPASHSPSPSLPPPPPSPPHPRDSPLFNSRCSSPLQLNLLQLEESPRTEGGA
AAGGPGSSAGPLPPSEESAEPERLVEVTESSNQDALSGSSDLLELLQEDSRSGTGSAASGSLGS
GLGSGSGSGSHEGGSTASITRSSQSSHTSKYFGSIDSSEAEAGAAQARTEPGDQVIKYVLQDPDWL
LMANADQHVMPTYQVPSRDAASVLKQDRERLRAMQKQKQPRFSEDQRRELGAHVSWVRKGQLPQ



ALDVTACVDCGSSVQDPGHSDDDLPLFSELDGLGLEPMEEGGEGGGVGGGGGGVGGGGGGDGEE
AQTQIGTKGSSSQDSAMEEEEEQGGSSSSPALPAEENGTS

3. Buffer Composition

Liquid format: PBS-based buffer containing 50% glycerol. Glycerol concentration can be customized upon customer request; please state special requirements when placing your order.

Lyophilized format: Buffer before lyophilization is PBS supplemented with 6% trehalose.

4. Storage Conditions

Upon receipt, store the product at -20 °C or -80 °C. Aliquot the product for on-demand use to preserve protein activity and prevent denaturation and inactivation caused by repeated freeze-thaw cycles.

5. Product Description

This product is recombinant Period circadian protein homolog 1 (rPER1) (Circadian clock protein PERIOD 1) produced using the HEK293T eukaryotic cell expression system. It is suitable for in-vitro functional assays, protein-protein interaction studies, antibody preparation and other biomedical research applications.

Protein Function: Transcriptional repressor which forms a core component of the circadian clock. The circadian clock, an internal time-keeping system, regulates various physiological processes through the generation of approximately 24 hour circadian rhythms in gene expression, which are translated into rhythms in metabolism and behavior. It is derived from the Latin roots 'circa' (about) and 'diem' (day) and acts as an important regulator of a wide array of physiological functions including metabolism, sleep, body temperature, blood pressure, endocrine, immune, cardiovascular, and renal function. Consists of two major components: the central clock, residing in the suprachiasmatic nucleus (SCN) of the brain, and the peripheral clocks that are present in nearly every tissue and organ system. Both the central and peripheral clocks can be reset by environmental cues, also known as Zeitgebers (German for 'timegivers'). The predominant Zeitgeber for the central clock is light, which is sensed by retina and signals directly to the SCN. The central clock entrains the peripheral clocks through neuronal and hormonal signals, body temperature and feeding-related cues, aligning all clocks with the external light/dark cycle. Circadian rhythms allow an organism to achieve temporal homeostasis with its environment at the molecular level by regulating gene expression to create a peak of protein expression once every 24 hours to control when a particular physiological process is most active with respect to the solar day. Transcription and translation of core clock components (CLOCK, NPAS2, BMAL1, BMAL2, PER1, PER2, PER3, CRY1 and CRY2) plays a critical role in rhythm generation, whereas delays imposed by post-translational modifications (PTMs) are important for determining the period (τ) of the rhythms (τ refers to the period of a rhythm and is the length, in time, of one complete cycle). A diurnal rhythm is synchronized with the day/night cycle, while the ultradian and infradian rhythms have a period shorter and longer than 24 hours, respectively. Disruptions in the circadian rhythms contribute to the pathology of cardiovascular diseases, cancer, metabolic syndromes and aging. A transcription/translation feedback loop (TTFL) forms the core of the molecular circadian clock mechanism. Transcription factors, CLOCK or NPAS2 and BMAL1 or BMAL2, form the positive limb of the feedback loop, act in the form of a heterodimer and activate the transcription of core clock genes and clock-controlled genes (involved in key metabolic processes), harboring E-box elements (5'-CACGTG-3') within their promoters. The core clock genes: PER1/2/3 and CRY1/2 which are transcriptional repressors form the negative limb of the feedback loop and interact with the CLOCK|NPAS2-BMAL1|BMAL2 heterodimer inhibiting its activity and thereby negatively regulating their own expression. This heterodimer also activates nuclear

receptors NR1D1/2 and RORA/B/G, which form a second feedback loop and which activate and repress BMAL1 transcription, respectively. Regulates circadian target genes expression at post-transcriptional levels, but may not be required for the repression at transcriptional level. Controls PER2 protein decay. Represses CRY2 preventing its repression on CLOCK/BMAL1 target genes such as FXYD5 and SCN1A in kidney and PPARA in liver. Besides its involvement in the maintenance of the circadian clock, has an important function in the regulation of several processes. Participates in the repression of glucocorticoid receptor NR3C1/GR-induced transcriptional activity by reducing the association of NR3C1/GR to glucocorticoid response elements (GREs) by BMAL1:CLOCK. Plays a role in the modulation of the neuroinflammatory state via the regulation of inflammatory mediators release, such as CCL2 and IL6. In spinal astrocytes, negatively regulates the MAPK14/p38 and MAPK8/JNK MAPK cascades as well as the subsequent activation of NFkappaB. Coordinately regulates the expression of multiple genes that are involved in the regulation of renal sodium reabsorption. Can act as gene expression activator in a gene and tissue specific manner, in kidney enhances WNK1 and SLC12A3 expression in collaboration with CLOCK. Modulates hair follicle cycling. Represses the CLOCK-BMAL1 induced transcription of BHLHE40/DEC1.

Subcellular Localization: Nucleus . Cytoplasm . Note=Nucleocytoplasmic shuttling is effected by interaction with other circadian core oscillator proteins and/or by phosphorylation. Retention of PER1 in the cytoplasm occurs through PER1-PER2 heterodimer formation. Translocate to the nucleus after phosphorylation by CSNK1D or CSNK1E. Also translocated to the nucleus by CRY1 or CRY2 (By similarity).

6. Notes

- Avoid repeated freeze-thaw cycles to maintain protein stability and biological activity.
- Please specify special buffer- composition requirements at the time of order placement.
- For research use only. Not intended for clinical diagnosis, therapeutic use or commercial manufacturing.