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CLOCK Antibody (C-term) Blocking peptide

Synthetic peptide
Catalog # BP12261b

Specification

CLOCK Antibody (C-term) Blocking peptide - Product Information

Primary Accession O15516

CLOCK Antibody (C-term) Blocking peptide - Additional Information

Gene ID 9575

Other Names
Circadian locomoter output cycles protein kaput, hCLOCK, Class E basic helix-loop-helix protein 8, bHLHe8, CLOCK, BHLHE8, KIAA0334

Format
Peptides are lyophilized in a solid powder format. Peptides can be reconstituted in solution using the appropriate buffer as needed.

Storage
Maintain refrigerated at 2-8°C for up to 6 months. For long term storage store at -20°C.

Precautions
This product is for research use only. Not for use in diagnostic or therapeutic procedures.

CLOCK Antibody (C-term) Blocking peptide - Protein Information

Name CLOCK

Synonyms BHLHE8, KIAA0334

Function
Transcriptional activator 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 (tau) of the rhythms (tau 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 the circadian expression of ICAM1, VCAM1, CCL2, THPO and MPL and also acts as an enhancer of the transactivation potential of NF-kappaB. Plays an important role in the homeostatic regulation of sleep. The CLOCK-BMAL1 heterodimer regulates the circadian expression of SERPINE1/PAI1, VWF, B3, CCRN4L/NOC, NAMPT, DBP, MYOD1, PPARGC1A, PPARGC1B, SIRT1, GYS2, F7, NGFR, GNRHR, BHLHE40/DEC1, ATF4, MTA1, KLF10 and also genes implicated in glucose and lipid metabolism. Promotes rhythmic chromatin opening, regulating the DNA accessibility of other transcription factors. The CLOCK-BMAL2 heterodimer activates the transcription of SERPINE1/PAI1 and BHLHE40/DEC1. The preferred binding motif for the CLOCK-BMAL1 heterodimer is 5'-CACGTGA-3', which contains a flanking adenine nucleotide at the 3-prime end of the canonical 6-nucleotide E-box sequence (PubMed:23229515). CLOCK specifically binds to the half-site 5'-CAC-3', while BMAL1 binds to the half-site 5'-GTGA-3' (PubMed:23229515). The CLOCK-BMAL1 heterodimer also recognizes the non-canonical E-box motifs 5'-AACGTGA-3' and 5'-CATGTGA-3' (PubMed:23229515). CLOCK has an intrinsic acetyltransferase activity, which enables circadian chromatin remodeling by acetylating histones and nonhistone proteins, including its own partner BMAL1. Represses glucocorticoid receptor NR3C1/GR-induced transcriptional activity by reducing the association of NR3C1/GR to glucocorticoid response elements (GREs) via the acetylation of multiple lysine residues located in its hinge region (PubMed:21980503). The acetyltransferase activity of CLOCK is as important as its transcription activity in circadian control. Acetylates metabolic enzymes IMPDH2 and NDUFA9 in a circadian manner. Facilitated by BMAL1, rhythmically interacts and acetylates argininosuccinate synthase 1 (ASS1) leading to enzymatic inhibition of ASS1 as well as the circadian oscillation of arginine biosynthesis and subsequent ureagenesis (PubMed:28985504). Drives the circadian rhythm of blood pressure through transcriptional activation of ATP1B1 (By similarity).

Cellular Location

Nucleus. Cytoplasm {ECO:0000250|UniProtKB:O08785}. Cytoplasm, cytosol. Note=Shuttling between the cytoplasm and the nucleus is under circadian regulation and is BMAL1-dependent Phosphorylated form located in the nucleus while the nonphosphorylated form found only in the cytoplasm. Sequestered to the cytoplasm in the presence of ID2 (By similarity). Localizes to sites of DNA damage in a H2AX-independent manner. {ECO:0000250|UniProtKB:O08785, ECO:0000269|PubMed:21659603}

Tissue Location

Hair follicles (at protein level). Expressed in all tissues examined including spleen, thymus, prostate, testis, ovary, small intestine, colon, leukocytes, heart, brain, placenta, lung, liver, skeletal muscle, kidney and pancreas. Highest levels in testis and skeletal muscle. Low levels in

thymus, lung and liver. Expressed in all brain regions with highest levels in cerebellum. Highly expressed in the suprachiasmatic nucleus (SCN).

CLOCK Antibody (C-term) Blocking peptide - Protocols

Provided below are standard protocols that you may find useful for product applications.

- Blocking Peptides

CLOCK Antibody (C-term) Blocking peptide - Images

CLOCK Antibody (C-term) Blocking peptide - Background

This gene encodes a protein that belongs to the basichelix-loop-helix (bHLH) family of transcription factors.Polymorphisms within the encoded protein have been associated withcircadian rhythm sleep disorders. A similar protein in mice is acircadian regulator that acts as a transcription factor and forms aheterodimer with aryl hydrocarbon receptor nucleartranslocator-like to activate transcription of mouse period 1.

CLOCK Antibody (C-term) Blocking peptide - References

Kalamvoki, M., et al. Proc. Natl. Acad. Sci. U.S.A. 107(41):17721-17726(2010)Lee, K.Y., et al. Prog. Neuropsychopharmacol. Biol. Psychiatry 34(7):1196-1201(2010)Bailey, S.D., et al. Diabetes Care 33(10):2250-2253(2010)Sookoian, S., et al. Chronobiol. Int. 27(6):1202-1218(2010)Xu, X., et al. Behav Brain Funct 6, 48 (2010) :