

## ATF-4 Protein, Rat, Recombinant (His & Myc)

### General Information

Synonyms:	Atf4;Cyclic AMP-dependent transcription factor ATF-4;Activating transcription factor 4 (rATF-4);cAMP-dependent transcription factor ATF-4
Protein Construction:	1-347 aa
Species:	Rat
Expression Host:	E. coli
Accession:	Q9ES19
Molecular Weight:	43.2 kDa (predicted)
AA Sequence:	MTEMSFLNSEVLGDLMSFPDQSGLGAEESLGLDDYLEVAKHFKPHGFSSDKAGSSEWLAMDGLVSASDT GKEDAFSGTDWMLEKMDLKEFDALFRMDDLETMPDELLATLDDTCDLFAPLVQETNKEPPQTVNPIGHLP ESVIKVDQAAPFTFLQPLPCSPGFLSSTPDHFSFSLELGSEVDISEGDRKPDAAAYITLTPQCVKEEDTPSDSDSGI CMSPESYLGSPQHSPSTSRAPPDSLPSGPVPRGSRPKPYDPPGVSVTAKVKTEKLDKLLKMEQNKTAATRY RQKKRAEQEALTGECKELEKKNEALKEKADSLAKEIQYLKDLIEEVRKARGKKRVP

### QC Testing

Biological Activity:	Activity has not been tested. It is theoretically active, but we cannot guarantee it. If you require protein activity, we recommend choosing the eukaryotic expression version first.
Purity:	> 85% as determined by SDS-PAGE.
Endotoxin:	< 1.0 EU/μg of the protein as determined by the LAL method.
Formulation:	If the delivery form is liquid, the default storage buffer is Tris/PBS-based buffer, 5%-50% glycerol. If the delivery form is lyophilized powder, the buffer before lyophilization is Tris/PBS-based buffer, 6% Trehalose, pH 8.0.

### Preparation and Storage

#### Reconstitution:

Reconstitute the lyophilized protein in sterile deionized water. The product concentration should not be less than 100 μg/mL. Before opening, centrifuge the tube to collect powder at the bottom. After adding the reconstitution buffer, avoid vortexing or pipetting for mixing.

#### Stability & Storage:

Lyophilized powders can be stably stored for over 12 months, while liquid products can be stored for 6-12 months at -80°C. For reconstituted protein solutions, the solution can be stored at -20°C to -80°C for at least 3 months. Please avoid multiple freeze-thaw cycles and store products in aliquots.

Actual storage temperature shall be subject to the COA.

#### Shipping:

In general, lyophilized powders are shipped with blue ice, while solutions are shipped with dry ice.

### Protein Background

Transcription factor that binds the cAMP response element (CRE) (consensus: 5'-GTGACGT[AC][AG]-3') and displays two biological functions, as regulator of metabolic and redox processes under normal cellular conditions, and as master transcription factor during integrated stress response (ISR). Binds to asymmetric CRE's as a heterodimer and to palindromic CRE's as a homodimer. Core effector of the ISR, which is required for adaptation to various stress such as endoplasmic reticulum (ER) stress, amino acid starvation, mitochondrial stress or oxidative stress. During ISR, ATF4 translation is induced via an alternative ribosome translation re-initiation mechanism in response to EIF2S1/eIF-2-alpha phosphorylation, and stress-induced ATF4 acts as a master transcription factor of stress-responsive genes in order to promote cell recovery. Promotes the transcription of genes linked to amino acid sufficiency and resistance to oxidative stress to protect cells against metabolic consequences of ER oxidation. Activates the transcription of NLRP1, possibly in concert with other factors in response to ER stress. Activates the transcription of asparagine synthetase (ASNS) in response to amino acid deprivation or ER stress. However, when associated with DDIT3/CHOP, the transcriptional activation of the ASNS gene is inhibited in response to amino acid deprivation. Together with DDIT3/CHOP, mediates programmed cell death by promoting the expression of genes involved in cellular amino acid metabolic processes, mRNA translation and the terminal unfolded protein response (terminal UPR), a cellular response that elicits programmed cell death when ER stress is prolonged and unresolved. Together with DDIT3/CHOP, activates the transcription of the IRS-regulator TRIB3 and promotes ER stress-induced neuronal cell death by regulating the expression of BBC3/PUMA in response to ER stress. May cooperate with the UPR transcriptional regulator QRI1 to regulate ER protein homeostasis which is critical for cell viability in response to ER stress. In the absence of stress, ATF4 translation is at low levels and it is required for normal metabolic processes such as embryonic lens formation, fetal liver hematopoiesis, bone development and synaptic plasticity. Acts as a regulator of osteoblast differentiation in response to phosphorylation by RPS6KA3/RSK2: phosphorylation in osteoblasts enhances transactivation activity and promotes expression of osteoblast-specific genes and post-transcriptionally regulates the synthesis of Type I collagen, the main constituent of the bone matrix. Cooperates with FOXO1 in osteoblasts to regulate glucose homeostasis through suppression of beta-cell production and decrease in insulin production. Activates transcription of SIRT4. Regulates the circadian expression of the core clock component PER2 and the serotonin transporter SLC6A4. Binds in a circadian time-dependent manner to the cAMP response elements (CRE) in the SLC6A4 and PER2 promoters and periodically activates the transcription of these genes. Mainly acts as a transcriptional activator in cellular stress adaptation, but it can also act as a transcriptional repressor: acts as a regulator of synaptic plasticity by repressing transcription, thereby inhibiting induction and maintenance of long-term memory. Regulates synaptic functions via interaction with DISC1 in neurons, which inhibits ATF4 transcription factor activity by disrupting ATF4 dimerization and DNA-binding.

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