

# PRODUCT INFORMATION



## TBK1 (human, recombinant)

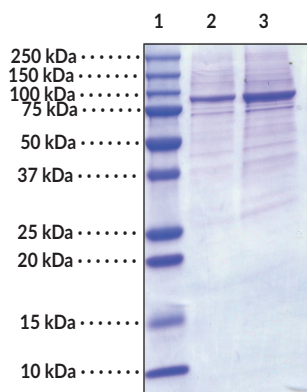
Item No. 22817

### Overview and Properties

|                               |                                                                    |
|-------------------------------|--------------------------------------------------------------------|
| <b>Synonyms:</b>              | NAK, NF- $\kappa$ B-Activating Kinase, TANK-Binding Kinase 1       |
| <b>Source:</b>                | Human recombinant protein expressed in insect cells (baculovirus)  |
| <b>Amino acids:</b>           | 1-729 (full length)                                                |
| <b>Uniprot No.:</b>           | Q9UHD2                                                             |
| <b>Molecular Weight:</b>      | 84 kDa                                                             |
| <b>Storage:</b>               | -80°C (as supplied)                                                |
| <b>Stability:</b>             | $\geq 1$ year                                                      |
| <b>Purity:</b>                | <b>batch specific</b> ( $\geq 50\%$ estimated by SDS-PAGE)         |
| <b>Supplied in:</b>           | 50 mM HEPES, pH 8.0, with 150 mM sodium chloride, and 10% glycerol |
| <b>Protein Concentration:</b> | <b>batch specific</b> mg/ml                                        |
| <b>Activity:</b>              | ATPase activity confirmed by ADP detection assay                   |

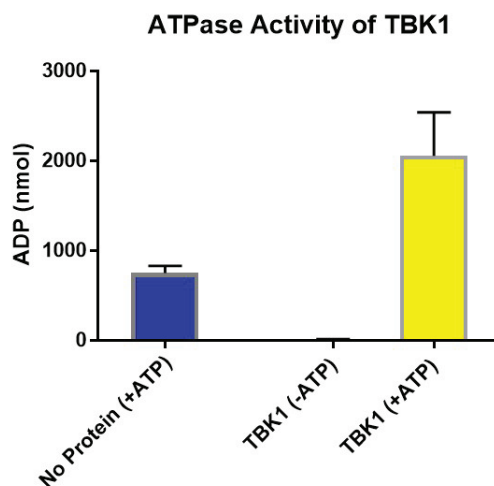
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Images



Lane 1: MW Markers  
Lane 2: TBK1 (2  $\mu$ g)  
Lane 3: TBK1 (4  $\mu$ g)

Representative gel image shown; actual purity may vary between batches.



**WARNING**  
THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

**SAFETY DATA**  
This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the [complete](#) Safety Data Sheet, which has been sent via email to your institution.

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## Description

TANK-binding kinase 1 (TBK1) is a non-canonical inhibitor of NF- $\kappa$ B kinase (IKK) that has an essential role in regulating inflammatory responses to pathogens.<sup>1</sup> Following activation of toll-like receptors by viral DNA, TBK1 interacts with various partners such as STING, MAVS, and TANK to phosphorylate and activate interferon regulatory factors (IRFs) 3 and 7 as well as DEAD-box helicase 3 X-linked (DDX3X), which leads to transcriptional activation of pro-inflammatory and antiviral genes including interferon (IFN) subtypes  $\alpha$  and  $\beta$ .<sup>1,2</sup> TBK1 induces nuclear translocation of NF- $\kappa$ B to initiate a pro-inflammatory response via phosphorylation of NF- $\kappa$ B inhibitor  $\alpha$  (NF $\kappa$ B $\alpha$ ), IKK $\beta$ , or NF- $\kappa$ B p65 subunit (RelA).<sup>3</sup> Cytosolic localization of *E. coli*, *Salmonella*, and *S. pyogenes* increases in *TBK1*<sup>-/-</sup> murine embryonic fibroblasts, macrophages, and epithelial cells, suggesting TBK1 maintains vacuolar integrity, which is critical to bacterial clearance.<sup>4</sup> TBK1 phosphorylates the autophagy receptor optineurin to enhance binding of ubiquitin-like microtubule-associated protein light chain 3 (LC3) modifiers and induce autophagic clearance of *S. enterica*.<sup>5</sup> It also binds to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) non-structural protein 13 (Nsp13), a helicase-triphosphatase and a component of the viral replicase-transcriptase complex.<sup>6</sup> Cayman's TBK1 (human, recombinant) protein can be used for ELISA, Western blot and enzymatic assays.

## References

1. Pomerantz, J.L. and Baltimore, D. NF- $\kappa$ B activation by a signaling complex containing TRAF2, TANK and TBK1, a novel IKK-related kinase. *EMBO J.* **18**(23), 6694-6704 (1999).
2. Tanaka, Y. and Chen, Z.J. STING specifies IRF3 phosphorylation by TBK1 in the cytosolic DNA signaling pathway. *Sci. Signal* **5**(214), ra20 (2012).
3. Tojima, Y., Fujimoto, A., Delhase, M., et al. NAK is an I $\kappa$ B kinase-activating kinase. *Nature* **404**, 778-782 (2000).
4. Radtke, A.L., Delbridge, L.M., Balachandran, S., et al. TBK1 protects vacuolar integrity during intracellular bacterial infection. *PLoS Pathog.* **3**(3), e29 (2007).
5. Wild, P., Farhan, H., McEwan, D.G., et al. Phosphorylation of the autophagy receptor optineurin restricts *Salmonella* growth. *Science* **333**(6039), 228-233 (2011).
6. Gordon, D.E., Jang, G.M., Bouhaddou, M. et al. A SARS-CoV-2-human protein-protein interaction map reveals drug targets and potential drug-repurposing. *BioRxiv* (2020).