

PRODUCT INFORMATION



PAD4 (human, recombinant) - Biotinylated

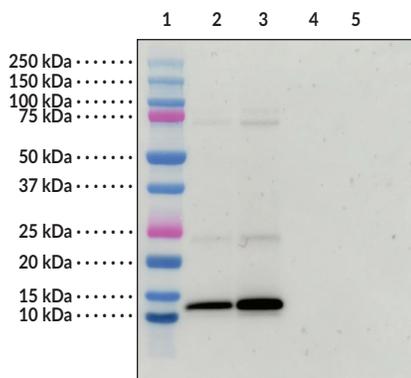
Item No. 43452

Overview and Properties

Synonyms:	PADI4, PADI5, PDI5, Peptidylarginine Deiminase 4, Protein Arginine Deiminase Type 4, Protein Arginine Deiminase Type IV
Source:	Active recombinant human PAD4 (N-His tagged, chemically biotinylated) expressed in <i>E. coli</i>
Amino Acids:	2-663 (full length)
Uniprot No.:	Q9UM07
Molecular Weight:	75.8 kDa
Storage:	-80°C (as supplied)
Stability:	≥1 year
Purity:	≥85% estimated by SDS-PAGE
Supplied in:	50 mM HEPES, pH 8.0, 300 mM sodium chloride, 10% glycerol, and 1 mM DTT
Protein Concentration:	<i>batch specific</i> mg/ml
Activity:	<i>batch specific</i> U/ml
Specific Activity:	<i>batch specific</i> U/mg
Unit Definition:	One unit is defined as the amount of enzyme required to produce 1 nmol of NH ₄ ⁺ per minute at 37°C in 50 mM HEPES, pH 7.7, containing 10 mM calcium chloride, 5 mM DTT, and 2 mM N-α-benzoyl-L-arginine ethyl ester (BAEE; Item No. 27183).

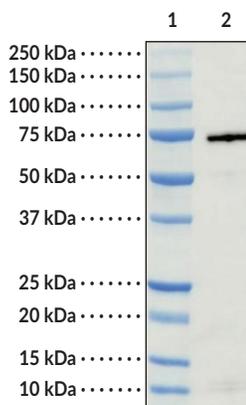
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: Citrullinated Histone H4 (100 ng)
Lane 3: Citrullinated Histone H4 (200 ng)
Lane 4: Histone H4 (100 ng)
Lane 5: Histone H4 (200 ng)

Histone H4 (human, recombinant) (Item No. 10264) was citrullinated using PAD4 (human, recombinant) - Biotinylated. Citrullination was determined using Cayman's Citrulline-specific Probe-biotin (Item No. 17450) and detected using Streptavidin:HRP (Item No. 16747).



Lane 1: MW Markers
Lane 2: Biotinylated PAD4 (200 ng)

PAD4 was confirmed to be biotinylated by Western blot using Streptavidin-HRP (Item No. 16747).

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.

WARRANTY AND LIMITATION OF REMEDY
Buyer agrees to purchase the material subject to Cayman's Terms and Conditions. Complete Terms and Conditions including Warranty and Limitation of Liability information can be found on our website.

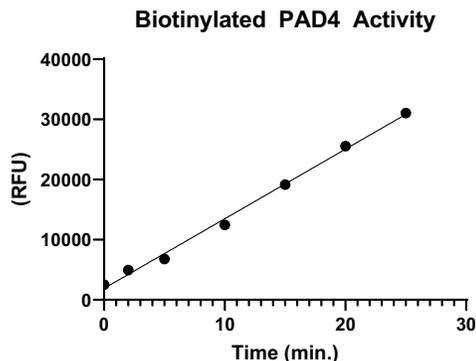
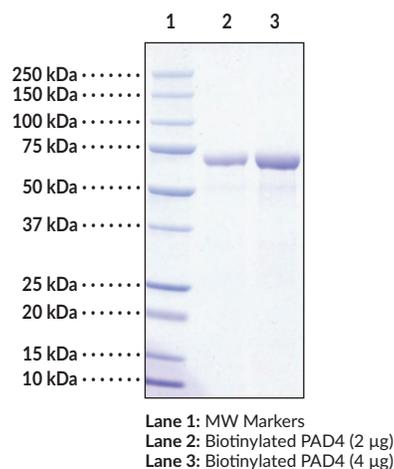
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Activity of Biotinylated PAD4. PAD4 activity was determined using Cayman's PAD4 Inhibitor Screening Assay Kit (Ammonia) (Item No. 700560) with 0.25 µg of PAD4 (human, recombinant) - Biotinylated and 2 mM BAEE substrate.

Description

Protein arginine deiminase 4 (PAD4) catalyzes the conversion of arginine residues to citrulline within cellular protein substrates, resulting in the loss of a positive charge, which can alter protein structure and/or function.¹ It is expressed in neutrophils, as well as a variety of tissues, including the brain, liver, lung, and kidney.¹⁻³ PAD4 has a key role in NETosis, a lytic form of cell death characterized by the release of neutrophil extracellular traps (NETs).¹ Upon neutrophil activation, PAD4 translocates to the nucleus where it citrullinates histones, initiating chromatin decondensation and the release of NETs.^{2,4,5} Neutrophils isolated from *Pad4*^{-/-} mice exhibit decreased citrullination of histone H3 under both basal and LPS-stimulated conditions and are defective for NET formation in response to stimulation with LPS, phorbol 12-myristate 13-acetate (PMA; Item No. 10008014), or hydrogen peroxide.⁴ *Pad4*^{-/-} mice exhibit larger lesions than wild-type mice in a model of necrotizing fasciitis induced by M1 group A *S. pyogenes* lacking the extracellular DNase Sda1. *Pad4*-deficient mice also exhibit reduced infarct size in a model of myocardial ischemia-reperfusion injury and reduced tumor growth in a Lewis lung carcinoma model.^{2,6} *PADI4* SNPs, including G55S, V82A, and G112A, are associated with rheumatoid arthritis in humans.⁷ Cayman's PAD4 (human, recombinant) - Biotinylated protein contains the G55S, V82A, and G112A SNPs and can be used for enzyme activity assays.

References

1. van Beers, J.J.B.C., Zendman, A.J.W., Raijmakers, R., *et al.* Peptidylarginine deiminase expression and activity in PAD2 knock-out and PAD4-low mice. *Biochimie* **95**(2), 299-308 (2013).
2. Demers, M., Wong, S.L., Martinod, K., *et al.* Priming of neutrophils toward NETosis promotes tumor growth. *Oncoimmunology* **5**(5), e1134073 (2016).
3. Jones, J.E., Causey, C.P., Knuckley, B., *et al.* Protein arginine deiminase 4 (PAD4): Current understanding and future therapeutic potential. *Curr. Opin. Drug Discov. Devel.* **12**(5), 616-627 (2009).
4. Li, P., Li, M., Lindberg, M.R., *et al.* PAD4 is essential for antibacterial innate immunity mediated by neutrophil extracellular traps. *J. Exp. Med.* **207**(9), 1853-1862 (2010).
5. Thiam, H.R., Wong, S.L., Qiu, R., *et al.* NETosis proceeds by cytoskeleton and endomembrane disassembly and PAD4-mediated chromatin decondensation and nuclear envelope rupture. *Proc. Natl. Acad. Sci. USA* **117**(13), 7326-7337 (2020).
6. Savchenko, A.S., Borissoff, J.I., Martinod, K., *et al.* VWF-mediated leukocyte recruitment with chromatin decondensation by PAD4 increases myocardial ischemia/reperfusion injury in mice. *Blood* **123**(1), 141-148 (2014).
7. Suzuki, A., Yamada, R., Chang, X., *et al.* Functional haplotypes of PADI4, encoding citrullinating enzyme peptidylarginine deiminase 4, are associated with rheumatoid arthritis. *Nat. Genet.* **34**(4), 395-402 (2003).

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