

# PRODUCT INFORMATION



## PAD4 (human, recombinant)

Item No. 10500

### Overview and Properties

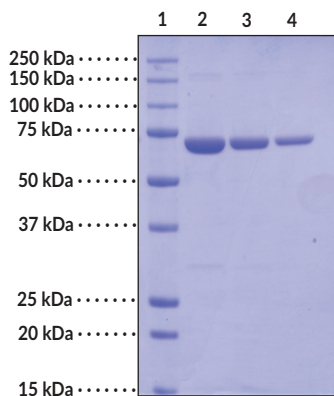
**Synonyms:** PADI4, PADI5, Peptidylarginine Deiminase 4, Protein Arginine Deiminase Type 4, Protein Arginine Deiminase Type IV  
**Source:** Active recombinant human N-terminal His-tagged PAD4 expressed in *E. coli*  
**Amino Acids:** 2-663 (full length)  
**Uniprot No.:** Q9UM07  
**Molecular Weight:** 75.8 kDa  
**Storage:** -80°C (as supplied); avoid freeze/thaw cycles by aliquoting protein  
**Stability:** ≥2 years  
**Purity:** ≥85% estimated by SDS-PAGE  
**Supplied in:** 50 mM HEPES, pH 8.0, containing 300 mM sodium chloride, 1 mM DTT, and 10% glycerol

### Protein

**Concentration:** *batch specific* mg/ml  
**Activity:** *batch specific* U/ml  
**Specific Activity:** *batch specific* U/mg  
**Unit Definition:** One unit is defined as the amount of enzyme required to produce 1 nmol of NH<sub>4</sub><sup>+</sup> per minute at 37°C in 50 mM HEPES, pH 7.7, containing 10 mM calcium chloride, 5 mM DTT, and 2 mM N-Benzoyl-L-Arginine Ethyl Ester (BAEE).

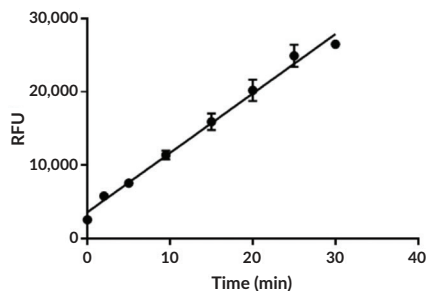
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Images

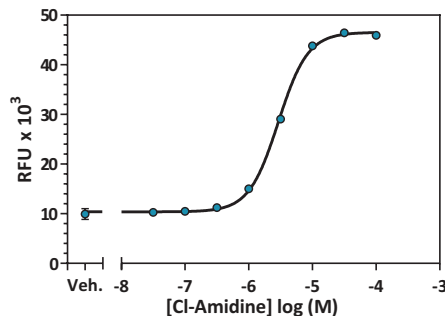


Lane 1: MW Markers  
Lane 2: PAD4 (4 µg)  
Lane 3: PAD4 (2 µg)  
Lane 4: PAD4 (1 µg)

Representative gel image shown; actual purity may vary between batches but protein will be ≥80% pure.



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



Inhibition of PAD4 (human, recombinant) (Item No. 10500) by Cl-Amidine. Image from PAD4 Inhibitor Screening Assay Kit (AMC) (Item No. 701320)

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.

Copyright Cayman Chemical Company, 02/04/2021

CAYMAN CHEMICAL

1180 EAST ELLSWORTH RD  
ANN ARBOR, MI 48108 · USA

PHONE: [800] 364-9897

[734] 971-3335

FAX: [734] 971-3640

CUSTSERV@CAYMANCHEM.COM

WWW.CAYMANCHEM.COM

# PRODUCT INFORMATION



## 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.<sup>1</sup> It is expressed in neutrophils, as well as a variety of tissues, including the brain, liver, lung, and kidney.<sup>1-3</sup> PAD4 has a key role in NETosis, a lytic form of cell death characterized by the release of neutrophil extracellular traps (NETs).<sup>1</sup> Upon neutrophil activation, PAD4 translocates to the nucleus where it citrullinates histones, initiating chromatin decondensation and the release of NETs.<sup>2,4,5</sup> Neutrophils isolated from *Pad4*<sup>-/-</sup> 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.<sup>4</sup> *Pad4*<sup>-/-</sup> 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.<sup>2,6</sup> *PADI4* SNPs, including G55S, V82A, and G112A, are associated with rheumatoid arthritis in humans.<sup>7</sup> Cayman's PAD4 (human, recombinant) 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).

CAYMAN CHEMICAL  
1180 EAST ELLSWORTH RD  
ANN ARBOR, MI 48108 · USA  
PHONE: [800] 364-9897  
[734] 971-3335  
FAX: [734] 971-3640  
CUSTSERV@CAYMANCHEM.COM  
WWW.CAYMANCHEM.COM