PRODUCT INFORMATION

PAD3 (human, recombinant)

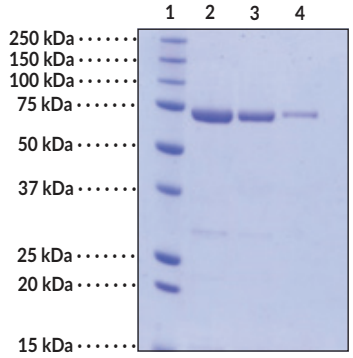
Item No. 10786

Overview and Properties

Synonyms:	PADI3, PDI3, Peptidylarginine Deiminase 3, Protein Arginine Deiminase 3
Source:	Active recombinant human N-terminal His-tagged PAD3 protein expressed in *E. coli*
Amino acids:	2-664 (full length)
Uniprot No.:	Q9ULW8
Molecular Weight:	76.4 kDa
Storage:	-80°C (as supplied); avoid freeze/thaw cycles by storing protein in aliquots
Stability:	≥1 year
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_4^+ per minute at 37°C in 50 mM HEPES, pH 7.7, containing 10 mM calcium chloride, 5 mM DTT, and 4 mM N-α-Benzoyl-L-Arginine ethyl ester (BAEE).

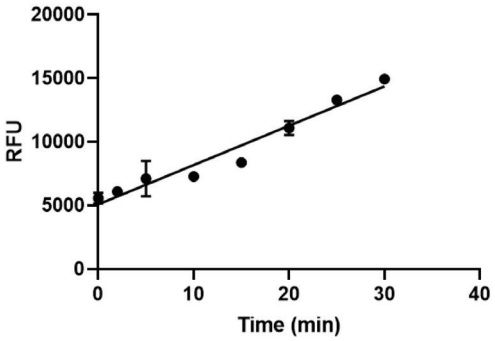
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: PAD3 (4 µg)
Lane 3: PAD3 (2 µg)
Lane 4: PAD3 (1 µg)

Representative gel image shown; actual purity may vary between batches but protein will be ≥85% pure.



Activity of PAD3. PAD3 activity was determined using Cayman's PAD3 Inhibitor Screening Assay Kit (Item No. 701470) with 0.25 µg PAD3 and 4 mM BAEE substrate.

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

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Description

Protein arginine deiminase 3 (PAD3) catalyzes the conversion of arginine residues to citrulline within its cellular protein substrates, which include S100A3, trichohyalin, and filaggrin, resulting in the loss of a positive charge, which can alter protein structure and/or function.[1] It exists as a homodimer and is composed of a C-terminal catalytic domain and an N-terminal domain that contains two immunoglobulin G (IgG) subdomains.[2] PAD3 is primarily expressed by differentiated keratinocytes in the epidermis and hair follicles where it has roles in the shaping and mechanical strengthening of hair.[2,3] It is also expressed by neural stem cells where it modulates cell death by regulating the nuclear translocation of apoptosis-inducing factor (AIF), in mammary glands where it citrullinates proteins during lactation, and cancer cells where it promotes cancer cell invasion.[4-6] Mutations in *PADI3* are associated with uncombable hair syndrome. Cayman's PAD3 (human, recombinant) protein 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).
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3. Basmanav FB, Ü., Cau, L., Tafazzoli, A., *et al.* Mutations in three genes encoding proteins involved in hair shaft formation cause uncombable hair syndrome. *Am. J. Cancer Res.* **99(6)**, 1292-1304 (2016).
4. U, K.P., Subramanian, V., Nicholas, A.P., *et al.* Modulation of calcium-induced cell death in human neural stem cells by the novel peptidylarginine deiminase-AIF pathway. *Biochim. Biophys. Acta* **1843(6)**, 1162-1171 (2014).
5. Li, G., Hayward, I.N., Jenkins, B.R., *et al.* Peptidylarginine deiminase 3 (PAD3) is upregulated by prolactin stimulation of CID-9 cells and expressed in the lactating mouse mammary gland. *PLoS One* **11(1)**, e0147503 (2016).
6. Uysal-Onganer, P., D'Alessio, S., Mortoglou, M., *et al.* Peptidylarginine deiminase inhibitor application, using Cl-amidine, PAD2, PAD3 and PAD4 isozyme-specific inhibitors in pancreatic cancer cells, reveals roles for PAD2 and PAD3 in cancer invasion and modulation of extracellular vesicle signatures. *Int. J. Mol. Sci.* **22(3)**, 1396 (2021).

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