PRODUCT INFORMATION

PAD3 (human, recombinant)

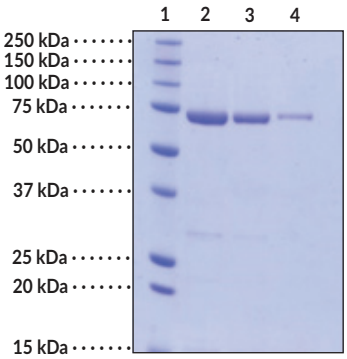
Item No. 10786

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:	≥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_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).

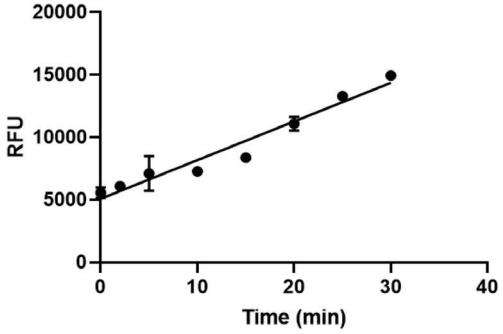
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

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 PAD4 Inhibitor Screening Assay Kit (Ammonia) (Item No. 700560) with 0.25 µg PAD3 and 4 mM BAEE substrate.

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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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).
2. Funabashi, K., Sawata, M., Nagai, A., *et al.* Structures of human peptidylarginine deiminase type III provide insights into substrate recognition and inhibitor design. *Arch. Biochem. Biophys.* **708**, 108911 (2021).
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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