Product Information

Peptidyl Arginine Deiminase Type 4

Human recombinant, expressed in *E. coli*, aqueous solution

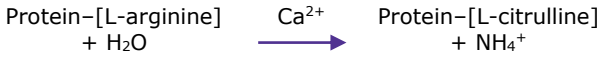
SAE0086

Enzyme Commission (EC) Number: 3.5.3.15

Synonyms: Protein arginine iminohydrolase, PAD4, PADI4

Product Description

Peptidyl Arginine Deiminases (PADs) perform post translational deiminations of proteins. PADs are calcium-dependent enzymes that catalyze the conversion of L-arginine residues to L-citrulline. The catalyzed reaction is as follows:



This deimination provides another level of regulating protein function.

There are five mammalian PADs sub-types, which differ in substrate specificity and tissue distribution. PAD enzymes are highly homologous, with 50-60% sequence similarity.[1] PAD enzymes play important roles in gene regulation by citrullination of arginine residues on histones H3, H2A, and H4. Overexpression of these enzymes has been found in several diseases such as rheumatoid arthritis, Alzheimer's disease, multiple sclerosis, lupus, Parkinson's disease, and cancer.[2,3]

PAD4 is widely expressed in the immune system with expression pathology in various tumor and cancer cell lines.[5] In cells, PAD4 can be found in the cytoplasm and nucleus. PAD4 activity has been correlated to the development and progress of Rheumatoid Arthritis (RA).[2,5] A study in mice has indicated a mechanism for the development of RA by anticitrullin autoimmunity.[6]

SAE0086 has been cited in the research literature.[7]

Precautions and Disclaimer

This product is for R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Product

This recombinant human PAD4 is expressed in *Escherichia coli* as a fusion protein. The fusion partner is removed by HRV3C protease digestion, followed by chromatographic purification. This purified PAD4 protein is supplied in 10 mM Trizma®-HCl (pH 7.5) with 500 mM NaCl, 1 mM EDTA, and 1 mM DTT.

Enzymatic activity: Activity is measured by a colorimetric method with the synthetic substrate benzoyl arginine ethyl ester (BAEE).[5]

Unit definition: One unit will produce 1 µmole of *N*-α-benzoylcitrulline ethyl ester from BAEE per hour at 37 °C at pH 7.7.

Storage/Stability

Store the product at –20 °C. The product is stable for at least 2 years as supplied.

After the first use, it is recommended to divide the enzyme into aliquots and freeze at –20 °C. Avoid extended storage above freezing. Avoid repeated freeze-thaw cycles. Do not store in a no-frost (frost-free) freezer.

References

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3. Bicker, K. L., and Thompson, P. R., *Biopolymers*, 99(2), 155-163 (2013).
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5. Jones, J. E. *et al*., *Curr. Opin. Drug Discov. Devel*., 12(5), 616-627 (2009).
6. Arnoux, F. *et al*., *Proc. Nat. Acad. Sci. USA*, 114(47), E10169-E10177 (2017).
7. Rappu, P. *et al*., *Front. Oncol*., 12, 1035188 (2022).

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