PRODUCT INFORMATION

PPAD (*Porphyromonas gingivalis*, recombinant)

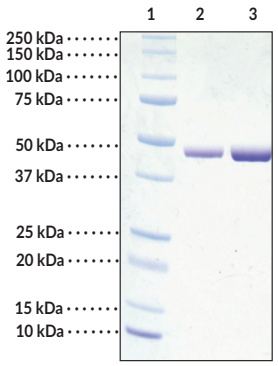
Item No. 36921

Overview and Properties

Synonyms:	*P. gingivalis* Peptidylarginine Deiminase, PPAD
Source:	Active recombinant *P. gingivalis* N-terminal His-tagged PAD expressed in *E. coli*
Amino Acids:	48-484
Uniprot No.:	Q9RQJ2
Molecular Weight:	51 kDa
Storage:	-80°C (as supplied)
Stability:	≥1 year
Purity:	≥90% estimated by SDS-PAGE
Supplied in:	50 mM Tris, pH 8, with 40 mM sodium chloride, 1 mM DTT, 5 mM βME, 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 200 µM N-benzoyl-L-arginine ethyl ester (BAEE)

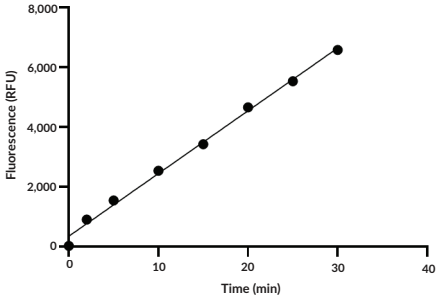
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: PPAD (2 µg, reduced)
Lane 3: PPAD (4 µg)

SDS-PAGE Analysis of PPAD. This protein has a calculated molecular weight of 51 kDa.



Activity of PPAD. PPAD activity was determined using Cayman Chemical's PAD4 Inhibitor Screening Assay Kit (Item No. 700560) with 5 µg PPAD and 200 µM 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

Porphyromonas gingivalis (*P. gingivalis*) peptidyl arginine deiminase (PPAD) is a bacterial enzyme and virulence factor secreted by *P. gingivalis*, an oral bacterium involved in the progression of periodontal disease.[1,2] It is composed of a pro-peptide sequence, a catalytic domain, an immunoglobulin-like (Ig-like) domain, and a C-terminal domain, but the mature protein contains only the catalytic domain and Ig-like domain.[2] It is expressed on the bacterial outer membrane. PPAD and proteolytic enzymes, such as arginine gingipain (RgpB), are released from *P. gingivalis* to break down proteins, which it uses as an energy source.[1,2] RgpB cleaves proteins at arginine residues, and PPAD specifically deiminates the resulting C-terminal arginine residues of both bacterial and host proteins to citrulline, a process known as citrullination.[1-3] Unlike mammalian PADs, PPAD does not require calcium and can convert free L-arginine into L-citrulline in addition to deiminating these residues at the C-terminus of proteins and peptides.[4] A *ppad* deletion mutation (Δ8820) in *P. gingivalis* strain 381 increases biofilm formation, alters biofilm architecture, and induces the secretion of protein aggregates.[1] Mice infected with a PPAD deficient strain of *P. gingivalis* have reduced periodontal inflammation and similarly infected mice in a model of collagen-induced arthritis have reduced bone erosion.[5] Cayman's PPAD (*Porphyromonas gingivalis*, recombinant) protein can be used for enzyme activity assays.

References

1. Vermilyea, D.M., Ottenberg, G.K., and Davey, M.E. Citrullination mediated by PPAD constrains biofilm formation in *P. gingivalis* strain 381. *NPJ Biofilms Microbiomes* **5(1)**, 7 (2019).
2. Montgomery, A.B., Kopec, J., Shrestha, L., *et al*. Crystal structure of *Porphyromonas gingivalis* peptidylarginine deiminase: Implications for autoimmunity in rheumatoid arthritis. *Ann. Rheum. Dis.* **75(6)**, 1255-1261 (2016).
3. Olsen, I., Singhrao, S.K., and Potempa, J. Citrullination as a plausible link to periodontitis, rheumatoid arthritis, atherosclerosis and Alzheimer's disease. *J. Oral Microbiol.* **10(1)**, 1487742 (2018).
4. Gómez-Bañuelos, E., Mukherjee, A., Darrah, E., *et al*. Rheumatoid arthritis-associated mechanisms of *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans*. *J. Clin. Med.* **8(9)**, 1309 (2019).
5. Gully, N., Bright, R., Marino, V., *et al*. Porphyromonas gingivalis peptidylarginine deiminase, a key contributor in the pathogenesis of experimental periodontal disease and experimental arthritis. *PLoS One* **9(6)**, e100838 (2014).

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