

MS07-P17 | PORPHYROMONAS GINGIVALIS TPR PROTEASE ZYMOGEN RESEMBLES CALPAIN-CALPASTATIN COMPLEX.

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Calcium dependent proteases of calpain family are widespread in eukaryotes, but no homologues in the kingdom of prokaryotes have been described to date. Here we present the crystal structure of the first prokaryotic calpain-like protease. The structure of Tpr protease zymogen from *Porphyromonas gingivalis* resembles a calpain-calpastatin complex. The core structure of the proteolytic domain is largely identical to calpain, while the propeptide only distantly resembles calpastatin and its function is distinct from enzyme inhibition. The structural similarity between calpain and Tpr suggests that the latter could have been acquired by horizontal gene transfer from animal host. Thus, *P. gingivalis*, one of the major periodontal pathogens responsible for formation of teeth disease (periodontitis) have likely acquired an additional virulence factor from its mammalian host. To help understand the role of Tpr in pathogenesis we characterized in detail substrate preference of Tpr and provided sensitive synthetic substrates for the detection of Tpr activity.