

THE ROLE OF TICK ASPARAGINYL ENDOPEPTIDASE (LEGUMAIN)  
IN DIGESTION OF HOST BLOOD

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Blood-meal digestion in ticks occurs intracellularly in the gut cells. Preliminary evidence suggests that blood meal digestion in ticks is based on evolutionary old network of digestive proteases comprising cathepsins B, L, D and asparaginyl endopeptidases. We have recently described a gut-specific asparaginyl endopeptidase from the tick *Ixodes ricinus* (IrAE) - the first legumain ortholog described among arthropods. IrAE is specifically expressed in the digestive cells and excreted into the peritrophic matrix. Recombinant IrAE displays similar characteristics as its ortholog - SmAE from the blood-fluke *Schistosoma mansoni*. IrAE undergoes catalytic auto-activation and is capable to activate schistosomal Cathepsin B. The pH optimum and stability of IrAE below pH 6 is in accord with its localization within the acidic vesicles of the digestive cells. IrAE was also shown to digest hemoglobin in vitro in a discrete manner, consistent with its restricted specificity for Asn at P1 position. However, the overall hemoglobinolytic activity of IrAE is weak indicating that the main role for this enzyme is to trans-activate other peptidases in the network which likely perform the major portion of hemoglobin digestion in ticks.

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