

University of South Bohemia in České Budějovice  
Faculty of Science



**Der-p2 (*Dermatophagoides pteronyssinus*) allergen-like protein  
from the hard tick *Ixodes ricinus* – a novel member of ML (MD-2-related lipid-  
recognition) domain protein family.**

RNDr. Thesis

**Mgr. Jana Plchová**

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### **Annotation**

A family of ML (MD-2-related lipid-recognition) domain containing proteins contains immune-related molecules. It does not belong among well-studied protein family in ticks although its occurrence is quite often. Generally, ML proteins are involved in innate immunity processes, lipid binding and transport. A novel member of the ML protein family, Der-p2 allergen-like protein was isolated from *Ixodes ricinus* and characterized for the first time.

### **Declaration [in Czech]**

Prohlašuji, že svoji rigorózní práci jsem vypracoval/a samostatně pouze s použitím pramenů a literatury uvedených v seznamu citované literatury.

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České Budějovice, 2.1.2012

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Jana Plchová

**Author's contribution**

Jana Plchová (Horáčková) participated in design of experimental procedure, tick collection, nucleic acids extraction and handling, gene isolation, bioinformatics/sequence analysis, expression and purification of the recombinant protein, antimicrobial and IgE binding activity determination, preparation of results for publication, manuscript writing and its revision.

**Der-p2 (*Dermatophagoides pteronyssinus*) allergen-like protein from the hard tick *Ixodes ricinus* - a novel member of ML (MD-2-related lipid-recognition) domain protein family.**

Horáčková, J., Rudenko, N., Golovchenko, M., Grubhoffer, L.

Parasitology. 137 (2010), 1139-1149.

SUMMARY

**Objective.** Expression of the gene encoding Der-p2 allergen-like protein in the castor bean tick *Ixodes ricinus* is induced by blood intake. Tick Der-p2 allergen-like protein belongs to a diverse family of MLproteins that includes major allergens of house dust mites, human MD-2 or similar proteins from *Drosophila melanogaster*. In ticks, genes encoding proteins belonging to the ML protein family were identified, but their protein products have not been characterized yet.

**Methods.** A gene encoding tick Der-p2 allergen-like protein was amplified from cDNA of engorged *I. ricinus* female using the genespecific primers designed on a basis of partial sequences of related allergen-like genes. The tissue and state specific patterns of expression of the gene were analysed. The IgE binding activity of the produced recombinant protein was studied by use of ELISA.

**Results.** Analysis of the expression pattern showed that the gene encoding the tick Der-p2 allergen-like protein is strongly induced by the bloodmeal in gut and haemolymph throughout all tick developmental stages. Der-p2 allergen-like protein possesses a putative lipid-binding site, according to the comparisons with the related proteins. The ability of tick Der-p2 allergen-like protein to bind immunoglobulin E (IgE) was revealed.

**Discussion.** The presence of a putative lipid-binding domain in Der-p2 allergen-like protein and its ability to interact with IgE might indicate the involvement of the protein in the tick's immune response.