

Cloning and functional characterization of the NRAMP/Malvolio homolog in *Anopheles albimanus*: Physiological implications of metal ion transport and mosquito immune response. Lanz-Mendoza H⁽¹⁾; Martinez Barnetche J⁽¹⁾; Garcia Solache MA⁽¹⁾; Rodriguez Gutierrez MC⁽¹⁾; Tello AT⁽¹⁾; Lecona AN⁽¹⁾; Gamba G⁽²⁾; and Rodriguez Lopez; MH⁽¹⁾.

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The NRAMP gene family is widely distributed in eukaryotes and prokaryotes. It was originally described as a polymorphic locus in inbred mice strains conferring innate resistance/susceptibility to intracellular pathogens such as *M. tuberculosis* and *Leishmania* sp, and hence was called *Natural Resistance Associated Macrophage Protein*.

The NRAMP proteins are divalent cation transporters. In mammals NRAMP1 and NRAMP2 are involved in iron and manganese depletion from phagocytic vesicles and iron absorption in the intestinal epithelium, respectively. In *Drosophila*, Malvolio (NRAMP homolog) is expressed in the central nervous system and in hemocytes. Null Mvl mutants are unable to discriminate gustatory stimuli, however a wild type phenotype can be restored by iron or manganese supplementation. Interestingly, Mvl mediated manganese transport in brain cells in *Apis mellifera* is implicated in age related division of labor (foraging).

Due to its implications in immunity and neural perception, we cloned the *An. albimanus* mvl homolog from cDNA and from genomic DNA. Consensual translation reveals a highly hydrophobic protein of 571 amino acid residues, 10 transmembrane regions and all the structural features of the NRAMP family. Ana-mvl transcripts generated *in vitro* were able to mediate Fe²⁺ transport into *Xenopus* oocytes, albeit one order of magnitude less than the rat NRAMP2 homolog.

Ana-mvl protein expression was assessed by Western blot using a polyclonal rabbit antiserum directed to a BSA-conjugated 19 aa peptide (positions 233-251), which identified a 60 kDa protein significantly expressed in adult female midgut and Malpighian tubules but not thorax or head. Ana-mvl protein was also expressed in the same organs of adult males but it was also found in head.

Malaria transmission is dependent on mosquito immune response, oxidative stress, neural perception and feeding behavior. Given that Ana-mvl may be implicated in such processes, it represents an interesting target for understanding *Plasmodium*/mosquito interactions. Further experimental evidence will be discussed.