Species *Candidatus* Midichloria mitochondrii

Etymology

[mi.to'chon.drii] **N.L. n.** *mitochondrium -i*, a mitochondrion; **N.L. gen. n.** *mitochondrii*, of a mitochondrion

Nomenclatural type

Unknown

Description

Sassera, et al (2006): '*Candidatus* M. mitochondrii' appears in EM observations (Lewis, 1979; Zhu *et al.*, 1992; Sacchi *et al.*, 2004) as a Gram-negative bacterium with a bacillus shape of ≈ 0.45 µm in diameter and ≈1.2 µm in length. This bacterium is observed within various cell types (lumenal cells, funicular cells and oocytes) of the ovary of the hard tick *I. ricinus* (Ixodidae). In all of the above cell types, the bacteria are observed free in the cytoplasm or included in a host-derived membrane. In addition, in luminal cells and oocytes, the bacterium is also observed within the mitochondria, in the periplasmic space between the two membranes of these organelles. As the development of the oocyte proceeds, the bacteria appear to consume the inner part of the mitochondria and multiply therein. The mitochondrial matrix is reduced as a result and some mitochondria appear as sacs full of bacteria (Sacchi *et al.*, 2004). Different numbers of bacteria have been observed within the mitochondria, from a single bacterium to over 20. Despite the high number of mitochondria consumed by the bacterium, the eggs of the tick develop normally. *In situ* hybridization with probes designed to target specific 16S rRNA gene regions resulted in the staining of only ovarian cells in female ticks (Beninati *et al.*, 2004). In male ticks, there is only PCR evidence for the presence of the bacterium (Lo *et al.*, 2006). The symbiont appears to be ubiquitous in the females of *I. ricinus* across its distribution (prevalence, 100 %), while a significantly lower prevalence is observed in males (44 %). In males that test positive by PCR, the bacterial load also appears lower compared with females (Lo *et al.*, 2006). Evidence for efficient vertical transmission of the bacterium has been reported based on PCR screening of eggs. Sequencing of the 16S rRNA and *gyrB* genes from ticks from 11 different countries from across the distribution of *I. ricinus* showed a low level of variability in both genes. One substitution in 380 bases was found in the 16S rRNA gene sequence and two substitutions in 519 bases were found in the *gyrB* gene sequence (Lo *et al.*, 2006). [...] '*Candidatus* M. mitochondrii' belongs to the phylum *Proteobacteria*, to the class *Alphaproteobacteria* and to the order *Rickettsiales*. '*Candidatus* M. mitochondrii' is assigned on the basis of the 16S rRNA (AJ566640) and *gyrB* gene sequences (AM159536).

Classification

Bacteria » *Pseudomonadota* » *Alphaproteobacteria* » *Rickettsiales* » *Candidatus* Midichloriaceae » *Candidatus* Midichloria » *Candidatus* Midichloria mitochondrii

References

Effective publication: Sassera et al., 2006 [1]

Registry URL

https://seqco.de/i:112

References

1. Sassera et al. (2006). 'Candidatus Midichloria mitochondrii', an endosymbiont of the tick Ixodes ricinus with a unique intramitochondrial lifestyle. *International Journal of Systematic and Evolutionary Microbiology*. DOI:10.1099/ijs.0.64386-0