

A REVIEW

## Vaccination against Paratuberculosis infection in animals

RAJIB DEB AND P.P. GOSWAMI

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There are twenty common or standard amino acids found in proteins (alanine, arginine, asparagine, asparagines, cysteine, glutamine, glutamate, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine) and there are also number of rare amino acids. The free amino acid fraction in tissues in small compared with the protein amino acids. The amino acids have high biological significance and the simplest forms of proteins, for that in this aspect the investigators made an attempt towards the studies on free amino acids of *Ascaridia galli* (Schrank, 1788) freeborn 1923, from Nanded, M.S., India.

Johne's disease, popularly known as paratuberculosis was initially reported by Johne and Frothingham in Germany in 1895 (Johne and Frothingham, 1895), but it gained importance only after 1910 when Twort demonstrated that Koch's postulates were fulfilled, by growing the organism and reproducing the disease in experimentally infected cattle (Twort and Ingram, 1912). The causative agent, originally named *Mycobacterium enteritidis chronicae pseudotuberculosis bovis johne*, was then referred as *Mycobacterium paratuberculosis*. The classification of *M.paratuberculosis* has followed classical bacterial lines based on the main criteria of extremely slow growth and the requirement of exogenous mycobactin (Naser *et al.*, 2004). However, some strains of *M.avium* designated wood pigeon mycobacteria require exogenous mycobactin only on primary isolation but later become independent of it on subsequent passage. *Mycobacteria* can also be differentiated on the basis of the specific insertion sequence on their

genomic DNA. *M.paratuberculosis* possesses the specific insertion sequence IS 900 and the *M.avium* can be divided into two distinct biotypes according to the presence of IS 901 (Kunze *et al.*, 1992). The classification of *M.avium* also based on a large number of biochemical tests into three subspecies, viz., *M.avium* subspecies *paratuberculosis*, *M.avium* subspecies *avium* and *M.avium* subspecies *silvaticum* (wood pigeon mycobacteria). *M.paratuberculosis*, causative agent of paratuberculosis in the ruminants is now known as *M.avium* ssp. *paratuberculosis* (*M.a. paratuberculosis*) or simply MAP, belonging to the *M.avium* complex (MAC) group of organisms (Thorel *et al.*, 1990). Immunological memory will be developed in vertebrate by an antigenic stimulation, which leads to adaptive immunity against the antigen and re-exposure of the some type of antigen, the immune response will be faster and intestinal of a greater extent, which may be crucial in the face of relatively fast replicating organisms, such as viruses and bacteria. A successful vaccine can provide the long-lived immune responses by induction of immunological memory in the host system. To date, no effective therapeutic or vaccine candidates are available and early detection along with good management practices are the only ways to control paratuberculosis (Ott *et al.*, 1999). Unfortunately, control programmes are hampered by the lack of simple and efficient diagnostic tests, especially to detect subclinically infected animals. Serological and cell mediated immunity based assays remain most promising but so far specific immunodominant antigens are lacking.

See end of the article for authors' affiliations

**RAJIB DEB**

Division of Animal Biotechnology, Indian Veterinary Research Institute, IZATNAGAR (U.P.) INDIA

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