In vitro infection of intestinal finite and continuous cell lines by L monocytogenes

Philippe Velge, Bertrand Kaeffer, Elisabeth Bottreau, Pierre Pardon

conditions exhibit immunological evidence of a contact of *Listeria* antigens with immunological tissues but the carrier state appears as transient.

References

Lhopital S, Marly J, Pardon P, Berche P (1993) Kinetics of antibody production against listeriolysin O in sheep with listeriosis. *J Clin Microbiol* 31, 1537-1540

Vincente MJ, Baquero F, Perez-Diaz JC (1985) Cloning and expression of the *Listeria monocytogenes* haemolysin gene in *E coli*. *FEMS Microbiol Lett* 30, 77-79

In vitro infection of intestinal finite and continuous cell lines by _L monocytogenes_. P Velge, B Kaeffer, E Bottreau, P Pardon (*INRA, Centre de Recherche de Tours-Nouzilly, Laboratoire de Pathologie Infectieuse et Immunologie, 37380 Nouzilly, France*)

Listeria-contaminated foods have been associated with 6 recent human listeriosis outbreaks in Europe and North America indicating that the gastro-intestinal tract is the most probable site of entry into the host (Jones, 1990). Unfortunately, we are still uncertain about the precise nature of the cells that are the natural target for the intestinal translocation of *L monocytogenes*. Indeed, controversial results were obtained after experimental *in vivo* infections (Racz *et al*, 1972; MacDonald *et al*, 1980). Numerous studies reported that *L monocytogenes* is able to enter several spontaneous continuous cell lines and to multiply within. However, these *in vitro* invasions were not performed with finite cell lines, another model to study cell-bacteria interactions (finite line refers to a finite life span whereas continuous line refers to an infinite life span). In this context, we established a collection of fibroblastoid and epithelioid finite cell lines from the ileum of an adult histocompatible miniature boar (Kaeffer *et al*, 1993). All the virulent *Listeria* strains tested exhibited a weak penetration and a lack of intracellular multiplication inside these finite cell lines compared with the continuous cell lines. To demonstrate that the cell immortalization modified *Listeria* invasion, we transfected the finite cell lines with the plasmid pSV3-neo containing the SV40 large T oncogene to obtain continuous cell lines (Kaeffer *et al*, 1993). Our immortalized cell lines became permissive to all the virulent *L monocytogenes* strains used, as observed with CaCo-2 cells and contrary to their untransformed counterparts. These data support the hypothesis that *Listeria* penetrates an enterocyte subset at a defined state of differentiation or expressing particular receptors (Velge *et al*, submitted for publication). This is in agreement with the *in vivo* cell differentiation where the progressive crypt to villus migration of the epithelial cells occurs by the interplay of expression/loss of functions or synthesis of specific receptors (Louvard *et al*, 1992).

References

Jones D (1990) Foodborne Listeriosis. *Lancet* 336, 1171-1174

Kaeffer B, Bottreau E, Velge P, Pardon P (1993) Epithelioid and fibroblastic cell lines derived from the ileum of an adult histocompatible miniature boar (d/d haplotype) and immortalized by SV40 plasmid. *Eur J Cell Biol* 65, 152-162

Louvard D, Kedinger M, Hauri HP (1992) The differentiating intestinal epithelial cell: establishment and maintenance of functions through interactions between cellular structures. *Annu Rev Cell Biol* 8, 157-195

MacDonald TT, Carter PB (1980) Cell-mediated immunity to intestinal infection. *Infect Immun* 28, 516-523

Racz P, Tenner K, Mérö E (1972) Experimental *Listeria* enteritis. I. An electron microscopic study of the epithelial phase in experimental *Listeria* infection. *Lab Invest* 26, 694-700