A CONTRIBUTION TO THE PATHOGENICITY OF LISTERIA MONOCYTOGENES

Patočka F., and Mára M.

Laboratory for Special Medical Microbiology, Prague

MPA factor described by Stanley in 1949 /chloroform extract of L. monocytogenes cells/, which is montoxic but induces distinct monocytosis on intravenous injection in rabbits and mice, was again studied and purified, and another biological activity was described /Tadayon et al., 1969, 1970/. Patočka et al. /1958/ described a protein factor which by itself was nontoxic and enhanced the virulence of weakly virulent strains of L.m. This was essentially confirmed by Silverman et al. /1961/. Sidiqué et al. /1969/ described a listeria hemolysin which is an exotoxin of cytolytic activily basically analogous with streptolysin O. Only recently 2 further factors were separated from this a very important factor of virulence of L.m. was certainly discovered, however, it remains to be answered whether it is the only factors because in our experiments it was observed that some strains of L.m. /judged by LD_{50} in mice/ are more virulent, although they produce less listeriolysin than strains more strongly hemolytic. Several strains isolated from patients were used, lately only strain Brat.1 /LD_{50} in 20g mice = 2.6×10^6/ which in vitro produced only slight amounts of hemolysin, and strain Brat.2 /Ivanov/ /$LD_{50} = 8 \times 10^8$/ which produced measurable amounts of hemolysin. In some control experiments the nonpathogenic Welshimer strain was used. Broth cultures of varying composition and length of cultivation were precipitated with methanol and up to 100-fold concentrates of the methanol precipitate were injected intradermally in rabbits. Concentrates which happened to contain live L.m. were sterilized with peracetic acid 0.01% final conc. In some cases /especially with

strain Brat.1/ an edematous reaction with erythema developped within a few hours. This reaction seems to. suggest the presence of a weakly toxic factor in concentrates although these did not contain detectable amounts of hemolysin; repeatedly, however, a phospholipase activity was demonstrated in them /Souček et al., 1969/. In view of evidence concerning the toxic properties of cell walls of Gram-positive bacteria or their components /Schuster, 1961; Rotta, 1968/ disintegrated L.m. cells were differentially centrifuged. The top fractions injected intradermally in rabbits produced a distinct edema and erythema, occasionally with some hemorrhage and necrosis /especially from strain Brat.1/. An inflammation-producing component was released from cell walls after ether-treatment /according to Ribi 1959/ into the aqueous phase while at the same time the activity of the original material after extraction was reduced to a minimum. The nature of this active component is the subject of fruther investigations.

Patočka et al., Acta Univ.Carol. 1-3,397 /1958/.
Ribi et al., J. Immunol. 82,75 /1959/
Rotta, in Caravano: Current Researc on Group A Streptococcus, pag. 133, EM, New York 1968.
Schuster et al., J. Bacteriol. 93,47 /1967/.
Sidique et al., Am.J.Vet.Res. 30, 865 /1969/
Silverman et al., J. Immunol. 86,669 /1961/
Souček et al., J.Hyg.Epid.Microbiol. 13,271 /1969/
Stanley, J.Exp.Biol.Med.Sci. 27,123 /1949/
Tadayon et al., Can.J. Microbiol. 15,421 /1969/
Tadayon et al., Can.J. Microbiol. 16,535 /1970/