OBSERVATIONS ON THE RELATIONSHIP OF H.PLEUROPNEUMONIAE AND A "PASTEURELLA-LIKE" ORGANISM, ASSOCIATED WITH PLEUROPNEUMONIA IN PIGS

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The sporadic isolation of an organism resembling Pasteurella haemolytica, associated with focal necrotic pneumonia combined with pleuritis, arthritis and septicaemia, was described by Bertschinger and Seifert (1978). Infections with this Pasteurella-like agent do not seem to be of substantial economic importance, contrary to Haemophilus pleuropneumoniae infections, although both pathological and histological findings show striking similarities.

A study of the DNA-base sequence relationship (Mannheim et al., 1980) among strains of the genus Actinobacillus, Haemophilus and Pasteurella reveals that H.pleuropneumoniae (syn. H.parahaemolyticus) and the "Pasteurella-like" organism are closely related and, with the exception of the V-factor requirement of H.pleuropneumoniae, there are no phenotypic differences.

On the basis of these findings we performed a number of comparative studies. With the exception of NAD-requirement, the two strains cannot be distinguished biochemically. Some major biochemical properties are shown in Table 1.

Table 1: Comparison of the major phenotypic features of H.pleuropneumoniae and "Pasteurella-like" organism

	H.pleuropneumoniae S 1536	"Pasteurella-like" S 419
NAD-requirement	+	-
Haemolysis (Sheep blood)	+	+
CAMP test	+	+
Urease	+	+
Mannitol	+	+
Sensitivity to Penicillin	+	+

A further difference may be observed in the consistency of the colony. While H.pleuropneumoniae is known to form a sticky colony on the classical growth media, the colony of "Pasteurella-like"organism is mostly smooth and does not adhere to the media. Both strains, however, are similar on PPLO-agar (Nicolet, 1971) and show on young culture a bright iridescence, suggesting the presence of a capsule.

In a serological investigation it was found that both strains belong to the capsular type 2, according to the serological classification of H.pleuropneumoniae (Kilian M. et al., 1978); the specificity was confirmed by absorption assays. Serotype 2 is known to be prevalent in Switzerland, and all "Pasteurella-like" strains we isolated so far in the routine diagnostic belonged to this serotype. It is, however, likely that other serotypes too occur in "Pasteurella-like" strains.

The scanning profiles of the protein pattern of SDS-solubilized cells (Nicolet et al., 1980) of the two strains, obtained after polyacrylamide gel electrophoresis, showed a striking similarity.

To complete our comparative study, we performed an experimental infection on a 12 weeks old hysterectomyzed piglet. We instilled intranasally $1.75 \cdot 10^8$ "Pasteurella-like" organisms of strain S 419 (6 h. culture suspended in saline).

The course of the infection was highly comparable with that observed after administration of a high dosis of H.pleuropneumoniae. After 6 to 7 hours, the piglet showed very severe respiratory distress with fever (41.5°C) and blood tinged vomiting. After a period of seeming amelioration, the animal died 36 hours after inoculation. The necropsy revealed the typical lesions of pleuresy and pneumonia seen in H.pleuropneumoniae infections. The inoculated strains could be reisolated in abundant culture from the lung and the bronchi.

Furthermore we infected 4 piglets with $5.3 \cdot 10^6$ "Pasteurella-like" organisms of the same strains (48 h. old culture) in order to follow the immunological reaction. The pigs showed only mild respiratory symptoms and recovered rapidly. A blood sample taken 10 days later gave, for all piglets, evidence of an increase of complement-fixing antibodies to a titer of 1/20 to 1/40, irrespective of the antigen used (inoculated Pasteurella-like strain or H.pleuropneumoniae serotype 2).

The results obtained in the different investigated systems confirmed the similarities of the two strains. This fact must be considered in the bacteriological diagnosis of pleuropneumonia in pigs, and the same control measures have to be applied also with NAD-independent isolates.

In field conditions, however, NAD-dependent strains (H.pleuropneumoniae) surprisingly caused much more frequently infections and a much severer course of infection than NAD-independent strains. This may point out a more marked virulence of H.pleuropneumoniae, the factor of which is not yet defined but may be in relation with its deficiency to synthetize NAD.

Until more precise statistical data on the spread of infection with both varieties of strains are on hand, there is to be attached equal etiological importance to both agents. Further bacteriological work on this subject is required and additional experimental data have to be gathered in order to assess the real practical implication of the infection with one or the other kind of strain.

Selected references:
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