Abolition of Swarming of Proteus

Proteus mirabilis and Proteus vulgaris are well known to be frequently involved in urinary tract infection pathologies and are also responsible for various systemic and localized infections. Hauser described the characteristic zonal growth of these two species, also called swarming, in 1884 (2). This swarming is described as the formation of concentric zones of bacterial growth, able to cover the whole surface of solid culture medium (5). It frequently interferes with the enumeration of other microorganisms in clinical microbiology investigations and enhances the difficulty of isolating organisms from mixed bacterial species. Numerous media have been reported to prevent this swarming (1). Among these are the very dry plates described by Whitby (8), the MacConkey medium containing bile salts (4), the Lefòsion medium containing sodium desoxycholate (3), ferrous ions (6), charcoal (1), or p-nitrophenyl glycerin (10). Sodium azide, barbitone, and sulfonamide also inhibit Proteus swarming (1). Kauffman and Perch proposed the addition of polyvalent anti-Proteus-H sera to culture media, and recently, J. A. M. van Asten and Wim Gastraa described media including urea for diagnostic purposes (7).

Ethanol at 90% added to the medium at a 5% concentration is also a very effective antiswarm agent. It allows an easier isolation of gram-positive cocci and members of the families Enterobacteriaceae and Pseudomonaceae. However, when ethanol is used in blood agar medium, hemolytic reactions cannot be reliably determined (9). None of the above-mentioned media is available from commercial sources, and they have to be prepared in the laboratory. In some cases, the addition of chemical agents such as ethanol can interfere with the growth of other bacteria.

In our laboratory, as in many French laboratories, a very simple method for isolating single colonies of bacteria from mixed cultures is used (1a). When Proteus mirabilis is suspected, e.g., in cutaneous, digestive, or skin ulcer samples, 2 drops of 90% ethanol solution are added to the cover of the plate. The plate is then incubated upside down as usual for 18 h. The same technique is used to isolate bacteria from mixed primary cultures. This method can be used with all the commercial media routinely used in the laboratory, including blood agar plates. The growth of other bacteria—such as Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus group A, B, C, or G, Enterobacteriaceae, and Pseudomonas aeruginosa—is not impaired.

This very simple technique does not require particular caution in the routine laboratory, can be used with all agar plate media, and does not require the preparation of special agar plates.

REFERENCES

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