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# NOTES

## Nonidentity of *Bdellovibrio bacteriovorus* Strains 109D and 109J

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Two strains of *Bdellovibrio bacteriovorus*, both designated as 109 in the literature, differ. They should be referred to as 109D and 109J to avoid further confusion.

Some 75 experimental papers, review articles, and abstracts specifically concerned with *Bdellovibrio bacteriovorus* have appeared since the initial description of this organism (4). Although the number of experimental papers is still small, this literature already contains conflicting data on aspects of bdellovibrio physiology, e.g., on whether specific cations are required for attachment to or penetration of the host, or on the efficacy of host "lysis from without" (2, 3). Some of the controversies undoubtedly result from the use by various investigators of strains of bdellovibrio that are inherently different. Among the dozen or so strains employed in published studies, strain 109, one of the first isolates (5), has been by far the most commonly used.

Unfortunately, not all strains labeled 109 are the same. We have compared cultures so labeled received from M. Shilo's laboratory in Jerusalem and from M. P. Starr's laboratory in Davis, two major centers of bdellovibrio studies, and they differ. The Jerusalem strain (109J) rapidly changes from a pronounced vibrio to an almost straight rod after release from its host (Fig. 1A); the Davis strain (109D), although straightening somewhat, retains its vibrioid morphology (Fig. 1B). Plaques produced by 109J growing on a lawn of *Escherichia coli* B develop more slowly and are smaller than those produced by 109D under identical conditions. The Davis strain attaches poorly to some hosts in tris(hydroxymethyl)-aminomethane buffer unless calcium and magnesium salts are added, while these cations need not be added for optimal attachment of the Jerusalem strain. Strain 109J has a marked propensity, not possessed by 109D, to attach to glass and other wet surfaces. *Pseudomonas putida* is a good host for 109D but not for 109J. The endogenous respiration rate of 109D suspensions is some 25% less than that of 109J. It is quite probable that further work with these two cultures will uncover still other differences.

The similarities between the two strains appear more fundamental than the differences. Qualitatively, as judged by phase microscopy, their infection cycles are the same. They have similar attachment and penetration kinetics measured by the techniques of Varon and Shilo (6). Strain 109D, like strain 109J (1), damages host respiratory processes and destroys host permeability control early in infection. The base compositions of their deoxyribonucleic acid (DNA) are very similar, since their DNA's band at the same density in cesium chloride gradients (1.709 g/cm$^3$).

In the light of the similarities, the differences carry little formal taxonomic significance. Nevertheless, the strains are distinct, and to avoid confusion and futile controversy in the literature, the strains should have separate designations. Starr (*personal communication*) has suggested that the Jerusalem strain might be a mislabeled strain 100. Varon (*personal communication*) believes that the Jerusalem strain is a variant of the Davis strain selected for by the procedures used in Shilo's laboratory for maintaining the stock culture.

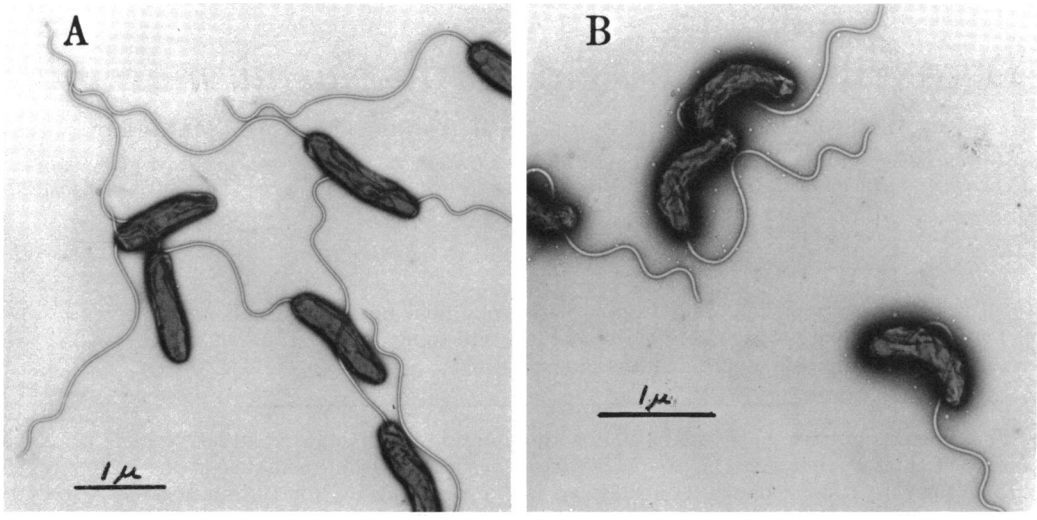


FIG. 1. *A, Bdellovibrio bacteriovorus strain 109J. B, B. bacteriovorus strain 109D. Negative stain, uranyl acetate; bar equals 1 μm.*

There seems no way of deciding between these and perhaps other explanations. It is recommended, therefore, that those using these strains add D or J to the strain designation, depending on the source and characteristics of the culture.

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