magnitude of about one-tenth. The other genera are generally less active, with some of the leuconostocs and the lactobacilli displaying only feeble, though readily demonstrable, catalase activity. There is some evidence for slight azide inhibition in preparations of cells grown in the absence of azide. This phenomenon is reminiscent of the findings of Whittenbury (Nature **187**:433, 1960), who observed the formation of a catalase in certain heterofermentative lactic acid bacteria, apparently through the coupling of an apocatalase with free hematin or the hematin from blood. With the preparations of *Lactobacillus*, *Leuconostoc*, and *Streptococcus* obtained from cultures grown in the presence of sodium azide, the insensitivity seems absolute. We conclude, therefore, that these systems, as with *Pediococcus*, do not contain heme iron, or at least do not involve heme-iron components.

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## *CLOSTRIDIUM INNOCUUM*, SP. N., A SPORE-FORMING ANAEROBE ISOLATED FROM HUMAN INFECTIONS

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Eight strains of this organism were selected for study from cultures of clostridia submitted to the Communicable Disease Center for identification. One strain had originally been isolated from an empyema pocket in the chest, one from an infected infarct of the brain, one from an appendiceal abscess, one from a subdiaphragmatic abscess, one from abdominal fluid after an acute intestinal obstruction, one from wound drainage, one from a sinus of the abdominal wall, and one from a compound fracture that had been contaminated with soil. Preliminary examination indicated that they were not identical with any known organism; consequently, they were studied in detail.

These organisms were gram-positive rods, 2 to 4 $\mu$ long and 0.4 to 1.0 $\mu$ wide, with terminal oval spores. Spores were readily formed when these strains were grown in chopped-meat medium for 2 days; they were also evident in preparations made from 3- to 5-day-old colonies on liver infusion agar. Cells in which spores were present were noticeably larger than nonsporulating cells. Motility was not observed in cells from young broth cultures under cover slips, nor could it be demonstrated in semisolid medium. Colonies were 1.5 to 2.5 mm in diam, glossy, white, raised, with entire margins. No zones of hemolysis were observed around colonies on blood agar. Glucose, sucrose, salicin, and mannitol were readily fermented, with the production of acid; lactose and sorbitol were not fermented; maltose was fermented slowly and irregularly. There was no appreciable difference in the fermentation of these carbohydrates when either 2% proteose peptone or thioglycolate medium was used as the basal medium. There was no evidence of digestion around colonies on cellulose or starch agar. Gelatin was not liquefied, casein and coagulated serum or albumin were not digested, nitrates were not reduced, and indole was not formed. Milk was slowly and softly clotted by two strains and was unchanged by the others (except for the formation of a few small bubbles of gas). Growth was obtained only under anaerobic conditions. The optimal temperature for growth appeared to be near 35 C.

These strains were not pathogenic for laboratory animals. Intramuscular inoculation of broth cultures as such or mixed with equal volumes of 10% calcium chloride into guinea pigs did not result in infection. In mice, no toxin could be demonstrated by intraperitoneal inoculation with supernatant fluid of broth cultures of various ages.

These bacteria do not appear to be identical

with any described in *Bergey's Manual of Determinative Bacteriology* (7th ed., Williams and Wilkins Co., Baltimore, 1957) or Prévot's *Manuel de Classification et de Détermination des Bactéries Anaérobies* (2nd ed., Masson et Cie., Paris, 1948). They differ from all clostridia with terminal oval spores listed in *Bergey's Manual* in the fermentation of several substrates and in other properties. They differ from *C. capitovale*, *C. cadaveris*, and *C. saprogenes* in being non-proteolytic; from *C. indologenes* in not producing indole; from *C. kluyveri* and *C. acidiurici* in their ability to grow on ordinary media; and from *C. perenne* in their inability to strongly ferment lactose and maltose and to coagulate milk. In Prévot's classification, their gram-positiveness, terminal oval spores, and lack of motility put them in the genus *Acuformis*. They differ from all species listed in several characteristics. Not only do they ferment different substrates, but they also differ from *A. filamentosus*, *A. alcaligenes*, and *A. thermoputrificus* in not producing indole; from *A. putrefaciens* and *A. immobilis* in not liquefying gelatin; from *A. macrosporus* and *A. dubitatus* in the shape of their spores; from *A. caninus* in not being aerotolerant; and from *A. spermoides* in not being pathogenic. They differ from *A. perrenis* and *A. innutrius*, the two species they most closely resemble, in the fermentation of several substrates and in being relatively inactive in clotting milk.

These strains apparently comprise a group of organisms unlike any that has been recognized as a species of the genus *Clostridium*. It is suggested that the name *Clostridium innocuum* be used to designate this species, in view of its lack of virulence. One culture, representing this species, has been deposited with the American Type Culture Collection.