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Rough and Smooth Variants of Cl. Welchii.

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Rough and smooth variants of *Cl. welchii* have been described by several investigators.[1] All found similar colony types but report with no uniformity on the characteristics of the broth cultures of the variants. In the course of some work on the effect of varying gaseous mixtures and pressures on the growth of anaerobic organisms, the variants of 2* strains of *Cl. welchii* were studied.

Five distinct colony types were observed consistently on freshly poured blood agar plates containing about 5% horse or rabbit blood. The plates were incubated for 48 hours, either in desiccators in which a negative pressure of at least 28 inches of mercury was obtained with a cenco hyvac pump and maintained, or in desiccators which were alternately evacuated and refilled with nitrogen 3 times before sealing for the period of incubation. Little difference was noted in the characteristic growth of the variants when the cultures were incubated at 20°C. or 37°C.

The colonies of the 2 smoother variants differed in opacity and in their ability to spread but both gave glistening, homogeneous rounded colonies with entire edges. The thin transparent haloes of the spreading type were suggestive of those of the smooth motile colonies of some of the Salmonella strains. Rapid transfer in veal infusion broth (pH 7.2) of cultures, made from the smoother colonies when the strains were originally plated, resulted in the isolation of these 2 characteristically smooth variants. The broth cultures were incubated in an atmosphere of nitrogen in small anaerobic jars as suggested by Leifson.[2] The supernatant broth at first showed only slight clouding but gradually this increased until the broth was almost uniformly turbid; the slight sediment was of a very stringy, mucilaginous consistency. One strain gave a more mucoid growth than the other. Plates streaked from the turbid

[1] Fortner, J., *Central. f. Bakteriol. Orig.*, 1929, **29**, 233; *Referat.*, 1930, **98**, 333. Condrea, P., *Compt. rend. Soc. de Biol.*, 1930, **103**, 631. Buchaly, J. F., *Central. f. Bakteriol.* 1931, **119**, 444.

* One strain was obtained from the Army Medical School, the other from the National Institute of Health.

[2] Leifson, *J. Bacteriol.*, 1931, **21**, 331.

broth cultures gave at least 95% smooth colonies; the opaque non-spreading colonies were found in a higher percentage than the thin transparent ones. These colonies were solid regular masses of more or less lanceolate shape in deep agar.

The rough colonies were usually of a spreading type with finely fimbriated edges although many were deeply corrugated granular colonies with irregular, confined borders. The broth cultures of both showed a granular growth in the bottom of the tube with a clear supernatant broth. The colonies had a fuzzy appearance in deep agar. The only intermediate type gave a finely granular rounded colony that was deeply grooved in the center but sloped off to a smooth circular base; in broth cultures a granular sediment was covered with clear broth.

All of the colonies on blood agar were surrounded by clear zones of hemolysis. The morphology of the individual cells was quite varied; small coccoid forms and long filaments as well as the rods of usual size were found in many cultures. All strains produced spores in beef heart medium with a pH of 7.4 to 7.6.

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A Stereo X-Ray Method of Demonstrating Bronchoconstriction in Anaphylaxis and After Drugs.*

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Changes in bronchial tone in the anaphylactic guinea pig and in the unsensitized animal after the injection of bronchoconstrictor drugs have been successfully studied by 2 methods: (1) the perfusion of the isolated lung,[1, 2] and (2) the direct visualization of the bronchial tree by celloidin casts of the respiratory tract. The latter method, described by Hanzlik,[3] affords structural information of value not elicited by the physiologic technic and has the advantage of producing permanent casts for study and demonstration. The

* Supported in part by the Rockefeller Fluid Research Fund of the School of Medicine of Stanford University.

[1] Thornton, J. W., *Quar. J. Exp. Physiol.*, 1932, **21**, 305.

[2] Hurwitz, S. H., and Wessels, A. L., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 120.

[3] Hanzlik, P. J., *Am. J. Physiol.*, 1925, **72**, 558.