

The usual reaction of the intestinal loop to the cathartic drug when injected intravenously was a sudden decrease in the general tonus and a decrease in the height of the rhythmical contractions. If peristaltic contractions were present these were temporarily inhibited. Peristaltic contractions usually began, without changing the decreased general tonus, 2 to 10 minutes after injection of the drug. The amplitude of these contractions increased gradually until in many instances their severity caused such pain that the animal became restless and whined during each contraction. Borborygmi were always heard. When the cathartic was placed in the lumen of the gut the first response was a rise in general tonus. This was followed by a decrease in general tonus to a point below the control level and by the introduction of peristaltic contractions.

Atropine when injected at the height of the cathartic action always temporarily produced a decrease in general tone and a disappearance of the peristaltic contractions. Although the rhythmical contractions continued they were always decreased in amplitude. Following this sudden change in tonus and activity of the gut the peristaltic contractions reappeared, but were less extensive and of longer duration than before, more nearly the type normally seen in the unmedicated gut.

Morphine sulphate when injected intravenously, when injected into the lumen of the gut, or when given by mouth invariably caused a sudden increase in the general tonus of the gut and a temporary disappearance of the peristaltic contractions.

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Utilization of Carbon Compounds by Mycobacteria in a Synthetic Medium.

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The utilization of a number of carbohydrates, when added to plain broth as the basic medium, by organisms of the genus *Mycobacterium* was reported previously.¹ The method employed was limited to determinations of utilization of reducing sugars only. In order to determine the extent to which other carbon compounds were

¹ Merrill, Malcolm H., *J. Bact.*, 1930, **20**, 235.

utilized, a synthetic medium has been used which contained the carbon compound under investigation as the sole carbon source. The appearance of growth and reaction change in the media were used as criteria for utilization.

Employing this method the extent of utilization of 16 carbon compounds by 14 strains of Mycobacteria has been studied. The

TABLE I.
Summary of results on utilization determinations.

| | <i>Myc. tuberculosis</i> H-37 | <i>Myc. tuberculosis</i> M-1 | <i>Myc. tuberculosis</i> saprophytic | <i>Myc. tuberculosis</i> bovis | <i>Myc. leprae</i> 282 | <i>Myc. avium</i> | <i>Myc. ranae</i> | <i>Myc. chelonae</i> | <i>Myc. smegmatis</i> | <i>Myc. butyricum</i> | <i>Myc. berolinensis</i> | <i>Myc. fortuitum</i> | <i>Myc. stercois</i> | <i>Myc. phlei</i> |
|-----------------|-------------------------------|------------------------------|--------------------------------------|--------------------------------|------------------------|-------------------|-------------------|----------------------|-----------------------|-----------------------|--------------------------|-----------------------|----------------------|-------------------|
| Glucose | 0 | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fructose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Galactose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Arabinose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Maltose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Lactose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Sucrose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Raffinose | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Inulin | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Mannitol | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Glycerol | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Ethyl alcohol | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Salacin lactate | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| Sodium citrate | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |
| acetate | 0 | 0 | + | + | + | + | + | + | + | + | + | + | + | + |

The symbols have the following meaning: + indicates definite utilization; ± indicates slow utilization; 0 indicates no evidence of utilization.

results are summarized in Table I. The utilization is sufficiently varied that it becomes of some value in differentiating the organisms studied. There were some cases in which utilization could not be demonstrated by this method where the same carbohydrates were shown to be utilized by the same organisms in the carbohydrate broth cultures.¹

The reaction changes associated with growth of the organisms in the synthetic media were progressive increase in acidity in the carbohydrate and alcohol containing media, and a primary increase in alkalinity followed by a reversion of the reaction towards neutrality of the media containing organic acids.