ISOLATION OF A NEW *MORAXELLA* FROM A CORNEAL ABSCESS

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THE purpose of this report is to record the isolation of an unusual Gram-negative bacillus from a human eye infection. The organism is provisionally classified as a strain of *Moraxella*.

The patient, a male Australian aboriginal, aged 52 yr, was a pensioner suffering from chronic bronchitis. When first seen (14 Jan. 1970) he had an enormous corneal abscess and ulceration, occupying two-thirds of the corneal surface; this was accompanied by a hypopyon and severe iritis with posterior synechiae. He was admitted to hospital and, after an abortive attempt to dilate the pupil, was treated with ampicillin 500 mg 6-hourly, Neosporin (Burroughs Wellcome and Co.) eyedrops 2-hourly, and atropine eyedrops three times daily. In hospital the ulcer began to heal from the edges, but the centre became ectatic and on 22 Jan. 1970 a conjunctival flap was placed over the ulcer. This led to a slow cure, so that by 25 Feb. 1970 there was only a large corneal scar corresponding to the site of the healed ulcer. The condition was quiescent and posterior synechiae were still present.

MATERIALS AND METHODS

The methods and media used were those of Cowan and Steel (1965) with some modifications. Indole, nitrate, methyl-red, Voges-Proskauer and H₂S tests were carried out both in the usual media and, because of the poor growth obtained in these media, also in the same media enriched with 0.5 per cent. yeast extract. Carbohydrate fermentation tests were carried out at 30° and 37°C in Cystine Trypticase Agar medium (BBL), peptone water medium (Cowan and Steel), Hugh and Leifson's medium with 0.5 per cent. yeast extract, and solid nutrient agar slopes with added yeast extract (0.5 per cent.) and indicator.

RESULTS

A Gram-negative bacillus, which was oxidase-positive and catalase-negative, was isolated from the base of the ulcer before it had been treated with antibiotics. A stained smear of this swabbing showed numerous pus cells and Gram-negative intracellular bacilli. The properties of this organism are as follows.

Morphology. The organism was a non-motile bacillus approximately 1.0–2.0 µm long and 0.5–0.75 µm wide. It was Gram-negative with some tendency to show bipolar staining. No spores or capsules could be demonstrated.

Colonial appearance. The organism grew slowly, and after 24 hours' incubation at 37°C the colonies on blood agar were small (0.1–0.5 mm). The colony tended to grow downwards into the medium, resulting in indentations of the surface immediately beneath it. After 48–72 hr the colonies were larger (1–1.5 mm) with an occasional colony twice this size. They were smooth and glistening when viewed in incident light with a stereomicroscope, and many showed a raised slightly opaque centre and a flat translucent periphery. The colonial appearance resembled that of *Bacteroides corrodens*. No haemolysis was evident after 24 hours' incubation, but after 48 hr incomplete haemolysis was found on sheep blood agar, particularly in the area beneath the colony. Partial haemolysis was sometimes, but less frequently, evident also on horse blood agar.

Growth requirements. Growth was poor in peptone water, but was improved by the addition of blood or yeast extract. Growth occurred on nutrient agar, but the extent varied

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with different brands of commercially available media (Oxoid, Difco and BBL). Growth on freshly prepared veal infusion agar was good.

The organism grew aerobically, but only very poorly under anaerobic conditions. Growth was not noticeably improved by the addition of CO₂, but unfortunately this characteristic was not investigated on first isolation. Growth occurred at 25°, 30° and 37°C, but not at 20° and 42°C after 14 days' incubation. Growth was most rapid at 30°C.

TABLE I
Biochemical reactions of Moraxella isolated from a corneal abscess

Catalase	—	Citrate utilisation	—
Oxidase	+	H ₂ S production	—
Penicillin sensitivity (0.1 unit)	+	Methyl red	—
Indole	+	Voges-Proskauer	—
Decarboxylases:		Gelatin liquefaction	—
Lysine	—	Urease	—
Ornithine	—	Litmus milk	No change
Phenylalanine deamination	—	Acid from glucose	+
Nitrate reduction	—	Hugh and Leifson's	Fermentative
		O-F test	

TABLE II
Characters of the new strain, and of Bacteroides corrodens and the saccharolytic species of Moraxella

	Test strain	<i>M. kingii</i> *	<i>B. corrodens</i> †	<i>Moraxella</i> sp.‡ (van Bijsterveld)
Catalase	—	—	—	—
Motility	—	—	—	+
Sensitivity to penicillin	+	+	+	+
Nitrate reduction	—	— or +	+	—
Saccharolytic	+	+	—	+
Phenylalanine deamination	—	—	...	+
Decarboxylases:				
Lysine	—	—	+	—
Ornithine	—	—	+	—
Indole	+	—	—	+
DNA: percentage GC§	49.9	49	56–58	49

* Henriksen and Bøvre (1968).

† Hill, Snell and Lapage (1970).

‡ van Bijsterveld (1970).

§ The DNA base ratios were determined at the National Collection of Type Cultures, Colindale, except for that of van Bijsterveld's strain, which is quoted from his paper.

Biochemical characteristics. The biochemical properties of the organism are given in table I. Of the carbohydrates tested, acid was produced from glucose, sucrose, galactose (slowly), arabinose (slowly) and fructose (slowly). No acid was produced from lactose, xylose, mannitol and salicin. The fermentation reactions varied with the different basal media used.

DISCUSSION

Comparison of this strain with published descriptions of *B. corrodens* (Hill, Snell and Lapage, 1970) and of other catalase-negative, oxidase-positive *Moraxella* species (Henriksen and Bøvre, 1968; van Bijsterveld, 1970) indicates that it most closely resembles van Bijsterveld's

strain, from which it differs in its lack of motility, negative phenylalanine reaction and colonial appearance. It should be noted, however, that the results for the strains listed in table II were those stated in the original reports and that the strains were not re-tested in our laboratory in parallel with the strain reported in this paper.

Whether these differences are sufficient to consider this isolate a separate new species is as yet uncertain.

SUMMARY

A Gram-negative bacillus, provisionally identified as a moraxella, was isolated from an eye infection. The properties of this organism are given and compared with those of similar catalase-negative, oxidase-positive Gram-negative bacilli.

A subculture of this organism has been lodged with the National Collection of Type Cultures, Colindale, London.

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