ANALYSIS OF SOME VIBRIO STRAINS.[1]

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In view of the difficulties of serological classification which the vibrio group presents, the problem was approached by Linton and his collaborators (1933, 1934, 1935) by a study of the chemical constitution of the cholera and cholera-like organisms. They succeeded in identifying in the vibrio group two types of protein, designated as protein I and protein II, and also three types of polysaccharide which are types I, II and III.

On the basis of the various combinations of these constituents, the vibrios have been tentatively classified into six groups as follows (Linton and Mitra, 1934):—

Group I — Protein I and Polysaccharide I.
Group II — Protein I and Polysaccharide II.
Group III — Protein II and Polysaccharide II.
Group IV — Protein II and Polysaccharide I.
Group V — Protein II and Polysaccharide III.
Group VI — Protein I and Polysaccharide III.

The classification of the vibrio group as a result of studies on their protein and polysaccharide constituents has an advantage over other classification in that it can explain the inter-relationship of the cholera organisms with respect to their sources.

A number of vibrio strains has been examined with a view to its classification according to chemical groups. It was found that the strains examined fell into one or the other of the above six chemical groups, each with a characteristic serological reaction (Table I).

It will be observed that organisms isolated from definite cases of cholera, fall into groups I and II, as judged from their protein-polysaccharide make-up. With few exceptions all these organisms are agglutinable. Group III usually contains water-vibrios, and Groups IV and V those from healthy carriers and dissociants.

Group VI ordinarily represents the variant types and dissociants. It also contains strains from cholera which have undergone subcultures in the laboratory a number of times. No strain from clinical cholera when examined within a reasonable period of time after its isolation was found to fall into Group VI.

It is very significant, especially as a diagnostic index, that protein II occurs in organisms isolated from sources other than cholera cases, such as water and healthy carriers.

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TABLE I.

Strain.	Chemical results.		Chemical Group.	Serological[1] reaction.	Source.
	Protein.	Polysaccharide.			
610	I	I	I	Agglutinable	Case
Kasauli 11	I	I	I	,,	,,
Kasauli 92/1	I	I	I	,,	,,
Hikojima	I	I	I	,,	,,
Nanking 32/77	I	I	I	,,	,,
196	I	I	I	,,	,,
202	I	I	I	,,	,,
179	I	I	I	,,	,,
2142-C(ii)	I	I	I	Non-agglutinable	,,
2147-E-7	I	I	I	,,	,,
3065 Habiganj	I	II	II	Agglutinable	,,
984 Habiganj	I	II	II	,,	,,
653 Shillong	I	II	II	,,	,,
172	I	II	II	,,	,,
176	I	II	II	,,	,,
200	I	II	II	,,	,,
315	I	II	II	,,	,,
319	I	II	II	,,	,,
322	I	II	II	,,	,,
330	I	II	II	,,	,,
334	I	II	II	,,	,,
2149-C-15	I	II	II	Non-agglutinable	,,
2000	II	II	III	,,	Water
2001	II	II	III	,,	,,
Nanking 32/103	II	II	III	,,	,,
Nanking 32/105	II	II	III	,,	,,
Nanking 32/109	II	I	IV	Agglutinable	,,
2009	II	I	IV	,,	Carrier
2014	II	I	IV	,,	,,
22	II	I	IV	,,	,,
El Tor 3661	II	I	IV	,,	,,
El Tor 3662	II	I	IV	,,	,,
El Tor 3663	II	I	IV	,,	,,
El Tor 3664	II	I	IV	,,	,,
2252	II	III	V	Non-agglutinable	,,
El Tor 34/D/19	II	III	V	,,	,,
Doorenbos 1934/11	II	III	V	,,	,,
Doorenbos 1934/13	II	III	V	,,	,,
Shillong 1077	I	III	VI	Agglutinable	Case
Nanking 32/123	I	III	VI	,,	,,
Nanking 32/124	I	III	VI	,,	,,
Kasauli 73/G	I	III	VI	,,	,,
China 5	I	III	VI	,,	,,
China 14	I	III	VI	,,	,,
Ogawa	I	III	VI	,,	,,
2148-G(I)	I	III	VI	Non-agglutinable	,,

[1] The term 'agglutinable' vibrios is used to denote those organisms which agglutinate with a standard high-titre cholera anti-serum of the Inaba type, in contra-distinction to non-agglutinable ones which do not agglutinate with the anti-serum of a true cholera organism.