POTENTIAL PATHOGENICITY OF NON OI VIBRIO CHOLERA

A Thesis Submitted to the Faculty of Medicine
Ain Shams University.
For the Partial Fulfillment of Ph.D. Degree
in Basic Medical Science (Bacteriology)

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FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
1989

بسم الله الرحمن الرحيم

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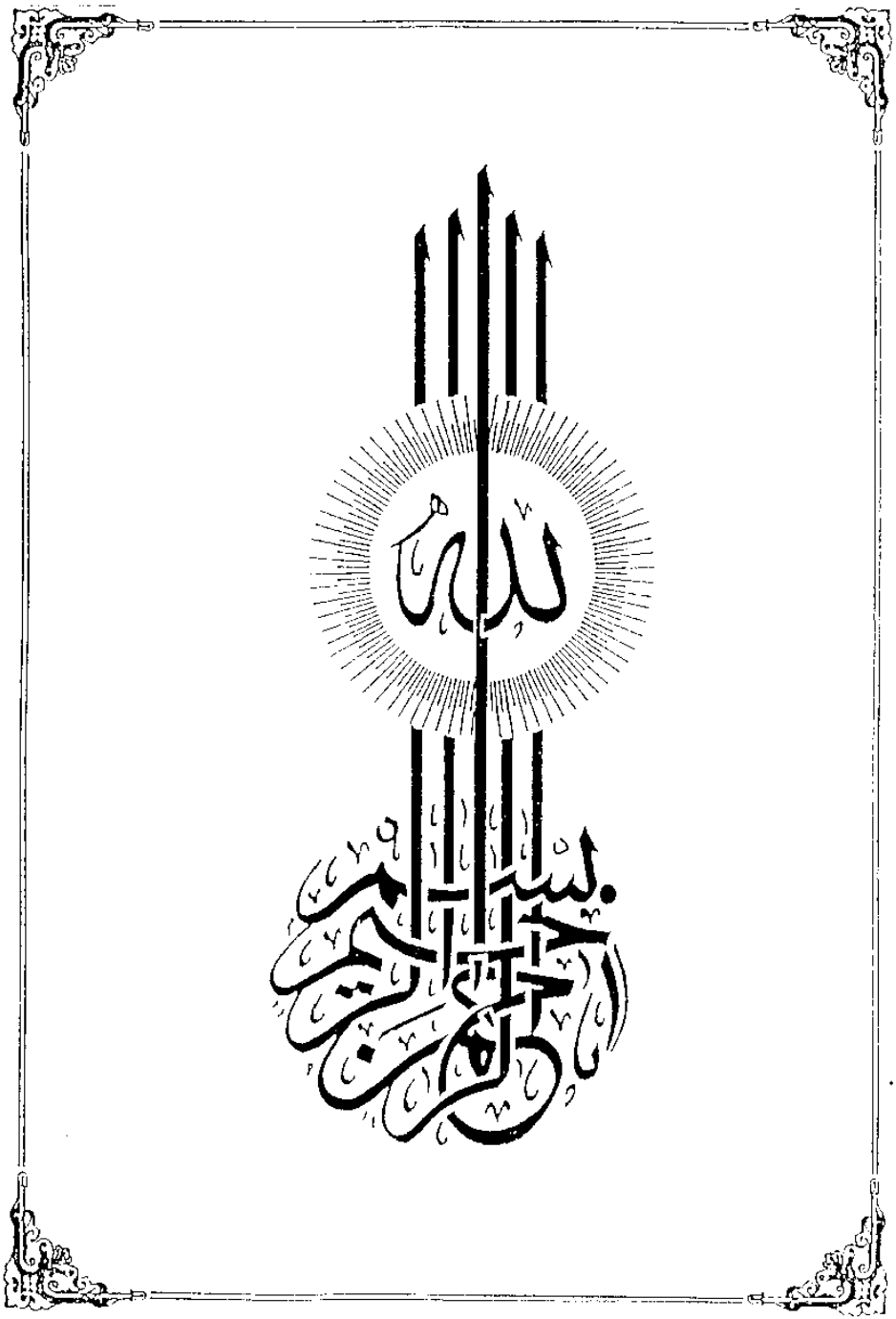

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Acknowledgement

It is my pleasure to express my deep gratitude to prof. Dr . Abla Abdel Salam Head of Microbiology and Immunology Department , Ain shams university for her tolerant guidance, experienced valuable advices, her constant efforts and her close supervision throughout the study.

I wish to express my deep and sincere gratitude to prof . Dr. Laila El sayed Soliman professor of Bacteriology Ain Shams University for her valuable remarks and continuous encouragement.

I am sincerely grateful to Dr Mahmoud Khalil lecturer of Bacteriology Ain shams university for his valuable support and help throughout the work .

I am sincerely grateful to NMRU 3 virology department for their cooperation . They kindly provided us with tissue culture cell lines (Y 1 and HEP2) as a generous gift.

Finally I wish to thank all the staff of Bacteriology Department for their kind cooperation .

Introduction and Aim of work.

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V. cholera O1 , the organism that causes cholera has historically been the vibrio of greatest interest to clinicians , microbiologists and epidemiologists .

Only in 1959 that other vibrios were isolated from cholera like diarrhoeal cases that were not agglutinated by anti O1 cholera sera . Some of these strains were found to be biochemically similar to V. cholera and were referred to as NAG or NCV but only recently (1972)they were classified in the species of V. cholera and called non O1 V.cholera . Other vibrio strains were biochemically different and were given different names. The importance of non O1 Vibrios whether non O1 Vibrio cholera or other vibrios has increased due to its wide distribution in the environment.

The pathogenesis of its intestinal infection is not well known as that of V. cholera O1 . Yet several pathogenic mechanisms has been postulated , as the production of cholera like toxin and heat stable entero-

toxin . Other extra cellular products produced by non 01 vibrio cholera as permeability factor, haemorrhagic factor and cell associated haemagglutinins were suggested to have a role in its pathogenicity. Other strains produce none of these factors nevertheless they cause illness.

The aim of the present work is to study the potential pathogenicity of non 01 vibrios , whether non 01 V. cholera or other vibrios.

Review of literature.

Definition and taxonomy of the genus Vibrios .

Gram negative short rods often curved . Motile by means of a single polar flagellum which is usually surrounded by a sheath , some species also have lateral flagella. Do not form endospores. Aerobic and facultatively anaerobic . Nearly all are oxidase and indole positive and all ferment glucose with the production of acid but not gas. Sensitive to the pteridine compound 0/129. The mole percentage G + C in DNA ranges from 40 - 45. Found in fresh and sea water, some species pathogenic for man.

According to Bergey (1948) the genus Vibrio was classified as belonging to the family Spirillaceae of the order pseudomonadales . Later Sakazaki et al (1963) and Ewing et al(1966)found a close relationship between Vibrios, Aeromonas and Plesiomonas.

The family Vibrionaceae was initially proposed by Veron (1965)in which genus Vibrios was grouped together with Aeromonas , Plesiomonas , Photobacterium and Lucibacterium . His primary intent was to group a number of genera comprised of species which were oxidase positive

and motile by means of polar flagella.This grouping was not necessarily meant to imply an evolutionary relationship among these species but rather was intended as a convenience for the purpose of differentiating these organisms from the enterobacteriaceae .

In the last few years the genus Vibrio has changed from a poorly characterized heterogeneous group of organisms to a well understood and a much more homogeneous group , this has been due to the removal of non fermentative , microaerophilic and anaerobic Vibrios to other genera such as Campylobacter (Vibrio fetus) and Wolinella(Vibrio succinogenes) (Baumann and.Baumann 1981) .

The genus Vibrio includes : -

1 - Non halophilic Vibrios : which are able to grow in media without added sodium chloride . Such as V.cholera and related NAG Vibrios, and some other Vibrios.

2 - Halophilic Vibrios: which are unable to grow on media to which Nacl was not added . They need Nacl or sea salt for growth.

Halophilic vibrio species includes V. alginolyticus , V. damsela, fluvialis, furnissi , hollisae , parahaemolyticus and vulnificus (Parker and Smith 1984)

Morphology : -

Cell morphology : Species of vibrios are short (.5 um by 1.5 to 3 um) , Gram negative rods that upon initial isolation appear to be comma shaped . Infact koch (1883) initially named his isolates the komma bacillus.Upon serial transfer in the laboratory , the organism revert to the straight forms . In some strains , cell curvature is more pronounced in early stationary phase in liquid media than during exponential growth . In late stationary phase or under adverse conditions, involution forms generally predominate in the culture. While the morphology of most cells becomes very irrigular , some assume a uniform spherical shape (spheroplasts) (Barker and Park 1975). They are arranged singly or in short chains , when curved they may form S shaped or semicircular pairs or spirals , the halophilic Vibrios are usually straight or only slightly curved . (Parker and Smith 1984)

Flagella : In liquid media , most species of

vibrios have a single sheathed, polar flagellum with a wave length of 1.4 - 1.8 Um . Occasional cells have been observed with up to three polar flagella (Baumann et al 1980). The polar flagella of all species of Vibrios are 24 - 30 nm thick and are composed of a 14 to 16 nm Core surrounded by a sheath which is continuous with the outer membrane of all the cell wall (Baumann et al 1980).
Studies with V. cholera have shown that the sheath and the outer membrane contain a common protein, but antibody to the lipopolysaccharides of this species reacts with outer membrane and not with sheath (Hrantizky et al 1980).

Under certain conditions of cultivation e.g. on solid media additional unsheathed lateral flagella may be synthesized which differ in wave length from the polar flagellum and may number from few to over 1oo flagella/cell. Fimbriae have been described but are not numerous (Allen and Baumann 1971).

Cultural characters and media used for isolation :

V Cholera is strongly aerobic and facultatively anaerobic organism with an optimum temperature ranging from 18 °C

to 37 C . It can grow on simple media that provide a source of carbohydrate , inorganic nitrogen , sulfur, phosphorus and minerals.

It grows best at PH 7.4, but can tolerate alkaline PH 9.5 and they are very sensitive to an acid PH. Growth of all species of vibrios is stimulated by sodium . The minimal concentration required for optimal growth ranges from 5 - 15 mM for V. cholera and other non halopilic vibrios and 600 - 700 mM for halophilic Vibrios (Baumann et al 1980) . Vibrios grow quickly in alkaline peptone water PH 8.4 with surface pellicle and little turbidity.

Most species give rise to colonies that are convex, smooth translucent round 2-5 mm in diameter with entire edge on n. agar . Variants in colonial morphology may be detected , particularly after repeated culture and storage on more complex media. Colonies may be large or small flat or domed . Rugose variants also occur. These are firmly adherent to the medium and almost impossible to emulsify . On meat extract agar fresh isolates of the organism develop bioluminescent colonies with an irridescent