BIOACTIVE COMPOUNDS FROM FAMILY VIBRIONACEAE

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The need of new bioactive compounds always makes the marine environment as a fascinating source. The immense biodiversity helps to quench the thirst of new molecules from the secondary metabolites by bacteria, sponges, marine plants and invertebrates. Most of the secondary metabolites from the marine environment are used as antibacterial, fungal, inflammatory, tumour and viral medicines

The Vibrionaceae family is the most diversified family under the bacterial classification of aqua bacteria. The vibrios are the most successful group of aquatic bacteria that can be found as symbionts in the aquatic animals, corals, shrimps, plants and free living as well. Some species are found as symbionts in specialized luminous organs of marine fish and invertebrates, whereas a number of other species are well-known pathogens of humans or animals. Vibrios account for the 80% of heterotrophic bacteria in marine environment which makes them important in biogeochemical cycling. As a Bacteria occurring in aquatic ecosystems vibrio are reported to have the ability to inhibit the growth of other microorganisms by producing antimicrobial substances such as antibiotics and bacteriocins. The analysis of coral associated vibrios have revealed they produce secondary metabolites of bioactive importance

Vibrindole and other compounds

Vibrindole is a bis-indole derivative isolated from *Vibrio parahaemolyticus* An3 strain. It is an antagonistic compound for many microbes and thus can be used as antimicrobial. Phenyl acetic acid pyrrolidine carboximidamide, pyrrolopyrazines, tetramethyl pyrazine and phenolic compounds also isolated from *Vibrio parahaemolyticus* and has the activity against different bacteria, fungi and other microbes

Anticorrosion substance

The symbiotic bacteria in corals belonging to the vibrio group produce many bioactive compounds for the protection of corals. The bacteria *V.neocaledonicus* produce anticorrosive paint like substance to form an inhibitory layer on the surface of corals

Acetylcholinesterase inhibitors (AChEIs) from vibrios

This can reduce the activity of the enzyme AChE that degrades the neurotransmitter acetylcholine (ACh). ACh is essential for processing memory and learning. Both the concentration and function of ACh are found to be decreased in patients with neuro degenerative diseases like Alzheimer‘s disease. AChEIs may alter the cholinergic synapse, which is involved in the etiology of Alzheimer’s disease

Snake bite venom inhibitors

Snakebite envenoming kills more than 100,000 people and maims more than 400,000 people every year . The pathophysiological effects induced by snakebite envenomations are induced by the biological activities of several enzymes, mainly phospholipases A_2 (PLA_2), zinc dependent metalloproteinases (SVMPs) and serine proteinases (SVSPs). Snake venom induce hemorrhage by the proteolytic degradation of endothelial cell surface proteins and extracellular matrix components of capillaries and venules. PLA_2 hydrolyze the sn2 ester bond of cell membrane glycerophospholipids, inducing systemic and local myotoxicity, mionecrosis and edema. Indole and indole-3-formaldehyde from *V. neocaledonicus are reported to have the potential of inhibiting the snake venom.*

Vibrio as a source of polymers

Vibrios are the known species to produce biopolymers as a virulence mechanism biofilm. The biopolymers can be utilized for various polysaccharide usages. The Vibrio cholerae biofilms are extensively studied for bioactive compounds. The biofilms are found to have bioactive lipid called sebestenoic acid. This is helpful in controlling the species distribution, signalling to production in biofilm. This can be used for beneficial biofilms.

Vibrio as the source of enzymes

Vibrio have the successful history of producing enzyme for almost all sugars present on earth. Their sugar utilizing diversity helps them for ubiquitous distribution. They produce enzyme with different metabolic and physiological utilities. Vibrios produce chitinase enzyme which can utilize the shrimp shell waste for production of other bioactive compounds. The

presence of chitinases and chitinase encoding genes has been confirmed for several members of the family. Vibrios are able to degrade other complex carbohydrates such as fucoidan and laminarin found in algal species.

Vibrio as a source of antibiotics

The red pigment and antibiotic prodigiosin has been isolated from *V. psychroerythreus,V. gazogenes* and *V. ruber*. Prodigiosin have a broad range of biological activities, including antimicrobial, antimalarial, immunosuppressive, and. The clinical potential as antibiotics is, however, limited due to a low therapeutic window and considerable toxic effects. The production of prodiginines in a *Vibrio* sp. isolated from estuaries conferred competitiveness against a *Bacillus* sp. from the same sample, suggesting that prodigiosin might act as an antibiotic in the natural environment.