

MARINE DRUGS

- Marine pharmacognosy is a branch of pharmacognosy which is mainly concerned with the naturally occurring substances of medicinal value from marine.
- In the western medicine agar, alginic acid, carrageenan, protamine sulphate, and cod liver oil and halibut liver oils are the medicinally established products.
- The oceans cover more than 70% of the earth's surface and contain over 200,000 invertebrates and algal species.
- Macro algae or sea weeds have been used as crude drugs in the treatment of iodine deficiency states such as goitre etc
- Some sea weeds are used in anemia during pregnancy.

- During the last 30-40 years numerous novel compounds have been isolated from the marine organisms having biological activities such as anti bacterial, anti viral, anti tumor, anti parasitic, anti coagulants, anti microbial, anti inflammatory and cardio vascular active products.
- Toxic marine organisms are the potent neuro toxin, tetrotoxin resulting from eating puffer fish and cigua toxin, tropical fish “***Gambier discus toxicus***”.
- **Conotoxin** (conus venom) used to develop new drugs like CNS drugs, anti hyper tensive, anti asthmatic and neuro vascular blocking agents.

MARINE ALGAE

Four types of marine algae are reported

1. Cyanophyceae (Blue green algae)
2. Chlorophyceae (Green algae)
3. Phacophyceae (Brown algae)
4. Rhodophyceae (Red algae)

These algae are used as CNS drugs, anti microbial agents , anti viral, anti coagulant, hypotensive, diuretic and hypoglycemic agents.

1. ANTI MICROBIAL COMPOUNDS

1. Cephalosporins

Obtained from a marine fungus *cephalosporium acremonium*.

Cephalosporin C was isolated as an anti biotic drug active against microbes.

2. Istamycins

Fermentation product of marine organism *streptomyces lenjimariensis* shows *in vitro* activity against gram +ve and gram –ve bacteria.

3. Eucin

Isolated from gorgonian *Eunicia mammosa* - anti bacterial agent.

4.Laurenterol

Obtained from Laurencia species *Ophioderma variegatum* and *Aplysia catifomica* shows anti bacterial activity against gram +ve and gram –ve bacteria.

5.Oppositol

From *Laurencia sub opposita* against *staphylococcus aureus* as anti bacterial agent.

6.Zonarol and iso zonarol

Obtained from brown algae *Dictyopteris zonariodes* as anti fungal agent.

7. Tetra bromo heptanone

Obtained from red algae *Bonnemaisonia hemifera* as anti microbial agent against large number of micro organisms.

8. Polyhaloacetones

Obtained from red algae *Aspargopsis taxiformis* as anti microbial agent.

9. Sargassum species

Brown algae containing brominated poly phenol as anti microbial agent.

2 . ANTI VIRAL AGENTS

1.Laminaran species

From a brown algae used as anti viral, anti HIV and anti coagulant agent

2.Ara-A

Semi synthetic compound based on the arabinosyl nucleosides isolated from the sponge *Tethya crypta* as anti viral and HIV agent

3.Avarol and avarone

Isolated from a sponge *Disidea avara* inhibit the HIV and have a high therapeutic ability to cross blood brain barrier.

4. Didemnins

These are cyclic depsi peptides isolated from tunicate, *Trididemnum* species as anti viral and HIV agent.

5. Eudistomin A and B – Carbolines

Isolated from tunicate, *Eudistoma olivaceum* as anti viral and HIV agent.

6. Patellazol B

Isolated from tunicate *Lissoclinum patella* a very potent in vitro activity against herpes simplex virus.

3.CYTO TOXIC COMPOUNDS

1.Bryostatin

Isolated from the bryozoan *Bugula neritina* cyto toxic compound

2.Dolastatins

Isolated from the *Dolabella auricularia*. Dolastatin- H and iso dolastatin-H are highly cyto toxic compounds.

3.Eleuthrobin

From gorgonian *Erythropodium caribaeorum* toxic to cancer cells similar to taxol.

4.Xenia

A novel di terpene called xenicane isolated from the ***xenia elongata*** inhibits mitochondria respiration in cancer cells.

5.Halimide

Pectin like molecule isolated from the green algae ***Helimeda opuntia*** used in the treatment of early stage cancer particularly breast cancer resistant to current chemotherapy.

6.Ecteinscidin 743(ET 743)

A natural new product isolated from the caribbean sea squirt ET 743 has shown high activity in cases of advanced sarcoma.

7. Yondelis TM (ET 743)

A new anti tumor drug derived from the marine organism *Ecteinascidia turbimata* anti cancer agent.

8. Aplidine

From a marine organism *Aplidium albicans*. Aplidin a novel anti tumor agent against medullary thyroid carcinoma and induces growth arrests in breast cancer cells.

9. Ara-C

Semi synthetic drug from caribbean sponge. Basic compound was spongo thymidine and marketed as cytosar. Used in the treatment of acute leukaemia both in children and adults.

10.Asperidol

Obtained from gorgonian coral as anti cancer agent.

11.Aplysistatin

Obtained from *Aplysia angasi* as anti leukaemic agent

12.Thelothurin A and thelothurin B

Cytotoxic saponin obtained from sea cucumber *Thelonata anasas*. Anti cancer agent.

13.Spongouridine

Isolated from Caribbean sponge *Cryptothya crypta* a promising anti viral and anti tumor agent.

14.Tocotrienal

From water soluble extract of *Sargassum tortile* (brown algae)
Anti tumor compound.

4.CARDIO VASCULAR AND NEURO- PHYSIOLOGICAL AGENTS

1.Anthopleurin A

It is polypeptide in nature isolated from *Anthopleuro xanthogrammica*. It is a heart stimulant 4 times more active than natural cardiac glycosides.(digitalis and strophanthus).

2.Eledoisin

It is a peptide obtained from salivary glands of *Eledone moschata*. 50 times more potent than acetyl choline,histamine or bradykinin.it is a potent vaso dilator and hypotensive agent.

3.Eptatretin

It is obtained from a neural bronchial heart of the hag fish *Eptatretus stontii*.A potent cardiac stimulant.

4.D-octopamine

It is an amine found in salivary glands of octopus species *octopus vulgaris*,*octopus macropus* and *Eledone moschata*. A potent cardio tonic.

5.Laminin

From marine algae *Laminaria angustata*.it is a heterotrimeric glyco protein.it has potent hypotensive effect in mammals.

6.Tetrodotoxin

From *Gobius criniger* and *Atelopus chiriquensis*.it is a toxin having cardio vascular and neuro physiological activities.