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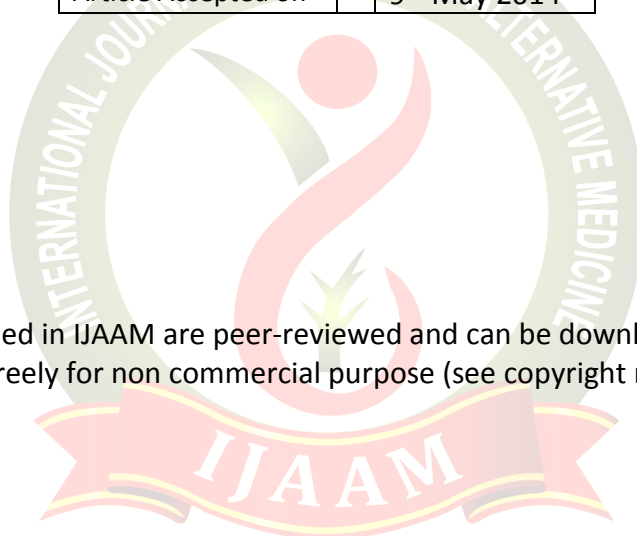
STRUCTURE - FUNCTION RELATIONSHIP IN AYURVEDIC PHARMACOLOGY - A SCIENTIFIC APPROACH

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STRUCTURE - FUNCTION RELATIONSHIP IN AYURVEDIC PHARMACOLOGY - A SCIENTIFIC APPROACH

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ABSTRACT:

Modern pharmacology being interested in studying the actions of the drug on different systems or part of the body, describes all drugs on the basis of action performed by them. There exists a great conceptual difference between Ayurveda and Modern pharmacology with respect to drug action. In Ayurveda, in relation to pharmacodynamics, the drugs are selected on the basis of their modulating effect on a particular *dosha* through its properties *Rasapanchaka*, based on its *Panchabhautik* constitution because both the drug as well as the body are constituted by the same five primary elements *Prithvi, Aap, Tej, Vayu, Aakash*. It forms a base to establish structural similarity between body (*Pinda*) and exterior world (*Bramhanda*) with its components, which can be apply to drug as well. This indicates structure-function relationship plays a vital role in *Ayurved Pharmacology*. *Ayurveda* supports this clearly through its basic principles as *sarvada sarvabhavanam.....* and *vriddhi samanaie sarvesham...*

Key Words : *Ayurveda, Pramana Vigyan, Panchamahabhuta, Tridosha, Rasapanchaka*

INTRODUCTION

Ayurveda, the oldest systems of medicine is carried forward as an ancient Indian heritage. Objectives of *Ayurveda* are preservation, promotion and maintenance of health in healthy and treatment of diseased one. It specifies that, *Ayurveda* deals with the preventive, Health promotive and curative aspects of life in a most comprehensive way. A strong linkage between the indigenous knowledge holders and modern scientists needed in order to strengthen, manage and exploit this resource because India is one of the greatest store house of traditional knowledge. There has been a resurgence in the use of herbal preparations in the past decade, not only among the traditional medicine users (Ethno-Medicine) but also among the modern consumer of herbal products and it all is because people all over the world have realized that vast plant wealth has much to offer in the shape of new remedies which are efficacious, safe and accessible to masses.

RESEARCH: THE PRIME NEED

The therapeutic measures advocated in the *Ayurveda* are time tested and trusted through thousands of years of usage. Ever since antiquity, *Ayurveda* has been evidence conscious. All theory and practice of *Ayurveda* have been evidence based, though in the present scenario, there is a strong need to explain fundamental principles of *Ayurveda* in a modern context. Further, one must also notify the growing demand for an evidence base research for which opportunities from ancient literature are to be investigated without diluting the fundamental principles. Hence

research is the prime need of contemporary *Ayurveda*. The purpose of research is not to prove afresh; the tenets of its basic principles for we are the believer of the efficacy of the science. But in modern conditions, for the wider applicability and acceptability of the principles one should demonstrate the reliability and usefulness of these principles. The research strategies of *Ayurveda* includes 1) Literary and conceptual research 2) Clinical and Therapeutic research 3) Drug development research including drug standardization and new drug development [1].

For such wide range of research the scientific approach of *Ayurveda* is evident from its *Pramana Vigyan*, which includes four modalities for the validation of knowledge, *Pratyaksha, Anumana, Sabda* and *Yukti*. It is accepted by all sciences that *Pratyaksha*-direct evidence and *Anumana*-inferential evidence are more acceptable to all, than the others. This fact is also applicable to understand the drug action in *Ayurved pharmacology* [2].

STRUCTURE -FUNCTION RELATIONSHIP

Modern pharmacology being interested in studying the actions of the drug on different systems or parts of the body, describes all drugs on the basis of action performed by them. In *Ayurveda*, in relation to pharmacodynamics, the properties of drugs have been described in terms of *Rasa, Vipaka, Virya, Prabhava* and *Guna* [3]. There exists a great conceptual difference between *Ayurveda* and modern pharmacology with respect to drug action. According to *Ayurveda* the drug acts as per its *Panchabhautik* constitution because both the drug

as well as the body is constituted by five primary elements *Prithvi, Aap, Tej, Vayu* and *Aakash*. Ultimately the drug action means therapy provided to restore balance of the deranged *Panchamahabhutas* by either toning down vitiated one or enhancing attenuated one. However one can not underestimate the utmost value of *Tridosha* in the drug action. The drugs are selected on the basis of their modulating effect on a particular *Dosha*, because disease is a state of imbalance of *Tridosha* and the measures to balance it is called *Chikitsa* in which drug play an important role, based on its *Panchabhautik* constitution, as drug and body (*Purusha*) are having same basic constitution. *Charaka* described it as '*Purushoqyam Loksammitaha*' whatever the factors/principles present in external world they are also present in human body and vice versa [4].

Although *Panchamahabhuta, Tridosha, Rasapanchaka siddhanta* are the basic guideline to know the drug action as per *Ayurvedic Pharmacology*, many times it is observed that indications of drugs are oriented on the structural similarity between drug and its target organ/system. To understand the vision of our pioneers behind this we have to refocus on our basic fundamental principles thoroughly. *Charaka* has clearly mentioned similarity is responsible for growth whereas specialty is attributed for deduction, irrespective of *Jati, Dravya, Guna* and *Karma* [5]. In fact as per *Charaka* all the therapeutics is based on this in terms of *Santarpana* (Anabolism) and *Aptarpana* (Catabolism). *Vagbhata* also have the same opinion regarding this issue [6]. It clarifies that the mechanism of drug action is to influence a system or an organ of body either by stimulation or depression. In stimulation the drug either strengthens that organ or helps to enhance the physiology of that organ. In other language it can be say that structural/morphological similarity between drug and an organ/system of body is a key guideline in concern to pharmacodynamics of *Ayurvedic* drugs. This gives a distinct idea about structure-function relationship. Hence, structure-function relationship plays an important role in the field of *Ayurved Pharmacology*.

SOME EXAMPLES

➤ *Aaragvadha* (*Cassia fistula* Linn.) is a well known drug of *Ayurveda* and used as '*Stransaniya*' *dravya*. Powder of pulp of pod is used for *Stransan karma* (mild laxative). These pods of *Aragvadha* are structurally similar to the colons or large intestines. Phytochemically pulp of the pod contains

Anthraquinone glycosides, Sennosides A and B, Rhein and its glucoside which are responsible for its laxative activity [7].

- *Hritapatri* (*Digitalis purpurea* Linn.) a plant of which name itself indicates its leaves are heart shaped. The leaves are used as *Hridya* (cardiotonic/stimulant) in *Ayurveda*. Phytochemically the leaf contains Glycosides Digoxin and Digitoxin which are used as cardio-stimulant in heart failure.
- *Manjistha* (*Rubia cordifolia* Linn.) a well known *Varnya* and *Kushtaghna* (skin vitaliser and Anti-Lepromatic) *Dravya* of *Ayurveda* used for its *Raktaprasadan, Raktashodhan karma* which is mainly related to blood, blood vessels and heart. The leaves as well as its roots are used in different forms in *Ayurveda* which resembles to shape of heart and the vessels. The dried root of *Manjistha* is red and hollow inside as similar as an artery or vein. The plant contains substantial amounts of Anthraquinones, Tri-terpenoids specially in the roots, which are responsible for most of its pharmacological activity specially Blood purifier, Antimicrobial and Antifungal [8].
- *Kapikacchu* or *Kaunchabeej* (*Mucuna pruriens* Linn.) an excellent Aphrodisiac and tonic drug of *Ayurveda*. It rejuvenates as well as tone up the entire male reproductive system mainly testes where spermatogenesis takes place. Testes are production house and reservoir of *Shukradhatu* as per *Ayurveda* and for the *Vrishya, Vajikaran, Balya karma* powdered seeds of *Kapikacchu* is recommended. Shape and its encapsulated structure strongly match with that of testes. The most important bioactive compounds of this plant are alkaloids, Flavonoids, Tannins, Phenolic compounds, Protein and carbohydrates. Seeds specially contain L-Dopa and alkaloid mucunine, mucanadine, purienine, purienidine which are responsible for its Aphrodisiac and Anti-stress activity [9].
- In *Ayurveda* there is no substitute for *Shatavari* (*Asparagus racemosus* Willd.) for its Galactogouge (to improve breast milk) property. *Shatavari* is considered to be the main *Ayurvedic* rejuvenating female tonic for overall health and vitality. It has an immense value in the drugs which are highly indicated for *Sutikavastha* (post natal condition). Root/tuber is used for its galactogouge property. In the soil the roots/tubers grow radially from a central point which shows Anatomical similarity of lactiferous ducts emerging at nipple in the mammary gland. The reputed adaptogenic effect of *Shatavari*

may be attributed to its concentrations of steroidal saponins, known as Shatavarins. Apart from this root also contains Alkaloids, glycosides, steroids, mucilage, starch, carbohydrate and calcium carbonate [10].

- One plant that has received the most attention for its Anti-diabetic properties is *Karvellak (Momordica charantia Linn.)*. It is a popular fruit used for the treatment of Diabetes and related conditions amongst the indigenous population of Asia, India, South America. No one is there who didn't know its hypoglycemic activity. Ayurveda also strongly indicate it in the treatment of *Prameha*. It is a must ingredient of all anti-diabetic *Ayurvedic* products available now days in market. Fruit juice or powder of fruit is used for this. Pancreas is the target organ in the treatment of Diabetes which shows morphological similarity with *Karvellak* fruit. Glycol alkaloid Viscine, Polypeptide-P or P-insulin an insulin like hypoglycemic protein, cucurbitane type tri-terpenoid charantin are the active phytochemicals which are rendered for its Anti-diabetic and hypoglycemic activity [11].
- Carrot (*Daucus carota*) is known for its outstanding qualities as a food and cosmetic product from ancient times until today. Everyone knows that carrots are healthy. It is a part of every diet either for sick or healthy, for adult or children, in any form raw or cooked. Carrot is well known to improve eye sight as it contains alpha and beta carotenes; (precursors of vit. A) which the body converts into vit. A. Transversely cut surface of carrot looks similar like eyeball showing optic nerve centrally and the red retinal layers surrounding it.
- *Akshota (Juglans regia Linn.)* commonly known as walnut has been regarded as a health food that is delicious and nutritious. Numerous studies and research has suggested that dietary supplementation with fruit or vegetable extracts high in Anti-oxidants like walnuts can decrease the enhanced vulnerability to oxidative stress that occurs in aging and neurological problems. Its only fitting that walnuts are shaped like the human brain, this wrinkly double lobed nut is a wonder food for the brain. Walnut is a rich source of Omega-3 fatty acid and vit.E, which improve brain function and responsible for anti-aging process. [12]

There are so many plants which comes in this series, as *Latakaranja (Caesalpinia crista Linn)* indicated in diseases of ovary and it resembles the

shape of ovary; *Jatamansi (Nardostachys jatamansi DC)* looks as bundle of hairs and used as a hair vitalizer; *kamal (Nelumbium speciosum Willd)* is known for its *Hridya karma*, the stalk with bud shows similarity of heart and its aorta; *Narikel (Cocos nucifera Linn)* a best diuretic and fluid maintainer advised in Antinatal care, reflects a womb having foetus and amniotic fluid around it; *Dadim (Punica granatum Linn)* is a best haematinic used in anemia, grossly the colour and shape of its seed is as that of RBCs. The list will be going on. From these examples one can easily find out the strong correlation between structure-function relationships. The only need of time is to be investigate such concepts on the *Ayurveda's* basic principle ground.

CONCLUSION

There is a greater opportunity lies in blending the traditional and nontraditional knowledge to creative, innovative, preventive and curative health systems as like *Ayurveda*. In any health system the success of treatment depends on drug which is used and its mode of action or the way by which it works on the body. As concern with the pharmacodynamics of all *Ayurvedic* drugs the routine *Painchamahabhuta, Tridosha* and *Rasapanchaka Siddhanta* pathway has been adopted but for the new strategies and methodology in *Ayurved* research there is a must necessity to study and investigate the *Ayurvedic* basic principles with the adaptation of new approach. From that Structure - function relationship is one of guidelines.

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