IS DECODING AYURVEDA POSSIBLE?

Ayurveda, the oldest medical science in the world is now looked upon as an enigma by the world. Many people think that Ayurveda holds some truth, which are only accidental findings from many people's experiences. Many think that Ayurveda is a mystery which nobody can understand and so there is no need to look for explanation. Still some others think that Ayurveda is a total blunder.

Only Ayurveda physicians who have learned the subject and attended practical classes can understand that this sasthra has all the features of an accomplished medical science. I admit that some details are lost, but the basic theories are fully available. Thousands of formulas of medicines are still available. Unfortunately, the practicality of the surgery is lost in the passage of time . But we have descriptions of pathology, physiology, pharmacology, medical ethics, general ethics, spirituality, astronomy, astrology, cosmetology, hygiene, nutrition, plant science and what not. So it is our duty to educate the public about the science behind Ayurveda.

Presently Ayurveda physicians are not in a position to explain the etiology of diseases and the relevance of the mode of treatments to the patient. We understand the disease on the basis of thridoshas, but are not able to explain the same to the patients. For the general public shasthra means modern science. So explaining our Sanskrit medical terms on the basis of modern science is the only practical solution to educate the public.

The basic theories of Ayurveda are eternal and universal. So researchers in modern science can also take facts and theories from this sasthra. But one should understand Ayurveda on the basis of modern science. Knowledge about the plant based pharmacology, cosmic energy, spirituality etc are not available presently in modern science. Our nighandus, in which the pharmacological efficacy of the plants and the specific plant parts, can be a guide for researchers all over the world. Since we have a taste based description of the nutritional and pharmacological effect of herbs, the molecular patterns of the phytochemicals can be found out with less effort. Targeted organs are also mentioned in Nighandus. So identifying the phytochemical will be easier through Ayurvedic descriptions. In the west they do not have plant based science in pharmacology.

Ayurveda also can benefit from modern science. The missing details of anatomy, sthreeroga, balaroga etc can be filled up with the help of modern science.

When we try to decode Ayurveda we have to attend to the Thridoshasidhantha in the

first place. Descriptions of roga and oushadhayoga are on the basis of thridoshas. Nothing is beyond thirdoshas is what our texts say. So I started thinking logically and then tried to find out the science behind it.

Actually, this decoding process needs scholars from Sanskrit,Chemistry, Physics, Biochemistry, Astronomy, Modern medicine, Astrology and Ayurveda. Once this is done it will benefit the medical world for ever.

THRIDOSHAS

Ayurveda says that the samavastha(equilibrium) of the doshas, vatham pitham and kapham brings arogya and vishamavastha (disequilibrium) of these doshas bring roga to the body. These three factors ie vatham, pitham and kapham are to be balanced for a healthy life.

In modern science ill health of body is looked upon as the imbalance in the buffer system and the abnormal values of the biomolecules. Health is the balance of all these molecules and is called homeostasis. Though both the sciences look upon the disease from two different angles, both aim at bringing the abnormal physiology back to normalcy.

Buffer system functions to balance the acidity and alkalinity (basisity) of the body. The normal ph of blood is 7.35 to 7.45. But the ph of the tissues are slightly different. Mostly the internal ph of the cells is acidic. All cells of the tissues try to maintain the normal range of its own ph continuously.

When the blood becomes more acidic the brain senses it and increases the speed of respiration and perspiration and decrease the urine out put. When the blood is more alkaline the body will have less rate of respiration and perspiration and higher out put of urine.

In vitro we are able to measure the ph of a substance in liquid state, with the help of a ph scale. Number 7 denotes the normal value on the scale. This is the ph of water. Acidity is marked to the left and alkalinity is marked to the right. Mildly acidic are placed adjecent to number 7 but slightly to the left. Mildly alkaline are placed on the immediate right of the number 7. The acids are represented by +ve sign and bases (alkaline) are represented by -ve sign.

The ph is decided by the number of H+(protons). It is influenced by the presence of other cations also. Other than this, the acidic foods, also affect the number of protons in the

blood. Positive charge in the blood and the tissues is maintained by protons and other cations.

The negative charge is attributed through bicarbonates, hydroxides, chlorides phosphates anions etc.

Other than biomolecules and foods, we have ions of minerals in the body which affect the acidity and alkalinity. The positively charged ions line up at the outer side of the cell membrane and negatively charged ions line up at the inner side.

Most of the positively charged minerals are seen on the left side of the periodic table. Negatively charged ions are mainly halogens and sulphur which are on the right side of the table. Almost all functions in the body are basically dependant on the attraction and repulsion of these ions . So balance of the positivity and negativity is very important in physiology for maintaining health.

When modern science speaks about the balance of acidity and alklinity only, Ayurveda speaks about the balance of three factors vatham pitham and kapham. I understand many aspects of vatham as alkalinity and pitham as acidity. I find that kapham as the neutral effect(inactivity) of a molecule.

Vatham -The symptoms of vathavardhana mentioned in Doshadivijnaneeyam, (Ashtanga hrudayam) is almost the alkalosis condition. Karshya (weight loss) ushnakamithwa (hypothermia) kampa (tremor, tetany, tingling, spasm) aanaha (gas formation in the gi tract) shakruthgraha (constipation) balabhramsha (mascular weakness) indriyabhramsa (confusion) nidrabhramsa (insomnia) pralapa (stupor) bhrama (temparory loss of conciousness) and deenatha (fatigue) are the symptoms when vathika or alkaline factors are increased in the body.

Generally the low level of cations like Na Ca K Mg Cu and Zn in blood causes the symptoms like spasm, seizures, tingling,tremor, constipation, hypothermia, fatigue, scaling of skin etc. These are the lakshanas of vathavardhana in the body.

Pitham- Symptoms of pithadhikya are yellow colour in nethra, thwak, mala and moothra , excess thirst and hunger, less sleep and ushna feeling. Yellowish colour is due to the presence of high bilirubin which is an acidic molecule. Excess hunger and thirst can be due to a faster metabolism which is the result of consumption of highly acidic food. Ushna feeling is also due to faster rate of metabolism(This will be explained in the context of ushna and sheetha).

Kapham- Kapha can be considered as neutral or inactive. Water is 100% neutral. But all kaphavardhaka molecules need not be 100% neutral. Some are mildly acidic molecules like fatty acids. Though it has an acidic functional unit (carboxyl group) at one end of the molecule, it is inactive due to the large hydrocarbon chain which is neutral. (But if the hydrocarbon chain is short it is acidic). Cholesterol and Glucose are also large molecules made of hydrocarbon and act as neutral . Ghrutha, thaila and madhuradravyas are kaphavardhaka. Large molecules always have high molecular weight . Kapham is said to have guruthwa and nishchalatha properties. When we look at the mucus or phlegm at the molecular level, we understand that it is rich in glycoproteins, water and salt which are neutral.

When acid and base are mixed, we get salt and water which are neutral in charge. Here the word 'salt' means 'neutral molecule'. So we get salt and water which are neutral in charge. Ayurveda says that when amla and kshara are mixed we get madhura. Here madhura means neutral. So 'salt' in modern science and 'madhura' , in Ayurveda denote the same meaning 'neutral in charge'.

So while there are only two charges, the negative and the positive, there are THREE EFFECTS, such as positivity, negativity and NEUTRALITY or INACTION or NISHCHALATHA.

When acids have the symbol ' +VE' and alkalis have the symbol '_VE' we can give symbol for neutrality as ' 0VE' which denotes ' inactive' charge. So pitha is positive, vatham is negative and kapham is INACTIVE'.

When the homeostasis is considered , not only acidity and alkalinity but the normal values of all types of biomolecules, including proteins, fats, glucose, water, salts etc are considered. . Only these kaphavardhaka molecules like glucose , fats, proteins and salts can provide stability to the body. The neutrally staying molecules give structure (sthiratha) to the body. Not only the balance between acids and alkali is to be taken cared of, but the levels of large, stable molecules also should be looked at. Those are also inevitable part of the homeostasis.

Even though the inactive (kapham) molecules have acidic or alkaline functional groups , they are inactive due to the large size of the neutral hydrocarbon structure. Similarly, the acidic and alkaline molecules also have a small or short hydrocarbon structure, it can not nullify the acidity or alkalinity due to the small size of the hydrocarbon structure. So if the molecule is small, it will be either acidic (paithaika) or alkaline(vathika) . But if the molecule is large, it will be inactive (kaphathmaka).Of course salt and water which are

small in size are also neutral and kaphathmaka.

Not only the functional groups on the molecules act as acidic or alkaline, but there are protons(H+) and ions like Ca Na Zn Mg Cu K etc playing their roles in the body. These cations line up at the outer side of the cell membrane. The Cl which is an anion will line up at the inside of the cell membrane. Cations give acidity and anions give alkalinity.

SHADRASA

Ayurveda speaks about six rasas or tastes. Taste has psychological (emotional) and physiological effects. Rasa is the feeling, the person experiences with the help of gustatory sense organ. It can be pleasant, unpleasant or mixed. Other than the feeling created in the mind, rasa has an indisputable role in supporting metabolism. Rasas can activate, speed up, deactivate or slow down metabolism. The molecules in the food are attracted to the sensory receptors on the tongue, according to its charge and shape.

When a food item is ingested into the mouth, different kinds of taste buds are activated. Each taste activates taste receptors on specific neurons. This activation is relayed to its own area in the sensory region of the brain . Each area has separate motor connections. So the response from each area will reach the concerned organs in the body to interfere with the metabolism. The responses released are in the form of neurotransmitters and hormones. Knowledge about the physiological and pharmacological actions of the six tastes is very important in diagnosis and treatment. Body has a capacity to select food according to the taste considering the body's need.

Madhura- Madhurarasa is obtained mainly from carbohydrates (glucose, fructose galactose etc). These molecules activate the sweet sensing receptors on the tongue. The message that carbohydrate has arrived is sent through an action potential to the sensory part of the brain. The brain responds emotionally and physiologically. Emotional response is by enjoying the taste. Physiological response is by sending message to pancreas to release more of insulin into the blood. So before the glucose reaches the blood, insulin is made available in the blood. The same glucose sensors are available in small intestine to activate insulin release into the blood. These are not connected to the taste sensing (emotional) area of the brain. But the motor area is activated. But taste detection is not possible from here.

Some other molecules of ketones, amides, glycol etc also activate madhura receptors.
Madhurarasa providing carbohydrate molecules are broken down inside the cell to produce CO_2, H_2O and heat energy. Extra glucose is stored in the cells especially in the

liver and in adipose tissue as glycogen and fat. So madhurarasa foods are generally kaphavardhaka.

Amlarasa- Amla is generally provided by H+ ions and other acidic substances. These acidic ions activate certain sensors which is relayed to the brain, and the brain responds by sending messages to the gastrointestinal tract including bucal cavity to release more mucus and water. The speed of metabolism is also increased.

We get less energy from amlarasa rich food, compared to madhura food. Amlarasa is from acidic foods . So it is pithavardhaka.

Lavana- Sodium and some other cations activate the lavana rasa (salt sensation) on the tongue. Lavana is said to be kaphavardhaka. It increases pitha also to some extent.

Lavana(sodium chloride) attracts water into the gastrointestinal tract which eases the passage of the contents of the GI tract. It is neutral in charge and so kaphavardhaka. Salt helps to retain water in the body which is also neutral. At the same time when there is more of Na in the interstitial space the antiporter system works and Na gets inside the cells and H+ gets out of the cell. This makes the extracellular fluid more acidic or paithika.

Other than sea salt (samudralavana) there are saindhava salt and sauvarchila salts which are also natural in charge. All salts have a lion share of sodium chloride in it. Other minerals are also present but vary in percentage.
Salt cannot give energy. But Sodium ions are necessary for the absorption of glucose and protein molecules from the gastrointestinal tract and also from the interstitial space into the cell. So the rate of absorption of glucose and proteins (which are kaphavardhaka molecules) are depended on the availability of sodium ions.

Thiktha- Thiktha is considered bitter. Phytochemicals with nitrogen is said to have bitter taste. Most of these are alkaloids with nitrogen in it. These have pharmacological value also. Thiktharasa (bitter) activates the brain to sent messages to the liver and gall bladder to release more bile into the intestine. Thiktha slows down the speed of metabolism including the peristaltic movement. It may be the cause of sthambhana property and malabandha. When the gastrointestinal tract contents are being held in the intestines for long, more and more water gets absorbed and feces becomes hard.

Bitter taste is obtained from alkali. So it is vathavardhaka. Since thiktha is said to be laghu, we can assume that the phytochemical is comparatively smaller in size.

Kashayarasa- Kshaya also means bitter in English and contains nitrogen. Kashaya is guru. So it can be a large molecule. Kashayarasa also activates liver and gall bladder and slows down rate of metabolism. So it is sthambhana and graahi like thiktha and also vathavardhaka. (See vipakarasa).

Bitter tastes are due to the alkaline nature of the molecule.

Katurasa- We get katurasa also from phytochemicals. It activates the heat sensing receptors on the tongue and the GI tract. The brain interprets the activation as the presence of heat. Then the metabolism is speeded up and CO_2, H_2O and heat is produced. This happens by breaking down fat and helps to lose body weight. So initially the molecule increases pitha but ends up as vathavardhaka. Katurasa activates the sympathetic nervous system. So automatically it reduces the peristalsis. (See vipakarasa).

PLANT BASED FOOD

We get two categories of food from plants. The building blocks and healing elements which are reducing elements. The molecules like carbohydrates, fats and proteins are the building blocks that give energy to the body and helps the repair and growth. The phytochemicals give pharmacological effect in the body and give no energy. Instead, it helps in metabolism and other physiological functions in the body and helps to maintain the ph of the blood and cells. Actually phytochemicals are the pharmaceutical molecules in Ayurveda.

The energy giving molecules like carbohydrates, fats and proteins have their own separate patterns for their molecules. Energy for physiological, mental and intellectual purposes are provided by these molecules.

Carbohydrates-We get carbohydrates mainly from cereals, pulses, fruits, and rizhomes. But there are exceptions like sugar cane. Carbohydrates are energy giving and are kaphavardhaka.

Lipids- We get lipids from seeds and nuts. Lipids are also energy giving and are kaphavardhaka. But some oils like nimba, sarshapa and gandharvahastha are kaphahara and weight reducing. It may be due to the high-level presence of kashaya, katu and thiktha phytochemicals in the oil. Oils like coconut and palm are sweet and do increase body weight. Sweet taste may be due to the presence of ketone, glycol, esters etc. All lipids have a hydrocarbon chain and a carboxyl group at one end. There are short chain, medium chain and long chain fatty acids. The short chain fatty acids are light in weight

and it takes the form of gas. It is said that short chain and medium chain fatty acids are easily absorbed by the body due to the small size and weight. Long chain fatty acids are absorbed as part of micelle from the small intestine and are taken into the lymphatic system. It can reach the system without entering the portal vein.

There are saturated, monounsaturated and polyunsaturated fatty acids. Polyunsaturated is also easily absorbed even if it is long chain, because of the curly shape . So it can get absorbed into the system easily. The molecules of long chain saturated fatty acids are closely and tightly packed and are difficult to get absorbed.

There are aromatic oils also which do not have carboxylic acid as functional group. Their basic structure is also not staight chain but benzene rings. These oils can activate olfactory and gustatory receptors. Some does activation and some does deactivation of brain cells.

Phytochemicals- Phytochemicals are obtained mainly from the parts like roots, bark and trunk of a plant. Grains, leaves, fruits, flowers, seeds and nuts also contain phytochemicals in lesser quantity than that in the roots, trunk and bark. The hot and bitter taste of any food is due to the presence of phytochemicals. Classification of phytochemicals is not easy as that of building 'block molecules' like carbs, fats, and proteins. It is done from different angles and are very complicated. The pharmaceutical values of these phytochemicals are being researched in many parts of the world.

Minerals- Minerals are necessary for the body for activation or deactivation of physiological functions. In plants these minerals are available as part of phytochemicals and some proteins. Also there are salts of Sodium, Calcium, Potassium etc in the plant parts.

Vitamins- These have a supportive role in metabolism. In a way these vitamins also can be considered as phytochemicals. Vitamins do not follow a particular molecular pattern.

TASTE OF PLANT BASED FOOD

Sweet taste- is obtained mainly from carbohydrates like fruits and cereals. Carbohydrates have a particular pattern on molecular structure. It is kaphavardhaka.

Sour taste- is from fruits which contains acids like citric, malic, ascorbic and tartaric. They roughly follow a pattern in their structure. These are pitha or pithakaphavardhaka.

Kashaya thiktha and katu - are from phytochemicals. These are vathavardhaka.

Salt-Though salts of Sodium, Potassium etc are present in all plants, it is not highly detectable due to the high level presence of other tastes like sweet, sour,hot and bitter. We depend on sea salt for salty taste in food. Samudralavana is from the sea waters, Sauvarchila is from volcanic ashes and Saidhava is from the rocks near the sea. These are natural salts. Other salts like vida and yavakshara are made artificially from sea salt and some other dravyams.

VIPAKARASA

Vipakarasa is not the gustatory feeling of the taste but it is functional. This is the vascular effect of the drayam, while rasa has a neuronal effect also. All molecules have a charge as positive, negative or inactive. When a molecule enters the system, the body's ph will be changed accordingly. So the charge of each molecule, whether it is acidic, alkaline or neutral, is very important in the homeostasis. Vipakarasa is the effect of the molecule, based on its charge, after it enters the system. Ayurveda says madhurarasa and lavanarasa are madhuravipaka. Amlarasa is amlavipaka and kashayakatuthiktharasas are katuvipaka.

Madhuravipaka is obtained from carbohydrates, fats and some proteins. Carbohydrates and fats have acidic functional groups, but due to the large hydrocarbon structure, acidity is nullified and stay as neutral. . In brief madhuravipaka is the inactive charge(0ve) and is kaphavardhaka.

Lavana is also inactive (0ve) in charge and so madhuravipaka and kaphavardhaka.

So madhuravipaka , inactivity (nishchalatha) and kapha are the same.

Amlarasa has amlavipaka. Amla is obtained from acidic foods, especially fruits. They have carboxyl functional group. The hydrocarbon chain is short . Also it does not have a linear structure as that of a fatty acid. Citric acid, hydroxycitric acid, tataric acid etc are examples. It shows its acidic nature in the system. So it is pithavardhaka. (But if the fruit is high in carbohydrate content, as in the case of banana, grapes, mango etc it becomes kaphapithavardhaka).

So amlavipaka, acidity(+ve) and pitha are the same. Kashaya katu and thiktha are katuvipaka. It is obtained from phytochemicals. These three are alkaline in charge. So

katuvipaka, alkalinity(-ve) and vatha are the same.

Though there are 6 rasas in total, there are only 3 vipakarasas as acidity, alkalinity and neutrality. These are pithavardhaka, vathavardhaka and kaphavardhaka respectively.

VEERYA

Veerya is used in three contexts in Ayurveda. One is the pharmacological efficacy of a dravyam, second is related to the effect on fertility, and the third is the thermal effect on the human body. Here the thermal effect is being discussed.
Thermal effect is in two ways as ushna and sheetha. Acharyans have divided all the dravyams(organic and inorganic) into two as ushnaveerya and sheethaveerya. This difference is not detectable with a thermometer in vitro. This is the thermal effect of the dravyam in the body, when it is consumed internally or applied externally.

When the ushnadravya comes in contact with the outside skin or the inside mucus membrane, a particular phytochemical in the dravyam activates the hot receptors of neurons. Severe pain, intense heat and hot taste(katurasa) activate the same receptor. The message is relayed to the sensory part of the brain. When this particular area of the brain is activated, it activates the concerned part of the motor cortex. Then the speed of metabolism increases and CO_2 , H_2O and heat energy are produced. This causes hyperthermia, faster respiration and sweat production. This is ushnaveerya and uthejaka in Ayurveda. Since this reduces kapha molecules in the body, we can say that ushna dravya increases pitha and reduces kapha in the body. There will be a temparory hype of acidity in the body due to CO_2 . But through faster respiration the acidity(CO_2) is removed. Ushna generating dravyams are mostly katu tasting. This katu molecule (ushnaveerya molecule) does the same effect in the gastrointestinal tract also. Piperine and capsaicin are examples. These activate the heat sensing neurons.

Sheethaveerya- Sheethadravya activates cold receptors in the body. This activation is responded by the concerned part of the brain to slow down the metabolism, increase urine out put, decrease respiration rate and perspiration rate. This is sheethaveerya and sthambhana in Ayurveda. The pharmacological actions of these kashayathiktha phytochemicals are not known clearly in phytochemistry. Some phytochemicals in chandana, karpoora, pudinhara etc give sheetha effect.

Sheetha dravyas are of three types as kashaya , thiktha and madhura. Kashaya and thiktha increases alkalinity (vatha) and madhura rasa increase neutrality(kapha). All these three reduces acidity. Kashaya and thiktha activate liver and gall bladder and more bile

acids are released into the intestine. Since some part of the acids are eliminated out of the body through feces and urine, we can say that it reduces acidity (pitha) in the body.

In short ushnadravya causes vasodilation (uthejanam) and sheethadravya causes vasoconstriction (sthambhanam). The pharmacological actions of these sthambhana dravyams are not understood clearly. Anyway the speed of metabolism is reduced.
So in vathika and kaphaja conditions we need ushnaveerya. In paithika condition we need sheethaveerya.

PRABHAAVA

The pharmacological effect of a dravyam is determined by its rasa, veerya and vipaka. When the rasa, vipaka and veerya are identical in two dravyams, both should show the same pharmacological effect. But we see some practical exceptions. It may be due to the presence of some other factor which over powers the effect of rasa, veerya and vipaka.

Chithraka and Nagadanthi are given as examples in our texts. They both have the same rasa, veerya and vipaka. But while Chithraka is graahi, Nagadanthi is bhedi. This may be due to the presence of some cathartic phytochemicals present in Nagadanthi. It may be nullifying the karmas of rasa, veerya and vipaka. Chithraka does karma according to its rasa, veerya and vipaka. Nagadanthi does karma according to its prabhava. So prabhava can be the action of some phytochemicals that can over power the rasa, veerya and vipaka.

DESHAM

Ayurveda uses the term desha in two contexts. One is about the geographical distribution of the land. The other is about the anatomical divisions of the body. Both are important in prescribing treatment.

Dehadesham (1)- Dehadesha is divided into three, following the anatomical positions as oordhwa, madhya and adha: . Adha: part is the anatomical area below the umbilicus, madhya is between umbilicus and heart, and oordhwa is the the part above heart. Adha: is vatha predomiinant, madhya is pitha predominant and oordhwa is kapha predominant. We have reasons to believe that the cells of the oordhwabhaga is mildly acidic (kaphathmaka), madhyabhaga is highly acidic (paithika) and adha: part is alkaline (vathika). When we look at the ph of the secreations and waste from these three areas, we understand this. The mucus which is mildly acidic is produced more in the upper part. This is the area of kapha. Hydrochloric acid and bile acids are high in middle part. This is

the area of pitha. The feces, urine and semen, which are from the lower part are alkaline in ph. This is the vatha area. Uterus is also highly alkaline though vagina is acidic.
When we do diagnosis on the basis of the doshas, we should take care of the sthaanidoshas. We must attend to the predominant dosha first, no matter whether it is sthaani or aganthukadosha. Other doshas should be attended later.

Dehadesha (2)- Other than the anatomical differentiation, there is an organ wise differentiation also for deha. All cells of the body have receptors to take in and take out the biomolecules. Not all kinds of receptors are seen on all cells. Some are seen on all the cells, some are seen on the cells of the same neighborhood , some are unique to a particular organ and some are randomly spread.

In Ayurveda we see the words like chakshushya, medhya, thwachya vrushya, swasahara, pleeharogaha, yakruthrogahara etc in the our nighandus. While all dravyams are made up of vatha, pitha and kapha, how come this organ wise special karmas possible ? I understand this as the presence of certain phytochemicals in certain dravyams, which are matching to the receptors of some particular organ. So if some phytochemicals are received by the chakshu:, some are not. Some phytochemicals are received by respiratory organs, but some are not. So this is the organ wise description of dravyams , which we see in nighandus.

BHOOMIDESHA- Bhoomidesha is the geographical differentiation of the land. These divisions are also relevant in treatment because dosha predominance is different in different areas.

The land is divided into three as jamgala(vathabhooyishta), anoopa (kaphabhooyishta) and sadharana (samadosha). I understand this as dry, humid and normal respectively. Dry areas have less water content in the air. The percentage of water in the air is determined by several factors like latitude, presence of water bodies, availability of rain, type of soil etc. So the percentage of water in the air decides whether the land is jamgala, anoopa or sadharana.

If there is less water content in the atmosphere, more water molecules are evaporated from the body into the atmosphere. Since this evaporation is continuously going on, there will be a loss of water molecules. Since water is kapha, loss of waer means loss of kapha from the body. This can increase the acidity(pitha) and alkalinity (vatha) of the body . Here vatha and pitha are increased and kapha gets reduced. If we don't drink enough water, body will produce it by breaking down fat. That will cause reduction of

body weight. This is what happens in a dry area or in hot climate.

We know that in summer, people living in some northern states of India, sweat less than people living in Kerala. The low level sweat does not mean that sweat is produced less. On the contrary, the sweat produced will be immediately evaporated into the atmosphere, due to less water content in the atmosphere. But in a humid area the sweat produced will not be easily evaporated, and so it accumulates on the body making the dress wet.

Another example is that the pus producing skin diseases tend to have a slower healing rate in humid areas where there are many water bodies. This is because the dehydration is taking place slowly.

SHAMANAM AND SHODHANAM

These are the treatment modalities in Ayurveda. Roga is the manifestation of increased doshas(charges) in the body . So chikitsa is to bring homeostasis (doshasamyam). When one or two doshas (charges) are increased, other one or two will be decreased. So the chikitsa is to reduce the increased doshas or charges. Shamanam and shodhanam are the two ways to handle the increased doshas. Treatment should bring down the number of the biomolecules which is in hype. This is done in two ways, ie Shamanam and shodhanam.

SHAMANAM-Shamanam is normalising the increased charge by neutralizing the molecules. This is done by providing medicines with opposite charge. When vatha(alkalinity) is elevated we give pitha(acidity) and kapha(neutrality). In other words when alkalinity is increased we give acidity and neutrality. When pitha(acidity) is increased we give vatha(alakalinity) and kapha(neutrality). When kapha(neutrality) is increased we give vatha(alkalinity) and pitha(acidity).

In kevalavatharogas we give agnivardhaka(paithika) dravyams like nagara, jeera, ela, pippali and kaphavardhaka dravyams like thaila, ghee, shookadhanya, ksheera, bala, aswagandha etc. So alkalinity is treated with acidity and neutrality. Neutrality(kapha) only can do pooranakarma(giving volume and structure). And the other two charges only can do actions.

When pitha(acidity) gets elevated we give vathavardhaka(alkalinity) and kaphavardhaka(neutrality) medicines. Kirathathiktha, usheera, chandana etc are alkaline and vathavardhaka and pithashamana. We give sitha, ghrutha, shookadhanya, ksheera

etc also which elevate neutrality. Here we treat acidity with alkalinity and neutrality.

When kapha is elevated kashayathiktha dravyams which increase alkalinity are given. Also katurasa dravyams which increase both alkalinity and acidity is given to speed up metabolism and to break down fat. All these kashaya thiktha and katu are katuvipaka. So we are treating neutrality with acidity and alkalinity.

When we treat with the herbs, we are making use of the pharmacological effect of the phytochemicals. These actions takes place on the basis of the presence of functional groups and the characteristics of the basic hydrocarbon structure. Functional groups are broadly divided into two as acidic and alkaline. The basic structure is always neutral.

SHODHANAM

Shodhanam is the elimination of elevated doshas(charges) through proper channels on a large scale. On a small scale, elimination of unwanted molecules and ions are being done as part of physiology. We do the shodhanakriya in a highly pathological condition, by accelerating the same physiological processes. Human body has specific methods to eliminate the three elements vatha, pitha and kapha. Vatha (alkalinity) is eliminated through feces and urine. Feces and urine are alkaline in charge. Pitha(acidity) is eliminated through bile flow. The acids reach intestine through bile and some part is eliminated through feces. Some is absorbed into the system and eliminated through urine. Kapha is eliminated through buccal and nasal cavities. The kapha is midly acidic(neutral in action) due to the presence of glycoproteins and glycolipids. Water, another content in mucus is also neutral.

Vamanam--Vamanam is the process of inducing vomiting. This is to eliminate excess kapha from the body. Some phytochemical in the emetic drug (vamanadravya) activate the chemoreceptors on the stomach lining. The response from the brain is to secrete more mucus and water into the stomach, buccal cavity and into the esophagus. This causes an anti peristaltic movement and emission of whole contents of the stomach . So by inducing vamana, kapha(mucus and water) is attracted to the stomach from the system and then eliminated.

Virechanam-Virechanam is to eliminate pitha(acidity) through feces. Acids are eliminated from the body through bile secretion. The virechana oushadham(purgative) activate the chemoreceptors of the small intestine. The response is to activate liver and gall bladder to release more bile into the intestine. More water is also released from the walls of the gastrintestinal tract. Peristaltic movement is also speeded up. So more bile reaches the

intestine, but due to the fast peristaltic movement the acids do not get chance to be reabsorbed in the form of micelle. Once when a good chunk of acids are eliminated through feces, the liver can do its normal physiological functions. Then it can absorb more waste molecules from blood. The daily share of acids will be eliminated through daily normal defecation.

One great function of virechanam is detoxification. As we all know, a big share of toxins from the food is stored in hepatocytes. Thus the body is saved from toxicity. While more bile is eliminated from the liver toxic molecules are also eliminated in a big way. Bile can carry both fat soluble and water soluble toxic molecules. So virechanam can eliminate acids, fats and toxins.

Vasthi- Vatha (alkalinity) is eliminated through vasthi process. Vasthi is of two types , as kashayavasthi and snehavasthi. Vasthi has both sodhana and shamana karmas. The problems of the colon and rectum are difficult to be treated through proximal end of the gastrointestinal tract. Because before reaching the distal end, the drugs get absorbed or the pharmacological property will be transformed due to the presence of acids and alkali secreted at different parts of the gastrointestinal tract. So ingesting drugs from the distal end is the practical solution.

We do shodhanavasthi in a constipated condition (kroorakoshta). In that condition the feces and the mucus membrane will be harder than the normal. Hard plaques of stool can get deposited in the folds of the colon . This stays for ever at the same site. Even with the help of a laxative or purgative, this can not be removed. The fresh stool may pass through the top of the deposited hard plaque with out disturbing hard deposited pieces.

Here we need three things for the efficacy of elimination . Distension of the colonal wall, presence of acidity and water, and a forceful peristaltic movement. The 900 to 1000 ml vasthidravyam is enough to distend the walls of the colon. Through a full distension of the wall the medicines can reach out to the plaques and liquefy it. It can liquefy the hard mucus and the medicines can come in contact with the colonocytes and the nerve endings there. The temperature which is above the body temperature also can activate the nerve endings to speed up the peristaltic movement. The chemoreceptors on the colonal wall can cause a speedy peristaltic movement due to the presence of irritants in the kwatham. The water content of the kwatham can wash out the whole content of the colon. Once the accumulated vathadosha or alkaline elements are removed from the site, more of the waste can come out of the body into koshta. There are pithahara and kaphahara vasthis. To explain that, we need a detailed study of the pathological conditions and also about the drugs.

Ayurveda does not claim that one time large scale shodhana can clear out all the doshas from the body. But the elimination of the deposited waste molecules from a site will enable the organ to function properly. So it is easy to bring back the normal physiology. After shodhana, shamanoushadhams are to be continued. Daily share of shodhana is also to be assured. Pathyahara and vihara are to be followed till the disease is cured.

AGNI

Agni does the breaking up of the food and big molecules into small ones. A macromolecule is broken into single units in the gastrointestinal tract. This single unit is broken down into smaller molecules inside the cells and heat energy is released. During the metabolic process some waste molecules are formed which is eliminated through proper channels. Presence of agni is there in buccal cavity, stomach, small intestine and inside the cells. It is present in the form of enzymes, coenzymes, acids, bicarbonates and peroxides. Thermal heat is also an inevitable part of agni. All these factors are needed for breaking down the food. This is the parinamakarma or daahakarma or dahanakarma. This is total metabolism. Like food, biomolecules also gets transformed from one form to another. For example fatty acid is transformed into cholesterol and cholesterol can get transformed into hormones. All these transformations need enzymes and coenzymes. Agni present in the koshta is jadtaragni and agni in cells is dhathwagni. All cells have their own type of agni according to the functions taking place there.

Enzymes are a cluster of polypeptides with two domains as acidic and alkaline. Both have separate shapes to match the molecule which is to be broken down. The acidic part of the molecule goes to the alkaline domain and alkaline part goes to the acidic domain. In most of the enzymatic actions, a water molecule is taken from the neighbourhood, broken down into O and OH, and supplied to the molecules which is getting separated.

At some sites coenzymes are also needed to support the enzymatic action. Coenzymes come and make the enzymatic domain accomplished to do the function.

Acids are involved in the transformation processes, undergoing reactions. Different acids are available in the stomach, intestine, cytoplasm and in mitochondria .

Peroxides are alkaline and are available in peroxisomes. The function is to cut the long hydrocarbon chain of fatty acids into smaller ones so as to prepare for metabolism in mitochondria.

External heat and warmth of food give activation to metabolism. Heat is conducted or convected to the whole body from one site. Heat makes the cells vibrate. This vibration enable the molecules at all sites, to be in touch with the enzymes in the neighborhood. So metabolic processes move forward in a faster pace. This is why heat is considered as 'uthejaka' in Ayurveda. Heat causes more perspiration, and the body tries to make up for the loss of water by breaking down fat.

The heat energy produced due to metabolism of nutrient molecules is utilized for physiological, physical, mental and intellectual purposes.

The word 'agni ' means 'kutilaaya gathau' or which takes a winding or curved route. The 'burning' of food starts in the gastrointestinal tract and it flares up and spreads to different tissues like fire flares up in any direction. So Agni is the term collectively used for all the elements needed for converting the food molecules into energy and waste products.

The cooking of food is also meant for breaking down many bondings of the macromolecules and for enabling many molecules for easy absorption.

DEEPANAM

Deepanam is the activation and forward force of agni or the whole metabolic processes. It is a sensory phenomenon. It can be auditory, visual, gustatory, olfactory and somatosensory.

Auditory activation- When we hear about a food item which we had tasted and enjoyed earlier, it will arouse the memory of the food. Due to the response from the brain the gastrointestinal tract is activated. The contraction and relaxation of the smooth muscles of the tract, release the secretions from the tract wall and get ready for the digestion of food which is expected to come.

Visual activation.-When we see a food item or even the image of it, memory works, brain responds, and metabolism starts functioning.

Gustatory activation-When the food touches the gustatory nerve endings, different nutrient molecules and phytochemicals with different tastes activate different parts of sensory area of gustatory cortex. So different motor areas are activated to initiate metabolism. (Details are given under the heading 'SHADRASA').

Olfactory activation- Olfactory activation also takes place similar to gustatory. In fact olfactory excitation is more effective because it can bypass the thalamus and reach the cortex faster. The kitchen spices which has aromatic property are good examples of olfactory deepana.

Somatosensory- When the food is in touch with the tongue, touch receptors like heat, cold, pain, pressure, texture etc are activated according to the type of food. (Refer ushnaveerya and sheethaveerya). Pain, heat and katurasa are interpreted the same way. And the response is also the same, to initiate and speed up metabolism. Different tasting molecules are capable of activating certain neurons in the gastrointestinal tract also. So deepanam takes place in the GI tract also.

Ushnaveerya, katurasa, lavanarasa and amlarasa are agnivardhaka and so are deepana. Kashayathiktharasas activate bile production and secretion.So that way these tastes are also deepana.

Ghrutha which is highly sheethaveerya is also deepana. The sensation of fat activates liver and gall bladder. So more bile acids are secreted into the intestine.

PAACHANAM

To my understanding pachana element means the factor that helps transformation of molecules. Food needs enzymes acids and alkalis to get transformed into other forms. Different enzymes and acids are needed at different stages of metabolism. These are bio synthesised according to the need. Due to some reason if the body is not able to produce enough of these enzymes and acids we should look for supplements . Some bio enzymes and acids are available in plants also. Pineapple, papaya, jeera, ginger etc contain some proteases. Some plant parts contain acids like citric, malic, fumaric etc. Esters of these acids are necessary part of the citric acid cycle. Ascorbic acid (vit C) which is necessary for the production of certain neurotransmitters, is available only in plants. Acids are needed for converting Fe3 into Fe2 to enable absorption. So my conclusion is that if a herb contains some phytochemical that can substitute a biomolecule, related to metabolism, that herb can be called paachanadravya. So pachanadravyas substituite biomolecules.

In our nighandus we see many herbs which we use as kitchen spices are with pachana property. Jeera and Nagara are proven examples. A study of phytochemicals will reveal the pharmacological properties of our pachana spices. All 'may' contain some kind of enzymes or acids.

AGNIMANDYA

From the word meaning, agnimandya is the slowness of metabolism. The low availability of any of the agni factors cause slow metabolism. Low availability of enzymes and acids, cold temperature, over consumption of food, etc are the causes for agnimandya. The end result of agnimandya is aamasanchaya and ojakshaya (low energy production). If at one site molecules accumulate, due to agnimandya, the message is sent to the front and back of the sequence of metabolic chain and the whole metabolic process is eventually slowed down. This causes low energy or ojakshaya.

Over consumption of food also can cause agnimandya. If the consumed food is more than that which the body can handle, it causes accumulation of aama. So the result is agnimandya.

SROTHAS

Srothas is the tubular space through which something can flow with out break . 'Sru gathau' is the definition for srothas. Grossly srothas is 13 in number. But many srothas can be subdivided. So in total there are innumarable srothas in the body. These tubes can be large, small, curly, straight or long. The main srothas are pranavaha, annavaha, rasavaha, rakthavaha, mamsavaha, medovaha, astthivaha, majjavaha, shuklavaha, jalavaha, moothravaha, pureeshavaha and swedovaha.

Pranavaha can be the nasal passage and the big and small tubes of the lungs.
Annavaha is the passage of food up to the distal end of the small intestine.(In Ayrvedic classical texts, both stomach and small intestine are called AAMASHAYA.)
Rasavaha can be the portal vein which takes the nutrients up to the liver.
Rakthavaha is the arteries and veins
Shuklavaha is tubes vas deferens and urethra.
Moothravaha is ureter, bladder and the fine tubules of the nephrons.
Pureeshavaha is colon, rectum and anus

All these are stthoola srothas. We do not see any stthoola tubes for mamsa, medas, astthi, majja and jala to pass through. But we see some similarities in the description of srothas in our texts to the description of receptors and channels on the cell membrane. Receptors and channels are polypeptide macro molecule which has a tubular space at the middle to enable the molecule to pass through. It extends from outer surface of the cell membrane through and through the membrane. The charge, size and shape of the molecule, enables it to pass through this narrow tubular passage . So these tubular space

inside the the receptors also can be called sookshmasrothas.

Jala (H_2O) has its own passage or receptor called aquaporin.

In the interstisial space also we can see the transportation of the water and other moleculeshave a channel like arrangement. The Glycoproteins which are alrea go to the sides and make pathway for the molecules to pass through. So there is a srothas in the interstitial space.

All the molecules consumed, or synthesised inside the body should go in and out across the cell membrane. Each biomolecule has its unique passage on the cell membrane. Charakom, srothovimanam says “yavantha; purusho moorthimanto bhaavavishesha: …….bhavanthi ayanaartthena” . The Ayurvedic description about srothas is the same as that of receptors on the cell membrane. How many moorthimath padaarthas are there in the body, that many number of srothas are avilable in the body. So srothas is not only the big tubes and minute tubules, but the micro sized receptors are also srothas.

Other than the biomolecules, ions also have their own unique kinds of receptors called channels.

AAMA

I understand Aama as some molecules accumulated at some site without able to enter the next phase of metabolism due to the no or low availability of acids, alkalis, enzymes, co enzymes and ions. This is the same in koshta and in dhathus.

SROTHORODHA , AGNIMANDYA and AAMASANCHAYA.

Srothorodha is the blockage of the functioning of the srothas. It can be due to the accumulation of large number of nutrient or biomolecules at a particular site. The body has a particular speed for the processing the molecules . Or it has a particular speed to synthesize the needed enzymes and other elements to enhance metabolism. If too many molecules come from food , molecules have to wait at a particular site for getting metabolised. This is one aspect of AAMASANCHAYA.

If the ph is too high or too low due to vathadhikya(alkalinity) or pithadhikya(acidity) , the

enzyme proteins can get denatured and dysfunctional. This also causes molecules to get accumulated at a site. But what is accumulated is nutrient molecules which is kaphavardhaka. When one site is clustered with aama a message is sent to the back and front of the sequence to delay or stop the metabolism. This whole effect is agnimandya. So srothorodha, agnimandya and aamasanchaya are interconnected.

When there is extra fat in the body, the receptors can get clogged due to fat molecules. This also leads to aamasanchaya due to kaphadhikya.

Shodhana (elimination of wastes) is also connected to srothorodha, aamasanchaya and agnimandya . If waste is not eliminated from a site on time, the metabolism is disrupted.

Ashtangahrudayam, Doshopakramaneeyam, slokams 23 and 24 are about the lakshanas of aama. Jwaranidanam and jwarachikitsa chapters also give us an insight into agnimandya and aamasanchaya.

GUNAS OF THRIDOSHAS AND DRAVYA

We find the reference of gunas (properties) of vatha , pitha and kapha in Ayushkameeyam, Ashtangahrudayam, slokam 11. Vatha has 6, pitha has 7 and kapha has 7 gunas. Some gunas like sheetha, snigdha and laghu are common to two doshas. Vatha and pitha are laghu, vatha and kapha are sheetha, pitha and kapha are snigdha. So on total there are only 17 properties. I think these properties can be explained on the basis of molecular weight, functional groups, atomic bonding, and intermolecular attractions.

In the same chapter in slokam 19, properties of dravyam is mentioned as 20 in number. Since no dravyam is beyond the properties of thridoshas , these extra three properties can be of samsargadoshas. I shall try to analyse some of the properties. Snigdhatha and theekshnatha are brought about by acidity. When the carboxyl group is at the end of a short hydrocarbon chain it is acidic(theekshna). Since the chain is short, the molecule is laghu(less molecular weight)

When the same carboxyl group is at the end of long hydrocarbon chain, the molecule is snigdha(kapathmaka). There the theekshnatha is nullified due to the neutrality of the long hydrocarbon chain. So the molecule becomes 'manda' or blunt. Since it has a long hydrocarbon chain it is guru(high molecular weight).

Pitha is ushna. Pitha is acidity and acid encourages metabolism with the end result of release of heat.

PANCHABHOOTHA

Undoubtedly Panchabhootha is a reality , which we can perceive with our sense organs. Pruttwi, ap, thejo, vayu and akasha are known to us on the macro level. But the relevance of these five factors in chikitsa is to be understood. According to Ayurveda, dravyams are made of panchabhootha. Nothing is beyond panchabhootha in this world. My understanding on this subject is like as follows.

Prutthwi—It is the long hydrocarbon chain,since it has guruthwa.
Ap—is water
Theja: --is any acidic functional group or cations which arouse pitha.
Vayu—is any alkaline functional group or anions which arouse vatha.
Akasha—It can be the molecule with benzene ring. Akasha actually denotes space. This benzene ring is always there on the molecule, no matter where it goes. This ring structure can not be broken down with any enzyme or any acid in the body. It can be one, two, three or four plus a half ring. In the animal body only the 'four and a half ring' is available. Best example is cholesterol. It is called steroid structure. All the hormones are derivatives of this structure. This may be with less density because the molecule takes comparatively larger space to occupy.

In plants there are one, two, three, and four and a half ringed molecules. But how these five elements are connected to roopa rasa shabda sparsha and gandha is not known. Other than these five structures ie hydrocabon frame, acidic functional groups, alkaline funtional groups, water and closed ring structutre, we see nothing in a matter or dravya.

OJA:

“Shuklanthanam param theja:” is the description given to oja: in Ashthangahrudayam. This is similar to the description given to Adenosine triphosphate in biochemistry texts. We know that the hydrocarbon rich molecules like carbohydrates, fatty acids and proteins are converted into CO_2, H_2O and energy. The CO_2 and water are eliminated as wastes and energy is the one factor utilized by the body. The energy is stored as binding force in ATP.

In the citric acid cycle when the energy is released in mitochondria, an Adenosine di phosphate and a phosphate get bonded with the help of the released energy. When a need of energy comes inside the cell, the ATP is broken down into ADP and Phosphate. The energy released will do the physiological, mechanical, emotional or intellectual

functions.

ATP can not sustain for long. It gets disintegrated fast. So extra energy is stored in NADH and FADH. They have similar structure like ATP.

Acharya says that though Oja: is spread all over the body, its sthana is hrudaya. We know that all cells in the body are supplied with mitochondria. But it is abundantly seen in cardiac muscles. It is said that 30% of the cardiac cells are filled with mitochondria. Since contraction and relaxation of the heart is to be continued with out rest, incessant flow of energy is needed. That is why energy (oja:), production is high in cardiac muscles.

Acharya says that kopa, kshudth, dhyana, shoka, shrama etc are the factors that reduce oja in the body. We know that more of ATP is spent in all these conditions. Also symptoms of ojakshaya mentioned in the chapter are the same as that of low energy.

Acharya says that jeevaneeya oushadhams like ksheera, mamsarasa are to be consumed when there is ojakshaya in the body. We know that ksheera is rich in carbohydrates, proteins and fat, which are the sources of energy. Mamsarasa ia also a source of energy since it is rich in fats and proteins. The jeevaneeyagana dravyams like kakoli, ksheerakakoli, jeevanthi etc may contain carbohydraytes.

Oja: is said to have reddish and yellowish colour. It is not clear whether ATP, NADH or FADH are in these colours, but phosphorus is available in nature in these colours.

NIMITHHA

Nimitha is the cause of the manifestion roga. Ayurveda says that the cause of the roga is from two different planes. One is nija where the cause is in the body itself. It is caused by the apatthyahara and vihara of the person.

Second is aganthuka where the cause is from the out side of the body. Without any apatthyahara or vihara, diseases are some times manifested. Aganthuka include aaghaatha and bhoothgrahavesha. It can be from the immediate sarroundings or from the very distance. Accidents(aghatha) and poisonous bites are the causes from the immediate sarroundings. Grahbhoothaavesha (influence of planets) is the cause from the distance.

Grahavesha is of two types. One is generalised and the other is personalised. Generalised

grahavesha is common to every living thing in a particular geographical area. This is applicable to plant world as well as animal world. This is caused by the change in the planetory positions in the constellation. And we call it 'ruthubhedam'. In the solar system all the planets are continuously moving. The constellation is also changing continuously. So the planets which had no visibility to the earth at some time, get visibility when all the planet moves. The newly arrived planet in the constellation can radiate its energy to the earth. It influences the whole of living things in a particular geographical area at the same time.

We are not aware of all the rays coming to the earth, from different planets. In the chapter Janapatthodhwamsaneeyam Acharyan tells the shishyas to collect dravyams before the ruthu changes, so that it will retain its pharmacological efficacy. What he meant is that the newly appeared grahas in the constellation can make changes in the plant physiology. This is true in modern phytochemistry also. It is proved that certain phytochemicals present in a particular plant in a particular season may not be present in the same plant in the following season.

Acharyan also warns about the onset of diseases in the ruthubheda. We now call this as seasonal viral diseases. It is said that certain type of virus are activated in a particular season. I wonder whether the energy rays from the planets make changes in the DNA or RNA of virus so as to activate it. It is proved that ultraviolet rays can make mutations in human DNA. If the cosmic ray can cause mutations in the DNA of humans, it may be doing the same thing in animals and plants and in microbes also. Virus can be the most vulnerable, since it is the simplest living thing.

We have reasons to believe that cosmic rays influence the physiology of humans. We know that Sun is a cosmic object and its rays influence the human physiology. The UVB rays support the synthesis of vitmin D and UVA rays encourage melanin production. Since we have no receptors for these rays, we are not aware of the influence. We are aware of the Sun only through photoreceptors and thermoreceptors. If these receptors are deactivated, we can not be aware of the Sun. But still the physiology is affected. So we are aware of the existence of a cosmic structure, only if we have suitable sensory system. We humans do not have sensory organs for receiving all kinds of energy coming from the cosmic world. So we have reasons to believe that some kinds of energy waves make physiological and pathological changes in humans, in plants and may be in microbes also, when a particular constellation takes place. But we are not aware of the influence because we do not have suitable receptors in our body. But scientists in physics say that many kinds of cosmic rays are coming from the distance and nobody knows where these come from or where these go or what these are doing to the physiology of any living

thing. If these cosmic rays are affecting the physiology of living things we can call it Grahavesha or influence of planets. This kind of grahavesha is seasonal and generalised.

The second type of grahavesha is just individual. This is understood only on a spiritual plane.

The human being is made up of three elements as panchabhoothathmaka body which gives structure, dwigunathmaka mana:, which is the moving force, and the nirguna athma which is the witness. The karmas done by shareera and mana: can be dharma or adharma according to the universal law. The adharma is registered as papa and dharma is registered as punya, with the athma. Once when the athma leaves the body, it stays in the cosmic world, as a separate entity, but still carrying the records of different shades and grades of punya and papa along with it.

The athma will wait in the cosmic world, till a proper constellation takes place in the solar system. The planets have an important role in implementing the results of the punya and papa. Each graha is entitled with a particular portfolio of universal law. And each graha is personified by a Devatha which is named after the graha. To experience the rewards and punishments, the athma takes rebirth in a particular constellation and into a particular sarroundings. The influence of the grahas takes place according to the natal chart. So in the course of time the person experiences the sukha and dukha implemented by the grahas automatically.

Other than Navagrahas there are bhoothagrahas and balagrahas. They influence the human body when they get a chance(randhra) due to some papa actions. Once I read a comment in the You tube by a man abroad, that 'astrocytes take instructions from aliens'. Here we have an important clue . In aganthuka rogas with mental disfunction, there can be the influence of some cosmic rays and astrocytes could have been the one affected.

For a long time, astrocytes were considered only as supportive cells to neurons, thinking that neurons are doing all the brain functions. Astrocytes cause tight junction formation in neurons. In bhoothavesha and grahavesha, we see the personality changes. So it can be due to the pathological condition of astrocytes. Astrocytes have a duty to keep the neurons detoxified. When some toxic molecule some how crosses blood brain barrier it is pushed back by the neurons. Astrocytes also have some role in helping the neuron to put back the toxic molecule into the blood. So if due to some reason the astrocytes have some problem, its function can be affected. There is a possibility that the DNA of the astrocytes are affected by some cosmic rays. Once the astrocytes are pathologically affected, it can not function properly.

Since many of these graha related theories have no proof from modern science, I just made a narrative linking many points from different shastras. As degree holders In Ayurveda, we are expected to understand every medical term told in our texts even if it looks mystic or fantacy. We can take aapthvakyam as pramanam.

BHOOTHAVESHA

“Manushyashareera anthargatha shareeropadravakaarino sookkshma anavo janthavo bhootha” in the definition for bhootha. This resembles the attack of microbes. These are infectious diseases. The behavioural changes in a person can be due to the infection of the microbe in the brain. I understand this bhootha as bacterias and virus.

BALAGRAHAVESHA

When we look at the symptoms of Blagrahavesha, we see that all the symptoms are that of Autism or Asperger's syndrome. Autism and Asperger's have a wide spectrum of symptoms. In the same way Balagrahas altogether have a broad spectrum of symptoms.

According to Ashtangahrudayam, there are 12 Balagrahas. Due to the influence of these grahas, garbhinis and kumaras get affected. It is not the physiology of garbhini that is affected but the physiology of the foetus is affected. So the affected child, shows symptoms according to the graha affected. Different grahaveshis show different symptoms, but the commonality is incessant cry and fever. I also noticed that the koshta is also affected in almost all cases. Modern science says that the brain attains growth only at the age of five. So we can believe that the brains of the foetus, babies and small children are affected by the baby planets or balagrahas because the brains of kumaras have not attained complete growth.

I find many possibilities here. The astrocytes could have been affected by some cosmic rays. May be the DNA of astrocytes itself is affected. So the pathologically affected DNA is not supporting the neurons properly. That may be the reason for the many neuronal problems including the gastrointestinal tract symptoms. The enteric system could have been affected. Many tantrums shown by the children may be due to the discomfort in the gastrointestinal tract.

Another possibility is that at the time of the fever some virus could have made alterations in the DNA of astrocytes. The virus activation itself could have been due to the influence of some cosmic rays.

So my assumption is that if there is a retardation or challenge in the mental growth of a child, the personality of the child is affected. Where ever the personality is deranged, there may be a pathological change in the astrocytes. When the astrocytes are affected, it affects the total brain functions also. Thus the intellect, emotions and the behaviour of the child also are affected.

When we go to the chikitsa part, we see that the medicines for grahavesha and bhoothavesha are indicated in visha, gara, athisara and grahani also. Some are indicated in unmada and apasmara. Autistic children show the symptom pica which is thought to be the reason for gastrointestinal disorders. But I think pica is shown by the children due to the discomfort in the gastrointestinal tract and the change in the personality which is a symptom of balagraha.

Also I doubt whether the virus has deposited some foreign bodies inside the brain cells or inside some cells of the gastro intestinal wall. I have read that some virus deposit some debris in the cells and it will give long term trouble to those cells. This is considered as long term toxicity. So in my opinion when we deal with the problem of balagrahavesha we should consider the cosmic rays influence, viral attack on astrocytes and the presence of some type of visha.

Dhoopas are very important in chikitsa. Like different tastes activate different areas of the motor cortex , different smells also can activate different areas of the motor cortex. In fact the aromatic dhoopas can activate the brain more than any other dravya, because olfaction is connected to the olfactory cortex bypassing the thalamus. But it has a connection to the thalamus also.

We should find out the role of laaksha also, because all the oils for bhoothagrahavesha contain this particular ingredient laaksha.

Even if we disagree with the appeasement of Devathas, we have to accept that the balihomadi rituals have a physiological effect on the child's body. The sound of the Manthras and the chiming of the bells and the aroma of the dhoopas can activate the concerned areas of motor cortex . Making the child chanting the mantras also activate the brain. The abhyangasnana which is done prior to the rituals with laakshadi like oils also can activate different areas of the cortex. All sensations from the epithelial cells are connected to the reticular formation and the activation of this area can activate a lot of areas of the brain.

When a kumara or garbhini is affected with fever , there is a possibility that it is a balagrahavesha. But the damage to the system will be noticed by the parents only when the child reaches the stage of communicating with the surroundings. By the time many stages of mental developments could have passed improperly.

Ayurveda does not claim that all balagrahaveshas are saadhya. One type is asaadhya, a few are yapya and some are saadhya. But the child should be given treatments in the early stages. Otherwise the child will lose many years of proper development and the case may become difficult. If we can at least manage the disturbing koshta problems, that itself may be a solace for the child and for the parents.

UNMADA

In Unmada also we see great behavioural changes. Nidana of unmada is vatha, pitha, kapha, samsarga and visha. Here also there could be pathological changes in astrocytes which is due to the imbalance of doshas. Affected area may be the astrocytes but the nidana is one's own aharavihara. Since it is a nijaroga, yukthivyapashraya chikitsa is mentioned. If only some grahaanubandha is seen in an unmada, daivavyapashrayachikitsa is also needed. If there is the the presence of visha, vishshara chikitsa also is to be introduced. So unmada is a nijaroga, but there can be grahanubandha sometimes.

APASMARA

In Apasmara, the intellect or the behaviour of the person is not affected. So we can assume that, in Apasmara only neurons are affected and not the astrocytes. Nidana of Apasmara is in four ways ie vathika paithika kaphaja and sannipathaja. There is no grahavesha told in this disease. Pathologically it is a disease that affects the neuronal functions like any other nuerological disease of the adha:kaaya.

Alzheimer's is a disease of the brain where memory is affected. Researchers say that there is degeneration of brain cells. There is an increase in the microglia which shows that the immune system of brain is affected. (Microglia is the macrophage of the brain). Plaques are also present in between the cells. This shows that there is unwanted accumulation of waste molecules in brain.

When it comes to the matter of chikitsa, we see umbrella treatments for grahavesha, apasmara and unmada. Here Ayurveda is giving treatment to the whole masthishka. The

medicines should cross the blood brain barrier, and received by the neurons, astrocytes and microglia. So I assume that all these brain cells are having the same types of receptors. Differential diagnosis should be made on the basis of doshadhikya.

So in my opinion grahavesha and in some cases of unmada, we need the daivavyapashrayachikitsa such as balipoojadi rituals plus yukthivyapashraya chikitsa. Apasmara, doshaja unmadas and Alzheimers like smruthikshaya problems need only yukthivyapashrayachikitsa. Here rituals are not needed. But the oushdhams are common to all brain function related problems. The differentiation is in the matter of doshaadhikya.

Ghruthams, gulikas, choornams and arishtasavams are used in the treatment of brain related symptoms. Altogather these medicines are rich in cholesterol, volatile oils and alcohol which are able to cross the blood brain barrier. Ghruthams are rich in cholesterol. Choornams and gulikas which contain hingu, vacha, ajamoja, haridra etc are rich in volatile oils. Generally kwathams are rich in water soluble elements which can not cross the blood brain barrier. That may be the reason,why kwathams are not mentioned in masthshkajanya rogas.

ADHISHTANA OF ROGA

Roga is manifested on two planes ie on physical body and in the emotional mind. Imbalance of thridoshas causes bodily rogas and imbalance of dwigunas causes emotional rogas. The shareerika rogas can influence the mana: and manasika rogas can influence the the shareera. The two gunas that represent the mind are rajoguna and thamoguna. The balance of these two gunas is sathwikaguna and is the lakshana of aroga. The aggressive behaviour of a person is due to elevation of rajasaguna and the depressive behaviour is due to the elevation of thamasaguna. A normal balanced behaviour is expected when both these gunas are in balance. Since mana: originated from 'Avyaktha' we can not have a detailed study of mana: . So we take aapthvakyam as pramanam. Ayurveda says that the manorogas later affect the shareera and the shareerika rogas in course of time affect the mana: also. This relationship is called ghataghrutha bandha.

The study of mind is abstract in modern science also. The study is conducted mainly through the behaviour and to some extent through the study of hormones and neurotransmitters. When we look at the neurotransmitters and hormones, we understand that these can be broadly classified into two as agonists ans antagonists. When these two are elevated, aggression and depression manifest respectively. A normalcy is the balance of the two.

So my understanding is that rajoguna is aggression , or elevation of agonists, thamoguna is depression or elevation of antagonists and sathwikaguna is the balance of these two .

In modern science amygdala is the area in the brain which makes a person aggressive or depressive. If amygdala is over activated the person becomes hyper active, hyper oral, hyper sexual and with low inhibition. This is similar to the raajasabhava . If the amygdala is less activated the person becomes hypo in all the above said actions. This looks similar to thaamasikabhava. So if the amygdala functions properly, the person shows balanced behaviour. The mental sukha or dukha experienced by the person is due to the activation of old memories which are stored in some parts of the limbic system and also in the cortex. The person decides to act or not to act after consulting with the limbic system, basal ganglia and prefrontal cortex. Even if the person act or do not act, the sukha or dukha will be experienced by the person.

RASAYANA

My understanding about a rasayana herb is that, it contains many phytochemicals which can be received by all types of cells in the body. So with one herb all dhathus are attended. It may not be the same phytochemical , but different phytochemicals in the same herb. Rasayana need not be thridoshashamana. For eg, garlic, a rasayana is pithavardhaka.

CONCLUSION

I feel that there is an urgency in developing a new field in the Ayurveda learning, for Decoding Ayurveda. This is a wonderful area if you have interest and enough time to spend. My this effort is only a starting step. It may contain mistakes since I have not learned biochemistry or physiology academically. I expect the Ayurveda research organizations to take up the matter seriously with the help of scholars from different sasthras and voluntary contributers from Ayuveda community. Singularly a person can not bring forward or to accomplish the work. It needs scholars from Ayurveda, Sanskrit, physics , chemistry, modern medicine, astrology, astronomy and phylosophy. So there is the necessity of a co- operative, coordinated effort. Creating a panel of scholars from these fields is easy for any Ayurveda institution.

Ayurveda need not be confined to Indians only. It is for the whole world. First we must understand that it is a SAASTHRA.

27 March 2020 Thank you,
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