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INTEGRATIVE UNDERSTANDING OF THE CONCEPTS OF AYURVEDA

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ABSTRACT

Ayurveda, the science of life has got fundamental concepts like Tridosha, saptadathus, trimalas, agni, etc., in order to understand biological phenomena & the governing factors of the living systems. The concepts are coming under frame work of systems theory, phase transitions and such other mechanisms. The biological events like thermodynamics, hydrodynamics, haemodynamics and other systemic functional aspects are understood basing upon certain concepts. Then only the physiological insights like variables of blood pressure, respiration and other systemic functions can be given successful explanations. It is to express universal concepts applicable across living organisms especially in human beings. In this study the description of varying states of health and disease as explained in Ayurveda classics, is given a scientific outlook in order to bring a better understanding.

KEYWORDS: *Tridoshas, Dhatus, Srotuses, Sammurchana,* Dynamics.

INTRODUCTION

The concept of Tridosha is a pivot in Ayurveda, in understanding physiology, pathology and pharmacology. All the Ayurvedic scriptures mentioned that, the Tridoshas are emerged from panchamahabhutas. Thus the characters are descended to Tridoshas from panchamahabhutas only. Though the body (sareera) consisting of transformed forms of the panchamahabhutas, Tridoshas have got separate entity in maintaining physiology. The present study is aimed to understand the contiguous relationship of Tridoshas with other constituents of the body.

The modern biomedical explanatory models of the human body are framed in terms of biochemistry and biophysics. Ayurveda appears to be in contrast and begin with "energy transitions" in explaining biological events. This study is making an attempt to begin a process of elucidating the fundamental Ayurvedic explanations of bodily physiological events in terms of contemporary biophysics and biochemistry. This becomes a brake through for misunderstandings over traditional medical knowledge.

AIMS AND OBJECIVES

This study is aimed to explore the understandings of the physiological and pathological phenomenon as explained in Ayurvedic classics supported by modern biological sciences.

MATERIALS AND METODS

The subject matter is collected and compiled from notable Ayurvedic classics, and relevant concepts are supported from modern medical texts and all available websites are searched relevant material is collected and this study is enriched with illustrations taken from relevant websites.

Doshas and their phenomenal aspects

Doshas are three as per the classics of Ayurveda, they are Vata, Pitta & Kapha. They are the physiological propensities governing structure and function of the systems in a wholesome way. Though they got separate entity, they go hand in hand and regulate the structure and functions of the systems. However, this holds good at cellular level also. This includes transport mechanism, inputs and outputs, transformations regulatory and storage etc, the functional modifications and the variables as per the subject to the condition, applicable to the states of health and disease. The pharmacological events are nothing but reversal of pathological states only.

Tridoshas are not any particular constituents in the body, but considered as transitory entities with relativistic expressions which regulate structure and function. The relativistic expressions are nothing but attributed qualities, termed as "gunas". These gunas are not to be confined to physical properties alone. Ayurveda classics stated that ruksha, laghu, sita, khara, sukshma and chala are prime gunas of vata. Similarly pitta and kapha doshas have got their respective prime gunas. These are sneha, teekshna, ushna, laghu, sara, and drava, for pitta dosha and guru, manda, hima, snigdha, slakshna, Sandra, mridu and sthira are for kapha dosha. All the gunas encounted above are enumerated under "sadharana gunas" 20 in number

and the same sadharana gunas are attributed to saptadathus and trimalas. All the gunas are interchangeable among Tridoshas, saptha dhatus and trimalas in health as well as disease.

On the other hand karmanya gunas are nothing but paradi gunas which are sin-qua-non for any event to be completed. In fact there is no biological event possible without karmanya gunas. Of course, physical laws are governing factors in exerting any action phenomenally these are specific and unique for the variable functions at unit level or systemic level. Thus in achieving ultimate proposed effect a sequence of phenomena are expected under physical, chemical laws as well. Hence the relativistic sadharana gunas clubbed with karmanyagunas expressed in terms of biochemical and biophysical explanations will help us to understand dravya, guna, karma siddhanta in physiology, pathology and pharmacology.

Basically all the phenomenae are going around the dravya, guna and karma, which are considered to be prime triad of "shatpadardhas". Tridosha, sapthadhatus and trimalas are dravyas and their qualities are gunas, functions of respective doshas and dhatus are nothing but karmas. Where in the biochemical and biophysical events are to be understood in respective states i.e, health and disease. Similar explanations are needed for all the types of Tridoshas with corresponding systemic functions. However the concept of srotuses, concept of agni, concept of dathu parinama with respective physiological functions coupled with variable conditions like aahara, vihara, desha, kala, etc., are intact and at the same time nidana panchaka, kriyakala are the concepts to be considered on similar lines in diseased conditions.

Review of functional aspects of kinds of Tridoshas

As per classics, gunas and karmas of Tridoshas are highlighted at different contexts. Charak has summarized prakrita and vikrita gunas and karmas, which are expected to be symptoms in different ailments. The text says the path way of getting vitiated, the doshas, through specific terms, cannote the exact interpretation. In fact it is told that the gunas are sent to their respective "aashrayas" and enhance (aapyayamana) themselves in body and retard (asadyamanascharan) with respective counter gunas. Aashrayas, are certain bodily entities which hold the respective gunas. Tridoshas do have their "aatmagunas" which are ultimate entities that involve in physiology and pathology. Chakrapani has thrown light on the concept that "asanghatam", "anavasthitam", and "anasadyam" of doshas cannote meaning "sanghatarahitam", "chalaswabhavam" and "anividavayatvam", respectively unattachedness, movable and seperatedness phenomenally behind the curtain.

Vata dosha is having 5 kinds namely prana, udana, samana, vyana and apana. Pitta dosha is having 5 kinds namely brajaka, ranjaka, aalochaka, pachaka and sadhaka. Kapha dosha is having 5 kinds namely sleshmaka, avalambaka, tarpaka, bodhaka and kledaka. The attributed functions are almost same in all the classics of Ayurveda, for all the kinds of Tridoshas. It is accepted that the prime gunas of Tridoshas are holding good with their kinds. Thus the pranavata is having ruksha, sita, sukshma etc. while executing the corresponding functions. At this juncture it is a need to give a thought over the event how it is carried out. Moreover, the events are known to be sequential and the net outcome may be expressed as guna and with the systemic level the same may lead to completion of the relativistic function at the unit level. Before going to the application of phenomenal propensities of gunas, the fundamental cellular activities are to be brought into the study. The transport mechanisms, ionic exchange input and output through the cellular membrane etc. are broadly understood as vata. The transformations and energy exchanges including enzymatic reactions, thermodynamics are all viewed as pitta. The anabolic reactions, molecular formations including structural responses are considered in kapha.

There are certain general dictums applicable to Tridoshas, they are.
Tridoshas are evolved from panchamahabhutas.
Tridoshas are moving all over the body and functions are carried out.
Tridoshas are traversed through srotuses.

1. एतान्येव वातप्रकोपप्रशमनानि भवन्ति यथा ह्येनमसङ्घातमनवस्थितमनासाद्य प्रकोपणप्रशमनानि प्रकोपयन्ति प्रशमयन्ति वा तथाऽनुव्याख्यास्यामःवातप्रकोपणानि खलु रूक्ष लघु शीत दारुण खर विशद शुषिरकराणि शरीराणां तथाविधेषु शरीरेषु वायुराश्रयं गत्वाऽऽप्यायमानः प्रकोपमापद्यते वातप्रशमनानि पुनः स्निग्ध गुरूष्ण श्लक्ष्ण मृदु पिच्छिल घनकराणि शरीराणां तथाविधेषु शरीरेषु वायुरसज्यमानश्चरन् प्रशान्तिमापद्यते।

2. सर्वशरीरचरास्तु वातपित्तश्लेष्माणः सर्वस्मिञ्छरीरे कुपिताकुपिताः शुभाशुभानि कुर्वन्ति--प्रकृतिभूताः शुभान्युपचयबलवर्णप्रसादादीनि अशुभानि पुनर्विकृतिमापन्ना विकारसंज्ञकानि।

3. सर्वेष्वपि खल्वेतेषु वातविकारेषूक्तेष्वन्येषु चानुक्तेषु वायोरिदमात्मरूपमपरिणामि कर्मणश्च स्वलक्षणं यदुपलभ्य तदवयवं वा विमुक्तसन्देहा वातविकारमेवाध्यवस्यन्ति कुशलाः तद्यथा रौक्ष्यं

शैत्यं लाघवं वैशद्यं गतिरमूर्तत्वमनवस्थितत्वं चेति वायोरात्मरूपाणि एवंविधत्वाच्च वायोः कर्मणः स्वलक्षणमिदमस्य भवति तं तं शरीरावयवमाविशतः तद्यथा--स्रंसभ्रं सव्या ससङ्ग भेद साद हर्ष तर्ष कम्प वर्तचाल तोद व्यथा चेष्टादीनि तथा खर परुष विशद सुषिरारुणवर्ण कषायविरसमु-खत्व शोष शूल सुप्ति सङ्कोचन स्तम्भन खञ्ज क्षतादीनि च वायोः कर्माणि तैरन्वितं वातविकारमेवाध्यवस्येत्।

Phenomenal aspects of the propensities in physiological functions: Swasa is a function of pranavata and may be understood in a better way with the core explanation of process of diffusion coupled with mechanics and dynamics. Air entering into the trachea reaching the bronchiole and the diffusion takes place through the surfactant in the lungs in a cycle of respiration. In Ayurvedic view the propensities possessed by vata will achieve the function of swasa.

"sukshma" is one of the gunas of vata, phenomenally "vivarana" is done at the channels, i.e, srotuses (opening of micro channels in gases diffusion) with the physical laws applied. As such there will not be any single propensity existing in the biological system but clubbed with other counter propensities which lead to the ultimate desired effect. In a nut shell these are necessarily falling under corresponding bio - physical and bio- chemical events. It is evident that "sukshma" is relativistic with the "sthula", which is phenomenally "samvarana", opposite to "viverana". "samvarana" is closure of the channel. "sthula" is known to be propensity of kapha. Here the movement is required for anything either in diffusion or perfusion at tissue level or at unit level. Movement of any particle is achieved through transport mechanism, may it be simple transport, facilitated transport or mediated transport. Thus it is understood an event is a combination of minimum two propensities at a juncture which is supposed to be a completion of the proposed action or a part of it. For example, Simple cellular event, sodium-potassium pump through the cell membrane to achieve membrane potentiality is expressed in terms of relativistic propensities coupled with karmanya gunas.

4. परिणारमतस्त्वाहारस्य गुणाः शरीरगुणभावमापद्यन्ते यथास्वमविरुद्धाः विरुद्धाश्च विहन्युर्विहताश्च विरोधिभिः शरीरम्।

Interpretation as wholesome phenomena

Pranavata carry out the function of swasa in coordination of pitta and kapha persisting during the function. Here "vivarana" is vata and "samvarana" is kapha. The cycle of getting opened followed by a closure and repeated with opening again for specific channels or gate ways or any other similar physiological function, must be understood as "relativistic phenoemenal propensity". At the outset the basic membrane potentiality for normal cell functions involving ionic exchange through the cell membrane may give raise to variable effects with different systems.

Interpretations in diseased conditions

Swasa as a diseased condition must be understood as a vitiation of pranavata. The total picture of swasa disease may present different symptoms which are not only systemic but also general. It is to be noted that swasa is mentioned as one of the sufferings in some other disease. In a nutshell swasa as physiological phenomena will have a definite alteration to the core. This may be with vitiation of other kinds of vata, pitta and kapha, as per the triggering factor. There may be a special note referring to one diseased phase like tamakaswasa originating at pittasthana. Relevantly rechana is 1st line of treatment modality for tamakaswasa.

The probable alterations in physiological phenomena is expected to be as follows: sita aahara, vihara triggers vata and kapha as per the causative factor for e.g.; eating ice-cream or cold water (sita aahara), exposing to a.c or cold breeze (sita vihara) may lead to vitiation of vata and kapha as per the subject to the condition. The expected propensities which get altered are ruksha, sita, sukshma, and sthula.

Dravyataha vridhi may give raise to guru, sthula gunas.
Gunataha vridhi may give raise to sita, ruksha, sukshma.
Karmataha vridhi impairing the function of swasa
Hyper secretion of mucus or accumulations of fluids fall under dravyataha vridhi. Impairment of bronchiolar dilatation is the result of sthula guna (samvarana). Ultimate inefficiency in gaseous exchange is the picture of swasa.

Probable consequences are, increased secretions or accumulations of the fluids in the tracheal tree (may be because of infection) obstruct the macroscopic bronchioles. Microscopically oedematous accumulation, the lung tissue will obstruct the gaseous diffusion through surfactant. Dominant sthula guna suppresses sukshma guna, i.e. samvarana dominates

vivarana. Where samvarana is kapha propensity and vivarana is vata propensity. As it is noted that pitta sthana is prime seat for swasa disease, ice-cream and cold water hampers the pachaka pitta at amasaya level. Then the pitta vitiation is established. Ushna and laghu gunas of pitta are dominated by sita and guru gunas of kapha.

Concept of srotus

Main srotus is pranavaha srotus and hridaya is the mula sthana for rasavaha srotus also and thus impairment goes together. Atipravrithi, sanga and vimarga gamana are clearly seen. All the channels involved microscopic or macroscopic are falling under srotus only.

5. स्रोतांसि सिराः धमन्यः रसायन्यः रसवाहिन्यः नाड्यः पन्थानः मार्गाः शरीरच्छिद्राणि संवृतासंवृतानि स्थानानि आशयाः निकेताश्चेति शरीरधात्ववकाशानां लक्ष्यालक्ष्याणां नामानि भवन्ति तेषां प्रकोपात् स्थानस्थाश्चैव मार्गगाश्च शरीरधातवः प्रकोपमापद्यन्ते इतरेषां प्रकोपादितराणि च स्रोतांसि स्रोतांस्येव धातवश्च धातूनेव प्रदूषयन्ति प्रदुष्टाः तेषां सर्वेषामेव वातपित्तश्लेष्माणः प्रदुष्टा दूषयितारो भवन्ति दोषस्वभावादिति।

Consideration of propensities of Tridoshas in pharmacology

Aim of the treatment is dathu samyata to be attained by dosha samyata. It is nothing but reversal of pathology, in the way how disease is established. Rasaadi panchaka are applicable according to the condition. Medicaments in swasa containing ushna, laghu, and sukshma gunas to counter the sita, guru, and sthula gunas. Rectification at the level of srotuses will be achieved by logical treatment modalities (sodhana & samana). Drugs like manahsila fulfill the requirements and achieve desired effect. Then the requirement of ushnata, laghuta, and sukshmata will be variable as per the patient's condition as well as prakruthi of the patient, vikriti avastha, vyadhisthiti, doshasthiti etc., thus there will be difference in dosage, formulation, and mode of administration. In swasa oedematous conditions at surfactant will be countered by ushna, laghu, sukshma and ruksha gunas of given medicaments. Out of soshana ruksha guna achieves desired effects along with ushna, laghu and sukshma gunas. Allied actions over apanavata karma, which relieves constipation and help to achieve pitta nirharana. Here vata activity is regularized in due course of pharmacological action.

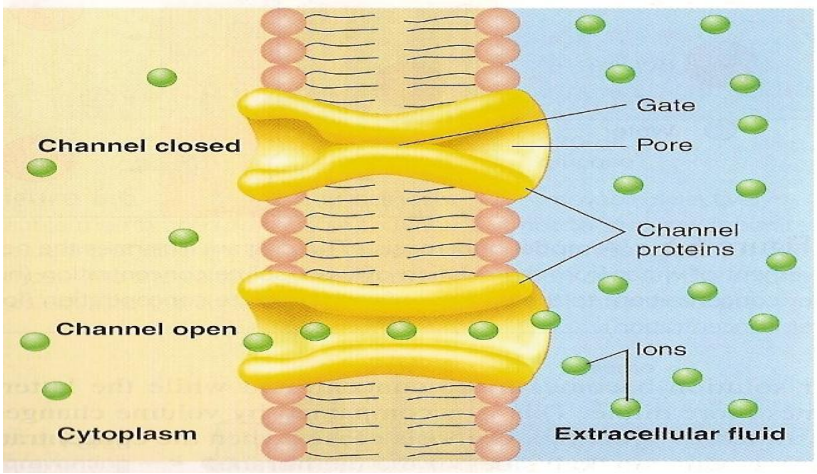
Illustrations: Here are the illustrations of the phenomenal propensities of the doshas involving in physiological and pathological states. Physiological state is "prasadakhya guna" where as pathological state is "malaakhya guna", of that particular situation. With the help of pharmacology "malaakhyaguna" is brought back to the "prasadakya guna". In a nutshell, any of the kind of dosha karma will be rectified by the use of selective medicament keeping intact the general principles or with any other special preparations.

In the following illustrations, samvarana and vivarana are understood at cellular channels i.e. sukshma srotuses. Chala guna is "prerana karma" phenomenally and thus it is seen as depolarization and repolarization of cell membrane. Ruksha guna is "soshana" at tissue level and can best be understood in cardio myopathy of ischemic in origin.

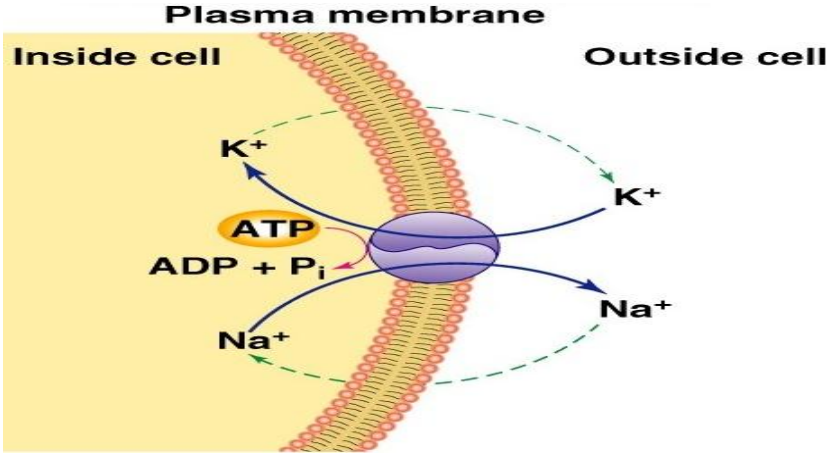
Functional propensities are expressed as (guna) phenominae

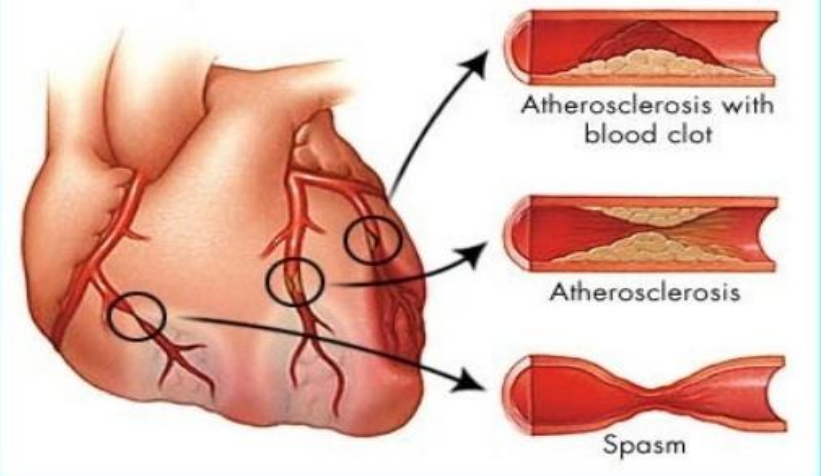
6. Illustrations from Gyton physiology website

1. Samvarana and vivarana (sthula and sukshma).



2. chala guna (prerana).



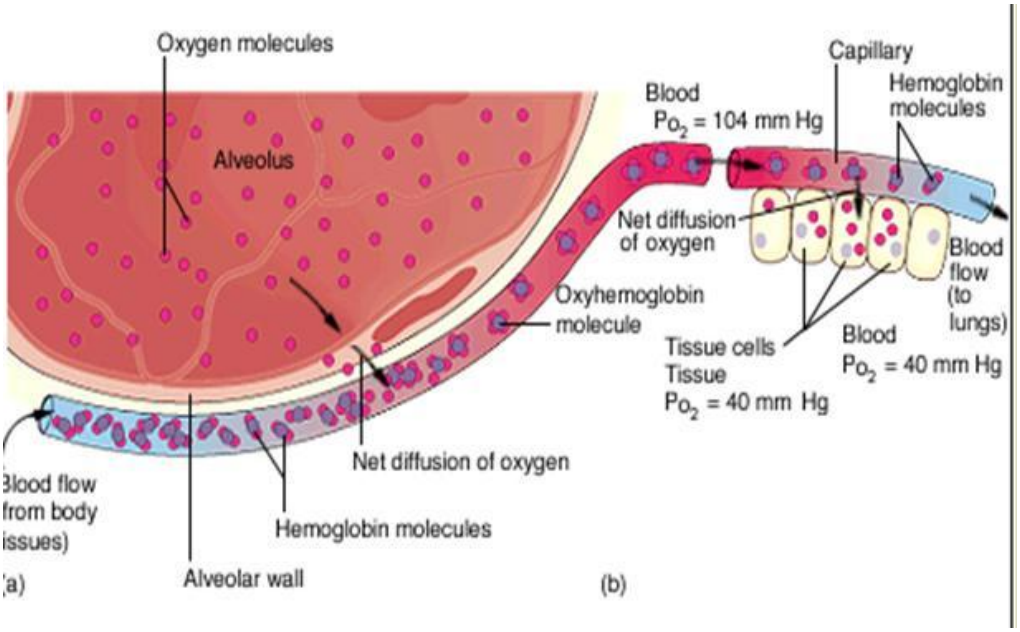


3. Ruksha (soshana karma) at receiving end of heart muscle (M.I.).

7. शरीरगुणाः पुनर्द्विविधाः संग्रहेण मलभूताः प्रसादभूताश्च तत्र मलभूतास्ते ये शरीरस्याबाधकराः स्युः तद्यथाशरीरच्छिद्रेषूपदेहाः पृथग्जन्मानो बहिर्मुखाः परिपक्वाश्च धातवः प्रकुपिताश्च वातपित्तश्लेष्माणः ये चान्येऽपि केचिच्छरीरे तिष्ठन्तो भावाः शरीरस्योपघातायोपपद्यन्ते सर्वास्तान्मले संचक्ष्महे इतरांस्तु प्रसादे गुर्वादींश्च द्रवान्तान् गुणभेदेन रसादींश्च शुक्रान्तान् द्रव्यभेदेन।

Swasa physiology and pathology (respiratory distress due to pulmonary oedema)

8. Illustrations from pathology of pulmonary oedema website



Causes of pulmonary edema

- Increased cap hydrostatic pressure
  - Recognized by measuring capillary "wedge" pressure (~pulm venous press.)
- Increased cap permeability
  - Also inc. cap hydrostatic pressure
- Reduced lymph drainage
  - Heart failure exacrebates this as central venous pressure rises
- Decreased interstitial pressure
  - rare
- Decreased colloid osmotic pressure
  - rare
- Uncertain etiology
  - Heroin overdose

TABLE 7–1
Causes of Pulmonary Edema

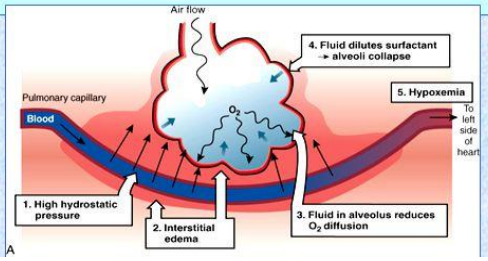
Mechanism	Precipitating Event
Increased capillary hydrostatic pressure	Myocardial infarction, mitral stenosis, fluid overload, pulmonary veno-occlusive disease
Increased capillary permeability	Inhaled or circulating toxins, sepsis, radiation, oxygen toxicity, ARDS
Reduced lymph drainage	Increased central venous pressure, lymphangitis carcinomatosa
Decreased interstitial pressure	Rapid removal of pleural effusion or pneumothorax, hyperinflation
Decreased colloid osmotic pressure	Overtransfusion hypoalbuminemia, renal disease
Uncertain etiology	High altitude, neurogenic, overinflation, heroin

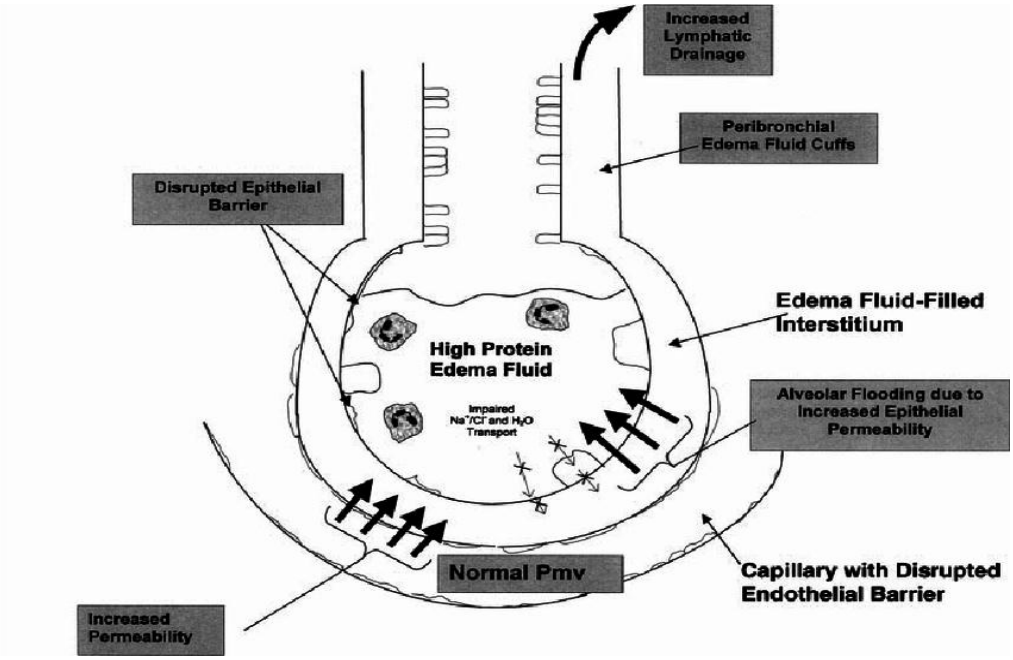
*ARDS, adult respiratory distress syndrome.

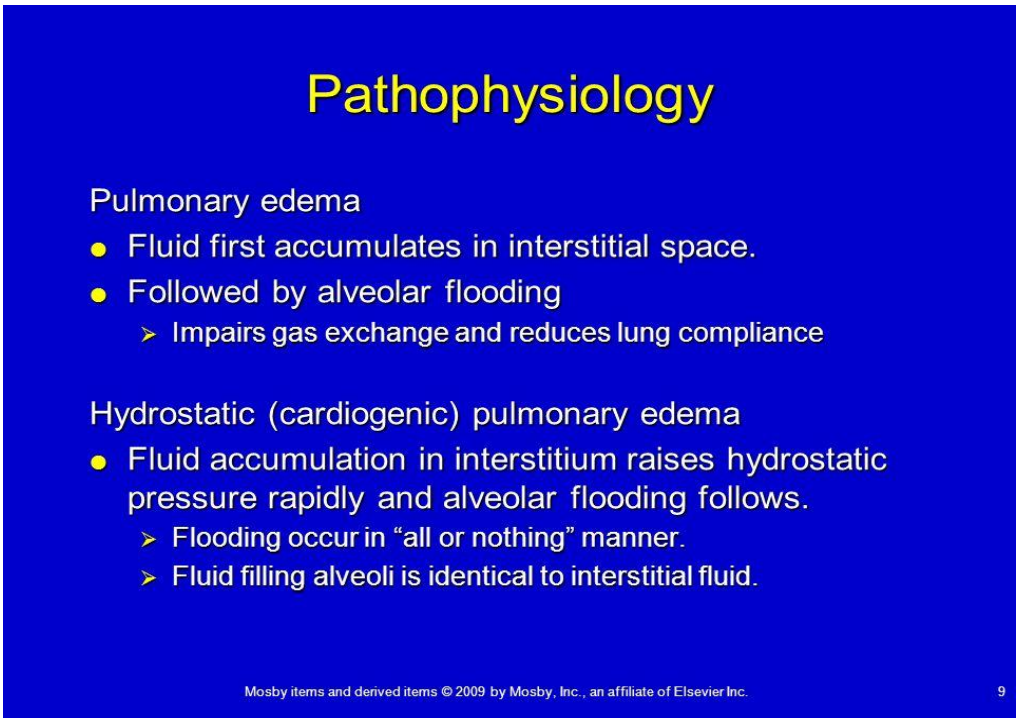
Vascular disorders

Pulmonary edema

- **Pathophysiology**
  - **Fluid collection (edema) in all lung tissues**
    - **Affects gas exchange**
    - **Affects lung expansion**
  - **Key = pulmonary capillary pressure increases & fluid moves into alveoli**
    - **Capillaries rupture & get bloody sputum (hemoptysis)**
- **True medical emergency**
- **Etiology**
  - **Left sided heart failure**
  - **Hypoproteinemia**
  - **Inhalation of toxic gases**
  - **Lymphatic blockage (e.g. from tumor)**







9. शरीरावयवास्तु परमाणुभेदेनापरिसंख्येया भवन्ति अतिबहुत्वादतिसौक्ष्म्यदतीन्द्रियत्वाच्च तेषां संयोगविभागे परमाणूनां कारणं वायुः कर्मस्वभावश्च॥

10. तेषां सर्वेषामेव वातपित्तश्लेष्माणो दुष्टा दूषयितारो भवन्ति दोषस्वभावात् एतावत्येव दुष्टदोषगतिर्यावत् संस्पर्शनाच्छरीरधातूनाम् प्रकृतिभूतानां तु खलु वातादीनां फलमारोग्यम् तस्मादेषां प्रकृतिभावे प्रयतितव्यं बुद्धिमद्भिरिति।

Above illustrations explore the phenomenal consequences of swasa in physiology and pathology in terms of srotuses and the pathology resulting out of a cause leading to pathophysiology (samprapti), necessarily involves biophysical and biochemical derangement (altered pressure gradients, transport between two media, bio chemical entities etc..) where in multiple systems may be affected, in turn to be considered as " srotodushti" of dhatus having been involved with "dosha dushya sammurchana", and thus established as lakshana samuchaya of that vyadhi.

DISCUSSIONS AND CONCLUSIONS

- Sadharana gunas and karmanya gunas are always relativistic.
- Prasadabhutata and malabhutata (malaakhyaguna) of gunas is individual with subject to the conditions.
- All the phenomenae necessarily involve biophysical and biochemical events.

It is to conclude that the gunas of doshas are to be understood as physiological propensities which are held responsible for physiological functions and the alterations in these propensities precipitate the pathological conditions. The exact dosha-dushya sammurchana is in terms of changes in gunas. Medicaments used to treat the pathological conditions are expected to reverse the diseased phase of propensities of the doshas. The present medical scenario demands a strategic and evidence based knowledge and the same is carried out with Ayurveda.

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