EXPONENT
Empowering The Common Man

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Editorial

Hi friends it's a pleasure meeting all of you again. We are happy to come up with the first issue of Volume 4 of this journal. Our lifestyle is progressing day by day from being bad to worse, causing a rapid rise in number of different types of diseases and health problems. These health problems are not limited to a single person but the entire community is suffering from it. Most of the time it happens because oflack in knowledge about the basic information regarding health and lifestyle issues and their preventive measures. In this issue the authors have tried to explain some of the common health problems in an easy and simplified manner along with a note on measures to prevent them.

Continuing the series on Prakruti from Ayurvedic medicine, Dr.A. Raut has explained in her article about the lifestyle guidelines necessary for the people with Vata Prakruti to balance the particular dosha.

When we eat how does the food travel to our stomach/ to our intestines? How does our digestive system look? A lot of such questions can come into our mind regarding our digestive system, as the organs of this system such as Stomach, intestine, etc. are present inside our body and are not visible outside. In the second article Dr. Deepak Khedekar has explained about anatomy of the human Digestive System in a way that is simple and easy to understand, covering each and every detail.

World Health Organization has declared 24th March every year as the World Tuberculosis Day to create an awareness about tuberculosis. The cases of tuberculosis are rising again all over the world and also in India. In this issue Dr. Shruti Prabhu has explained us everything about tuberculosis including its treatment preventive measures, in a simple way.

Nowadays hardly anybody ventures into the sunlight by choice. Job requirements and busy schedule being the reason behind this but it is jeopardizing the vitamin D levels of the people at large. Dr. Shilpa Mestry in her article on Vitamin-D has explained us about How Vitamin D is formed in the human body, what are its dietary sources, what happens to our body in the case of vitamin D deficiency and why it is necessary to have a Sufficient Vitamin D in our body. It also sheds a light on the corrective measures for vitamin D deficiency.

Every year rainy season brings a number of diseases and health problems along with it. And Dengue is the king of them. The stagnant water provides a good shelter for Dengue mosquito for breeding. That is the reason dengue fever cases peak during the rainy season. Dr. Umesh Shirodkar has explained in his article on dengue fever about how it is caused?, Signs and symptoms, prevention and treatment. With a note on laboratory tests required for the diagnosis and their significance.

Hope we have satisfied you with the articles on common health and lifestyle realted problems and how to prevent them. We will try to keep on updating you about the information regarding health and health services in the upcoming issues.

Prakruti – Your Body-Mind Blueprint - Part X

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Lifestyle guidlines for your Prakruti Type – VataPrakruti
In the 10th article of this series now we will be exploring lifestyle recommendations for each Prakruti type.

Previously, in the last series of nine articles, we have seen how Ayurveda recognizes individual uniqueness in terms of Prakruti or body-type. The dominant dosha (bioenergy) in your physiology defines your Prakruti. All the recommendations for the diet, Lifestyle, medications etc. revolve around the individual Prakruti.

So far, we have understood the diet recommendations for each dosha dominant Prakruti such as VataPrakruti, Pitta Prakruti, and KaphaPrakruti. In Ayurvedic treatment modalities, along with diet (Aahar), lifestyle (Vihar) recommendations are equally important with medicines.

So let's see how each dosha type should adopt the lifestyle which will help that particular dosha to be balanced in his or her body.

We will start with **VataPrakruti** type. As we know, in Ayurveda, recommendations of any doshatype are based on qualities of particular dosha.For balancing any dosha one has to use the action of opposite quality. For example, if we are working on VataPrakruti type people, the quality of Vatadosha are Dry, Cold and Mobile (on the move). Hence for balancing Vatadosha one has to use Unctuous, Hot and Grounded qualities.

Vatadosha type people have tendency towards change which can potentially create irregularity in their daily routine and hence establishing a regular routine is the very first step for balancing Vatadosha in VataPrakruti type.

The literal meaning of Vata is Wind. Like the wind, Vata type people have hard time settling down and staying grounded. Due to the mobile quality of Vatadosha, they do not like sitting idle but prefer constant activity as if not doing anything is a punishment for them. With constant activity they really lose a lot of energy. To restore energy, plenty of rest is much recommended for Vata type. Their sleep pattern is also disturbed or interrupted. Or in some cases, they take time falling asleep.The best recommendation for having a good night sleep is to perform alternate nostril breathing

(a type of Pranayama) at least 5 minutes before going to bed. Applying and rubbing oil to the sole of the feet further helps to gain a sound sleep. Even during day-time, Vata type people can have energy drain. Performing Shavasana and thereby giving time for quietness help a lot to restore Vata balance.

Since Vatadosha's quality is cold, Vata type people's hands and feet are often cold. In general they are sensitive to cold. So they are recommended to stay warm. Especially in very cold and windy weather, they should strictly wear a Hat (monkey cap) to cover and protect head and ears.

Their digestion is erratic, so the simplest guideline they should follow is to – eat on time. As Vatadosha is dry in nature, Vataprakruti type people often have dry skin or tendency towards roughness. Therefore, applying oil on body's extremities (hands and legs) help to balance Vatadosha. Also, due to dryness, it is critical for Vata type people for paying attention to fluid intake and keeping hydrated helps.

Under stress, Vata type individuals face anxiety, insecurity and nervousness. The best way to keep stress under control for Vata type is to perform meditation. Daily practice of meditation calms their nervous system.

Doing exercise every day is essential for all Prakruti types. With their light muscles, bones and thin body frame Vata types do best with quieter exercises like walking, jogging or yogasnas. The most important seat of Vatadosha in the body is in the pelvic cavity and the exercise that stretches the pelvic muscles help to calm Vatadosha. Hence particularly yoga postures beneficial for Vataprakruti are Lotus(Padmasana), Cat (Marjarasana), Forward bend(Pashchimottanasan), Backward bend or Cobra (Bhujangasana), Plow(Halasana), Leg lifts(Viparitakarani) etc.

Profession or employment consumes at least one third part of one's life. Success or failure is ones chosen occupation or profession can profoundly affect physical or mental health.Therefore Ayurveda recommends that nature of work should be aligned with ones doshaPrakruti type.

Vata-dosha type people usually love work that requires sudden bursts of intense energy. At the same time it tends to exhaust such individuals. Hence these people should look for a job where they do not exhaust themselves and they get adequate rest, especially in the afternoons. They should avoid places where the air is exceptionally cool and dry.

Highly creative, quick thinkers at their best, vataPrakrutitypes may be prone in their vulnerable moments to have difficulty settling down long enough to actualize their visions. They are prone to distractions, free-floating fear, and worry—the latter of which one authority defines as "movement of the mind without anchor." Vata-imbalanced people can actually find their stress subdued by calm, quiet, grounded activity. Thus, an ideal career choice for a Vata type would allow them to make use of their highly imaginative capacity for creative expression while at the same time "anchoring" them to a set daily routine. Some of the best examples could be in the role of a commercial artist or graphic designer or newspaper editor. Stage artist also can be very exciting career for them as adopting change is inherent to themwhether it is situational or environmental. So they caneasily change their facial expressions and moods very well. As VataPrakruti typelove to travel and constantly want to meet new people, they led into travel related profession, like the airlines or tourist guide. Being a clairvoyant, they also enjoy a profession where along with knowledge of the subject intuition is equally needed. Vataprakruti type study and can do career in mystic sciences such as Jyotish, Vastu etc.

After understanding lifestyle recommendations for VataPrakruti type, in the next article we will see the lifestyle recommendations for balancing Pitta Prakruti type.

Gastrointestinal Tract

- Dr. Deepak N. Khedekar

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Introduction:

The Gastro intestinal system is one of the important system of the body concerned with digestion of food and excretion of its bye product.

The mouth (oral cavity):

The mouth or oral cavity is where the process of digestion begins .The oral cavity consists of several different structures as shown in figure 1. The lips and cheeks are muscular and connective tissue structures,lined with mucus(viscid-thick secretion)-secreting, stratified squamous epithelial cells which provide protection against abrasion caused by wear and tear.

Lips and cheeks

The lips and cheeks help to move and hold food in the mouth while the teeth tear and grind the food. This process is calledmastication (chewing). The lips and cheeks are also involved in speech and facial expression.

Tongue :(figure 1 &2)

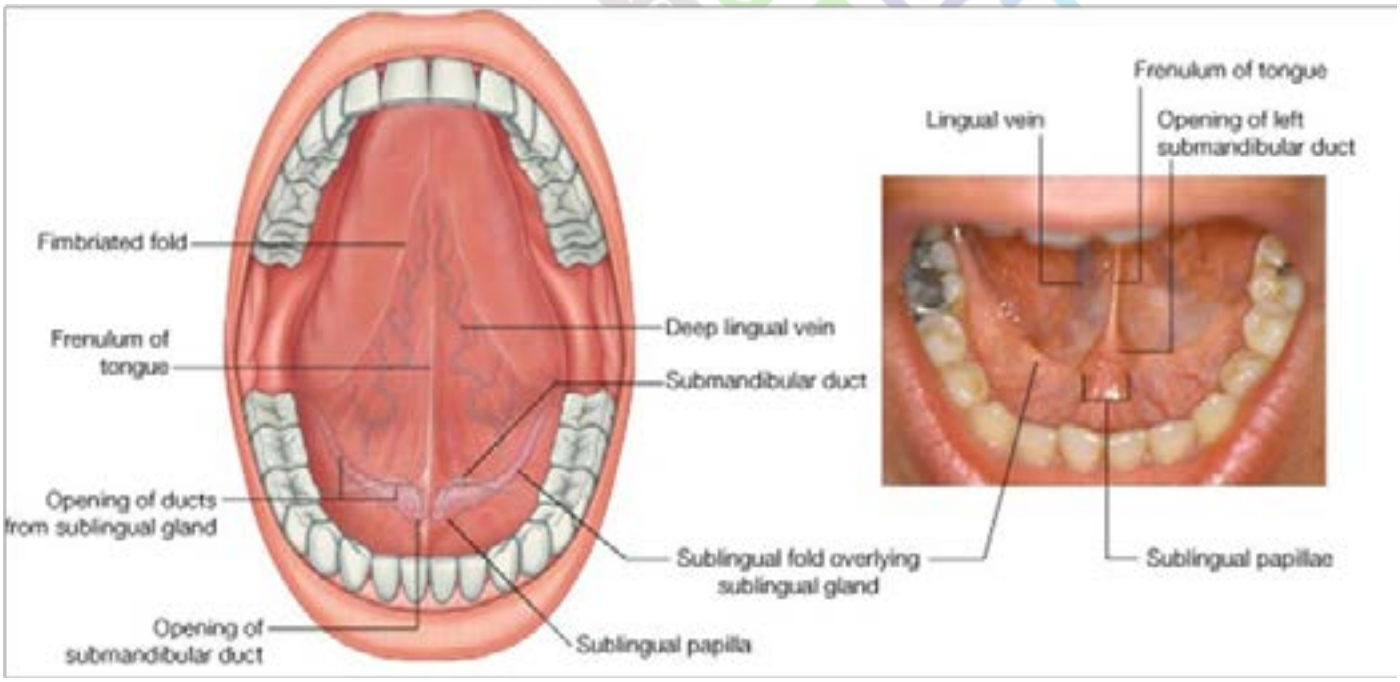

Figure 1:Tongue (Ventral surface)

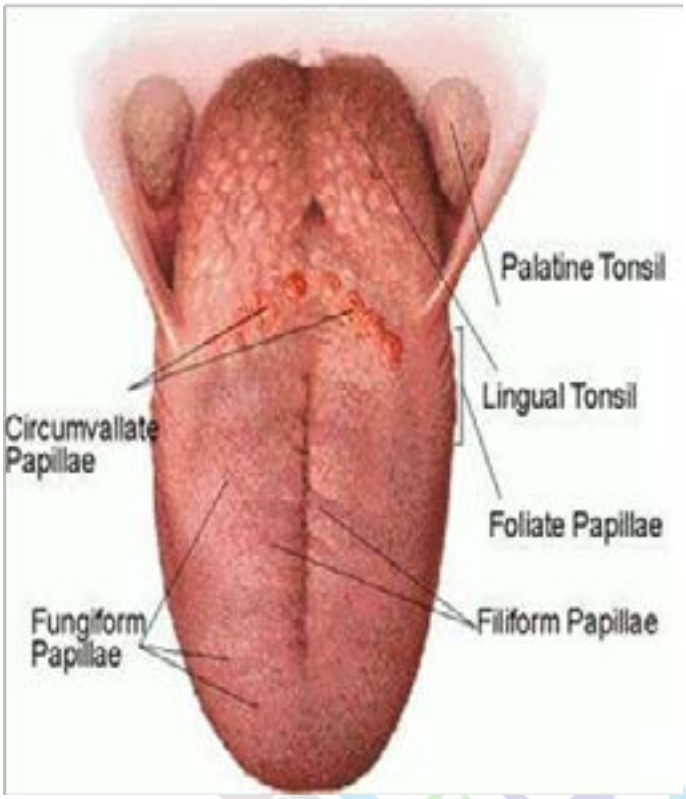

Figure 2: Tongue (dorsal surface)

The tongue is a muscular organ in the mouth. It is covered with moist, pink tissue called mucosa. Tiny bumps called papillae give the tongue its rough texture. Thousands of taste buds cover the surfaces of the papillae. Taste buds are collections of nerve-like cells that connect to nerves running into the brain. The tongue is anchored to the mouth by webs of tough tissue and mucosa. The tether holding down the front of the tongue is called the frenulum. In the back of the mouth, the tongue is anchored into the hyoid bone.The tongue is vital for chewing and swallowing food, as well as for speech.

Palate: (figure 3)

The palate forms the roof of the mouth and consists of two parts:the hard palate and the soft palate. The hard palate is located anteriorly and is bony. The soft palate lies posteriorly and consists of skeletal muscle and connective tissue. The palate plays a part in swallowing. The palatine tonsils lie laterally and are lymphoid tissue. The uvula is a fold of tissue that hangs down from the centreof the soft palate.

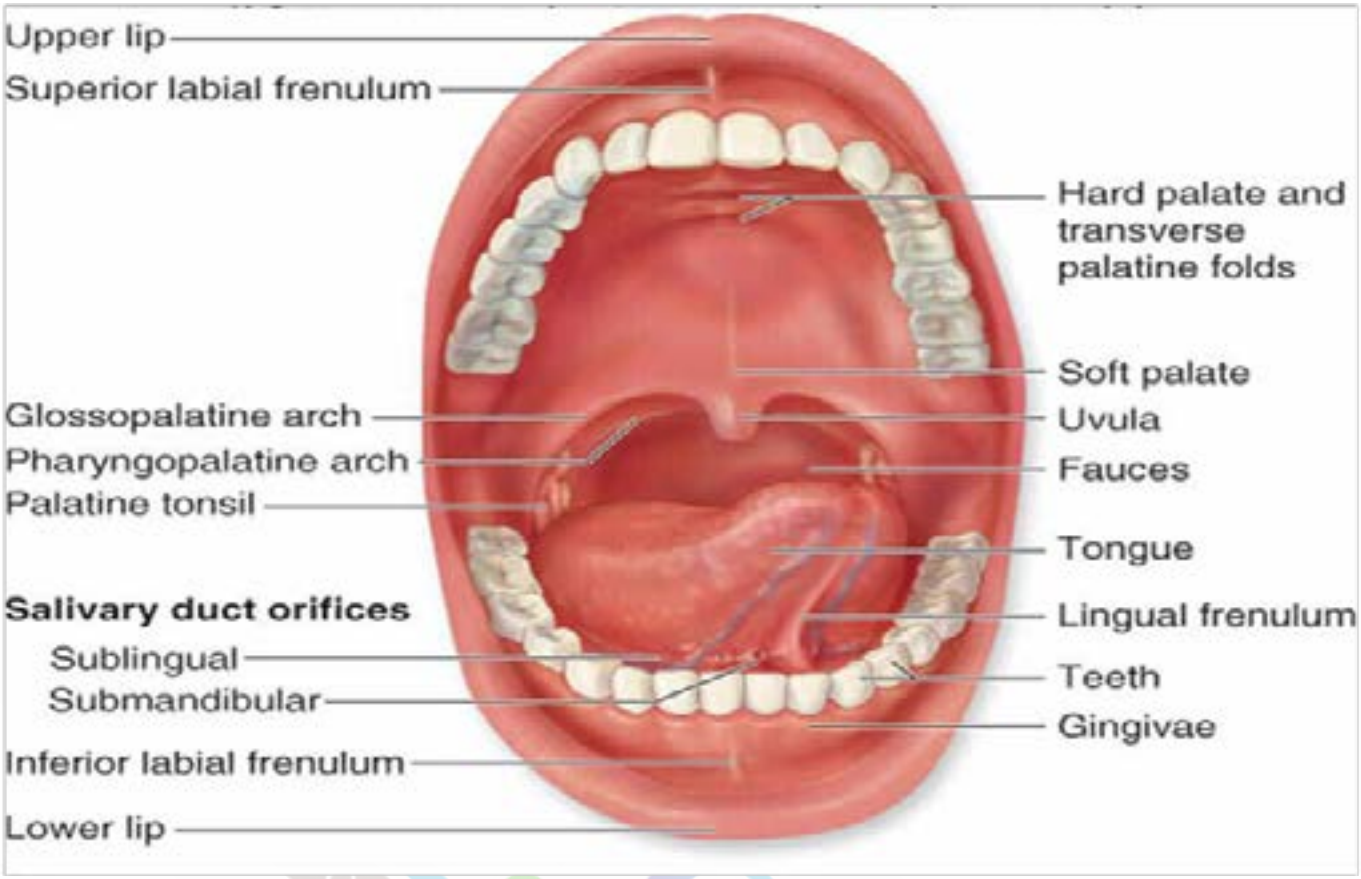

Figure 3 :Palate in oral cavity

Salivary glands: (figure 1 & 3)

Saliva is produced in and secreted from salivary glands. Salivary glands are classified according to their location Parotid, sublingual, submandibular salivary gland. The basic secretory units of salivary glands are clusters of cells called acini. These cells secrete a fluid that contains water, electrolytes, mucus and enzymes, all of which flow out of the acinus into collecting ducts.Within the ducts, the composition of the secretion is altered.Much of the sodium is actively reabsorbed, potassium is secreted,and large quantities of bicarbonate ion are secreted. Bicarbonate is important because it, along with phosphate, provides a critical buffer that neutralizes the massive quantities of acid produced inthe stomach.

Oesophagus: (figure 4 & 5)

When food exits the oral part of pharynx it enters the oesophagus (food pipe). The oesophagus extends from the laryngopharynx to the stomach. It is a thick walled structure and measures about 25 cm in length and lies in the thoracic cavity, posterior to the trachea(wind pipe). The function of the oesophagus is to transport substances (food bolus) from the mouth to the stomach. Thick mucous is secreted by the mucosa of the oesophagus and this aids the passage of the food bolus and protects the oesophagus from abrasion.

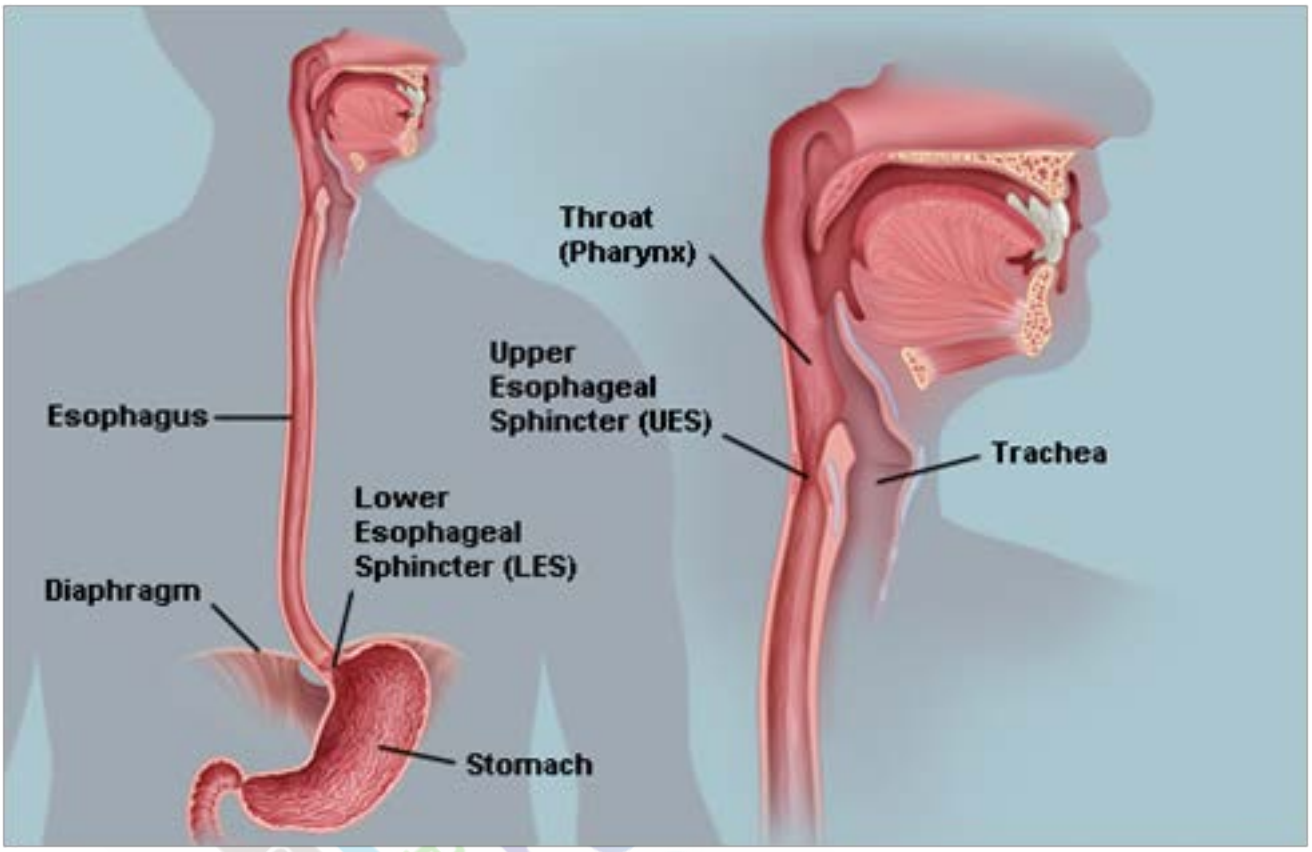

Figure 4:Oesophagus

The upper oesophageal sphincter regulates the movement ofsubstances into the oesophagus and the lower oesophageal sphincter (cardiac sphincter) regulates the movement of substances from the oesophagus to the stomach. The muscle layer of the oesophagus differs from the rest of the digestive tract as the superior portion consists of skeletal (voluntary) muscle and the inferior portion consists of smooth (involuntary) muscle.Breathing and swallowing cannot occur at the same time.

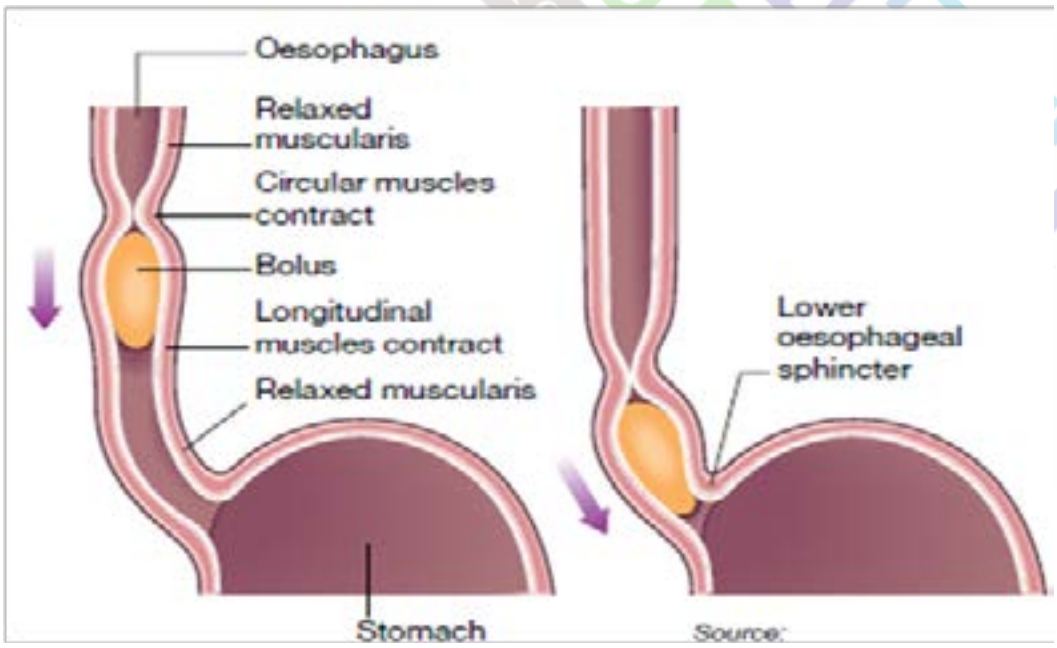

Figure 5:Oesophagus

Stomach:

The stomach is a muscular organ located on the left side of the upper abdomen. The stomach receives food from the oesophagus.As food reaches the end of the oesophagus, it enters the stomach through a muscular valve called the lower oesophageal sphincter. The stomach is supplied with arterial blood from a branch of the celiac artery and venous blood leaves the stomach via the hepatic vein. The vagus nerve(parasympathetic NS) innervates the stomach and stimulate gastric motility and secretion of gastric juice. Sympathetic fibres from the celiac plexus reduce gastric activity.The stomach has the same four layers of tissue as the digestive tract .It has longitudinal, circular and oblique muscle fibres. The extra muscle layer facilitates the churning, mixing and mechanical breakdown of food that occurs within the stomach as well as supporting the onward journey of the food by peristalsis.The stomach secretes acid and enzymes that digest food. Ridges of muscle tissue called rugae line the stomach. The stomach muscles contract periodically, churning food to enhance digestion. The pyloric sphincter is a muscular valve that opens to allow food to pass from the stomach to the duodenum.

Small intestine:

The small intestine is the part of the gastrointestinal tract following the stomach, and is where much of the digestion and absorption of food takes place. The small intestine consists of three sections. The first portion, called the duodenum, connects to the stomach. The middle portion is the jejunum. The final section, called the ileum,attaches to the large intestine.The small intestine is innervated with both parasympathetic (from the vagus nerve) and sympathetic (from the thoracic splanchnic nerve) systems. It receives its arterial blood supply from the superior mesenteric artery and nutrient-rich venous blood drains into the superior mesenteric vein and eventually into the hepatic portal vein toward the liver.

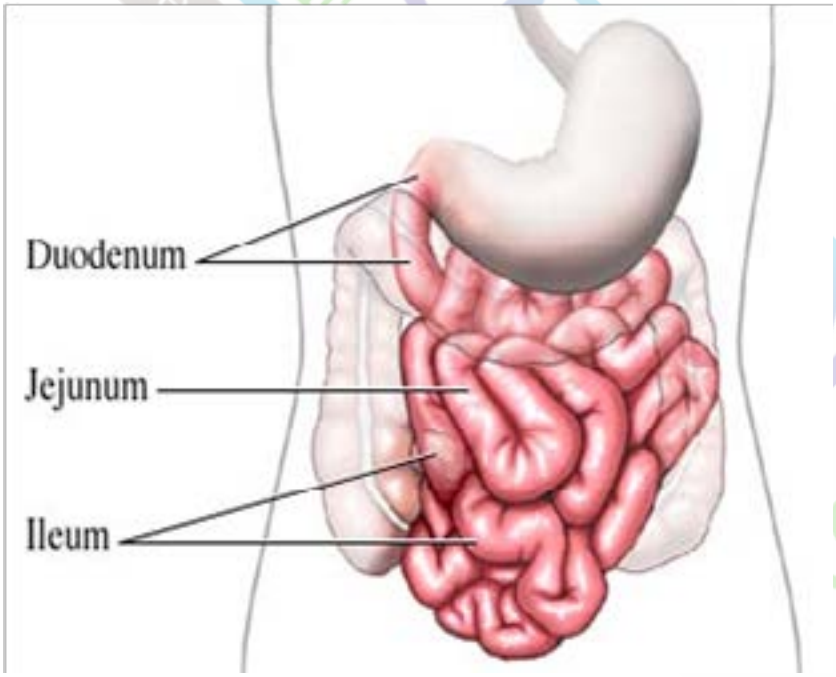

Figure 5 :Upper GIT

Duodenum: (figure 5)

The duodenum is a short portion of the small intestine connecting it to the stomach . It is approximately 25cm long,while the entire small intestine measures about 6.5 metres. This structure begins with the duodenal bulb, bordered by the pyloric sphincter that marks the lower end of the stomach, leading into the next portion of the small intestine, the jejunum.The duodenum is largely responsible for the breakdown of food

in the small intestine, using enzymes. The interior of the duodenumhave a leafy-looking appearance(villi), a histologically identifiable structure.Brunner's glands, which secrete mucus, are found in the duodenum.The duodenum wall is composed of a very thin layer of cells that form the muscularis mucosae.The duodenum also regulates the rate of emptying of the stomach.Secretin and cholecystokinin are released from cells in the duodenal epithelium in response to acidic and fatty stimuli present there when the pylorus opens and releases gastric chyme into the duodenum for further digestion. These cause the liver and gall bladder to release bile, and the pancreas to release bicarbonate and digestive enzymes such as trypsin, lipase and amylase into the duodenumas they are needed.

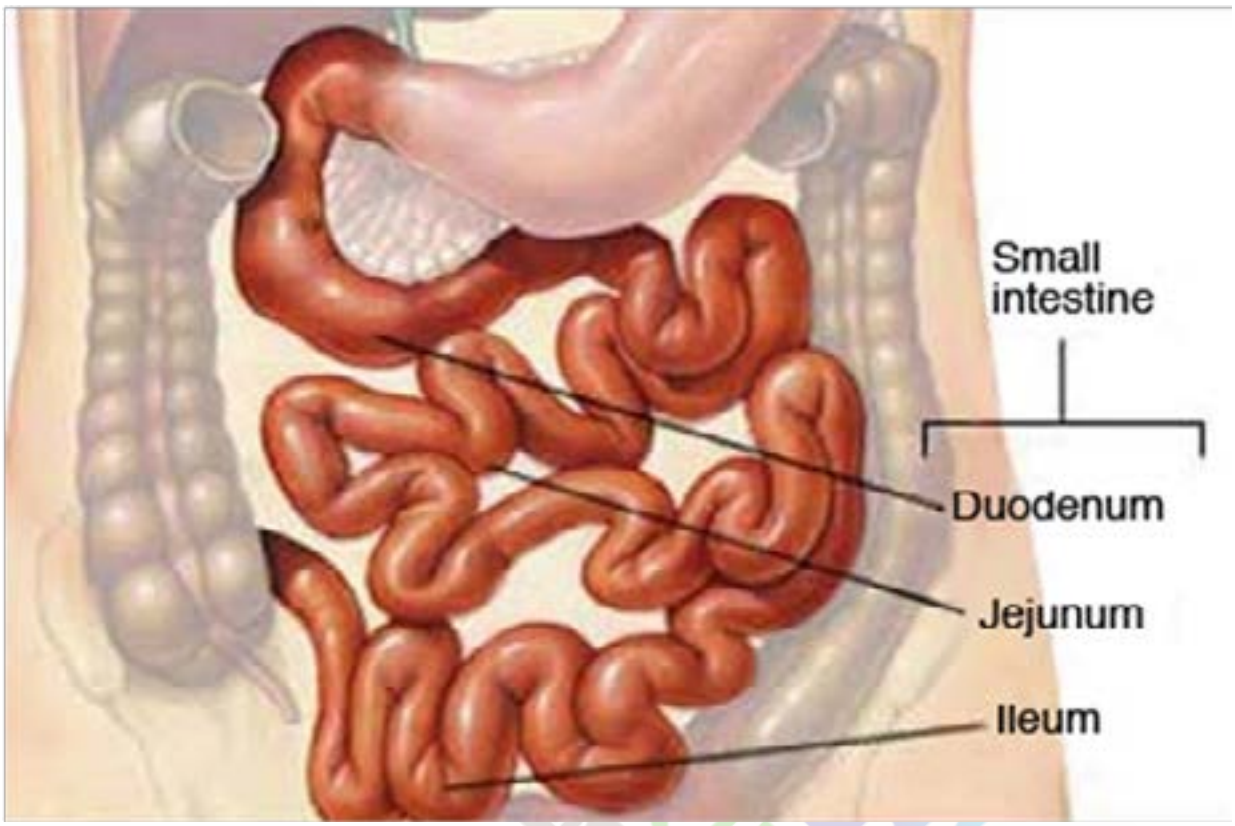

Figure : 6

Jejunum:(figure 5&6)

The section of the small intestine that comprises the first two-fifths beyond the duodenum; it is larger, thicker-walled, and more vascular and has more circular folds than the ileum. The inner surface of the jejunum, its mucous membrane, is covered in projections called villi, which increase the surface area of tissue available to absorb nutrients from the gut contents. The epithelial cells which line these villi possess even larger numbers of microvilli. The transport of nutrients across epithelial cells through the jejunum and ileum includes the passive transport of sugarfructose and the active transport of amino acids, small peptides, vitamins and most glucose. The villi in the jejunum are muchlonger than in the duodenum or ileum.The jejunum contains very few Brunner's glands (found in theduodenum) or Peyer's patches (found in the ileum). However,there are a few jejunal lymph nodes suspended in its mesentery.The jejunum has many large circular folds in its submucosa calledplicaecirculares, which increase the surface area for nutrientabsorption.

Ileum: (figure 5&6)

The ileum is the final and longest segment of the small intestine. Itis specifically responsible for the absorption of vitamin B12 and thereabsorption of bile salts. It is about 4 metreslong and extends from the jejunum (the middle section of thesmall intestine) to the ileocecal valve, which empties into the colon(large intestine). The ileum is suspended from the abdominal wallby the mesentery, a fold of serous membrane.The smooth muscle of the ileum is thinner than the walls ofother parts of the intestine, and its peristaltic contractions areslower.

The ileum's lining is also less permeable than that of theupper small intestine. Small collections of lymphatic tissue (Peyer'spatches) are embedded in the ileal wall, and specific receptors forbile salts and vitamin B12 are contained exclusively in its lining;about 90% of the bile salts in the intestinal contents isabsorbed by the ileum.

Large intestine (colon): (figure 7)

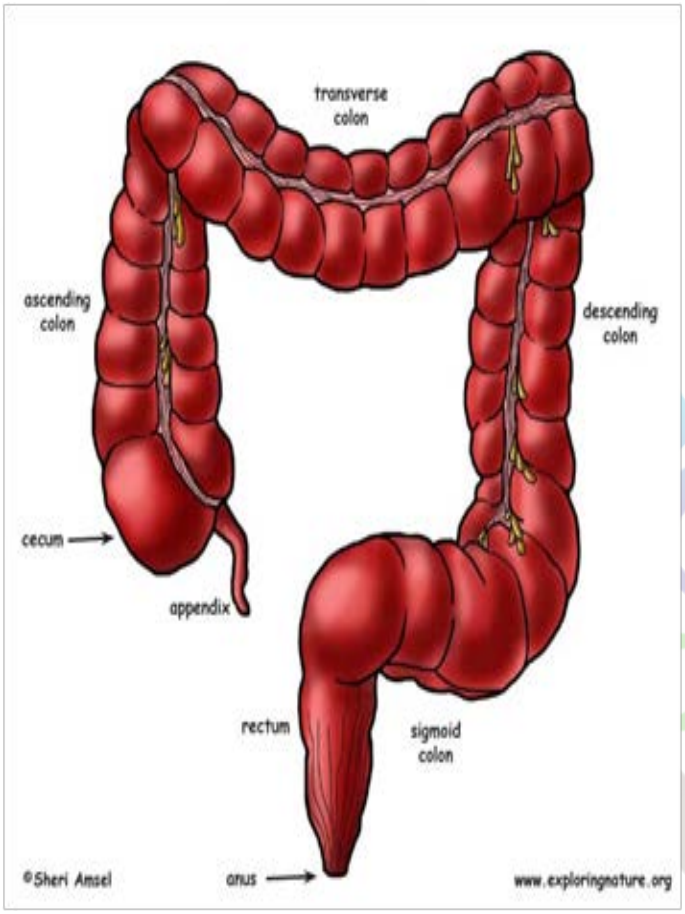

Figure: 7

The large intestine, next section of the intestine, consistsof four regions: the cecum, colon, rectum and anus.The term colon is sometimes used to refer to the entire largeintestine. The large intestine is wider and shorter than the smallintestine (approximately 1.5 metres in length) and has a smoothinner wall. In the upper half of the large intestine, enzymes fromthe small intestine complete the digestive process, and bacteriaproduce B vitamins (B12, thiamin and riboflavin).The large intestine mucosa contains large numbers of gobletcells that secrete mucus to ease the passage of faeces and protectthe walls of the colon. Anal sinusessecrete mucus in response to faecal compression. This protects theanal canal from the abrasion associated with emptying.The food residue from the ileum is fluid when in enters thecaecum and contains very few nutrients. The small intestine isresponsible for some of the absorption of water but the primaryfunction of the large intestine is to absorb water and turn the foodresidue into semi solid faeces. The large intestine also absorbssome vitamins, minerals, electrolytes and drugs.

Tuberculosis

- Dr. Shruti Prabhu

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Tuberculosis has been present in humans since antiquity.Known as “kshayrog” in India, it was termed as “consumption” in the western world in past due to its characteristic feature of causing debility in the affected person.

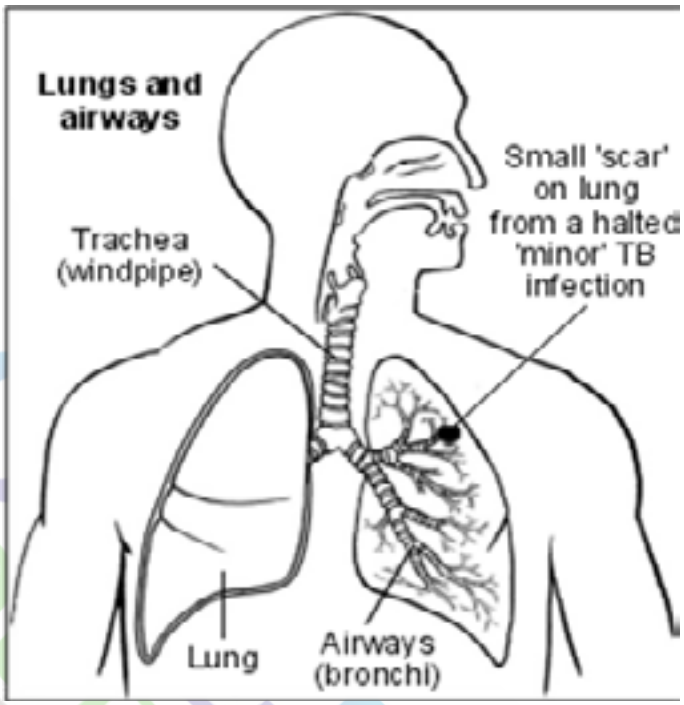
History

The bacteria causing tuberculosis, Mycobacterium tuberculosis, was identified and described on 24 March 1882 by Robert Koch. He received the Nobel Prize in physiology or medicine in 1905 for this discovery. Koch announced a glycerine extract of the tubercle bacilli as a “remedy” for tuberculosis in 1890, calling it “tuberculin”. While it was not effective, it was later successfully adapted as a screening test for the presence of pre-symptomatic tuberculosis. The World Tuberculosis Day was established on 24 March for this reason. Every year this day is marked to create public awareness about tuberculosis and strengthen disease control activities.

Albert Calmette and Camille Guérin achieved the first genuine success in immunization against tuberculosis in 1906, using attenuated bovine-strain tuberculosis. It was called Bacille Calmette–Guérin (BCG). The BCG vaccine was first used on humans in 1921 in France.

What is Tuberculosis?

Tuberculosis (TB) is a disease caused by the bacteria called as Mycobacterium tuberculosis. It spreads from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys or the spine. A person with TB can die if he/she does not get the effective treatment.



How does TB Spread?

TB bacteria are spread through the air from one person to another. TB bacteria are put into the air when a person with active TB disease of the lungs coughs, sneezes, speaks or sings. The bacteria are carried in the air within tiny water droplets. These bacteria can stay in the air unaffected for several hours, depending on the environmental conditions. People nearby who may breathe in the air containing these germs can become infected.

Poor hygiene and sanitation, overcrowding, lack of ventilation, smoking, alcohol and drug abuse and pre-existing illness favour the spread of TB. India has a high proportion TB infection and most of us get exposed to the TB bacteria on frequent basis . But still one will not get the disease unless the immunity of that person is very weak.

The infection may progress in one of the following three ways:

1. Minor infection with no symptoms - occurs in most cases

Most people with good health who breathe in TB bacteria do not develop active TB disease. The TB bacteria that are breathed in begin to multiply in the lung. This stimulates the body defence (immune system) into action. The TB bacteria are killed or made inactive by the immune system. There may be some mild symptoms for a short period of time or no symptoms at all and the infection is halted.

Usually a person is unaware that he/she has had a mild infection. A small scar on the lung may be seen on a chest X-ray. This may be the only indication of a previous TB infection.

2. Infection progressing into active TB disease - occurs in some cases

Active TB disease with symptoms occurs when the immune system does not win the battle and fails to halt the invading bacteria. The TB bacteria once gained the entry, multiply further and spreads to other parts of the lung and body. Symptoms of active TB then develop about 6-8 weeks after first breathing in of the bacteria.

TB infection can progresses to active disease in anybody who is infected with the TB bacteria. However, it is more likely in a person having poor health. For example, it is common in malnourished children or even in adults.

3. Secondary (reactivated) infection causing active disease

Some people develop active TB disease months or years after a minor TB infection had been halted. The body's immune system at first stops the bacteria from multiplying (as above). However, not all the bacteria may be killed. Some bacteria may be 'walled off' in the scar tissue of the initial minor infection. They are stopped from multiplying by the immune system. They do no harm but can remain inactive for many years. The inactive TB bacteria may later start to multiply and cause active TB if the body's immune system becomes weak for some reasons. Reactivation of TB due to weak immune system is likely to happen if a person is:

- Elderly or frail
- Malnourished
- Have diabetes
- Take steroids or immunosuppressant medication
- Have kidney failure
- Are alcohol-dependent ('alcoholic')
- HIV infection or AIDS

TB DOES NOT spread by

- shaking someone's hand
- sharing food or drink
- touching bed linens or toilet seats
- sharing toothbrushes
- kissing

At times, the TB bacteria can enter the the blood and is carried to other parts of the body, such as the kidney, spine, and brain, where it can cause a TB disease in that particular organ.

TB disease in the lungs can be infectious. This means that the bacteria can be spread to other people. TB in other parts of the body, such as the kidney or spine, is usually not infectious.

People with TB disease are most likely to spread it to the people with whom they spend time every day. This includes family members, friends, and co-workers or schoolmates.

What are the symptoms of Tuberculosis (TB) ?

The general symptoms of TB disease include weakness or feeling sick and weight loss.

TB affecting the lungs is the most common form of TB. Most common symptom is cough of two weeks or more, with or without sputum (expectoration). It can start as a dry irritating cough. It tends to continue for months and get worse. At times the cough produces a lot of sputum (expectoration), which may be bloodstained.

This can be accompanied by:

- Fever, night sweats, loss of appetite.
- Chest pain, difficulty in breathing or shortness of breath
- At times, coughing up of blood.

TB infection sometimes spreads from the lungs to cause infection in other parts of the body. Depending on which part of the body is affected, various symptoms may then occur:

- **Lymph glands** - swollen gland or glands anywhere in the body. If the swollen glands are in the neck, armpit or groin then one may see or feel them.
- **Gut and tummy (abdomen)** - Tummy pain and swelling/distension or poor digestion of food with diarrhoea and weight loss. Or some times Constipation.
- **Bones and joints** - TB can get into a bone or joint, causing bone pain (for example, in the spine) or pain and swelling in a joint.
- **Heart** - TB sometimes causes inflammation around the heart, with chest pain or shortness of breath.
- **Kidneys and bladder** - pain in the side (loin), or pain while passing urine.
- **Brain** - TB can cause meningitis, with symptoms such as: - Headache, Feeling sick (nausea), vomiting, Fits (convulsions), drowsiness, change in behaviour
- **Spread to many parts of the body** - this is called miliary TB, and can affect many organs including lungs, bones, liver, eyes and skin.
- **Genital TB** – can lead to infertility

How is TB diagnosed?

1. Sputum microscopy – this is the mainstay of diagnosis. A very reliable method for the diagnosis of TB.

Three sputum samples preferably in the morning on three consecutive days are collected for diagnosis. Presence of bacteria in the sputum on microscopic examination confirms the diagnosis of TB.

In Mumbai, a well planned system of designated microscopy centres offers sputum tests free of cost. These are present in BMC (Brihanmumbai Municipal Corporation) dispensaries. The laboratory technicians are well trained within the program and quality reagents and supplies are provided by government for performing the tests.

They are linked to government Tuberculosis Treatment centres, so patients diagnosed with TB can immediately be registered for treatment.

2. X-ray examination – This helps in diagnosis when the sputum reports are negative. Damage in lungs can be seen on chest x-ray and is suggestive of TB.

3. Culture - This test uses sputum or tissue sample to grow any TB bacteria that may be there. It tells doctors how infectious you are and also whether your TB is resistant to any antibiotics. This helps doctors to ensure the right combination of drugs which can be prescribed and the duration of treatment required for the complete cure. As TB culture grows slowly, it may take up to eight weeks to get some of the results.

4. Rapid tests – LPA (Line Probe assay) and Genexpert (CBNAAT – Cartridge Based Nucleic Acid Amplification Test) are rapid culture tests giving results for drug sensitivity testing within 2 days to as fast as 2 hours.

5. Can we include the tests like CT scan, MRI, USG and Tissue Biopsy that are required for the diagnosis of extra pulmonary tuberculosis?

Treatment of Tuberculosis

The standard duration of treatment is of 6 months. The current regimen for TB treatment includes 4 drugs (Isoniazid, Rifampicin, Pyrazinamide and Streptomycin) for 2 months, followed by 2 drugs (Isoniazid and Rifampicin) for 4 months; medicines are to be consumed every alternate day. These medicines are very expensive if obtained from private pharmacies or clinics.

Government of India implements a National TB Control Programmecommonly called as RNTCP (Revised National Tuberculosis Control Programme) throughout the country through which free medicines are supplied for the entire course of treatment. Once diagnosed, patient is provided with the treatment free of cost in “Patient wise boxes” that containmedicines for the entire duration of treatment. Through this program, a health worker or trainedcommunity volunteer watches and supports the patient in taking their drugs and ensure treatmentadherence. The drug box is kept either at the government health post or in the community at a treatment provider’s place or family doctor’s clinic – whichever is nearer to the patient’s home and acceptable,accessible to the patient as per his/her choice.

Good quality of drugs and uninterrupted supply is being supported by the government. A lack of trust

usually exists among people regarding government programmes but this program has improved and expanded over the years benefiting millions of people.

A note on Drug Resistant Tuberculosis

TB is totally curable, provided the entire course of treatment is completed by the patient diligently. During the recent times, drug resistant TB has emerged as a threat to the TB control programme.
In this form of TB, the bacteria are resistant to the antibiotics that are used for TB treatment. It can only be diagnosed in a specialized laboratory. It requires at least 18-24 months of treatment with medicines which are 100 times more expensive and often highly toxic. To avoid emergence of drug resistant TB, it is necessary to avoid misuse of higher antibiotics and to complete the full course of TB treatment.

Can we include preventive measures or Prevention of Tuberculosis like,

- Isolation of Infective person from the other susceptible family members like children.
- Household and personal hygiene.
- Personal care like wearing a mask or covering mouth and nose while coughing with handkerchief etc.
- No spitting at public places.
- BCG Vaccine3 - Bacillus Calmette–Guérin (BCG) vaccineis the only vaccine available against TB. It is given at birth. Efficacy of the vaccine is reported to be in the range of 0-80% but this vaccine plays a major role in preventing severe deadly forms of TB like miliary and meningeal TB.

References:

1. http://www.cdc.gov/tb/topic/basics/default.htm
2. RNTCP Training course Programme Manager Module 1. April 2011
3. http://www.tbfacts.org/bcg-tb-vaccine/

Vitamin D

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Vitamin D has been called the miracle vitamin by many health experts due to mounting discoveries of its significance in promoting health & fighting numerous diseases including cancer, heartdisease, diabetes. It may also be therapeutic for certain neurodegenerative diseases.Research for past few decades has shed light on the protective effects of vitamin D on immune and nerve cells &has confirmed that deficiency of vitamin D as a risk for various brain diseases.

Can we include what is the meaning of vitamin. Different types of vitamins and their classification according to the solubility in water or fats?

WHAT IS VITAMIN D?

Vitamin D is a fat soluble vitamin.There are five different forms of this vitamin, but the two major forms are vitamin D2 [ergocalciferol] & vitamin D3 [cholecalciferol]. Vitamin D2 is produced by plants,fungus in response to sunlight[UVirradiation] (Can we include the edible sources ofergocalciferol?),while VitaminD3 is produced by the exposure of skin to sunlight[UVlight].

- Vitamin D1 – It is a molecular compound of ergocalciferol with lumisterol.
- VitaminD4- It is called as22-dihydroergocalciferol.
- Vitamin-D5- Is called as sitocalceferol [Made from 7-dehydrositosterol].

Both vitamins D2&D3 are used in human nutritional supplements.

Pharmaceutical forms of Vitamin D include Calcitriol [1alpha,25-dihydroxycholecalciferol], Doxercalciferol and Calcipotriene.

SYNTHESIS-

On exposure to sunlight[UVrays] 7-dehydrocholesterol----Cholecalciferol

Cholecalciferol is transported to liver where it undergoes hydroxylation at 25th position under the activity of 25-hydroxylase to---25-hydroxycholecalciferol. It's a major storage & transport form.

25-hydroxycholecalciferol is transported to kidney where it is further hydroxylatedat 1st position to form-----1,25,dihydoxycholecalciferol under the activity of 1, alpha, hydroxylase. Its an active form of vitamin D also called as Calcitrol.It mainly acts on intestine, kidneys and bone.

1,25,dihydroxycholecalciferol production is regulated by serum calcium, phosphorous,PTH[Parathyroid Hormone]levels. 1,25[OH]2 D binds to cytoplasmic vit d receptors ,increasing the absorption of dietary calcium from the intestine& increasing the resorption of calcium in the renal tubule ,there by decreasing calcium loss in urine.
1,25[OH]2D also stimulates bone osteoblasts to release RANKYL that stimulates osteoclasts which release calcium from bone.

SOURCES OF VITAMIN D-

1. Exposure to sunlight
2. Fatty Fish[mackerel,salmon],fish oils
3. Egg Yolk
4. Liver
5. Cod-liver oil
6. Milk[poor source]
7. Mushrooms
8. Commercial cows milk, curds , oils, cereals fortified with vitamin D.

DAILY REQUIREMENTS-

1. Adults—600IU[15mcg/day] , Above 70yrs-800 IU[20mcg/day]
2. Pregnancy&lactation - 600IU
3. Children- 400IU-600IU
4. Infants-300- 400IUs[10mcg/day]

<10 – Vitamin D Deficiency
10–30 -Vitamin D insufficiency
30- 100- Adequate levels of Vitamin D
>100 -Vitamin D Toxicity

CAUSES OF VITAMIN D DEFICIENCY

- Commonly seen in people with limited exposure to the sunlight. E.g. Continuously working indoors or using Sunscreen with >30spf value.
- Residents of higher latitudes during winter.
- Malnutrition
- People with Dark skin are at higher risk of having Vitamin D deficiency because large amount of melanin reduces the ability of skin to produce vitamin-D
- Malabsorption of Vitamin-D due to intestinal diseases like Crohn's disease, Celiac disease.
- People who have undergone Bariatric surgery for weight loss has reduced capacity to absorb vitamin.
- Chronic kidney disease reduces the conversion of vitamin D in the form that is necessary for our body
- Older age- Reduces the ability of skin to synthesize Vitamin-D
- Obesity- People with BMI > 30 are at higher risk of vitamin D deficiency. Subcutaneous fat absorbs vitamin D. Thus less amount of vitamin-D enters the blood.
- Medicines like Antifungal, Antiepileptic drugs, Steroids & drugs used in the treatment of HIV/ AIDS.

FUNCTIONS

- Vitamin D is an important prohormone which plays an important role not only in calcium homeostasis& bone mineral metabolism but also sub serves in a wide range of fundamental biological functions within our body.
- Promotes absorption of calcium from the intestines to maintain normal blood calcium level and helps in mineralisation of bones to keep them strong.
- Parathyroid hormone if in excess causes absorption of bone minerals thus making bones brittle. Adequate levels of vitamin keeps this parathyroid hormone in check to prevent bone weakening and damage
- Protective effect over many Cancers like Cancers of Large Intestine, ovaries, breast etc.
- Protective effect on Cardiovascular problems like High Blood pressure, High Blood cholesterol level, Heart attacks etc. because of its anti-inflammatory effect.
- Imparts a good immunity against infectious diseases of lungs and respiratory tract. E.g. Pneumonia, Tuberculosis, etc.
- Regulates the balance of hormones within our brain to prevent development of depression(psychological problems)
- Reduces the risk of getting type II Diabetes mellitus.
- Reduces the risk of allergies.
- Sufficient level of vitamin D is necessary for the prevention of obesity.
- Reduces the incidence of Alzheimer and Parkinson's Disease in elderly.
- Normal levels of Vitamin D is associated with reduced incidence of multiple sclerosis (Neurological Disease).

DEFIENCY MANIFESTATIONS

Vitamin D deficiency has its adverse effects on both Skeletal and Non skeletal systems within our body. These are,

1. Skeletal Manifestations of Vitamin D deficiency:

Vitamin-D deficiency resultsthe demineralization of bones causing RICKETS in children& OSTEOMALACIA in adults.

Rickets—Characterized by bossing of forehead , bow legs, knocked knee,pigeon chest, soft pliable bones, delayed teeth formation& thickening of wrists and ankles.There is low serum calcium and phosphorous levels with raised serum alkaline phosphatase levels.

Osteomalacia - Characterized by softened, osteoporotic bones which are more prone for fractures.

2. Non Skeletal Manifestations of Vitamin D deficiency:

- Vitamin D deficiency is associated with increased risk of death due to Cardiovascular diseases
- Increase risk of getting Type –II Diabetes Mellitus and High Blood Pressure.
- Increase the risk and incidences of Allergies and Asthma.
- Increase risk of Cancers (Large intestine, Breast, Ovaries, Prostate)
- In older individuals Vitamin D deficiency can lead to increased incidence of psychological and neurological diseases.
- Vitamin D deficiency is associated with increased weight gain and contributes in obesity.
- Increased incidence of Infections.
- Increases risk of autoimmune and inflammatory diseases.
- Vitamin D deficiency plays an important role in development of Metabolic syndrome (Insulin resistance, Diabetes mellitus, Hypertension, Obesity and Abnormal blood Cholesterol levels)

HYPERVITAMINOSIS D:

It occurs due to excessive ingestion or overdosing of Vitamin D preparations. Where Vitamin D levels in the body exceeds than the upper level of safe range. It manifests as,

- Nausea and Vomiting
- Dehydration
- Irritability and Confusion
- Constipation
- Loss of appetite
- Fatigue and Muscle weakness
- Excess amount of vitamin D causes abnormally high levels blood calcium concentrations. This leads to deposition of calcium or calcification of Bones, Soft tissues, Kidneys, Heart etc. Leading to risk of Cardiovascular diseases like chest pain and heart attack. And kidney damage.

INVESTIGATIONS

- Serum levels of 25[OH]D (25 Hydroxy Vitamin D)-It will tell us whether we are getting enough amount of vitamin-D.It reflects vitaminD produced cutaneously and that obtained from food supplements and has fairly long circulating half life of 15 days.25[OH]Dserves as a biomarker of exposure.Serum25[OH]Dlevels alsoindicates the amount of vitaminD stored in body tissues.
- Levels of 1,25[OH]2D (1,25 Dihydroxy Vitamin D)-Is nota good indicator of vitaminD status asit has short half life of 15hours& its serum concentrations are closely regulated by parathyroidhormone, calcium&phosphatelevels. Decreases only in severe vitaminD deficiency.

PREVENTION AND TREATMENT OF VITAMIN D DEFICIENCY-

- To obtain adequate vitamin D over face,arms, or back one must have sun exposure without sunscreen for 15 mins to One hour depending on the skin type(fair or dark). At least twice weekly.
- In sunlight deprived individuals daily allowance of vitaminD should be 1000IUS.Vitamin D3 or cholecalciferol is more effective than vitamin-d2 in raising serum levels of 25[OH]D.
- In intestinal malabsorption individuals oral doses of 25000---100.000 IUs of vitamin-D3 may be required.Serum levels of 25[OH]D should be monitored &dosage of vitamin –D adjusted to maintain serum.25[OH]D above 30ng/ml.

During treatment serum calcium levels should also be monitored to avoid hypercalcemia. Certain evidence based studies and textbooks recommend treating vitamin D deficiency serum 25[OH]D levels below 20ng/ml with 50,000IU of D2 or D3 orally once aweek for 6-8 weeks followed by a maintenance dose of 800-1000 IUof vitamin D3 daily.

Also levels between 20-30ng/ml to be treated with 800-1000IU of vitaminD3 daily.

REFERENCES-

1. US National Institute OfHealth Medicine,FoodAnd Nutrition BoardFact sheets-2013.
2. Current Medical Diagnosis& Treatment 2015. Evidence based studies report at Institute of Medicine-CME journal for family physicians.4] Singhals Textbook of Biochemistry .
3. http://www.ncbi.nlm.nih.gov/pmc/articles/ PMC3012634/ Vitamin D insufficiency
4. Concentrations of Serum Vitamin D and the Metabolic Syndrome Among U.S. Adults. http:// care.diabetesjournals.org/content/28/5/1228
5. http://www.medicinenet.com/vitamin_d_ deficiency/article.htm
6. Vitamin D Deficiency in Adults: When to Test and How to Treat. http://www.ncbi.nlm.nih.gov/ pmc/articles/PMC2912737/

Dengue

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Introduction:

Dengue is transmitted by the bite of a mosquito infected with one of the four dengue virus serotypes. It is a febrile illness that affects infants, young children and adults with symptoms appearing 3-14 days after the infective bite.

Dengue is not transmitted directly from a person-to-person and symptoms range from mild fever, to incapacitating high fever, with severe headache, pain behind the eyes, muscle and joint pain, and rash. There is no vaccine or any specific medicine available to treat dengue. People having dengue fever should rest, drink plenty of fluids and take medicine like paracetamol in consultation with a doctor to reduce the fever.

Severe form of dengue (also known as dengue haemorrhagic fever) is characterized by fever, abdominal pain, persistent vomiting, bleeding and breathing difficulty and is a potentially lethal complication. Early clinical diagnosis and careful clinical management by trained physicians and nurses is necessary for the survival of patients.

Cause:

Dengue fever is caused due to infection by any one of the four dengue viruses that spread by mosquitoes (Aedes Aegypti). These mosquitoes thrive in and near human lodgings. When a mosquito bites a person infected with a dengue virus, the virus enters within the mosquito. When the infected mosquito bites another person, the virus enters into the bloodstream of that person and infects that person.
After oneself has recovered from dengue fever, he/she has an immunity to that type of dengue virus — but not to the other three dengue fever viruses. The risk of developing severe dengue fever, also known as dengue haemorrhagic fever, actually increases if the same person is infected a second, third or fourth time.

Signs and Symptoms:

Many people, especially children and teens, may experience no signs or symptoms during a mild case of dengue fever. When symptoms do occur, they usually begin about3 to 14 days after being bitten by an infected mosquito.

Signs and symptoms of the dengue fever include,

1. High gradefever(106 F/ 41 C)
2. Headache, Pain behind eyes
3. Muscle, bone and joint pain,
4. Widespread rash
5. Nausea and vomiting
6. Rarelyminor bleeding from gums or nose.

Most people recover within a week or so. In some cases, symptoms worsen and can become life-threatening. Blood vessels often become damaged and leaky. And the number of clot-forming cells (platelets) in your bloodstream drops. This is called as Dengue haemorrhagic fever. It mostly affects the children under 15 years but can affect adults also. It manifests as:

1. Bleeding from nose and mouth
2. Bleeding inside the body
3. Severe abdominal pain
4. Persistent vomiting
5. Bleeding under the skin which might look like bruising
6. Problems related to lungs, liver and heart may develop.

In even more sever form Dengue fever can manifest

as Dengue Shock syndrome(DSS) and usually Dengue haemorrhagic fever precedes this. If not treated promptly it can be fatal. It manifests as:

1. Severe abdominal pain
2. Heavy bleeding
3. Low blood pressure (Hypotension)

Diagnosis:

Diagnosing dengue fever can be difficult, because its signs and symptoms can be easily confused with those of other diseases — such as malaria, leptospirosis and typhoid fever, chikungunya.

The diagnosis of dengue fever is usually made when a patient exhibits the typical clinical symptoms of headache, high fever, eye pain, severe muscle aches, and petechial rash and has a history of being in an area where the dengue fever is endemic.

Dengue fever testing is used to determine whether a person with symptoms and recent potential exposure to dengue has been infected. The infection is difficult to diagnose without the help of laboratory tests because symptoms may initially resemble other diseases, such as malaria. The laboratory tests are ordered when there is,

- Sudden high grade fever (104°F or 40°C)
- Severe headache or pain behind the eyes
- Joint, muscle and/or bone pain
- Gum and nose bleeds
- Easy bruising

Two types of testing are available:

- Antibody tests—these tests are primarily used to help diagnose a current or recent infection. They detect two different classes of antibodies produced by the body in response to a dengue fever infection, IgG and IgM. Diagnosis may require a combination of these tests because the body's immune system produces varying levels of antibodies over the course of the illness. IgM antibodies are produced first and tests for these are most effective when performed at least 7-10 days after exposure. IgM antibody levels in the blood rise for a few weeks, then gradually decrease. After a few months, IgM antibodies fall below detectable levels. IgG antibodies are produced more slowly in response to an infection. Typically, the level rises with an acute infection, stabilizes, and then persists long-term. Rapid testing kits are available to check for dengue infection.

- Testing for Dengue Virus Antigen (Dengue NS1 test): Helps in rapid Diagnosis of Dengue infection. It helps in diagnosis on Day 1 of Dengue fever. It is a very reliable and important test but a bit expensive compared to antibody tests.

- Molecular testing (polymerase chain reaction, PCR)—this type of test detects the genetic material of the dengue virus in blood up to 5 days after symptom onset (fever).

Testing is usually ordered within one to two weeks of the onset of symptoms to detect an acute infection. If antibody testing is performed, an additional blood sample may be collected after two weeks of symptoms to determine if the antibody level is rising.

Along with these test some routine laboratory tests are also done and are equally important like

- Complete Blood Profile or commonly called as CBC. It gives an idea about Blood haemoglobin level, Platelet count, White and red blood cells count etc.
- Urine routine and Microscopy.

What does the test result mean?

Antibody testing—antibody tests may be reported as positive or negative, or may be reported as an antibody titer with an interpretation of which type(s) of antibody (IgG or IgM) is present.

Positive IgM and IgG tests for dengue antibodies detected in an initial blood sample mean that it is likely that the person became infected with dengue virus within recent weeks. If the IgG is positive but the IgM is low or negative, then it is likely that the person had an infection sometime in the past. If the dengue IgG antibody titer (level) increases four-fold or greater between an initial sample and one taken 2 to 4 weeks later, then it is likely that a person has had a recent infection.

Negative tests for IgM and/or IgG antibodies may mean that the individual tested does not have a dengue infection and symptoms are due to another cause, or that the level of antibody may be too low to measure. The person may still have a dengue infection – it may just be that it is too soon after initial exposure to the virus to produce a detectable level of antibody.

Dengue virus antigen (NS1) testing: Test results are reported as either positive or negative.

Positive test: indicates presence of acute infection with dengue Virus.

Negative test: Indicates that the symptoms may be due to some other infection but clinical and other pathological tests like antibody tests correlation is necessary to rule out dengue infection.

CBC: Complete blood profile gives us the idea about Haemoglobin level, Number of white blood cells and Platelet count.

Haemoglobin: May decrease in case of bleeding due to dengue haemorrhagic fever
Platelet count and White blood cells count generally reduces during Active dengue infection.

URINE ROUTINE AND MICROSCOPY:
detects the presence of visible or microscopic blood in urine.

Complications:

The complications of dengue fever are usually associated with the more severe forms of dengue infection: haemorrhagic (bleeding) and shock syndrome.

The most serious complications, although infrequent, are as follows:

- Dehydration
- Bleeding (haemorrhage)
- Low platelets
- Low blood pressure (hypotension)
- Slow heart rate (bradycardia)
- Liver damage
- Respiratory (Lung) problems like ARDS
- Neurological damage (seizures, encephalitis)
- Death

What is dengue haemorrhagic fever?

Dengue haemorrhagic fever (DHF) is a specific syndrome that tends to affect children under 15 years of age. This complication of dengue fever causes abdominal pain, haemorrhage (bleeding), and circulatory collapse (shock).

DHF starts abruptly with continuous high fever and headache. There are respiratory and intestinal symptoms with sore throat, cough, nausea, vomiting, and abdominal pain. Shock occurs two to six days after the start of symptoms with sudden collapse, cool, clammy extremities (the trunk is often warm), weak pulse, and blueness around the mouth (circumoral cyanosis).

In DHF, there is bleeding with easy bruising, red or purple blood spots in the skin (petechiae), spitting up blood (hematemesis), blood in the stool (melena), bleeding gums, and nosebleeds (epistaxis). Pneumonia is common, and inflammation of the heart (myocarditis) may be present.

Patients with DHF must be monitored closely for the first few days since shock may occur or recur precipitously (dengue shock syndrome). Cyanotic (having a bluish coloration to the skin and mucus membranes) patients are given oxygen. Vascular collapse (shock) requires immediate fluid replacement. Blood transfusions may be needed to control bleeding.

The mortality (death) rate with DHF is significant. With proper treatment, the World Health Organization estimates a 2.5% mortality rate. However, without proper treatment, the mortality rate rises to 20%. Most deaths occur in children. Infants under 1 year of age are especially at risk of dying from DHF.

Treatment of Dengue:

Fortunately, this viral disease is usually self-limited. Adequate hydration (drinking sufficient water), complete rest and pain control helps person to overcome the infection. However, for dengue fever, a caution is given by most doctors regarding home treatment. Nonsteroidal anti-inflammatory agents (for example, aspirin, ibuprofen and other NSAIDs should be avoided because of the tendency of the dengue viruses to cause bleeding. The NSAIDs may add to the bleeding symptoms. Other medications

such as acetaminophen, codeine, or other agents that are not NSAIDs may be used.

More severe variations of dengue fever (haemorrhagic and shock syndrome) usually require additional supportive treatments; these patients often require hospitalization. IV fluid hydration, blood transfusions, platelet transfusions, blood pressure support, and other intensive-care measures may need to be utilized in these patients. Consultation with infectious-disease and critical-care specialists is often advised to optimize patient care

Prevention:

Dengue fever can be prevented by stopping mosquitoes from biting because they are the vectors that dengue viruses require for their transfer to humans. Following are the general rules to prevent transfer of viruses and other pathogens by mosquitoes and other biting vectors:

- Although mosquitoes may bite at any time of day, peak biting activity for vectors of some diseases (for example, dengue, chikungunya) is during daylight hours. Vectors of other diseases (for example, malaria) are most active in twilight periods (for example, dawn and dusk) or in the evening after dark. Avoiding the outdoors or focusing preventive actions during peak hours may reduce risk.
- Wear appropriate clothing: Minimize areas of exposed skin by wearing long-sleeved shirts, long pants and boots. Tucking in shirts and wearing socks and closed shoes instead of sandals may reduce the risk.
- Bed nets: When accommodations are not adequately screened or air conditioned, bed nets are essential to provide protection and to reduce discomfort caused by biting insects. If bed nets do not reach the floor, they should be tucked under mattresses. Bed nets are most effective when they are treated with an insecticide or repellent such as permethrin. The permethrin will be effective for several months if the bed net is not washed. (Long-lasting pre-treated nets may be effective for much longer duration)
- Insecticides: Aerosol insecticides, vaporizing mats, and mosquito coils can help to clear rooms or areas of mosquitoes. Insecticides should always be used with caution, avoiding direct inhalation of spray or smoke.
- Mosquito Repellents: Optimum protection can be provided by applying repellents. The insect repellent should contain up to 50% DEET (N, N-diethyl-m-toluamide), which is the most effective mosquito repellent for adults and children over 2 months of age.
- The transmission of the virus to mosquitoes must be interrupted to prevent the illness. To this end, patients are kept under mosquito nets until the second bout of fever is over and they are no longer able to transmit the virus to a biting mosquito.
- The prevention of dengue fever requires control or eradication of the mosquitoes carrying the virus that causes dengue. In nations plagued by dengue fever, people are urged to empty stagnant water from old tires, trash cans, and flower pots. Governmental initiatives to decrease mosquitoes also help to keep the disease in check but have been poorly effective.

Measures to prevent mosquito proliferation

- Prevent accumulation of stagnant water
- Change the water in vases once a week
- Clear the water in the saucers under potted plants every week
- Cover water containers tightly
- Ensure air-conditioner drip trays are free of stagnant water
- Put all used cans and bottles into covered dustbins

Is there a dengue fever vaccine?

In April 2016, the WHO approved Sanofi Pasteur's Dengvaxia (CYD-TDV), a live recombinant tetravalent vaccine for Dengue fever. Dengvaxia can be administered as a three-dose series in people 9-45 years of age who live in areas where dengue is endemic.

In clinical trials in Latin America and Asia involving more than 40,000 children and adolescents, Dengvaxia protected 66% of people aged 9 and older against dengue. Dengvaxia was very effective at protecting against severe dengue, which can be fatal, preventing 93% of severe cases, and reducing hospitalizations due to dengue by 80%.

Dengvaxia was initially approved in 2015 for use only in Mexico, the Philippines, Brazil, and El Salvador.

Several other vaccines for dengue are undergoing clinical trials, but none have yet been approved for use.