ISSUE-1

AUGUST,2021

HEALTHOMETER

E-MAGAZINE Presented by DEPARTMENT OF PHYSIOLOGY

HIGHLIGHTS:

- *TOPICS ON CURRENT PHYSIOLOGICAL CONCERN,*
- *QUIZ CORNER,*
- *CREATIVE SECTION,*
- *TIPS FOR POSITIVE THINKING,*
- *TIPS FOR HEALTHY LIFESTYLE.*

TRUE WEALTH IS HEALTH

SURENDRANATH COLLEGE

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"You have not lived today until you have done something for someone who can never repay you"

- John Bunyan

ABOUT OUR DEPARTMENT:

- *Department of Physiology was founded in 1958 and the Honours course started in the year 1978.*
- *The Department is housed on the ground floor of the main building and the second floor of the science building.*
- *Department has always been a star performer in terms of academics and results and one of the most coveted department of the college.*
- *Significant numbers of alumni are holding promising positions in schools, colleges, Universities and Research Institutes, and also various administrative services.*
- *Students through project work and extension activities such as Health Check-Up get hands-on experience and thereby learn to deal with human subjects using modern-day Laboratory equipment.*
- *Departmental faculties and support staff put in their best efforts to cater to the need of the students.*
- *Since last year in the pandemic era, Physiology Department is in the virtual mode of the teaching-learning process and has close contact with the students in all aspects.*
- *Department of Physiology of Surendranath College is a place for students who want to learn and think logically, act responsibly, and grow with optimum potential.*

RESPECTED FACULTIES OF PHYSIOLOGY DEPARTMENT

DR. MIRA GHOSH

DR. SUSANTA KUMAR PATRA

DR. SUKTI CHAKRABORTY

SUBHARAJIT BANERJEE

DR. BARNALI RAY BASU

FIRDOUS AHAMED

MALLIKA BHATTACHARJEE

OLIVIA CHOWDHURY

FROM THE DESK OF MENTOR :

- *An educational institution always plays a greater role in changing society and its people in the sphere of academic, social, mental, moral, and physical developments. One step ahead, it ignites the young minds and moulds the pupils to be good citizens. Our institute Surendranath College believes in the all-around development of a student and is concerned with nurturing the sprouting minds beyond the classroom.*

Since last two years, due to the COVID pandemic students have to come up with the challenge of a new-normal online mode of teaching-learning in an inadvertent confined ambiance. The urgency of all the off-the-classroom thoughtful activities needs to be re-think and re-shape to spell some happiness to our beloved students. Considering this Department of Physiology, Surendranath College is continuously arranging different kinds of exposures in virtual modes. A group of students comes forward with their ideas to release an e-magazine "Healthometer" to convey the message for better living both physically and mentally.

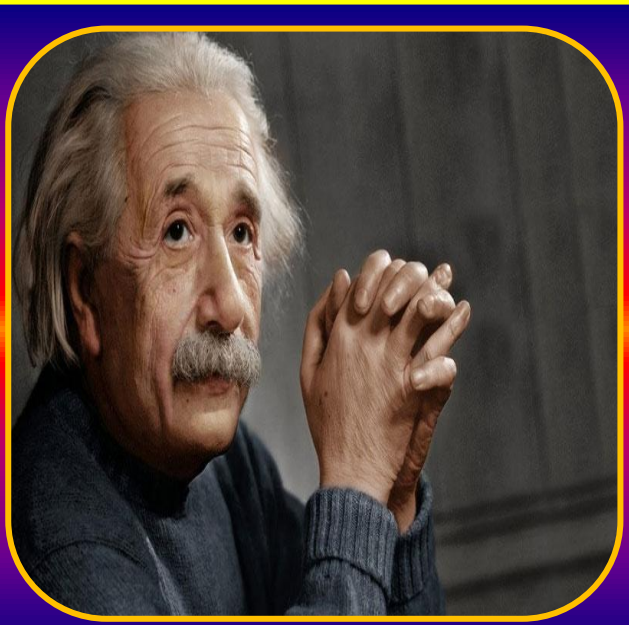
Being a mentor, I feel proud for this head start and their concern to aware the society. My heartfelt greetings to all the young talents who contributed and thought for such an innovative and timeless theme for their e-magazine.We cordially request all the readers to go through it and please let us know your insight view. Your thoughtful comments would guide young minds to grow generously and move forward.

Enjoy reading

Dr. Barnali Ray Basu

"Education is not the learning of facts, but the training of minds to think."

.....Albert Einstein



FROM THE DESK OF PRINCIPAL :

- *Educational institutions shape the attitudes of the students, prepare them to work more efficiently and transmit the cultural values to the next generation.*

We in Surendranath College always strive to impart education both inside the class room and also outside the to provide holistic delivery of knowledge, skills and abilities which qualifies them to reach desired destination.

I am delighted to know the initiative taken for the publication of the e-magazine "Healthometer" by the students of physiology under the mentorship of Dr. Barnali Ray Basu.

I also congratulate the editorial board for their tireless efforts in bringing out it publicly.

I also extend my blessings to the students who have contributed to this issue with their innovative ideas and enhanced its perfection and beautification.

My best wishes for the entire endeavour.

-------From Principal of Surendranath College , Dr.Indranil Kar

"Vision without Action ..... is just a dream.
Action without Vision .... just passes the time
But, Vision and Action.... can change the world.
.....Joel A. Barker

FROM THE DESK OF IQAC CO-ORDINATOR :

- *I am delighted to know that Department of Physiology, Surendranath College has come up with the 1st issue of their e-magazine *Healthometer* . I sincerely congratulate all the faculty members and students of that department for this useful publication.*

  *Hope it would help to aware *All* irrespective of their disciplines to deal with common health issues and know the right way to stay physically fit and mentally positive in this extraordinary situation. I do seriously believe all the readers would enjoy reading this issue!*

  Happy reading!

From IQAC Coordinator, Dr. Suchandra Chatterjee

- ***"The highest education is that which does not merely give us information, but makes our life in harmony with all existence"***
  ...Rabindranath Tagore

FROM THE DESK OF HOD :

- *I am very happy to announce that our 1st e-magazine, 'HEALTHOMETER', is being published by the Physiology Department, Surendranath College. It is entirely a product of the collective effort and wonderful creativity of our students and their mentor, our faculty Dr. Barnali Ray Basu. I sincerely appreciate and congratulate them on this great initiative. I request you all to read the e-magazine and give us your valuable comments on this. I hope everyone enjoys reading it.Thank you.*

From Head of the Department of Physiology
Dr. Sukti Chackrabarty
Asssociate Professor

The beautiful thing about learning is nobody can take it away from you.
.....B. B. King

শরীর-সর্বস্ব

শরীর ভাঁজে গল্প জমেছে , শুনতে কি পাও ?
তোমার শরীর যে ভাষা বলছে , জানতে কি চাও ?
ছোট্ট হলেও সূক্ষ্ম ভীষণ , মানব শরীর...
রন্ধ্রে রন্ধ্রে রহস্যজাল , সেই মায়াবীর...

কখনো হৃদয় কখনো আবার স্নায়ু'দের ভিড়ে ,
উৎসেচক আর হরমোন , এলো অস্ত্র জুড়ে...
ঘুমে'রা কীভাবে গভীর হয়েছে মধ্যরাতে ,
সে উত্তরও শরীরী ভাষায় জানতে পাবে.....

তুমিও এসো , আবেগে আঁকরে ধরবে তাকে;
নিজের জন্য নিজের শরীর চিনতে হবে।
এসো হে বন্ধু , হাতে হাত রেখে নিজেদের খুঁজি ;
তোমার আমার ভালোবাসা হোক "ফিজিওলজি"।

কাঞ্চন মুখার্জী।

EDITORIAL

Dear Readers,

The whole Editorial Team is here today to congratulate every single member who made it possible to publish the 1st issue of our e-zine HEALTHOMETER. As it names Healthometer is a handy resource of some basic health-related issues that everybody has to be faced directly or indirectly.

This is even more appreciated considering the exam time; we are proud to see that the stressful digital mode of education has not prevented them to think innovatively and produce for our Mag works.

Considering the present pandemic scenario, this issue is designed with the matters that are peeping into everyone's mind and the budding physiologists had tried their level best to represent them most lucidly and attractively. Nowadays Stay safe and Eat healthily are perhaps the two most popular wishes, as what we eat is closely linked to our health and only good health with a sound mind can provide the best safety for health. Interesting topics like the impact of screen-time on body and mind, facts and tips to get rid off of unhealthy mouth-watering and tempting foods any many more are there for a valued reader.

We want to stress the invitation to be connected with us, place your demand for any specific and relevant topic which would be befitted with this magazine. Today visibility is more important than ever and with it the way we communicate it: we want to give special attention to the better living of human beings with good health and vibrating mind irrespective of unavoidable threats. And we can say that you can make it!

We want to renovate Healthometer, From the next issues, we will have a new section, the so-called "Pleased to meet you", dedicated to external innovative contributions. Sometimes, a nice picture is more important than a long essay, a smile is communicating more than a thousand words.

Let's go together, keep learning, get growth.

Yes, we are ready to extend our family.

The Editorial Team

Dr. Barnali Ray Basu

Kanchan Mukherjee,
Physiology honours(SEMESTER - 6)

✓ *Ankit Kumar Gupta*
Physiology honours(SEMESTER - 6)

Chaitali Jana,
Physiology honours(SEMESTER - 6)

DIGITAL AGE : GREATER STRESS ON OUR EYE

1

-By Ankit Kumar Gupta ,Physiology honours Semester 6

For any queries: ag29851@gmail.com

Do you spend more than two hours a day working on a computer?

Do your eyes feel tired after working on a computer screen?

Do you occassionally suffer from blurred vision or stiff neck & shoulder pain while using your digital device?

If YES, then like millions of others, you too may be suffering from Computer Vision Syndrome ,also referred as Digital Eye Strain.

LET'S FACE IT:

✓Whether you use a computer for work or at home, you are more likely spending at least 2 hours or sometimes even more at a time staring at the screen.
Our eyes can't tolerate such close activity for hours, and thus Computer Vision Syndrome or Digital Eye Strain has become a very common complaint.
✓Computers and smart digital devices , have brought so much enrichment into our lives as well as increased productivity. The students are capable of analyzing what they require to learn to search and use online resources. Furthermore, to appealing students, digital learning tools and technology sharpen critical thinking skills which are the basis for the growth of systematic reasoning. Students also develop positive feelings of exploitation by mastering new knowledge and skills using digitized learning tools, offering them the confidence they require to want to learn even more new things. But the only problem is that this digital age has come to put a greater stress on our eyes.

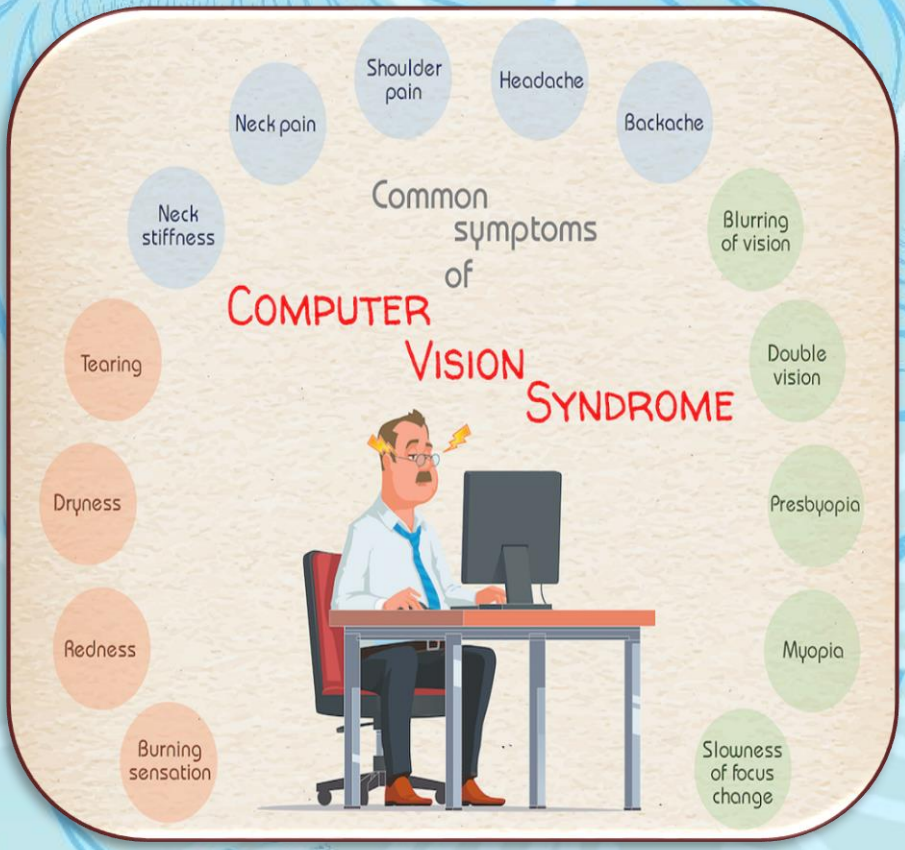
But the only problem is that this digital age has come to put a greater stress on our eyes.

KNOW ABOUT DIGITAL EYE STRAIN:

DEFINITION:

✓In recent years,clinicians have observed that the prolonged use of visual display units can result in a certain symptom complex, which has been defined as Computer Vision Syndrome or Digital Eye Strain.
It is the physical eye discomfort after two or more hours in front of a digital screen.
It also describes a group of eye and vision related problems that result from prolonged computer,tablet,e-reader and cell phone use.
*✓**Do you know:***
According to the 2014 Vision Watch Survey results;
-nearly 3 in 10 adults (29.8%) are high users, spending more than 9 hours each day using digital devices.
-One in four childrens use gaming devices more than 3 hours a day.

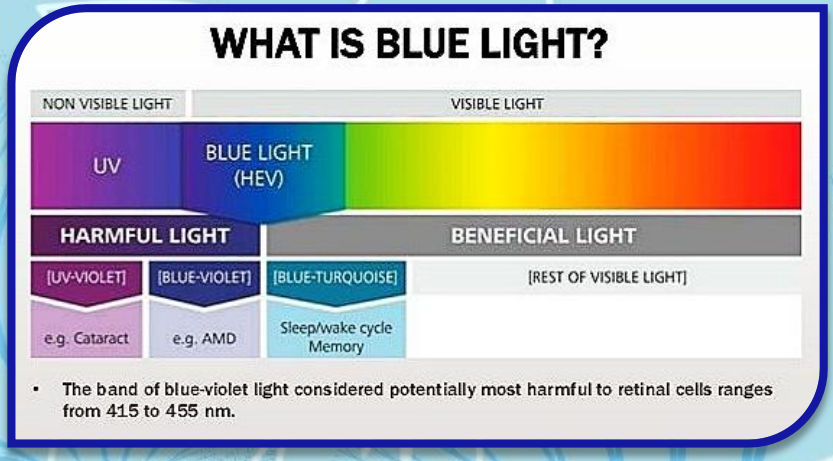
COMMON SYMPTOMS OF DIGITAL EYE STRAIN:



These symptoms may be caused by;

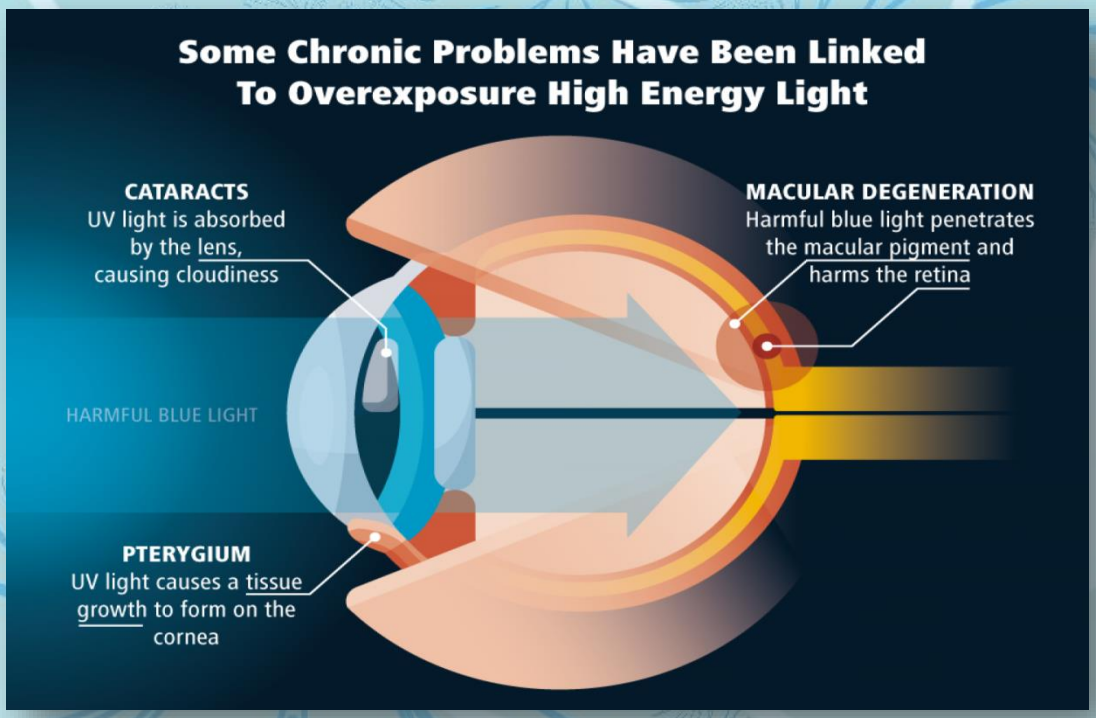
1.Poor lighting,
2.Poor Seating Posture,
3.Glare on a Digital Screen,
4.Uncorrected Vision Problems,
5.Excess exposure to the Blue light or the High-energy visible light wavelengths.

BLUE LIGHT?

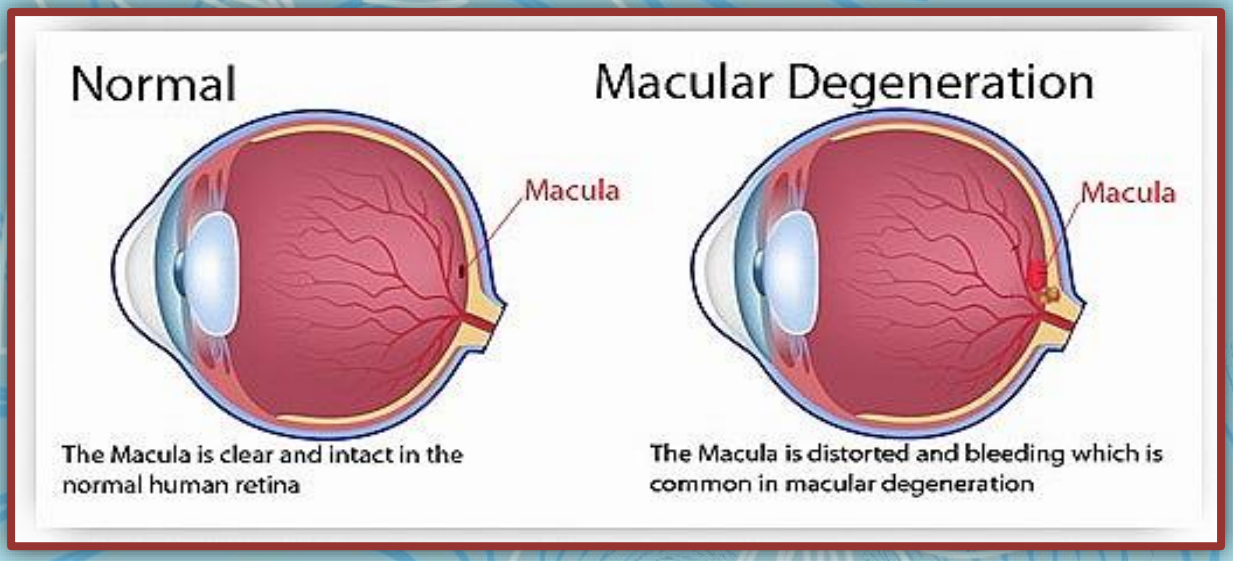


- ✓ *Blue light is a colour in the visible light spectrum that can be seen by human eyes.*
- ✓ *Blue light is a short wavelength (range from 380-500 nm),which means it produces high amounts of energy.*
- ✓ *Blue light is everywhere in our world.It is used to be that the only source of blue light was from the sun.Now we have brought Blue light inside by way of digital screens (found on TVs,smartphones,computers,laptops,tablets and gaming systems),electronic devices,LED and fluorescent lighting.*

IMPACT OF BLUE LIGHT ON THE EYE:



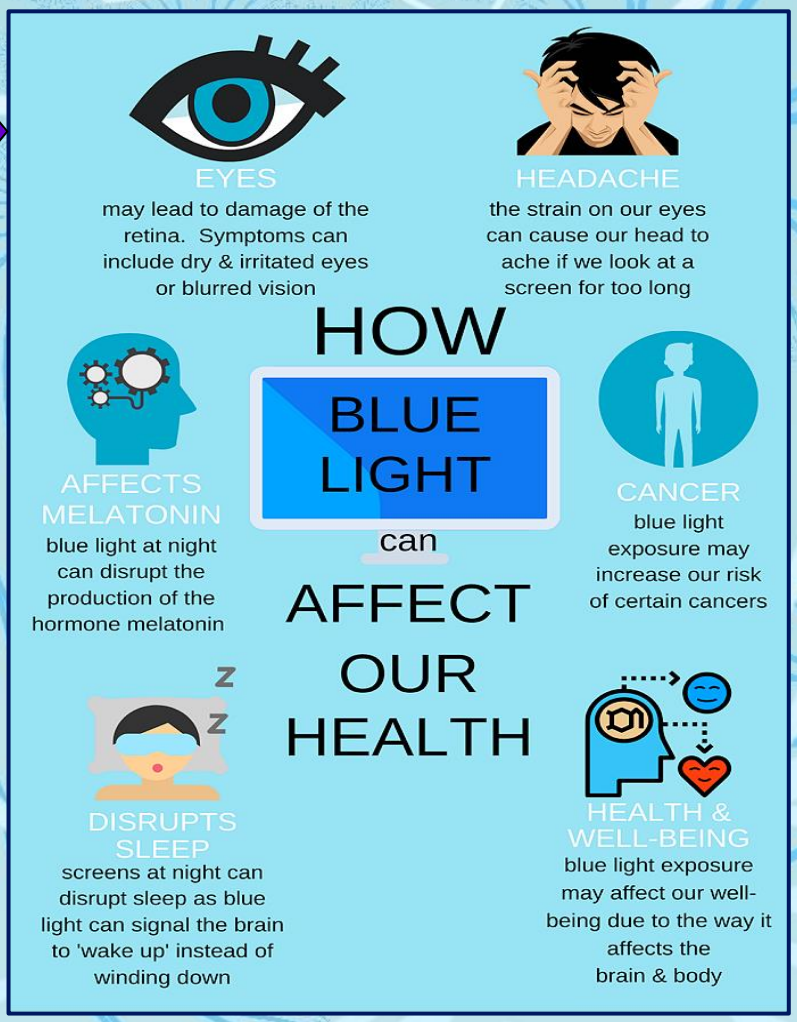
✓*All Blue light passes through the cornea and then to the lens and afterthat,it reaches to the retina. This light may become the cause of Vision*



✓***DAMAGE TO RETINA (MACULAR DEGENERATION);***

-This is a condition in which retina damaged due to the excessive usage of Blue light. -Macular Degeneration is an eye disease affecting the macula (the centre of the light-sensitive retina at the back of the eye), causing loss of central vision.

HOW BLUE LIGHT AFFECTS YOUR HEALTH?



FACTS!

IS IT ALWAYS HARMFUL?

✓ The normal blue light in the day light is essential for;
-Natural circadian and rhythms,
-Normal Sleep Cycle,
-Cognitive functions: alertness,memory and emotion regulation.
✓ However Overexposure Especially at night hours;
-Disturb the circadian rhythm,
-Affect the normal sleep cycle,
-Cause Eye Strain and headache.

While it may seem like there is no escaping the harmful effects of high energy blue light,protection is available.

TIPS TO GET RELIEF FROM COMPUTER VISION SYNDROME/DIGITAL EYE STRAIN:

1. GET A COMPREHENSIVE EYE EXAMINATIOIN :

✓If you have any underlying visual or ocular problem then it will exaggerate the digital eye strain.

✓Correct any refractive error: for example; Myopia,hypermetropia or astigmatism.

✓During your exam,make sure to tell your eye doctor how often you use your computer at home and at work.It also helps if you can measure how far your eyes are from the screen.Bring this measurement to your exam.Your optimetrist can test your eyes at that specific working distance.

2.USE PROPER LIGHTING :

✓Excessively bright light can cause eye strain.The ambient lighting surrounding you, shouldn't be too bright when you use a computer.For example,many computer users find that they feel better when overhead fluorescent lights are turned off.

✓Eliminate exterior light by closing drapes, shades or blinds.

✓Reduce interior lighting by using fewer or lower intensity light bulbs or tubes.

✓If possible, position your computer monitor or screen in such a way that windows are to the side and not in front or behind it.

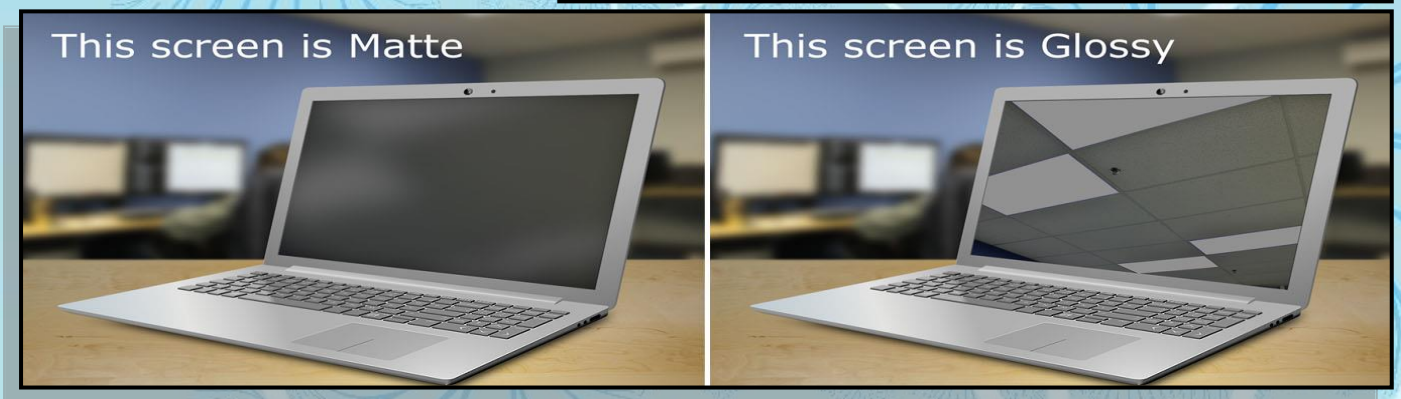
3.REDUCE GLARE :

✓*If you wear glasses then choose anti- reflective lenses and Amber-yellow coating.*

✓*This minimizes the amount of light reflecting off the front and back surfaces of your eye glass lenses and block the excess Blue light.*

✓*Glare on walls and finished surfaces and also on your computer screen can cause computer eye strain.*

✓*Use anti glare screen on your monitor and if possible paint bright white walls a darker colour with a matte finish and cover the windows.*

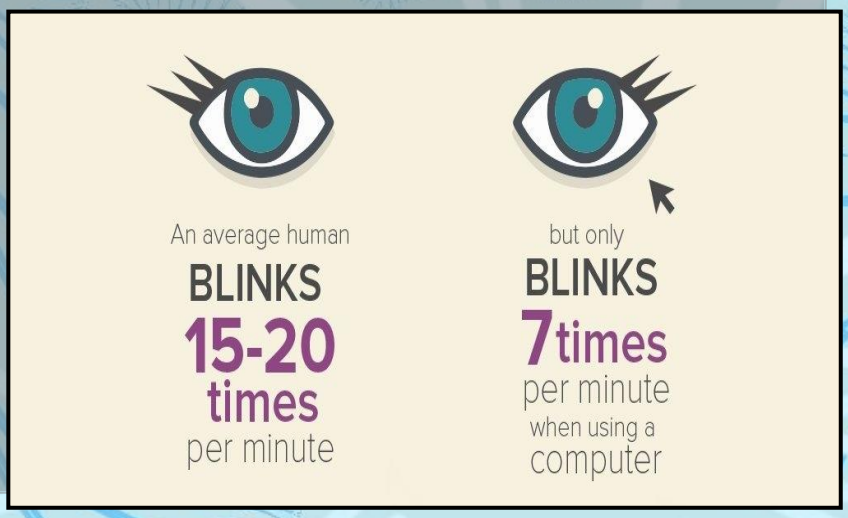


4. BLINK MORE OFTEN :

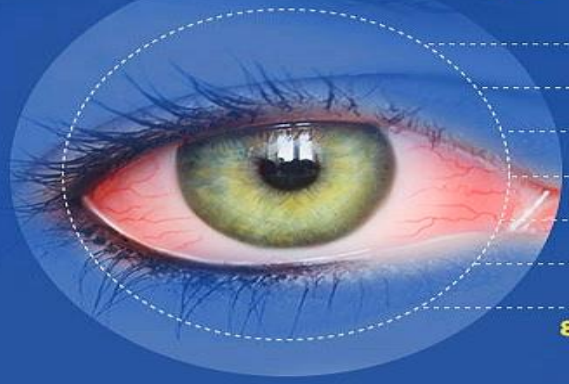
✓*Blinking is very important when working at a computer.Blinking moistens eyes to prevent dryness and irritation.*

✓*People normally blink about 18 times a minute,but computer users tend to blink only one fourth as often.This increases the chance of developing dry eye.*

✓*Tears coating the eyes evaporate more rapidly during long non-blinking phases and this will exaggerate dry eye symptoms.*



8 SIGNS OF DRY EYE



1. Blurriness
2. Sensitivity to light
3. Irritation from windy conditions
4. Fatigued eyes at the end of the day
5. Problems wearing contact lenses
6. Scratchy or gritty feeling
7. Excessive tearing
8. Red eyes

8 CAUSES OF DRY EYE

- Heavy reading or digital device use
- Living/working in dry environment
- Prolonged contact lens wear
- LASIK surgery
- Allergy drugs, diuretics, beta-blockers, birth control pills, or other drugs
- Diets poor in essential fatty acids or anti-inflammatory foods
- Certain health conditions, such as diabetes, arthritis, lupus, and Sjögren's syndrome
- Deficiency of tear-producing glands

8 STEPS TO MANAGE DRY EYE

1. Check your medications. Talk to your doctor to see if prescription drugs might be causing your dry eyes

2. Nutrition. Eat three healthy and sensible meals and snacks every day

3. Avoid pollution and irritants. Avoid rubbing your eyes which can disturb the tear film and transfer irritants to your eye

4. Balance your hormones. Try eating more whole grains, less sugar, and fewer processed foods. This will help to control insulin levels and keep inflammation under control

5. Take Special care with contact lenses. Contact lenses can soak up the fluid in your eye. Keep lenses clean, and try not to wear them all the time.

6. Use artificial tears to provide more moisture and lubrication for the surface of your eye

7. Hydrate and humidify. If you are dehydrated, the fluid in your eyes can be depleted, so drink lots of liquids

8. Blink! Try to blink every five seconds, especially when staring at your computer screen or digital device

5. UPGRADE YOUR DISPLAY :

✓*Types of Display;*

-CRT (Cathode Ray tube) [Most harmful to our eyes]

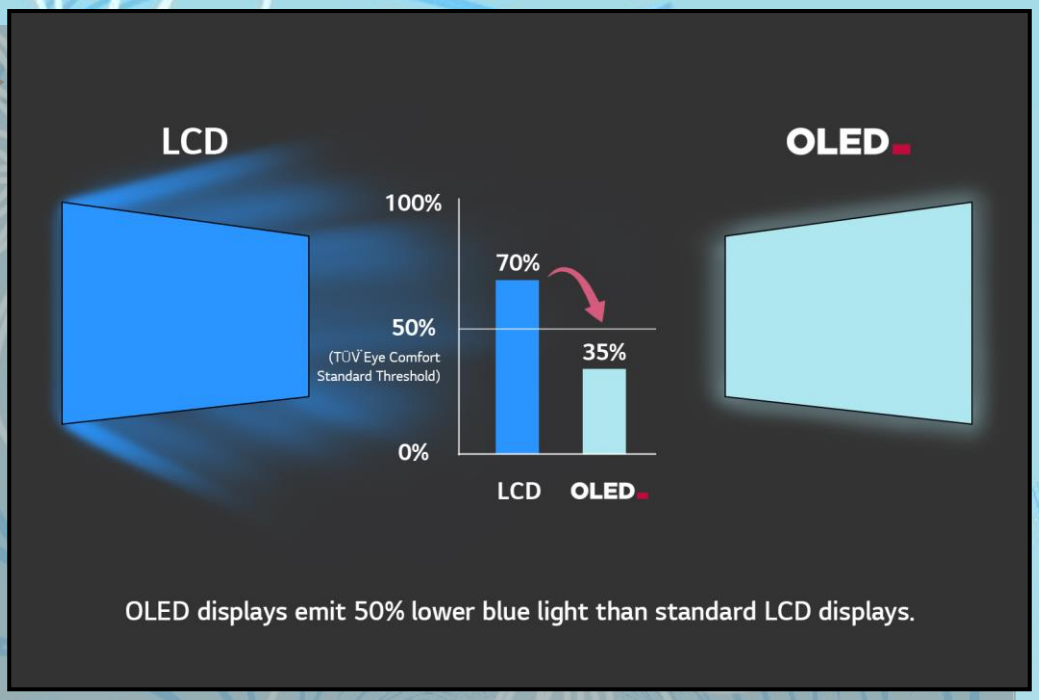
-TFT (Thin Film Transistor)

-LCD (Liquid Crystal Display)

- LED (Light Emitting Diode)

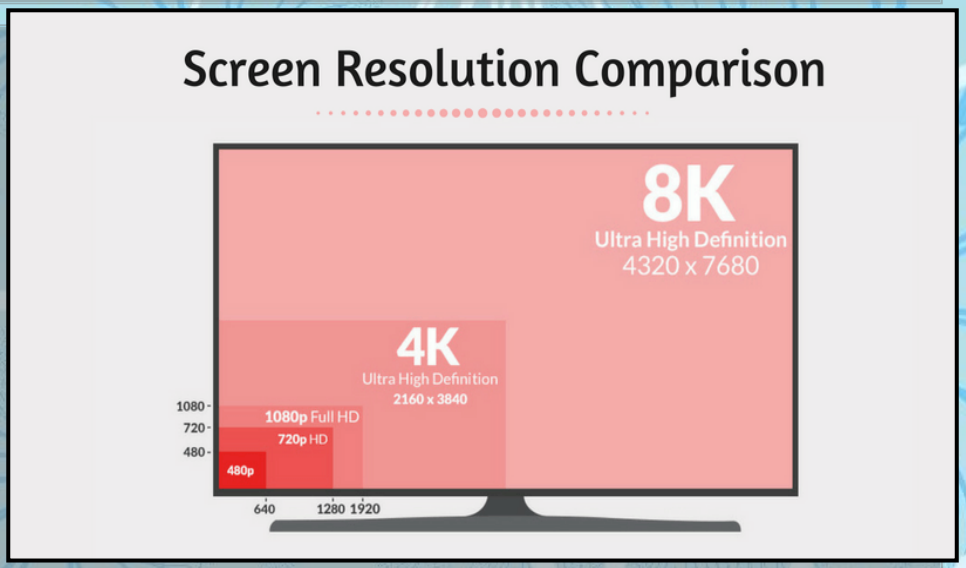
-OLED (Organic Light Emitting Diode) [Least Harmful]

-OFET (Organic Field Effect Transistor)



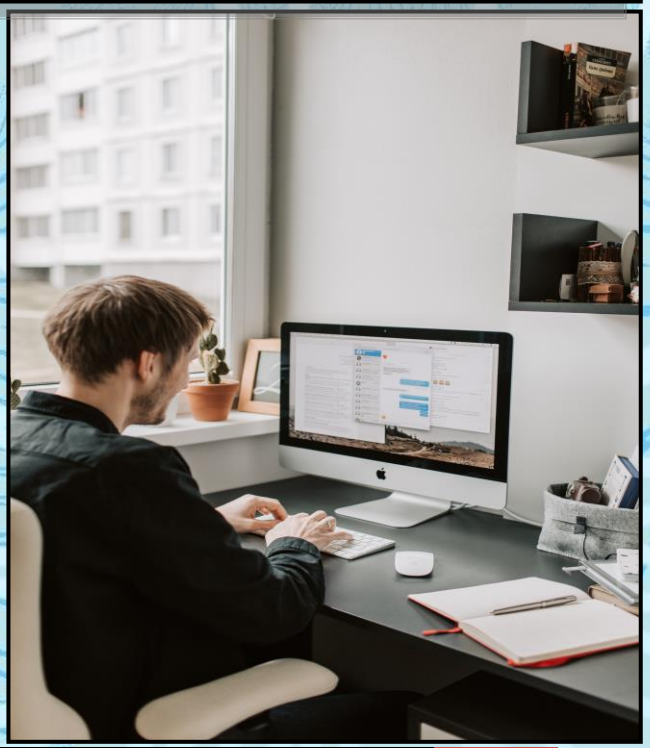
✓*Old fashioned CRT screens can cause a noticable 'flicker' of images,which is a major cause of Computer Vision Syndrome specially when refresh rate is below than 75 Hz.*

✓*LCD and LED screens are easier on the eyes and usually have an anti-reflective surfaces.Flicker is not an issue with LCD screens,since the brightness of pixels on the display are controlled by 'backlight' that typically operates at 200 Hz.*



✓*When choosing a new flat panel display, select a good display type with the highest resolution possible.*

✓*Finally,choose a relatively large display.*



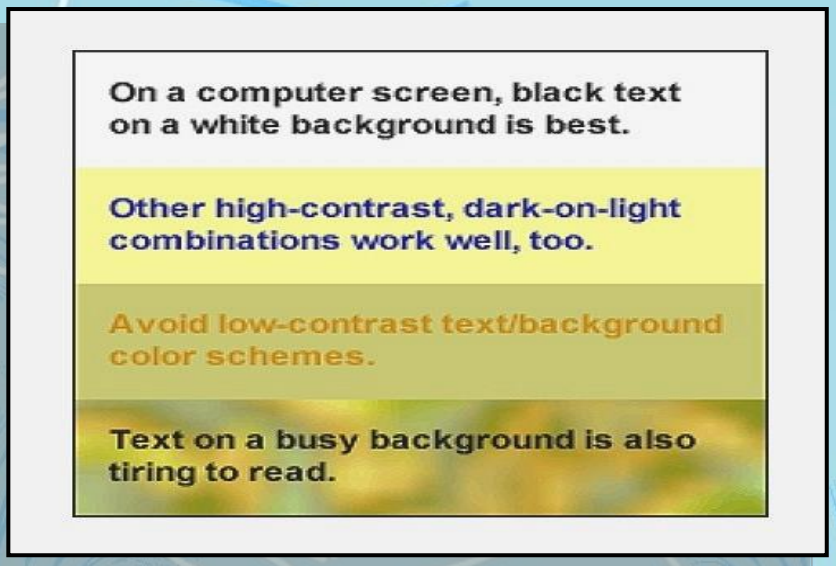
6. ADJUST YOUR DEVICE DISPLAY SETTINGS:

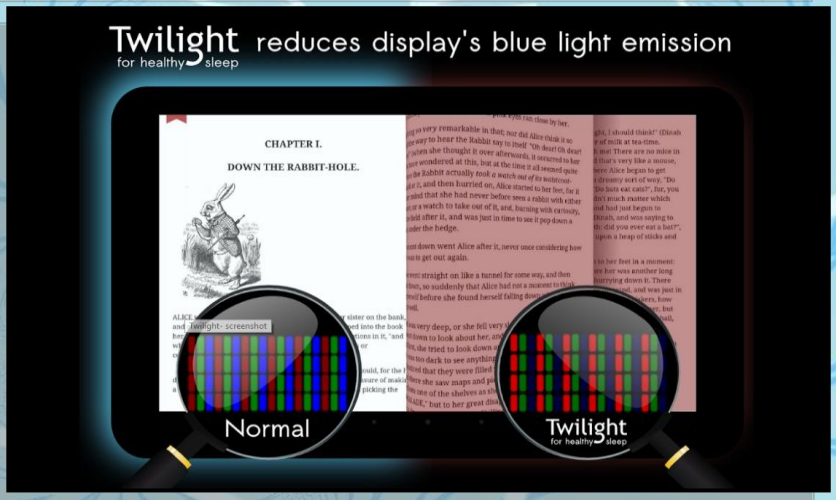
✓Adjust the brightness of your virtual display units as same as the brightness of your surrounding workstation.

✓Adjust the text size and contrast for comfort,especially when reading or composing long documents.

✓Reducing the colour temperature will give you a better long term viewing comfort.

✓As the Blue light is a short wavelength visible light,it is associated with more eye discomfort than longer wavelength hues, for example, orange and red.





7. TAKE FREQUENT BREAKS :

✓Neck,back and shoulder pain can be symptoms of Computer Vision Syndrome. You should take frequent breaks during your work day to prevent this.

✓During breaks, stand up, move about and stretch your neck,shoulders,back,legs and arms to reduce muscle fatigue and tension.

8. EXERCISE YOUR EYES :

✓If you find yourself gazing at screens all day, your eye doctor may have mentioned this rule to you. Basically, every 20 minutes spent using a screen, you should try to look away at something that is 20 feet away from you for a total of 20 seconds.

✓You need to do this every 20 minutes while using virtual display units like Computer, Tablets,Smartphones and laptops.

✓Doing this exercise will help reduce the risk of your eyes' focusing ability locking up after prolonged viewing of a digital screen.

9.ADJUST YOUR WORKSTATION :

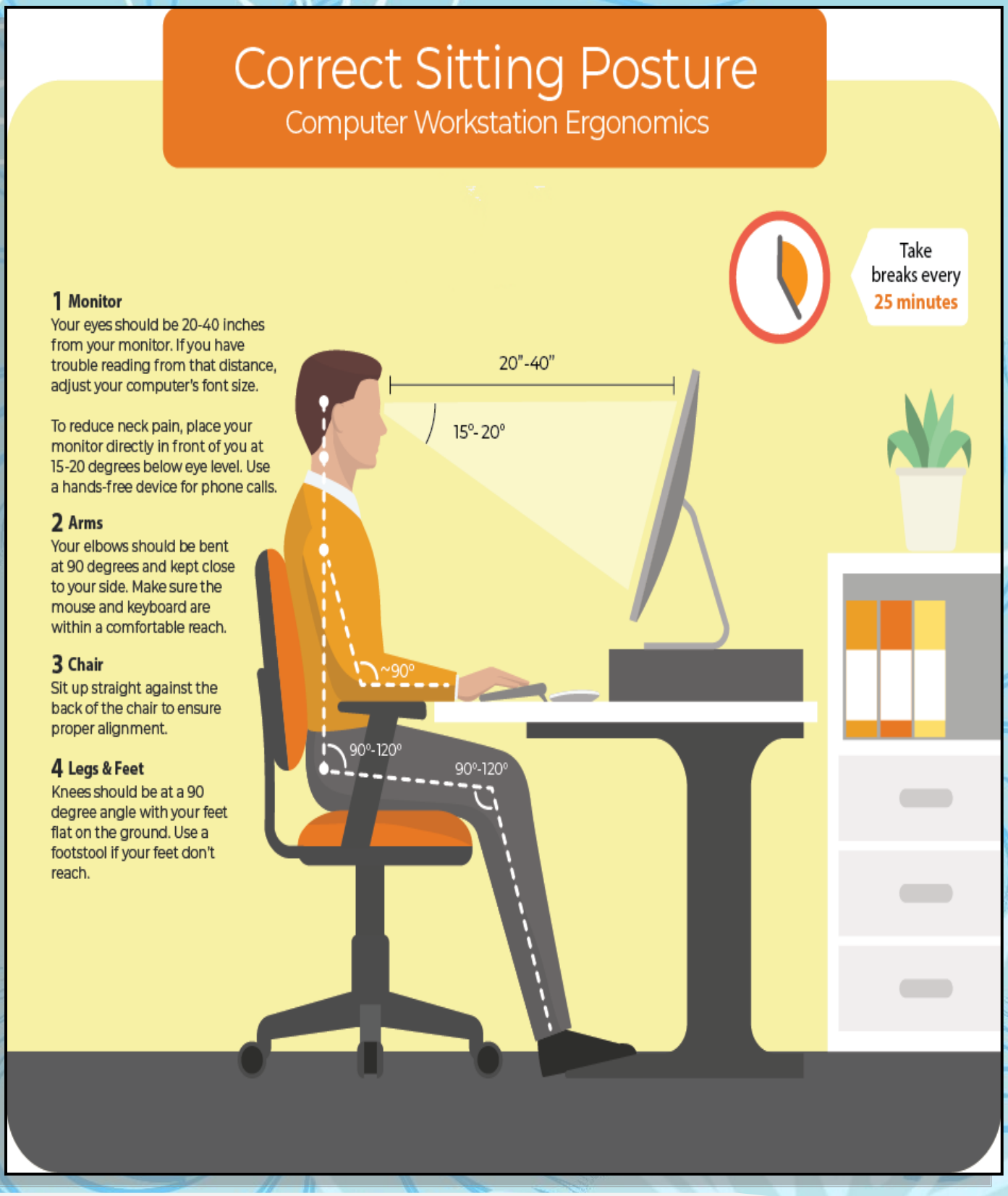
✓Simple changes can have a big impact on preventing Digital Eye Strain.

✓Sit in the correct posture to reduce the risk of Computer Vision Syndrome.

✓Adjust your chair and workstation to the correct height.

✓Purchase ergonomic furniture to enable you to position your computer screen at least 20 to 24 inches away from your eyes.

✓The centre of your screen should be about minimum 10 to 15 degrees below your eyes for comfortable positioning of your head and neck.



10. LIMIT SCREEN TIME-DON'T OVERUSE YOUR DIGITAL SCREEN :

✓*Although our digital focus society demands screen time from the moment we wake up to the second we go to bed, it's crucial to limit your screen time.*

Not only is looking at your laptop or phone before you go to bed is bad for your health but it also inhibits your sleep.

Your brain doesn't have a chance to slow down and it keeps you awake for longer making it harder to get a good night's rest.

✓*Gradually start decreasing your screen time before you go to bed.*

Start putting your phone away 30 minutes before hitting the hay and then increase it to an hour.

✓*When it comes to our eye health,social media and email can wait.*

FOLLOW THESE TIPS AND SEE THE BEAUTIFUL WORLD WITH YOUR BEAUTIFUL EYES

✓Beauty is how you feel on the inside and it reflects in your eyes.

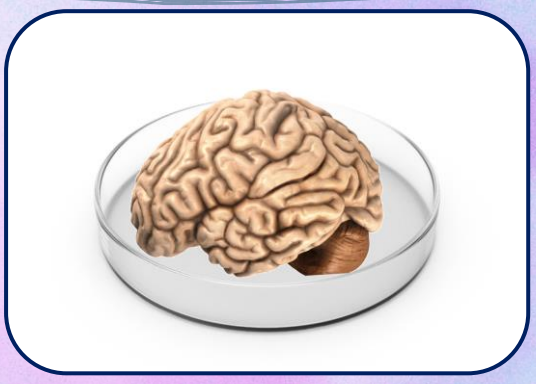
✓Smile.Your eyes sparkle when you do.

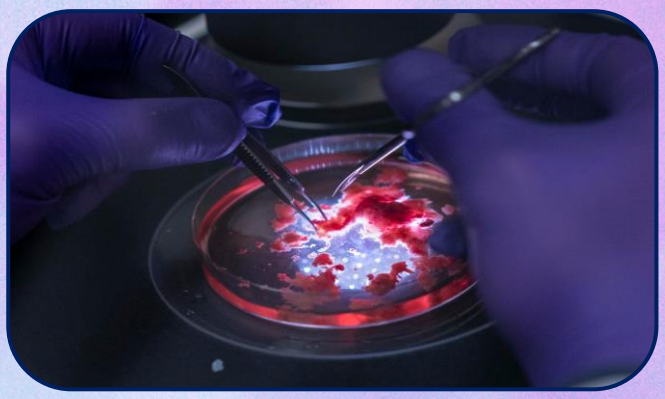
BRAIN ORGANOIDS

2

-By Souranil Biswas, Physiology honours Semester 6

For any queries: bsouranil@gmail.com

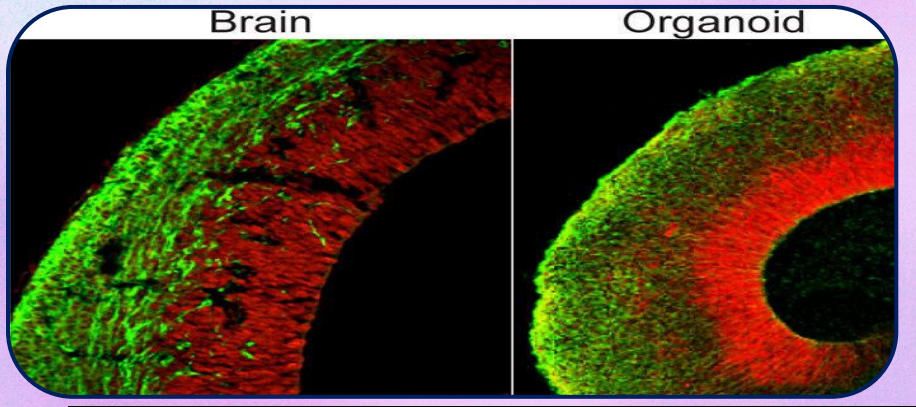




❖ *Imagine if diseases like developmental disorders cancers and dementias could be modelled in a lab from beginning to end with real human tissue being encouraged to develop as close to the maximum diversity as possible. This is the subject of ground-breaking research that has built up over the past seven years. This is what places the development of cerebral organoids as potentially one of the greatest blessing's neurosciences have received in its long history over the past hundred years. Scientists have come to understand just how capable cells are at organizing themselves how they sort their positions and turn into new cells and ultimately form superstructures. In all the organs that we have in common, what we don't quite know, what are the specifics of the individual components of the well-oiled system that can go wrong in specific conditions, that's why organoids are so promising.*

So, what even is an organoid?

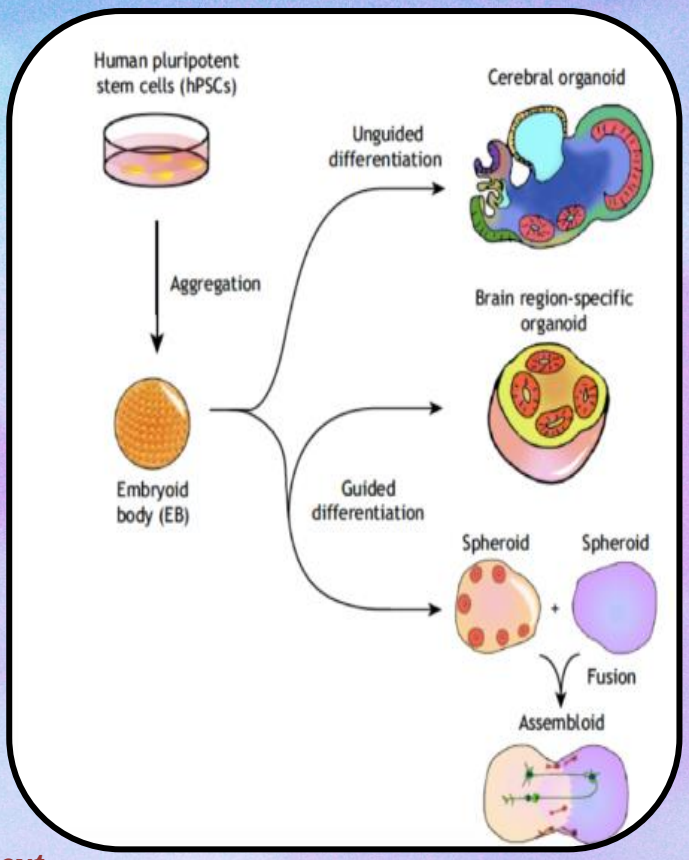
An organoid is a set of cells created in vitro or a dish that when grouped functionally resemble and behave like any given organ. They only max out at about four millimetres in size, the size of an apple seed but their appeal is that they contain multiple organized cell populations this means that we can make stronger conclusions about a real organ's development than we ever have before making them.



DO YOU KNOW?

WHAT IS NEURON FOREST?

We need four specific requirements,

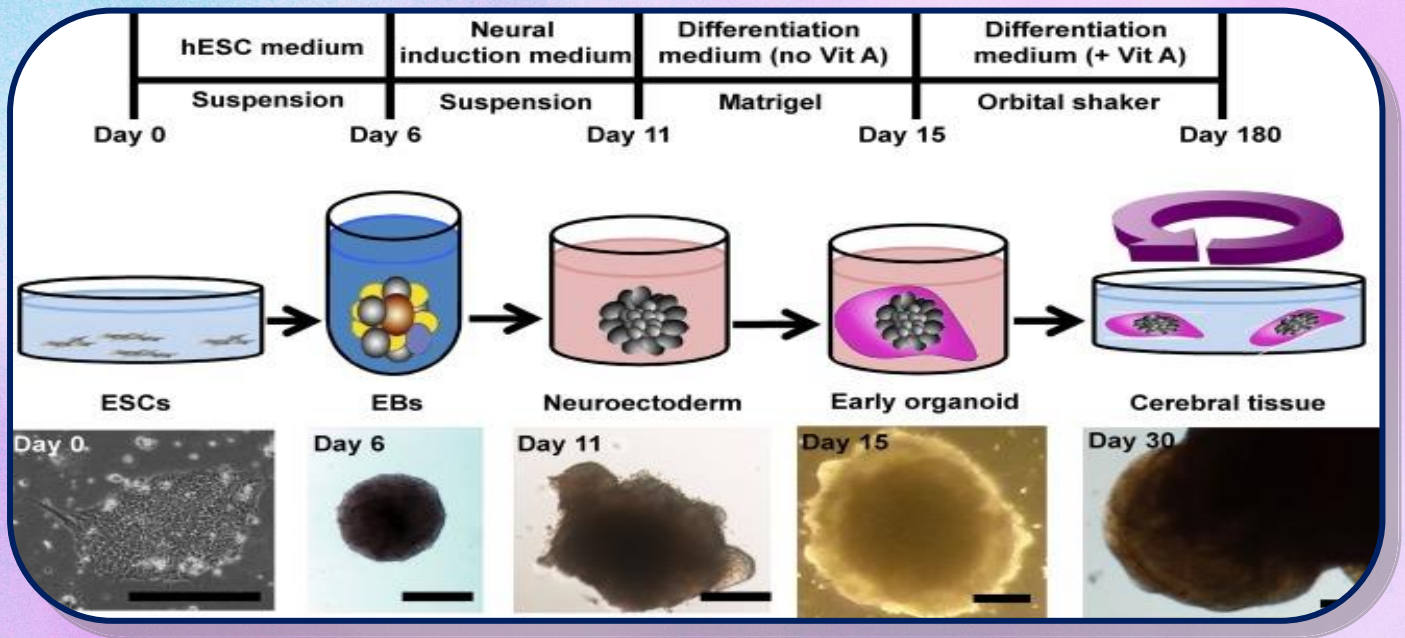


- ***First of all, you need cells, not just any cells but pluripotent stem cells. In 1981 the biologist and future Nobel prize winner Dr. Martin Evans managed to separate pluripotent stem cells from the embryos of mice, these are cells that can divide into any cell type in the body. Organoids need to be as accurate in their reconstruction of a given organ as possible so, having pluripotent stem cells that can turn into anything you want is essential when it comes to organoids. We've reached a point where we can essentially reprogram mature epithelial cells skin cells, in particular, to turn into pluripotent stem cells. This means that donors only need to donate tissue that easily regenerates for scientists to get going.***

So, we've got the cells what do we need to do next

- ***The answer is that they need something to grow in. In the early 2000s growing stem cells in 2d cultures meant that key structures could develop. This was interesting in terms of exploring how and why cells moved and structured themselves the way that they did but, it's nowhere near as complex or realistic as a true organ. This is where 3d cultures come in. In the 1980s a nutrient-rich matrix derived from mouse tumor cells called Matrigel. This matrix allows cells to migrate in all directions as well as granting them a greater space to interact and grow.***

Once that's in place all you need to do for step three is to pattern the cells with specific growth factors to create. Whatever tissue you want then you spin them in a bioreactor this keeps the nutrients and gases flowing throughout the organoid, allowing over several months to develop a true miniature organ.



- *So, now we know how to make an organoid but what does this have to do with Neuroscience.*
  - *In 2013 the method that we described for making them, was applied to making miniature brains for the first time by a team at the University of Cambridge.*
  - *They used the cells of a patient with congenital microcephaly, a condition where a patient is born with a pathologically small head.*
  - *To see what would happen and the findings were astonishing you could see just how fast the microcephaly cells developed, over the first 22 days only to suddenly stop.*
  - *This created a shrunken organoid that resembled that of the patient the implications of this are profound.*
  - *If you wanted to track real-time changes in a brain, you'd normally have to rely on real-life which is slow, or on mice, the problem with mice is that they have entirely different brain structures to us for example, they've got a much more primitive neocortex, which in humans is our most highly involved brain component.*
  - *Human-derived organoids on the other hand can broadly replicate the neurodiversity of a real brain meaning we can use them to make far more solid conclusions about how each group of cells forms and functions, of course, not every brain the disorder is something that you're born with.*

We will develop many of these problems throughout our life, luckily organoids can help us with those too. Using models replicating cerebral palsy which is sometimes influenced by a hypoxic event or when there's very little oxygen going to a child's brain. Researchers have managed to show critical time points at which cells are more likely to compensate and survive. In 2016 when zika virus a virus which can cause developmental problems like microcephaly threatened to become a pandemic. Organoids were also used for drug testing, running six thousand compounds on human tissue and generating a list of viable candidates. Even brain cancers, glioblastoma in particular and neurodegenerative diseases like familial Alzheimer's have had models generated for them allowing various drugs to be tested to see just how effective or toxic they might be. This could be the ultimate height of lab science bringing an untold benefit to humanity.

- ***Organoids as a whole are limited, they've only been around for 10 years and we're still finding ways for them to improve for example when it comes to the brain its stem cells and patterning factors don't automatically generate their blood supply this is important for two reasons.***
  - ***Firstly, without a blood supply, the organoid has a much shorter lifespan and most of them survive between about 100 days and 9 months, meaning we aren't yet able to see a condition's full clinical course which is something relevant for a disease like Alzheimer's which relies on the degeneration of those cells over time.***
  - ***Secondly, to acquire a blood supply the organoids need to be coated with another type of cells, those that have shown promise lasting longer than the blood vessel-free organoids, those that do develop blood vessels and do last longer than blood vessel free organoids. This just goes to show that a mini-brain in a glass dish isn't the same as growing it in a fully functioning body, there simply is not the range of signals required to be accurate.***

ARTIFICIAL BLOOD : TRUTH OR MYTH

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-By Kanchan Mukherjee, Physiology honours Semester 6

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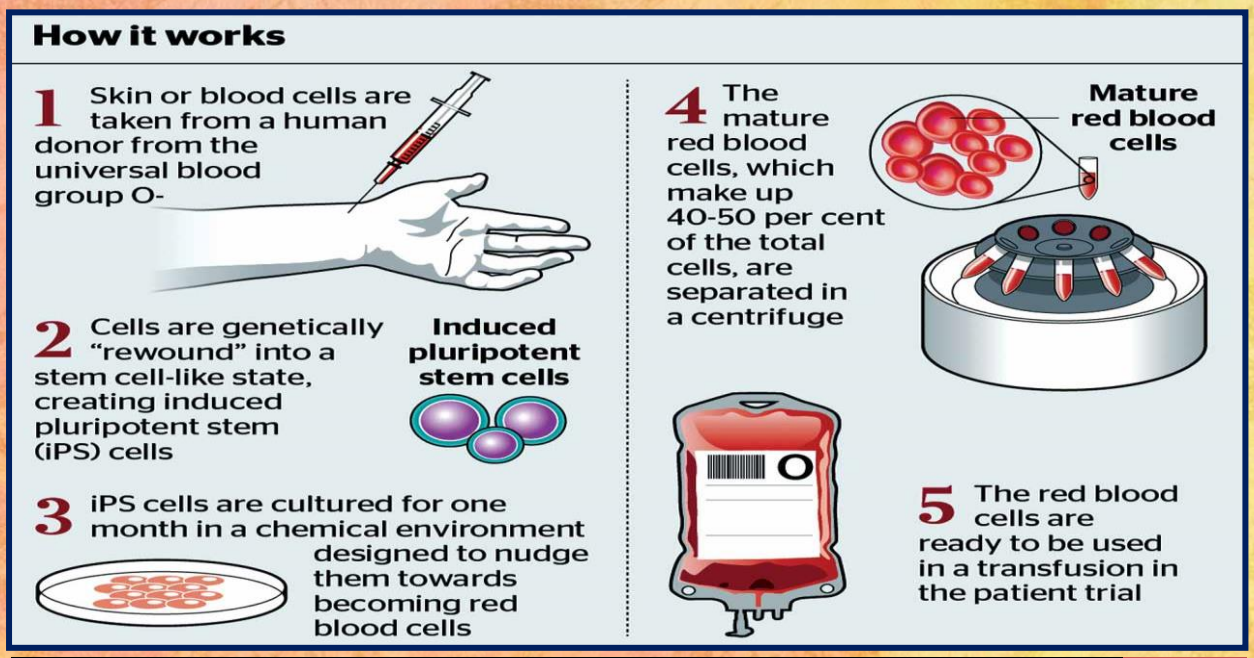
ABOUT ARTIFICIAL BLOOD:

- *A blood substitute, though it may sound unrealistic, it's actually true enough.*
  - *Artificial blood is an innovative concept of transfusion medicine where specifically designed compounds perform the task of transport and delivery of oxygen in the body to replace this function of allogenic human blood transfusion.*
  - *The researchers are in a continuous search of it from the 17th century. At the very beginning various substances like urine, plant resins, wine, sheep blood, milk and salt solutions were tried as artificial blood.*
  - *In early 1900's along with the discovery of various blood groups by Landsteiner, necessity of type specific allogenic transfusion as well as the oxygen transport and delivery by RBC's become well understood.*
  - *In the year 1949 Amberson et al. was the first to be reported of doing cell free infusion of haemoglobin in a patient with postpartum hemorrhage for vivification.*
  - *Several molecules have been developed in the past few decades to achieve this objective and continuous refinements are being continuously made with the search of the ideal blood substitute.*

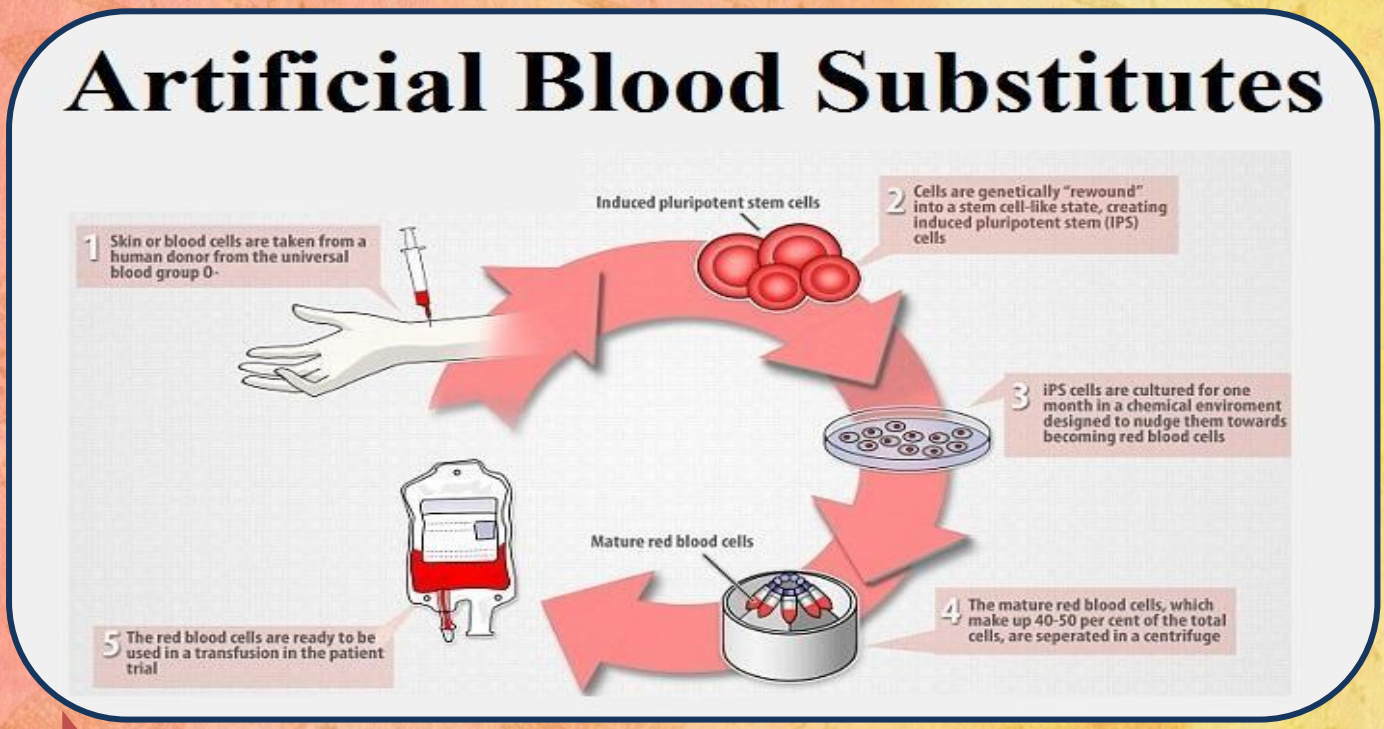


❖ *There are two significantly different products that are under development as blood substitutes. They differ primarily in the way of carrying oxygen*

One is based on perfluorocarbons(PFC), while the other is a hemoglobin-based product.

✓ ***Perfluorocarbons(PFC):*** *Although it is inexpensive to produce and can be made devoid of any biological materials, it is not preferred as artificial blood . Because of two reasons, first it is not water soluble and secondly its capability to carry oxygen is too less than that of the hemoglobin-based products.*

✓ ***Hemoglobin-based products:*** *Hemoglobin carries oxygen from the lungs to each and every part of the body. Artificial blood based on hemoglobin, uses this functional property as it's principle. These hemoglobin products are different than whole blood, here they do not possess any membrane, so the problem of blood typing is resolved. But still There are also issues with the stability of hemoglobin in a solution.To overcome these challenges various strategies are employed to stabilize hemoglobin to create hemoglobin based artificial blood.*



Artificial blood can be produced in different ways using synthetic production, chemical isolation, or recombinant biochemical technology. Recombinant DNA technologies are like; Polyethylene Glycol-Modified Liposome-Encapsulated Hemoglobin, nanoparticle and polymersome encapsulated hemoglobin, stabilized hemoglobin solutions, polymerized hemoglobin solutions, conjugated hemoglobin solutions. Synthetic hemoglobin-based products are produced from hemoglobin are harvested from an E. coli bacteria strain. The hemoglobin is grown in a seed tank and then fermented

❖ *These artificial blood supplements have some advantages over the natural occurring RBCs, those are;*

✓ *Due to the characteristic of lower affinity towards oxygen these substances unload the oxygen more rapidly thus they have a capability of faster oxygen distribution.*

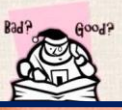
✓ *They can be stored in room temperatures for 1 to 3 years without any refrigeration.*

✓ *Artificial blood components are sterilized , thus they does not transmit any disease.*

✓ *Due to absence of any type surface protein, this product is universally compatible and do not require any compatiblity testing. So they are devoid of inflammatory or reperfusion injury.*

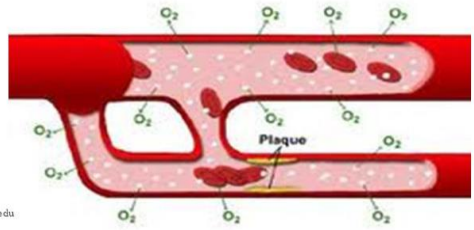
Donated Blood VS Artificial Blood

Donated Blood	Artificial Blood
Short shelf life	Longer shelf life
Risks of transmitting infectious diseases	No risk of transmitting infectious diseases
Need for cross-matching	Universally compatible



Areas of Research

perfluorocarbons (PFCs) carry oxygen in a dissolved form. They can carry up to 50 times more dissolved oxygen than plasma, enough to supply sufficient oxygen to tissues in the absence of red blood cells.



The term "oxygen carrier" might be more appropriate to these products than that of the artificial blood. Because, still date, the clinical implications of artificial blood is performed only as the replacement of red blood cells as well as blood volume and as a sort of drug carriers conjugated with haemoglobins and PFCs; mainly in case of trauma, organ preservation before transplant, and also in the patients with sickle cell anemia, CO poisoning etc. The usage of this blood supplements can be much more in specific situations like; war, natural disasters and in areas with scarcity of safe blood for transfusion (like South Africa and Nigeria where a large population is HIV infected). Therefore, further researchers are going on to develop artificial platelets, white blood cells and blood proteins to mitigate this shortcoming of the available molecules and to ensure that the future blood substitutes contain the functionality of these elements. We hope that in the near future the researchers will found new materials, having the ability of oxygen carrying capacity along with a long-term replacement applications, which will also perform various blood functions(like: protecting from diseases, preventing

Besides all these, still there is a need for abundant amount of clinical tests , trials and studies to be done, before these artificial blood substitutes come into regular practice ; as , their usage is coupled with various complications like; increase in systemic and pulmonary arterial resistance, decreased cardiac output, jaundice, increased activities of enzymes like amylase, lipase or transaminases which reflects to the clinical pancreatitis. The large-scale clinical application of these substances are also being hindered by the issues like; insufficient supply of raw materials, toxicity, cost and safety.

So, we can definitely conclude in a optimistic way by saying that, "Artificial Blood", obviously is a futuristic dimension of modern day transfusion sciences.

HYPOTHYROIDISM : A Health Issue in which 1 out of 10 Indians are Suffering

-By Nurain Shakil , Physiology honours Semester 4

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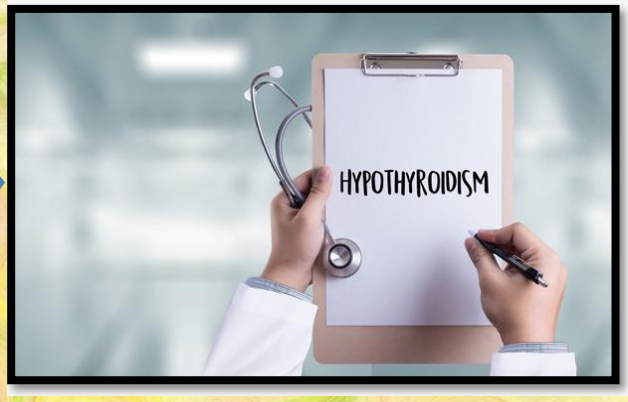
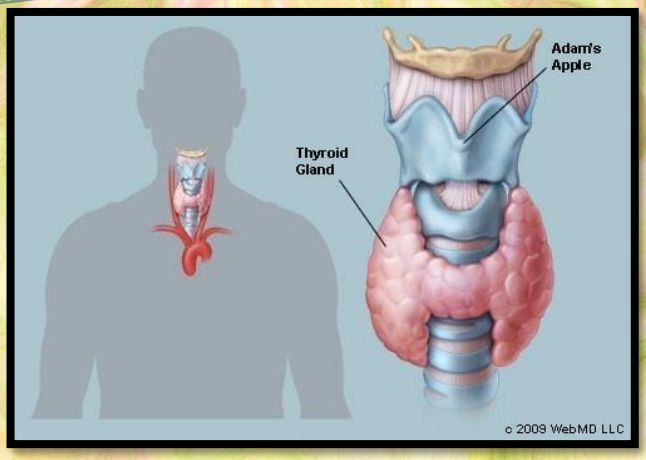




- *Hypothyroidism is a common hormonal problem where the thyroid gland remains underactive and cannot produce enough hormones to meet the body's demand. These hormones are responsible for cell growth, repair and proper functioning of metabolism. Over time this disease can lead to tiredness, hair loss, weight gain and the person might feel extremely exhausted. 90% to 95% of cases are chronic and medication should be taken lifelong to control the abnormality of the gland. It affects people of all age groups and mostly women face this problem almost two to ten times more than that of the men.*

TYPES OF HYPOTHYROIDISM:

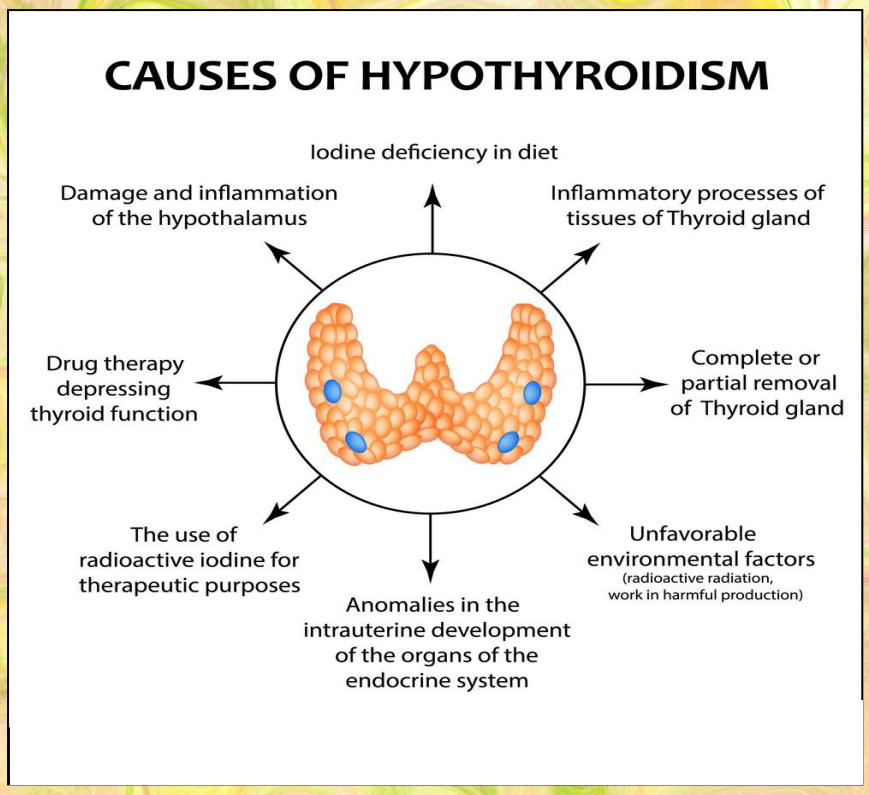
- *The thyroid gland is 'butterfly' shaped gland located in the lower front of the neck, and is under the control of the pituitary. When the pituitary releases thyroid stimulating hormone(TSH),the thyroid secretes two kinds of hormones - triiodothyronine(T3) and thyroxine (T4) – into the bloodstream. These thyroid hormones help the body to work properly by controlling the rate of metabolism and function of many organ systems.*

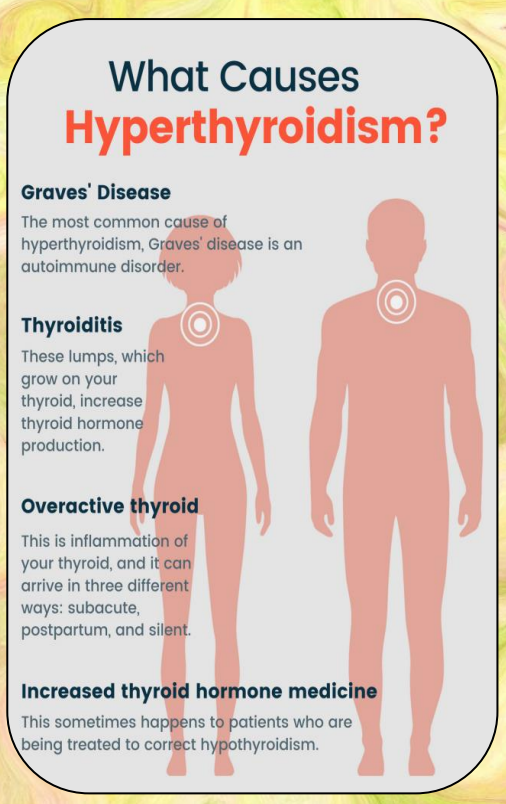
- ✓ *Primary hypothyroidism: In this type, an inadequate amount of thyroid hormone is produced and secreted in the bloodstream, by the thyroid gland itself.*

- ✓ *Secondary or central hypothyroidism: When inadequate amount of thyroid hormone in the bloodstream is due to the failure of thyroid gland or failure in function of both the pituitary and thalamus.*

- ✓ *Tertiary or hypothalamic hypothyroidism: When reduction of thyroid hormone entirely caused by Pituitary disorder leading to inadequate secretion of TSH because of decreased stimulation by TRH.*

CAUSES OF HYPOTHYROIDISM :

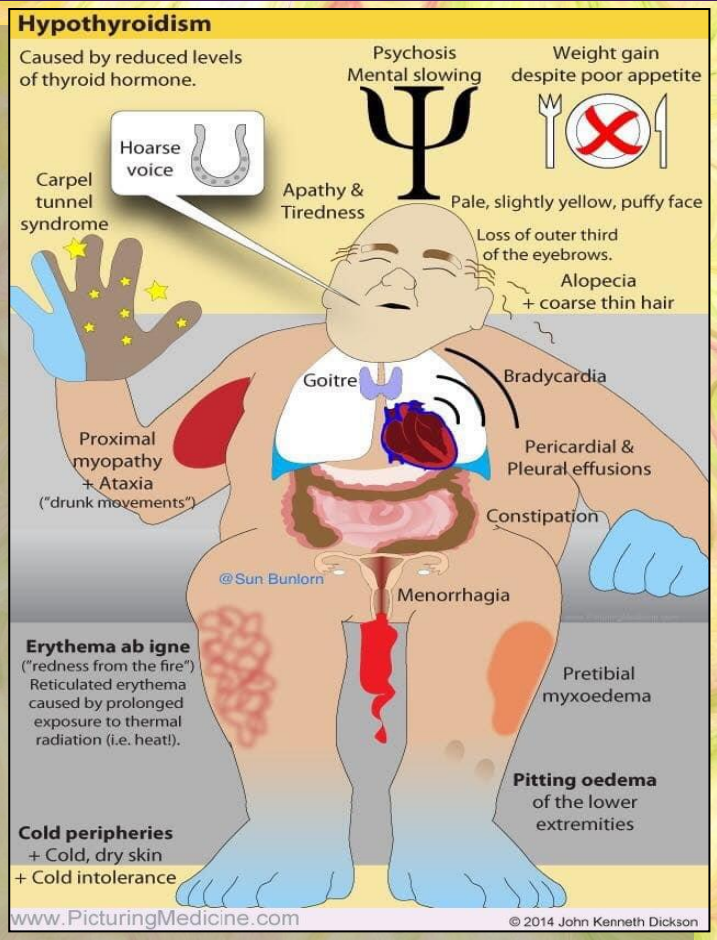




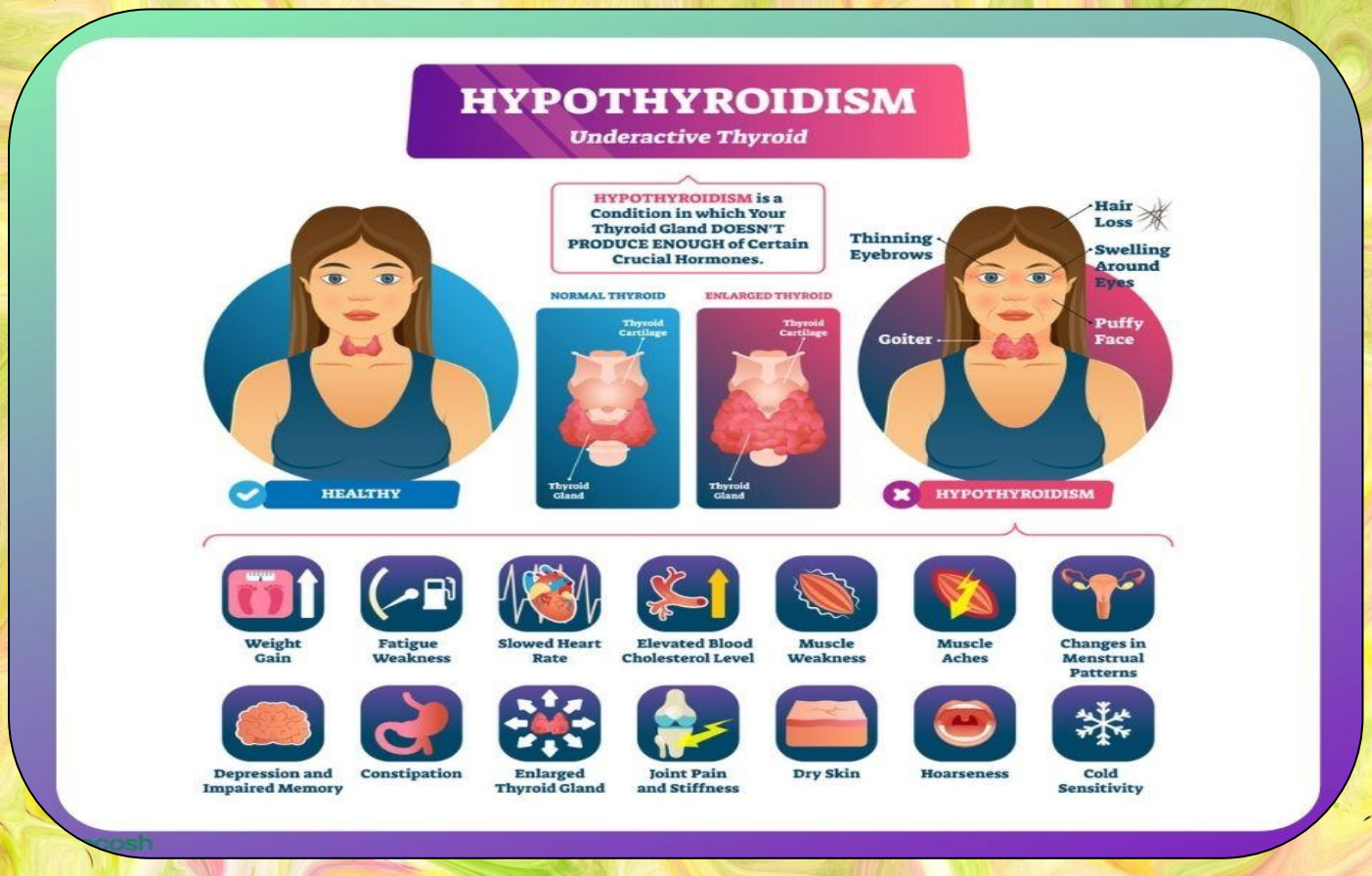
- ***When your thyroid doesn't produce enough hormones, the balance of chemical reactions in your body can be upset. There can be a number of causes, including autoimmune disease, hyperthyroidism treatments, radiation therapy, thyroid surgery and certain medications.Your thyroid is a small, butterfly-shaped gland situated at the base of the front of your neck, just below your Adam's apple.***
- ***Hormones produced by the thyroid gland — triiodothyronine (T3) and thyroxine (T4) — have an enormous impact on your health, affecting all aspects of your metabolism. These hormones also influence the control of vital functions, such as body temperature and heart rate.***
- ***Hypothyroidism results when the thyroid gland fails to produce enough hormones.***
- ***<u>Hypothyroidism may be due to a number of factors, including</u>:***
  - ✓ ***Autoimmune disease.***
  - ✓ ***Over-response to hyperthyroidism treatment.***
  - ✓ ***Radiation therapy.***
  - ✓ ***Medications.***
- ***<u>Less often, hypothyroidism may result from one of the following</u>:***
  - ✓ ***Congenital disease.***
  - ✓ ***Pituitary disorder .***
  - ✓ ***Pregnancy.***
  - ✓ ***Iodine deficiency.***

SYMPTOMS OF HYPOTHYROIDISM:

- ***Hypothyroidism may include the following signs and symptoms:-***
- ✓ *Fatigue*
- ✓ *Increased sensitivity to cold*
- ✓ *Constipation*
- ✓ *Dry skin*
- ✓ *Weight gain*
- ✓ *Puffy face*
- ✓ *Hoarseness*
- ✓ *Muscle weakness*
- ✓ *Elevated blood cholesterol level*
- ✓ *Muscle aches, tenderness and stiffness*
- ✓ *Pain, stiffness or swelling in your joints*
- ✓ *Heavier than normal or irregular menstrual periods*
- ✓ *Thinning hair*
- ✓ *Slowed heart rate*
- ✓ *Depression*
- ✓ *Impaired memory*
- ✓ *Enlarged thyroid gland (goiter).*



COMPLICATIONS OF HYPOTHYROIDISM:



❖ ***Complications of Hypothyroidism:*** ***It includes;***

- ***Goiter***
- ***nerve injury***
- ***peripheral neuropathy***
- ***carpal tunnel syndrome***
- ***reduced kidney function, in cases of severe disease***
- ***myxedema coma, in cases of severe disease***
- ***obstructive sleep apnea***
- ***Hypothyroidism can also result in infertility or pregnancy-related complications such as preeclampsia.***

OCCURRENCE OF HYPOTHYROIDISM:

❖ ***Almost 1-2% of the total population of earth are suffering from hypothyroidism. The disease gets more common with age. People over 60 years old experience it more frequently. Women are more likely to have an underactive thyroid. In fact, 1 in 8 women will develop hypothyroidism.***

RISK FACTORS OF HYPOTHYROIDISM:

❖ ***Factors that can increase your risk of developing hypothyroidism include:***

- ***Being female***
- ***Age of 60 years or more***
- ***Having a family history of hypothyroidism***
- ***Having certain autoimmune conditions***

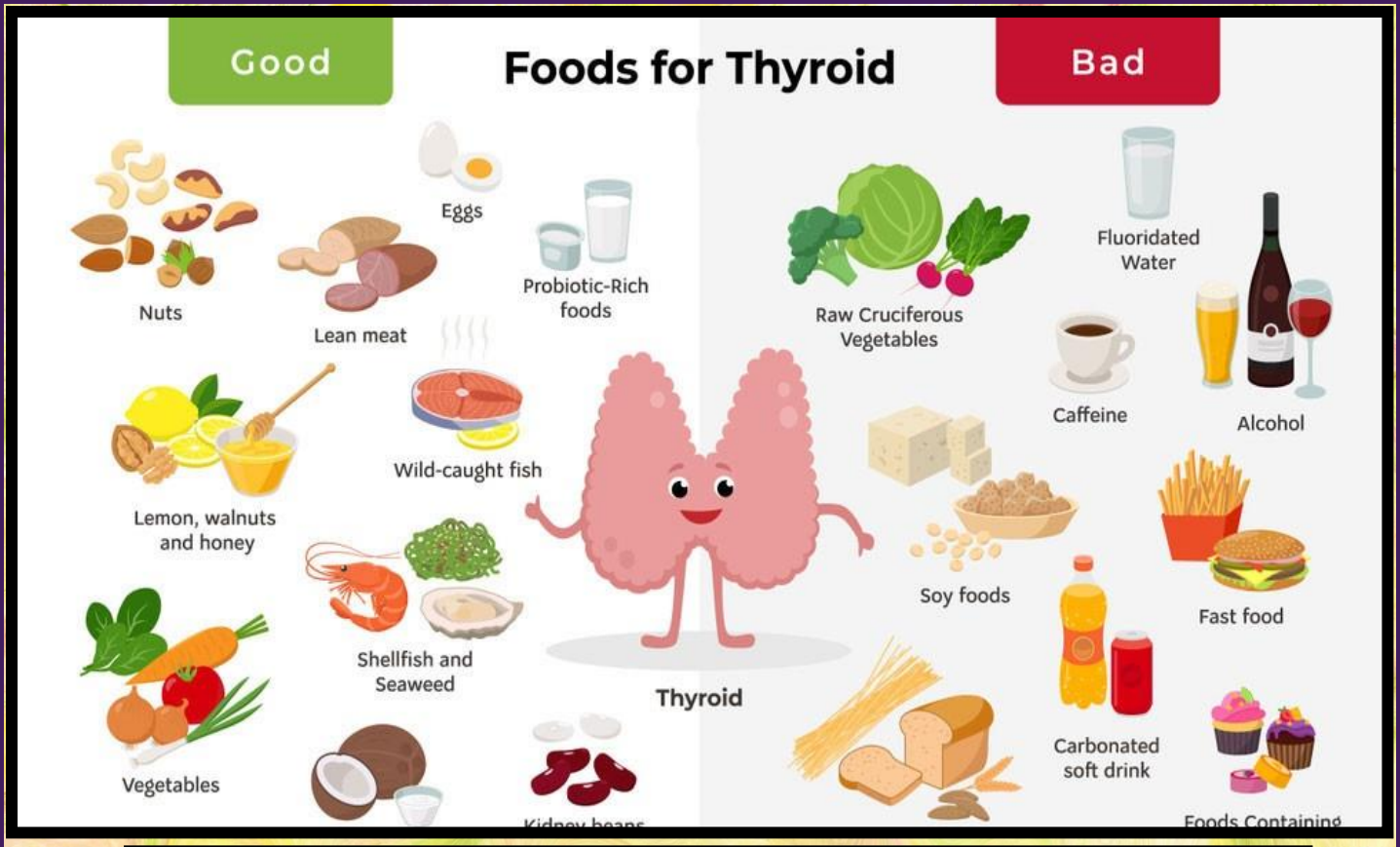
MANAGEMENT OF HYPOTHYROIDISM:

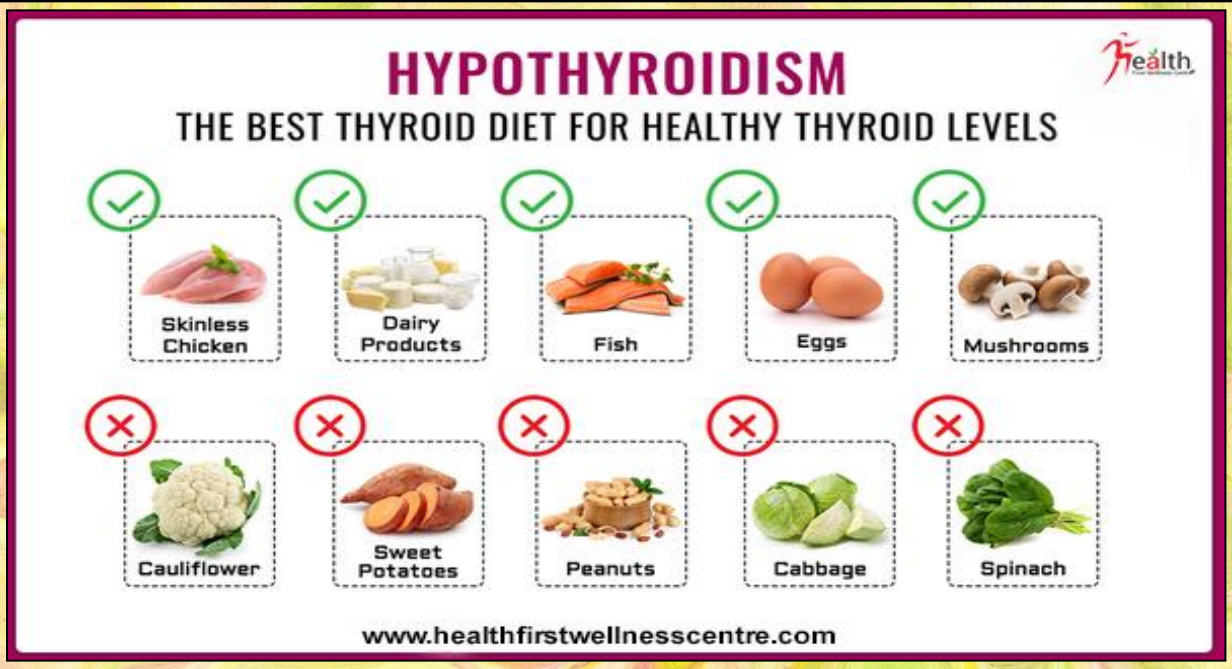
- ***It is important to manage the condition on time, which can only be possible with proper medication and a healthy diet.***

- ***A person with this complication should include leafy green vegetables, whole grain, nuts, seeds and foods rich in zinc(like: lentils, chickpeas, beans), selenium(like: tuna, sardines, eggs, legumes) in their daily diet. So that these can cover the symptoms of thyroid imbalance.***

- ***Hypothyroidism can be easily treated with thyroid hormone replacement.The preferred treatment for most people with an underactive thyroid is levothyroxine sodium(Levoxyl, Synthroid) this is a more stable form of thyroid hormone and requires once a day dosing. Liothyronine sodium(cytomel), also may be prescribed to treat hypothyroidism under certain conditions.***

- ***With the exception of certain conditions, the treatment of hypothyroidism requires life-long therapy. However, over treating hypothyroidism with excessive thyroid medication is potentially harmful and can cause problems with heart palpitations and blood pressure control, and contribute to osteoporosis.***





Hypothyroidism is quite common in Indian's and is the most common reversible congenital disease causing mental retardation. Almost in 60% of the cases this remains undetected, as most of the symptoms are nonspecific; early identification and intervention is important as thyroid dependent brain development is complete by three years of age. However one can lead a normal and healthy life if he/she goes through the prescribed medications and proper diet pattern after the problem is detected.

ঘুম শারীরবৃত্ত এবং মানবশরীরে এর প্রভাব

-By Arpita ghosh , Physiology honours Semester 4

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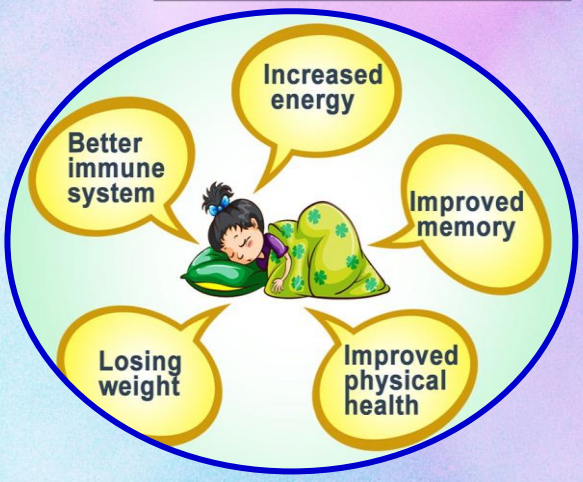
ঘুম কেন পায়?



- ঘুম হল মস্তিষ্ক নিয়ন্ত্রিত এক প্রতিবর্ত ক্রিয়া। আমাদের মস্তিষ্কের হাইপোথ্যালামাস অঞ্চলে রয়েছে স্লিপ সুইচ, যা নিয়ন্ত্রণ করে আমাদের ঘুম।
- এটা আসলে মস্তিষ্কের হাইপোথ্যালামাসের সামনের অংশের একগুচ্ছ বিশেষ ধরনের কোষ, যে অঞ্চলটিকে 'ব্রেন অফ দি ব্রেনড' বলা হয়ে থাকে।
- এই স্নায়ুকোষগুলো থেকে এক ধরনের রাসায়নিক সংকেত হাইপোথ্যালামাসের পিছনে বিশেষ আরেকটি অঞ্চলে পৌঁছলেই আমাদের ঘুম পায়। আবার পিছন থেকে উল্টো পথে এই সঙ্কেত হাইপোথ্যালামাসের সামনে পৌঁছলে আমরা জেগে উঠি।
- এই ব্যাপারে হাইপোথ্যালামাসের ল্যাটারাল অংশে উৎপন্ন অরেক্সিন নামক এক ধরনের রাসায়নিক গুরুত্বপূর্ণ ভূমিকা পালন করে।
- ঘুমের সময় মানুষের কোনো কোনো দেহাঙ্গ সক্রিয় অবস্থায় থাকে, যথা — হৃৎপিন্ড, ফুসফুস, কিডনি, পৌষ্টিক নালী ও মস্তিষ্ক। এই সময়ে মস্তিষ্কে সক্রিয় পুনর্বিন্যাসের কাজ চলে। অতএব ঘুমকে সাময়িক চেতনালোপ জাতীয় অবস্থা

কিভাবে আসে ঘুম?

ঘুম আসার সময়ে প্রথমে শিথিল হতে থাকে দেহের নানা মাংসপেশি। ঘাড়, পিঠ, পা এবং হাতের উপরের দিকের পেশি প্রথমে শিথিল হয়, তারপর হয় হাত পায়ের আঙুল, পায়ের পাতা, হাতের নিচের দিকের পেশি। এরপর ক্রমশ দেহের ছোটো পেশিগুলো শিথিল হতে থাকে।

কতক্ষণ ঘুমানো উচিত?

- ✓ দেখা গেছে, বয়স যত বৃদ্ধি পেতে থাকে, ঘুমের চাহিদাও তত হ্রাস পায়। নবজাতকে এই চাহিদা ১৬-২০ ঘন্টা, শিশুতে ১২-১৪ ঘন্টা, প্রাপ্তবয়স্ক মানুষের ৭-৯ ঘন্টা এবং বার্ধক্যে ৫ ঘন্টা।
- ✓ প্রাপ্তবয়স্ক মানুষের ক্ষেত্রে দুপুরে এক ঘন্টা ঘুমিয়ে নিতে পারলে খুবই ভালো।
- ✓ এতে শরীর সুস্থ থাকার সঙ্গে সঙ্গে সতেজভাবে কাজ করবার ক্ষমতা বৃদ্ধি পায়।
- ✓ আবার শরীরকে বিশ্রাম দেওয়ার অর্থ এই নয় যে সময় পেলেই আমরা একটু ঘুমিয়ে নেব।
- ✓ ব্যাপারটা অনেকটা ওই দীর্ঘক্ষণ কম্পিউটারে কাজ করবার পর রিফ্রেশ বোতামে ক্লিক করবার মতো। কিন্তু কেউ যখন ১০ বা ১২ ঘন্টার বেশি ঘুমান তখনই সমস্যার সৃষ্টি হয়।
- ✓ নিয়মিত ১২-১৩ ঘন্টা ঘুম কিন্তু একটা চিন্তার বিষয়।

ঘুম পাড়ায় যারা

❖ হাইপোথ্যালামাসের স্লিপ সেন্টারকে ঠিকঠাক কাজ করতে সাহায্য করে মস্তিষ্কের নানা অংশ।

১) চোখ : হাইপোথ্যালামাসের সুপ্রাকায়াসমেটিক নিউক্লিয়াস জেগে থাকা এবং ঘুমিয়ে পড়ার সঙ্কেত পায় চোখ থেকে।

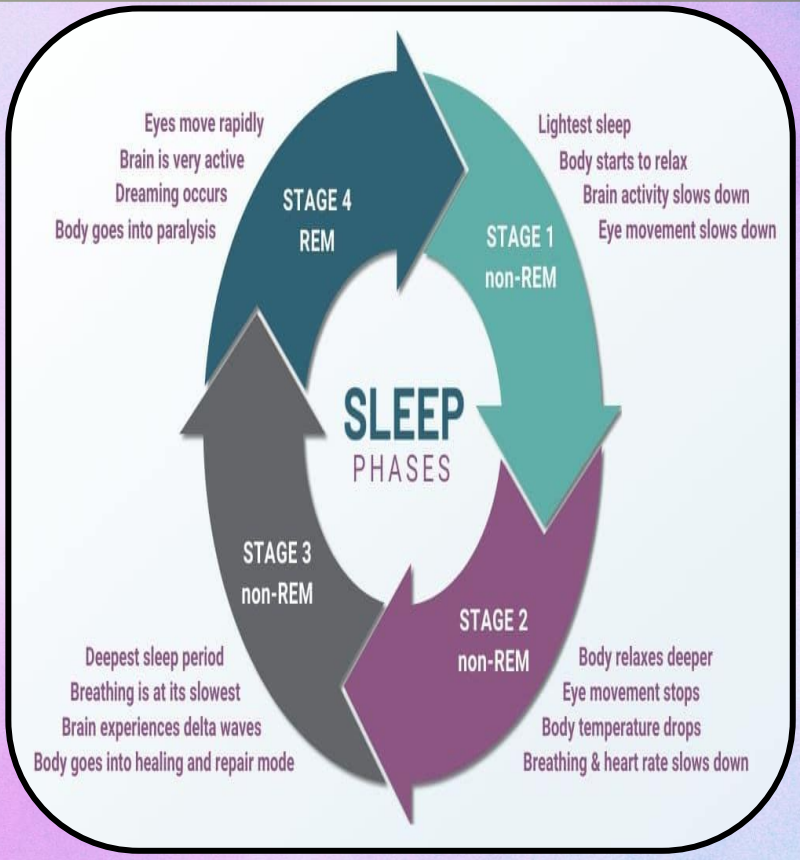
২) পিনিয়াল গ্রন্থি : পিনিয়াল গ্রন্থি থেকে নির্গত মেলাটোনিন হরমোন আমাদের ঘুমোতে সাহায্য করে।

৩) পিটুইটারী গ্রন্থি : ঘুমের মধ্যে এই গ্রন্থি থেকে ক্ষরিত হওয়া গ্রোথ হরমোন প্রোটিন সংশ্লেষ এবং ক্ষতিগ্রস্ত কলার মেরামতিতে সাহায্য করে।

৪) পনস : পশ্চাৎ মস্তিষ্কের এই গুরুত্বপূর্ণ অংশটি সংকেত পাঠায় সুষুম্নাকান্ডকে তার কাজকর্মের হারকে ঘুমের সময় কমিয়ে আনতে। এর ফলেই ঘুমের REM পর্ব শুরু হয়ে যায়।

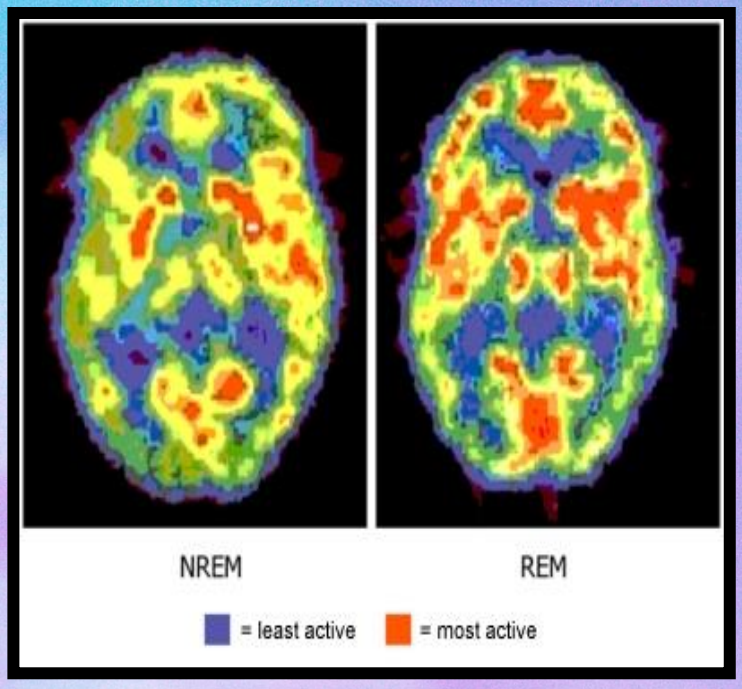
ঘুমের নানা পর্যায়

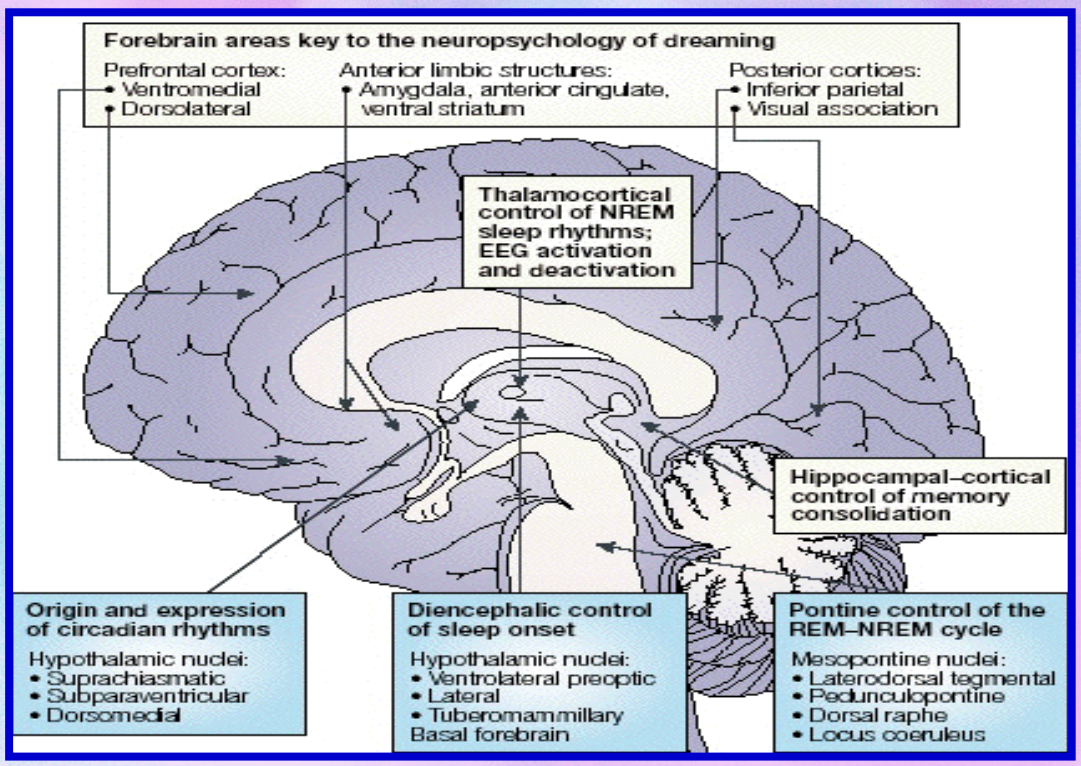
- ➢ ঘুমের দুটি পর্যায়। প্রথম পর্যায়টি হল REM বা Rapid eye movement ও NREM বা Non rapid eye movement।
- ➢ ঘুম শুরু হওয়ার প্রথম ৮০-৯০ মিনিট চোখ স্থির থাকে অর্থাৎ এই সময়টা NREM স্লিপ, তারপর ২০ মিনিট দ্রুত নড়াচড়া করতে থাকে অর্থাৎ REM স্লিপ। ঘুমের পুরো সময়টা জুড়ে একবার NREM (৮০-৯০ মিনিট) আরেকবার REM (১০-৩০ মিনিট) এভাবেই চলতে থাকে। এমন করে ৪-৫ টা চক্রে পুরো ঘুমটা শেষ হয়।
- ➢ NREM পর্যায়ে শরীর পুরোপুরি শিথিল হয় না, হার্ট রেট এবং পালস রেট কমে যায়। প্রশ্বাসের হার এবং দেহের তাপমাত্রাও কমে আসে। মস্তিষ্কের কাজকর্ম ভীষণ রকম কমে আসে।
- ➢ REM পর্বে হার্ট রেট, পালস, প্রেশার কিছুটা বেড়ে যায়। মাংসপেশি পুরোপুরি শিথিল হয়ে পড়ে অথচ মস্তিষ্ক জেগে থাকে।



জেগে থাকে মস্তিষ্ক :

- ✓ শরীর যখন ঘুমোয় তখন জেগে থাকে মস্তিষ্ক।
- ✓ শুধু জেগে থাকে নয়, রীতিমতো ব্যস্ত থাকে।
- ✓ এই ব্যস্ততা মস্তিষ্কের CNS এ জমে থাকা নানা ক্ষতিকর বর্জ্য পদার্থকে সাফাই করার ব্যস্ততা।
- ✓ সারাদিনের কর্মব্যস্ততায় এরা নানা বিপাকীয় ক্রিয়ার বাইপ্রোডাক্ট।
- ✓ ঘুমোলে মস্তিষ্কের কোষমধ্যস্থ স্পেস বেড়ে যায়, বেশি পরিমাণ CSF মস্তিষ্কে প্রবেশ করে এবং বর্জ্য পদার্থকে বার করে দিতে সাহায্য করে।
- ✓ এর ফলে মস্তিষ্ক আরো তরতাজা হয়ে পরের দিনের কাজের জন্য প্রস্তুত হতে পারে।





ঘুমের সময় শারীরিক পরিবর্তন

ঘুম গভীর হলে কমে যায় হার্ট রেট, পালস রেট, ব্লাড প্রেশার এবং শ্বাস প্রশ্বাসের গতি। ফুসফুসের কাজকর্ম এক-চতুর্থাংশ কমে যায়। দেহের বিপার ক্রিয়ার হার এই সময়ে ১৫-২০ শতাংশ কমে যায়, যেজন্য ঘুমের আগে পেট ঠেসে খেতে নেই, হজম বিভ্রাটের সম্ভাবনা থাকে। স্পর্শ, গন্ধ, দৃষ্টি, অনুভূতি ঘুমোলে প্রায় পুরোটাই চলে যায়। প্লাজমা লঘু হয়ে যাওয়ার ফলে রক্তের পরিমাণ বৃদ্ধি পায়। কিডনির কাজও কমে আসে। এই সময় যেটুকু ইউরিন তৈরি হয় তা ব্লাডারে গিয়ে ধীরে ধীরে জমতে থাকে। ঘুম ভাঙার কিছুক্ষণ আগে থেকে সব স্বাভাবিক হতে শুরু করে।

THE HEALTH BENEFITS OF SLEEP

The National Heart, Lung, and Blood Institute Sleep Recommendations:	
Age:	Hours per day:
0-2	16-18
3-5	11-12
5-13	at least 10
13-17	9-10
adults 18+	7-8

Sleep Stages

Stage 1: Light sleep, eyes and muscles move slower
Stage 2: Light sleep, brain waves slow down
Stage 3: Deep sleep, some short, fast brain waves
Stage 4: Deep sleep, very hard to wake up
REM: rapid eye movements and heart beat, stage where dreams occur

THE HEALTH BENEFITS OF SLEEP:

Improves memory and problem solving
The brain organizes our memories and reviews important information we learned during the day

Improves mood
The brain rests its social and emotional parts while we sleep, "recharging" our desire to interact with those around us

Maintains good health
During sleep your body produces hormones that help cellular growth and repair, as well as support the immune system to fight infections

...AND WHAT HAPPENS WHEN YOU DON'T GET ENOUGH

You are more likely to develop chronic depression

You are at a higher risk of having high blood pressure and heart disease, and more likely to be overweight

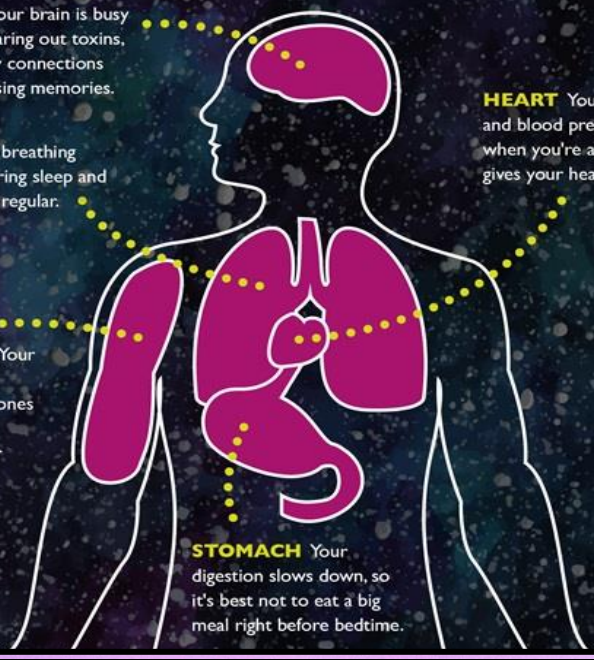
Children ages 5-12 who don't get enough sleep are more likely to:
develop behavioral problems
have mood swings
perform poorly in school

Adolescents ages 13-18 who don't get enough sleep are more likely to:
be overweight
develop symptoms of depression
perform poorly in school

Tips For Getting Enough Sleep:

- Set a nightly routine. Go to bed and wake up around the same time each night
- Avoid large meals, caffeine and exercise before bed
- Keep your sleep environment relaxing, avoid TV, electonics and loud noises
- Don't nap after 3 pm and always keep naps under one hour

WHAT HAPPENS TO YOUR BODY DURING SLEEP?



BRAIN Your brain is busy at night clearing out toxins, making new connections and processing memories.

LUNGS Your breathing slows down during sleep and becomes more regular.

MUSCLES Your body releases growth hormones as you sleep, repairing your muscles.

HEART Your heart rate and blood pressure lower when you're asleep, which gives your heart a break.

STOMACH Your digestion slows down, so it's best not to eat a big meal right before bedtime.

HOW TO SLEEP BETTER

1 STICK TO A SLEEP SCHEDULE

Go to sleep and wake up around the same time every day. It's tempting to catch up on sleep when you can but a schedule keeps your body's clock regulated.

2 WATCH YOUR FOOD AND DRINK

Limit caffeine and alcohol later in the day. Don't eat a large meal shortly before bedtime. Reduce fluids at night if you get up often to use the bathroom.

3 MOVE MORE DURING THE DAY

Regular exercise is one of the best ways to improve your sleep, but don't do it too close to bedtime because its stimulating effects may keep you up late.

4 MANAGE STRESS

Relieving stress helps you sleep better and is good for your health. Journal, meditate, practice deep breathing or find other ways to clear your head before bed.

5 GET COMFORTABLE

Set the thermostat to a comfortable temperature, limit light and noise, and choose quality bedding, linens and pillows.

6 CREATE A BEDTIME RITUAL

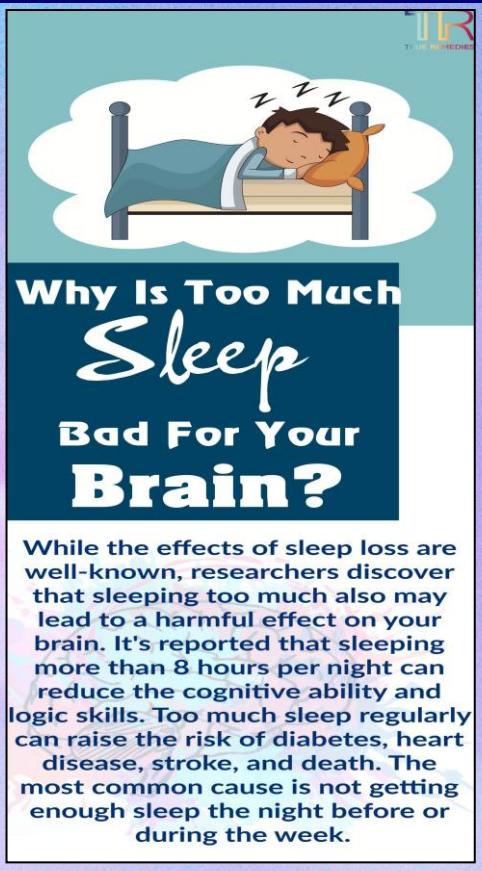
Find routines that help you relax, such as reading, listening to music or taking a warm bath. Keep screen time to a minimum, including phones, laptops and TV.

7 LIMIT DAYTIME NAPS

A short power nap may recharge you but if you sleep too much during the day, it makes it harder to fall asleep at night.

বেশি ঘুমের বিপদ

- Leptin এবং adrenaline নামক হরমোনের হঠাৎ বাড়া বা কমা দেখা যায় ঘুমবিলাসীদের মধ্যে। এর সঙ্গে সম্পর্ক আছে মেদ বৃদ্ধির।
- Leptin হরমোনটি আমাদের দেহে কম সংশ্লেষ হলে খিদে বেড়ে যেতে পারে, কারণ মস্তিষ্কের হাঙ্গার সেন্টারটিকে আংশিক নিয়ন্ত্রিত করে leptin।
- খিদে বেড়ে যাওয়া মানেই বেশি খাওয়া, নিটফল মোটা হওয়া।
- আবার বেশি ঘুমোলে আমাদের দেহে insulin হরমোনের গ্রাহক কোষ বা রিসেপটারে গন্ডগোল দেখা দেয়, ফলে insulin এর বিরুদ্ধে একটা প্রতিরোধ ক্ষমতা গড়ে ওঠে, insulin তার স্বাভাবিক কাজ করতে পারে না।
- এর ফলে রক্তে গ্লুকোজের মাত্রা বেড়ে গিয়ে টাইপ টু বা ইনসুলিন ডিপেনডেন্ট ডায়াবেটিস দেখা দেয়।
- এছাড়া ঘুমবিলাসীদের রক্তে insulin বিরোধী নানা হরমোন যেমন growth হরমোন, adrenaline, steroid, glucagon ইত্যাদি বেশি পরিমাণে ক্ষরিত হওয়ার ফলে ডায়াবেটিসের আশঙ্কা বাড়ে।
- বেশি ঘুমনো মানেই বেশি করে মোটা হওয়া, আর তার থেকে ডায়াবেটিস ছাড়াও উচ্চ রক্তচাপ, রক্তে ট্রাইগ্লিসারাইড কোলেস্টেরল বেড়ে heart attack ও brain stroke এর আশঙ্কা, ফ্যাটি লিভার ইত্যাদি নানা সমস্যা দেখা দিতে পারে।



Stress ও ঘুমের মধ্যে সম্পর্ক

- অতিরিক্ত stress এর কারণে ঘুমের ব্যাঘাত ঘটে। রাত্রে দীর্ঘক্ষণ মস্তিষ্ক alert অবস্থায় থাকলে ঘুম আসতে দেরী হয় এবং এর ফলে ক্রমাগত উত্তেজক চিন্তার সৃষ্টি হয় যা ঘুমকে আসতে বাধা প্রদান করে। আর অপর্যাপ্ত ঘুমের ফলে stress আরো বেড়ে যায়।
- পর্যাপ্ত ঘুমের অভাবে নেতিবাচক মানসিকতা, এনার্জির অভাব, মনঃসংযোগে ঘাটতি এবং যে কোনো কাজ স্বাভাবিকভাবে করতে পারার ক্ষমতা হ্রাস হওয়া পরিলক্ষিত হয়।
- কোনো বিশেষ কারণবশতঃ যদি কখনো কোনো একদিন কম ঘুমোতে হয় তার কারণে কোনো শারীরিক ক্ষতি ঘটে না কিন্তু নিয়মিত কম ঘুম নানানরকম জটিল শারীরিক অসুস্থতার ঝুঁকি বাড়িয়ে দেয়।
- যারা নিয়মিত রাত্রে ৭ ঘন্টার কম ঘুমোন তাদের ক্ষেত্রে ওবেসিটি, হার্টের অসুখ, ডায়াবেটিস, stroke, ডিপ্রেশন, arthritis, কিডনির অসুখ এই সমস্ত সমস্যাগুলির ঝুঁকি বৃদ্ধি পায়।
- ঘুম stress কমাবার একটি শক্তিশালী মাধ্যম। নিয়মিত পর্যাপ্ত ঘুম শরীরকে শান্ত এবং তরতাজা থাকতে সাহায্য করে, মনোযোগের বৃদ্ধি ঘটায়, মানসিকভাবে চলমনে রাখে এবং আমাদের বিচারশক্তি ও সিদ্ধান্ত নেওয়ার ক্ষমতাকে উন্নত করে। যথাযথ বিশ্রাম আমাদের stress এর সঙ্গে মোকাবিলা করার ক্ষমতা জোগায় এবং যেকোনো সমস্যা সুসমাধা করতে সাহায্য করে।

ঘুম সম্পর্কে কয়েকটি মজার তথ্য

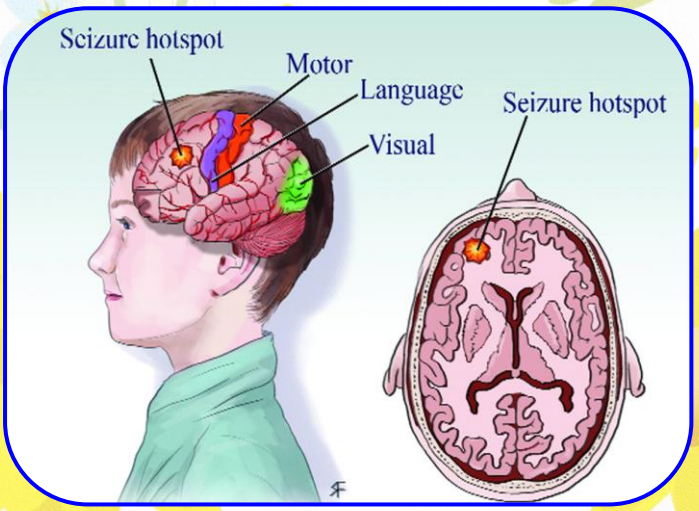
১) শামুকরা একটানা ৩ বছর পর্যন্ত ঘুমোতে পারে।
২) একজন মানুষ তার সম্পূর্ণ জীবনকালের ১/৩ অংশ ঘুমিয়ে কাটান।
৩) সবথেকে বেশি না ঘুমিয়ে জেগে থাকার রেকর্ড ১১ দিন ২৪ মিনিট (২৬৪.৪ ঘন্টা)। ১৯৬৪ সালে অভাবনীয় ঘটনাটি ঘটিয়েছিলেন ক্যালিফোর্নিয়ার Randy Gardner।
৪) বেড়ালরা জীবনের প্রায় ৭০% সময় ঘুমিয়ে কাটায়।
৫) অনেকেরই গভীর ঘুমের মধ্যে উঁচু থেকে নিচে পড়ে যাওয়ার মতো অনুভূতি হয়। ফলে তাঁরা চট করে উঠে পড়েন। এই অনুভূতিকে হিপনিক জার্ক বলা হয়।
৬) সাধারণত ঘুমের মধ্যে REM স্তর চলাকালীন আমরা যাবতীয় স্বপ্ন দেখে থাকি।

Epilepsy : The Second Most Common Neurologic Disorder

6

-By Susmita bera, Physiology honours Semester 4

OVERVIEW OF EPILEPSY:



- *Epilepsy is a long term brain condition where a person has repeated seizures that can also alter from brief and nearly undetectable symptoms to periods of forceful shaking and convulsions.*
- *Epilepsy is one of the most common neurological diseases that has affected over 50 million people globally.*
- *While it is a chronic non-communicable disease it has been estimated that 70% of people could live seizure-free if properly diagnosed and treated.*
- *It is one of the commonly occurring global neurological diseases and can affect anyone, irrespective of their age, gender, race, region, or ethnicities.*
- *This is more prevalent in low and middle-income countries, among younger children and adult males.*

SYMPTOMS OF EPILEPSY:

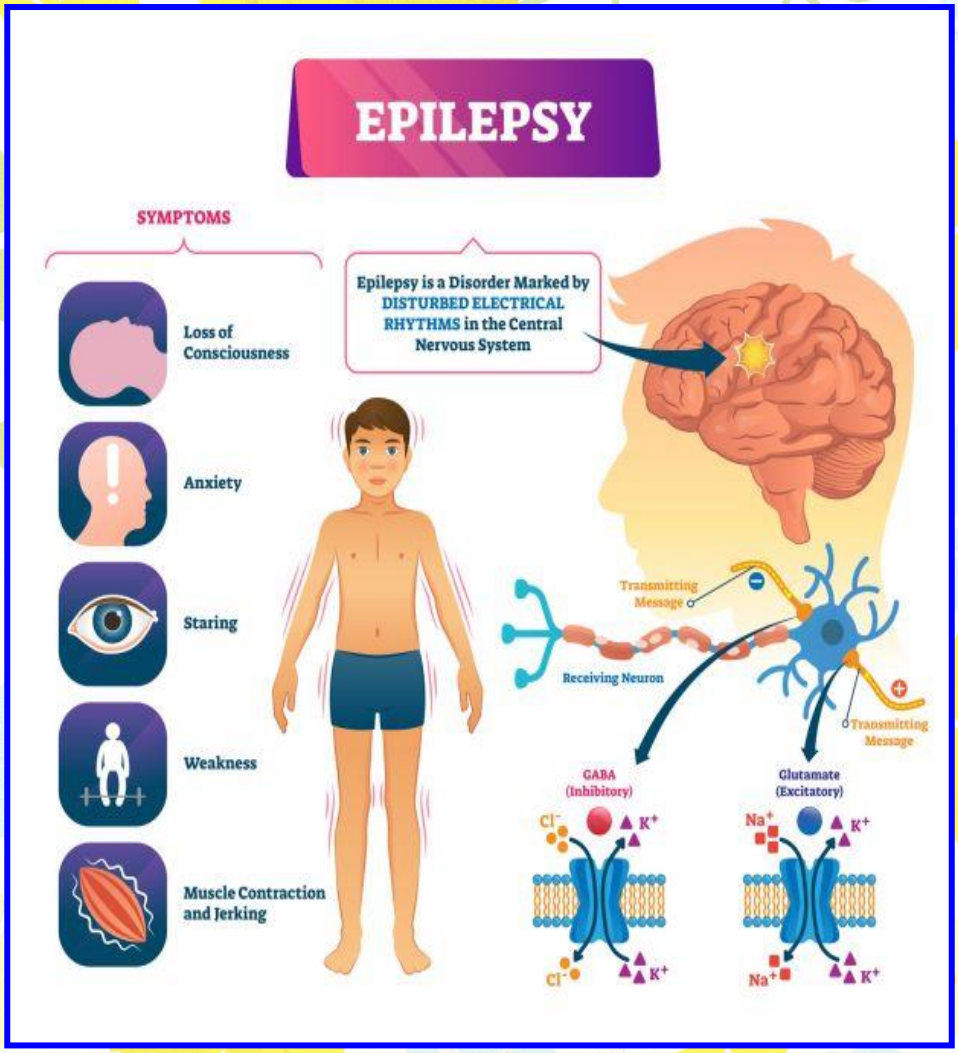
- ***Medically, epilepsy is based on the following criteria:***
  - ✓ *The occurrence of at least two unproved seizures within 24 hours With a 60% risk of recurrence risk of further seizures*
  - ✓ *A definitive diagnosis of epilepsy*
- ***A seizure is an event or symptom occurring due to the epilepsy disease.***
  - ✓ *Symptoms: During a seizure, a person experiences abnormal behaviour, symptoms and sensations, sometimes including loss of consciousness.*

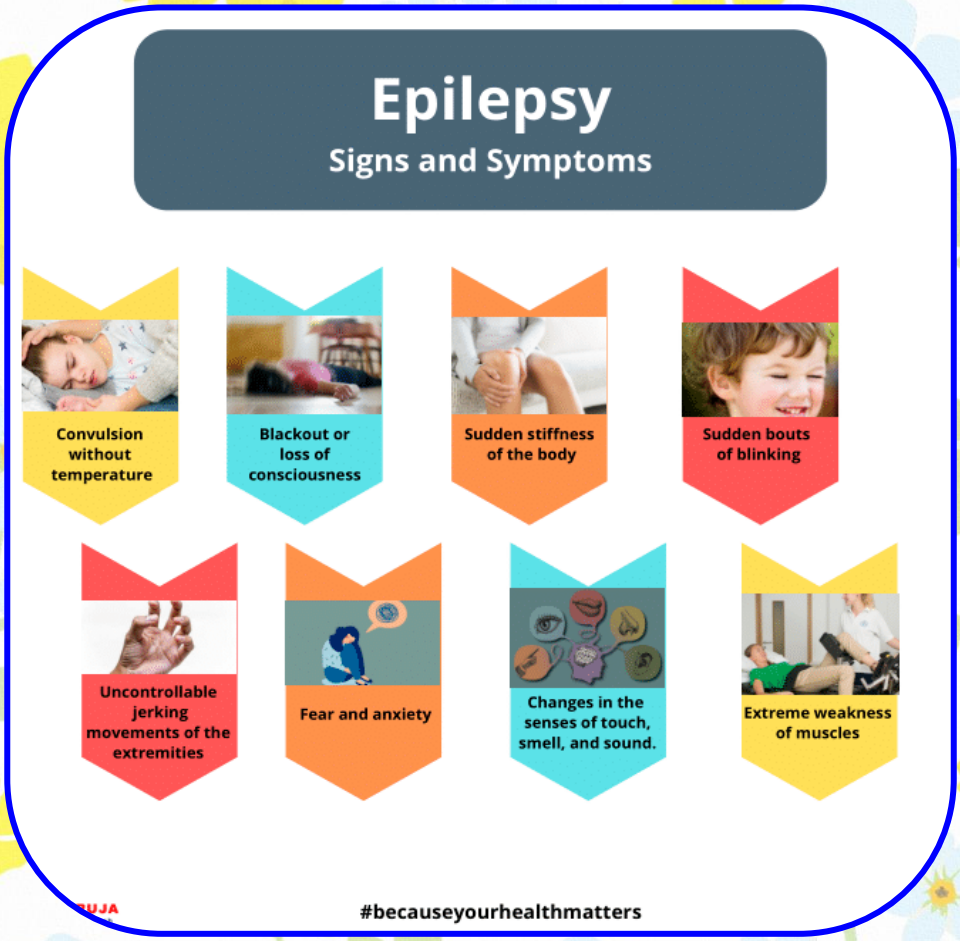
- ✓ *Epilepsy is a multiple disease. Its clinical symptoms are heterogeneous and reflect multiple underlying causes and pathophysiological mechanisms that cause cerebral dysfunction and injury ,such as trauma , tumors and infections.*

- ✓ *Genetic factors play an important role, although not only a specific cause can be identified in many patients and several factors may coexist , reflecting an acquired brain pathology and genetic predisposition.*

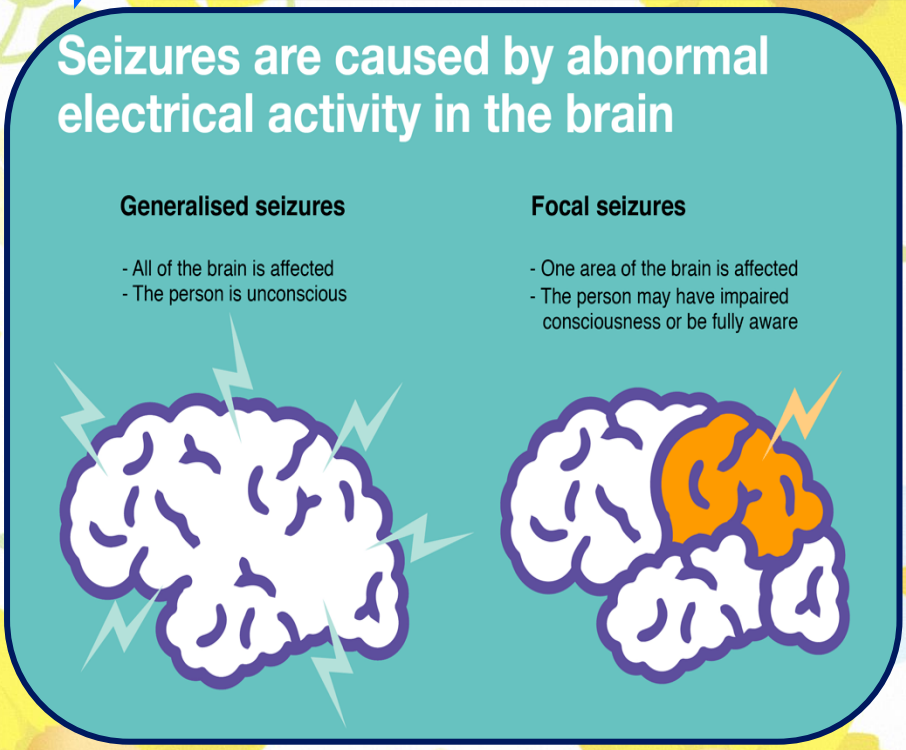
- ✓ *Epilepsy is estimated to affect approximately 1% of the population, or 65 million people worldwide. Many affected individuals experience unprovoked seizures, for no apparent reason, and without any other neurologic abnormalities.*

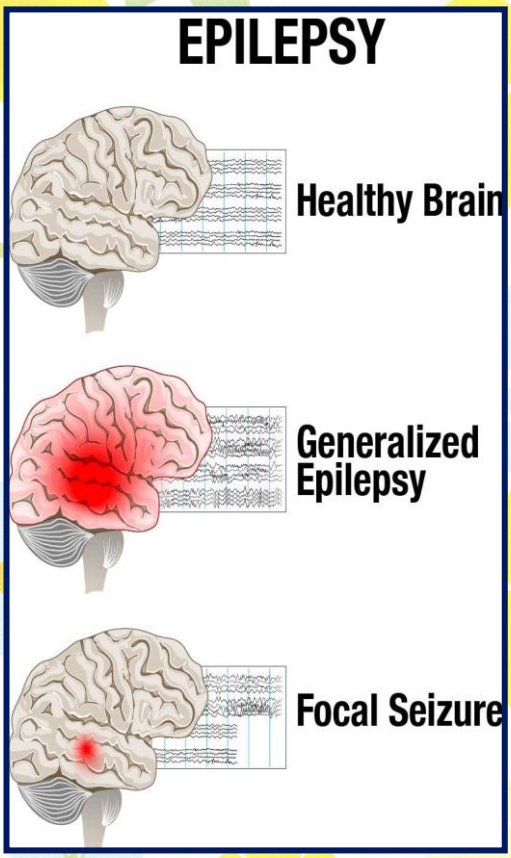
- ✓ *These are called idiopathic epilepsies and are assumed to be genetic in origin. Mutations in voltage-gated potassium, sodium and chloride channels have been linked to some forms of idiopathic epilepsy. Mutated ion channels can lead to neuronal hyperexcitability via various pathogenic mechanisms.*





CLASSIFICATION OF EPILEPTIC SEIZURES :



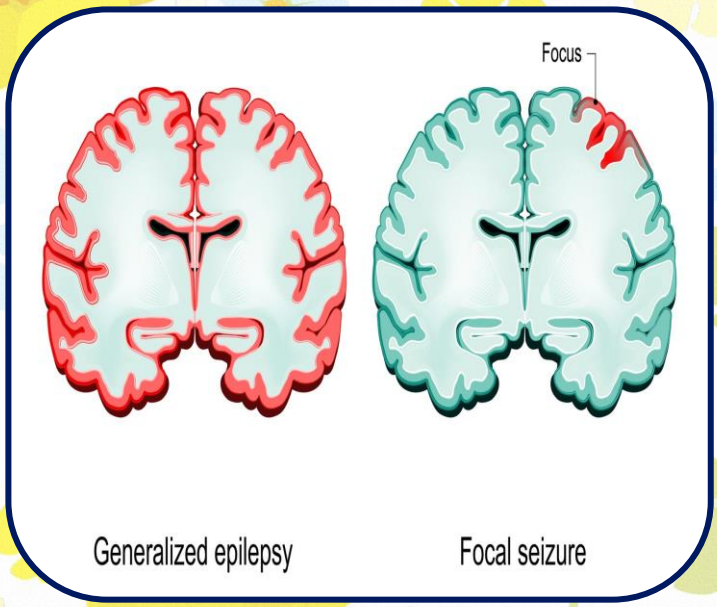


- ***Epileptic seizures can be classified into two major types:***

✓ ***a)focal seizures (also called partial seizures)that are limited to a focal area of one cerebral hemisphere, affect the parts of the body controlled by that area of the brain. The seizure may involve unusual movements, feelings, sensations or behaviours. People can have different levels of consciousness during focal seizures. and***

✓ ***b)generalized seizures,in this type, there is synchronous widespread electrical activity in both the cerebral hemispheres.***

Generalized seizures are also of further two subtypes;(i) convulsive and (ii) nonconvulsive based on tonic & clonic movements.



- ***Tonic-clonic seizure formerly called grand mal epilepsy or convulsive generalized seizure is characterized by tonic stage(in which there is sudden beginning of constructions of the limb muscles for 30s) followed by clonic stage lasting for 1-2 min.EEG changes during tonic stage show fast and slow wave activity occurs during clonic stage.***
- ***Absence seizure formerly called petit mal epilepsy is a nonconvulsive generalized seizure, characterized by frail loss of cognition only. There are no typical aura and postnatal periods. EEG changes show pairs,each included a typical point and wave pattern lasting for 10s. This pattern of EEG occurs due to activation of low threshold T-type Ca2+channels of thalamic neurons.***

CAUSES , RISK FACTORS , TRIGGERS OF EPILEPSY :

➢ ***Causes:***

- ✓ *Genetic predisposition and family history*
- ✓ *Head and brain injuries or trauma*
- ✓ *Developmental disorders*
- ✓ *Infectious diseases*
- ✓ *Prolonged febrile conditions due to serious illness*
- ✓ *Neurological disorders*
- ✓ *Cardiovascular illness*

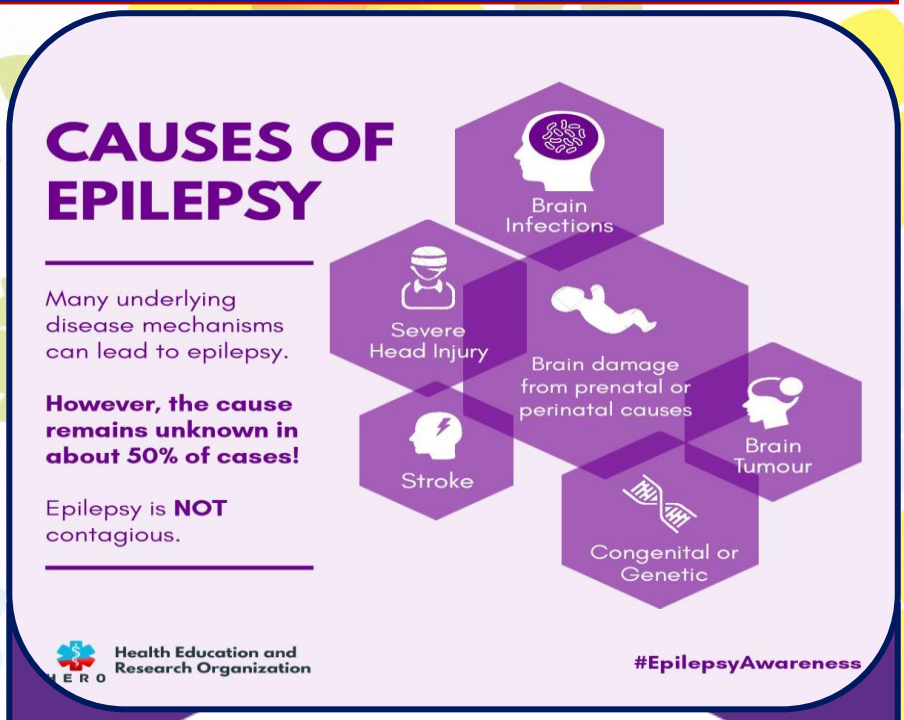
➢ ***Risk factors:***

✓ ***Children:***

1. *Premature birth*
2. *Low birth weight*
3. *Congenital brain anomalies*
4. *Trauma like lack of oxygen at the time of birth*
5. *High fever and prolonged infections or illness*
6. *Seizures during the initial months of a child*
7. *Family history*
8. *Improper and insufficient food intake*
9. *Mental disabilities*
10. *Maternal drug/alcohol abuse*

✓ ***Adults:***

1. *Bleeding and/or abnormal blood vessel pattern in the brain*
2. *Brain injuries, hypoxemia, brain tumors, brain infections etc*
3. *Stroke, blocked arteries, and other cardiovascular illness*
4. *Dementia and other neurological conditions*
5. *Sleep deprivation*
6. *Alcohol/drug abuse*
7. *Increased stress*
8. *Improper food habits*
9. *Mental disabilities*



- ***Triggers:***
  - ✓ *Fever*
  - ✓ *Lack of sleep*
  - ✓ *Stress, anxiety, worry*
  - ✓ *Bright flashing lights*
  - ✓ *Certain medicines or drugs*
  - ✓ *Caffeine or alcohol*
  - ✓ *Improper eating habits*

PATHOPHYSIOLOGY OF EPILEPSY:

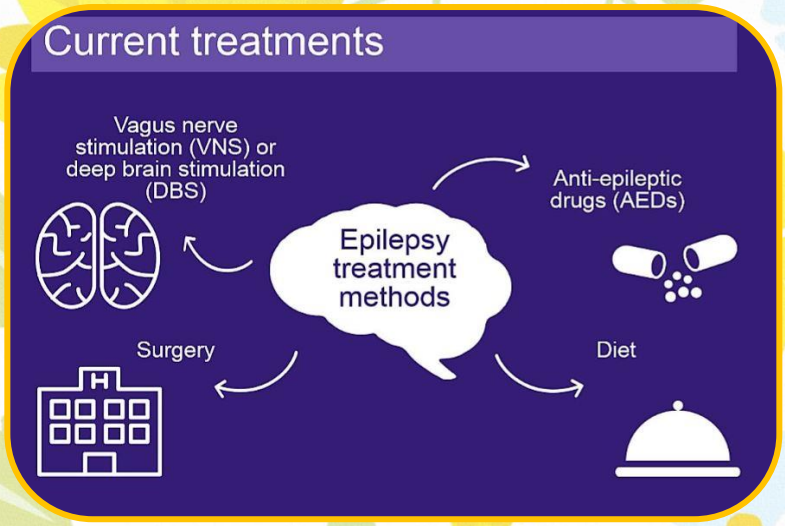
- *Epilepsy occurs due to release of glutamate from astrocytes. The present view suggests that there are structural basis of increment in excitability due to reorganization of astrocytes along with production of dendrites and new synapse formation.*
- *Genetic mutation-Mutation of certain ion channels have been associated with idiopathic epilepsy which occurs in different forms.*
- *Childhood absence epilepsy (CAE) is associated with mutation of a subunit gene(responsible for GABA receptors called as GABA B3).*
- *Gabapentin is a GABA analog that acts by decreasing Ca2+ entry into cells and reducing glutamate release;it is used to generalized seizures.*
- *Topiramate blocks voltage-gated Na+ channels associated with glutamate receptors and potentiates the inhibitory effect of GABA ;it is also used to treat generalized seizures.*
- *Ethosuximide reduces the low threshold T-type Ca2+ present in thalamic neurons and is particularly effective in treatment of absence seizures.*
- *Valproate and phenytoin block high-frequency firing of neurons by acting on voltage-gated Na+ channels to reduce glutamate release.*
- *Inherited form of generalized epilepsy with fever(febrile seizures) is associated with mutation of sodium channel subunit gene called SCANIA and SCNIB mutations.*

Seizure and epilepsy

Pathophysiology

- Seizures are a result of a shift in the normal balance of excitation and inhibition within the CNS.
- There are many different ways to perturb this normal balance, and therefore many different causes of both seizures and epilepsy.
- high fevers in children
- Penetrating head trauma
- brain tumors
- infections
- medications
- idiopathic

TREATMENT:



❖ ***Activation :***

✓ *Activation is made to discover underhand epilepsy, which cannot be discovered by common EEG recording. A flash stimulus, hyperventilation, sleep or drug administration is used to exponentiate an epileptic attack.*

❖ *1: The basis of therapeutic measures for epilepsy is to reduce excitability, increase inhibitory neuronal transmission (increase release of GABA).*

➢ *The anticonvulsant drugs include:*

✓ *Topiramate blocks voltage-gated Na+ channels associated with glutamate receptors resulting in potentiation of inhibitory effect of GABA.*

✓ *Gabapentin acts by decreasing Ca2+ influx into cells and reduces glutamate release.*

✓ *Phenytoin and valproate act on voltage-gated Na+channels to reduce glutamate release,thus blocking firing of neurons.*

✓ *Ethosuximide reduces low threshold T-type Ca2+ present in thalamic, therefore, effectively used for treatment of absence seizures.*

❖ *Surgery: The seizures associated with the temporal lobe are treated by surgical treatments. Vagal nerve stimulation is effective in partial seizures.*

❖ *2: Most of the presently available used to treat epilepsy appear to block the the beginning or spread of seizures, although appreciate mode of action for some drugs are unknown or may involve multiple actions.*

➢ *Some of major effects of various antiepileptic drugs include*

✓ *blockade of voltage-dependent sodium channels (e.g.,carbamazepine and phenytoin);*

✓ *(ii) altsered calcium currents (e.g.,ethosuximide);*

✓ *(iii)an increase in GABA activity(e.g.,phenobarbital and benzodiazepines);*

✓ *(iv) inhibition of receptors for glutamate, the most prevalent excitatory neurotransmitter(e.g.,perampanel); and*

✓ *(v) multiple mechanisms of action (e.g., valproate and topiramate, which block voltage-dependent sodium channels and increase GABA levels in the brain).*

➢ *The choice of antiepileptic drug recommended by present guidelines depends on the type of seizures,the age of the patient,and other factors,but correction of the underlying cause of the seizures is the best option when possible.*

❖ *When epilepsy can not be controlled by medications , in such conditions a focal point is found by localising the abnormal spiking waves in ECG then surgical excision of the focus is done to prevent future attacks.*

❖ *In conclusion it must be said that , There is no need to worry if you or your loved ones are suffering from these disorders , proper medical check-up and regular medications can help you to lead a normal life. With the improvement of medical sciences the recovery rate from this disorder is notably increasing day by day.*

CHOLESTEROL Your BEST-FRIEND, or ENEMY ?

7

-By Mokaddam Hossain, Physiology honours Semester 4

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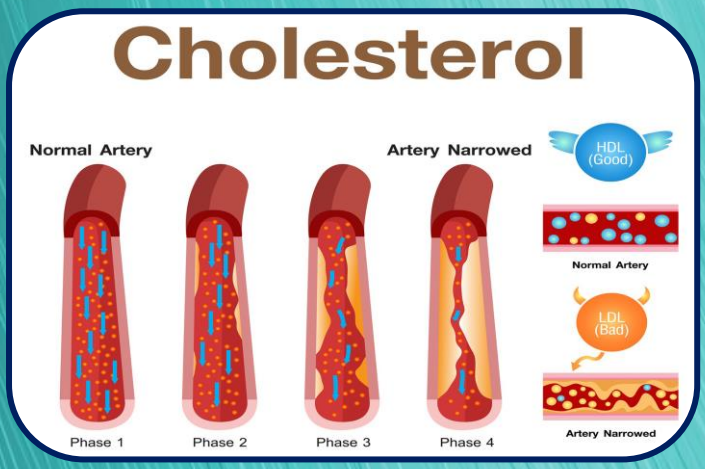
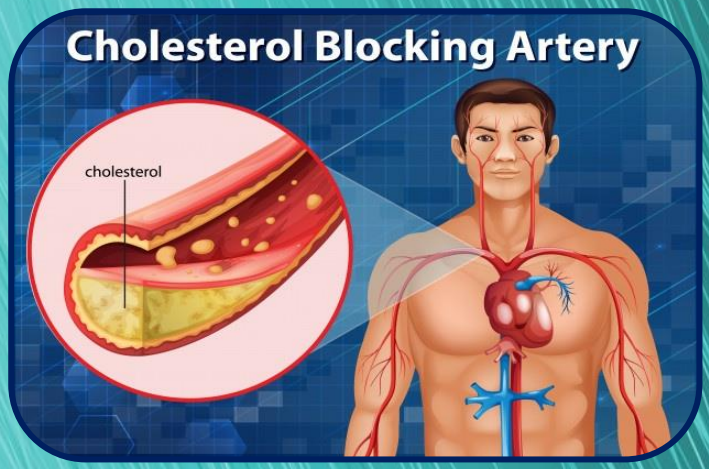
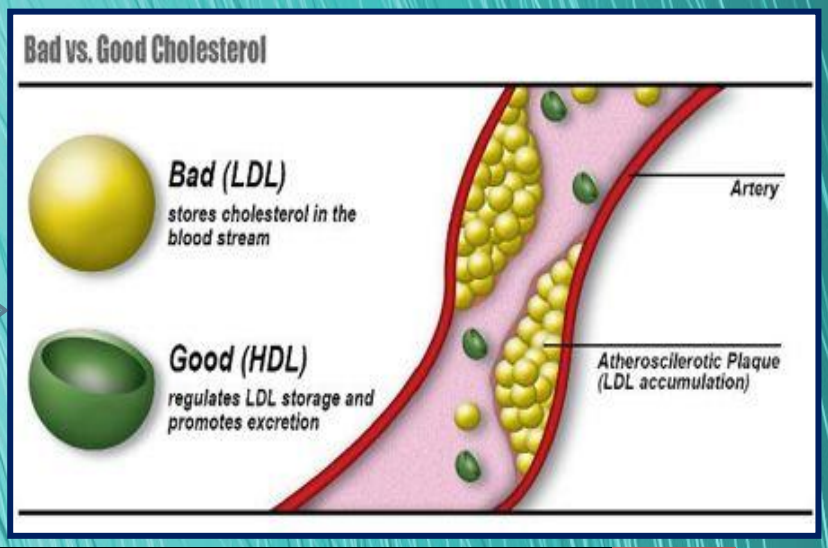
WHAT IS CHOLESTEROL ?



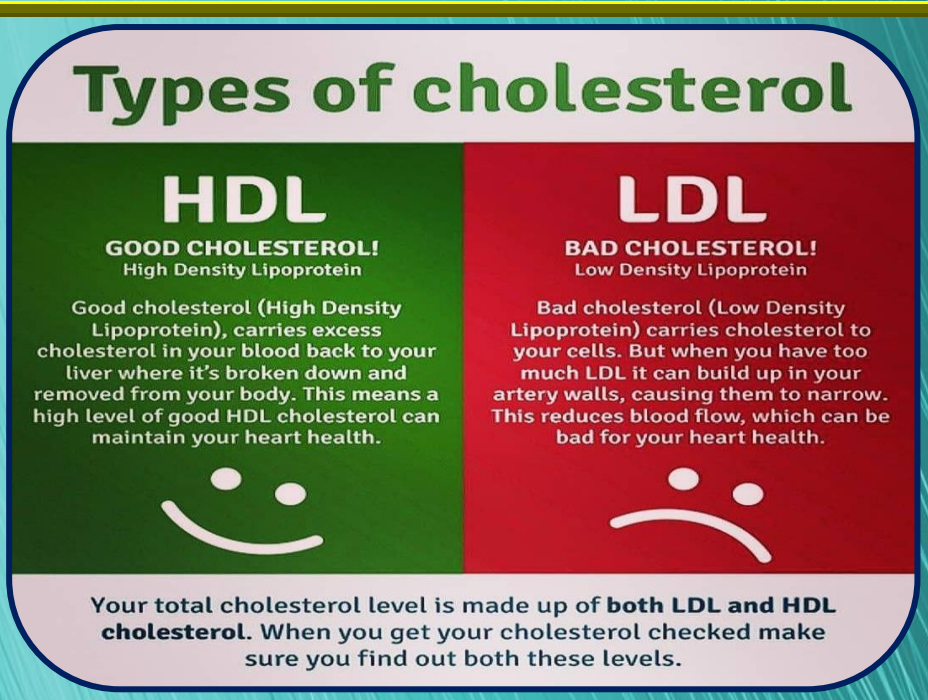


- *Cholesterol is a lipophilic molecule. It is a vital and universal component of every cell membrane on the earth. It contributes to various physiological activities of a normally functioning cell. As a component of the cell membrane it not only structurally makes up the membrane but also modulates its fluidity. Cholesterol functions as a precursor molecule in the synthesis of vitamin D, steroid hormones (e.g., cortisol and aldosterone and adrenal androgens), and bile acids. Cholesterol is also a constituent of bile salt used in digestion to facilitate absorption of fat-soluble vitamins A, D, E, and K.*
- *In plasma cholesterol is present both in esterified(70-75%) and free(25-30%) form. It is transported through the blood, along with triglycerides, inside lipoprotein particles (HDL, IDL, LDL, VLDL, and chylomicrons). These lipoproteins can be detected in the clinical setting to estimate the amount of cholesterol in the blood.*

TYPES OF CHOLESTEROL:



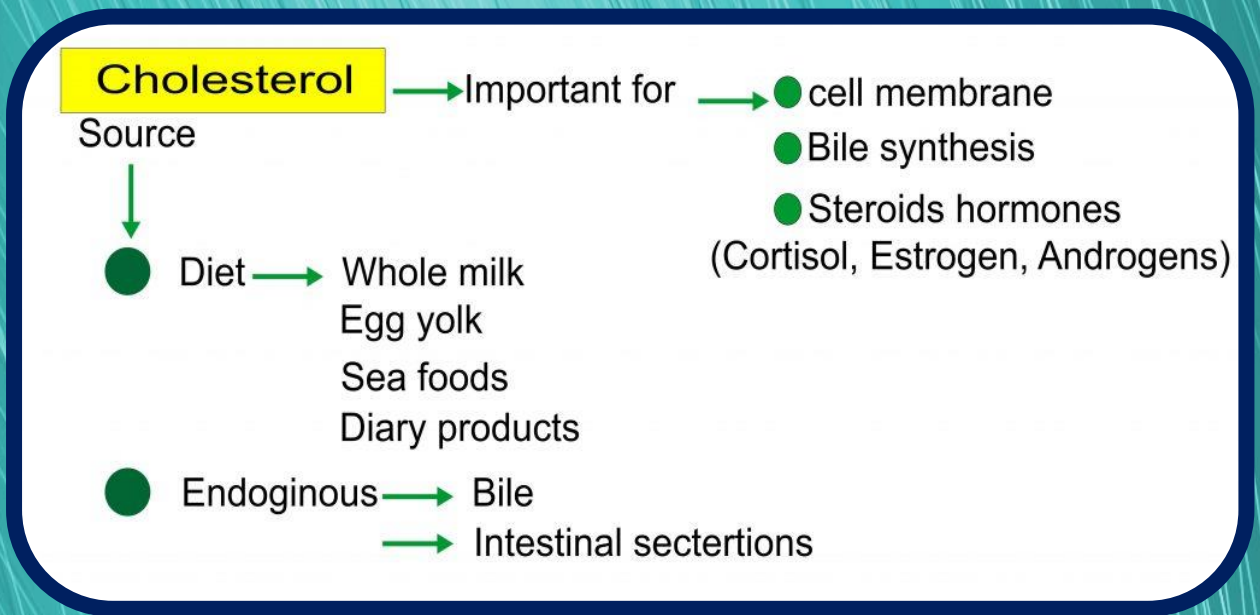
- ✓ *It does not dissolve well in the blood. For this reason, it is packaged in lipoproteins that have phospholipid and apolipoprotein.*
- ✓ *There are several types of lipoproteins to serve this purpose, and they each have different perspectives.*
- ✓ *There are high-density lipoproteins (HDL), intermediate-density lipoproteins (IDL), low-density lipoproteins (LDL), and very-low-density lipoproteins (VLDL).*



- ✓ *Notably, LDL particles are thought to act as a major transporter of cholesterol; at least two-thirds of circulating cholesterol resides in LDL to the peripheral tissues. Conversely, HDL molecules are thought to do the opposite.*

FUNCTIONS OF CHOLESTEROL:

- ➢ ***Cholesterol has several vital functions. Some of the primary uses for cholesterol are related to;***
- ✓ *The cell membrane. It is required for the normal structure of the membrane; it contributes to its fluidity. This fluidity can influence the ability of some small molecules to diffuse through the membrane, which ultimately changes the internal environment of the cell.*
- ✓ *In the intracellular space cholesterol plays a role in intracellular transportation.*
- ✓ *Beyond these cholesterol is also known to be an important precursor molecule for the synthesis of vitamin D, steroid hormones and bile acids. Cholesterol synthesize all the five classes of steroid hormones; Glucocorticoids(e.g. cortisol), Progestins(e.g.progesterone), Mineralocorticoids(e.g. aldosterone), Androgens(e.g. testosterone), and Estrogens(e.g. estradiol).*



Cholesterol in relation to Depression :

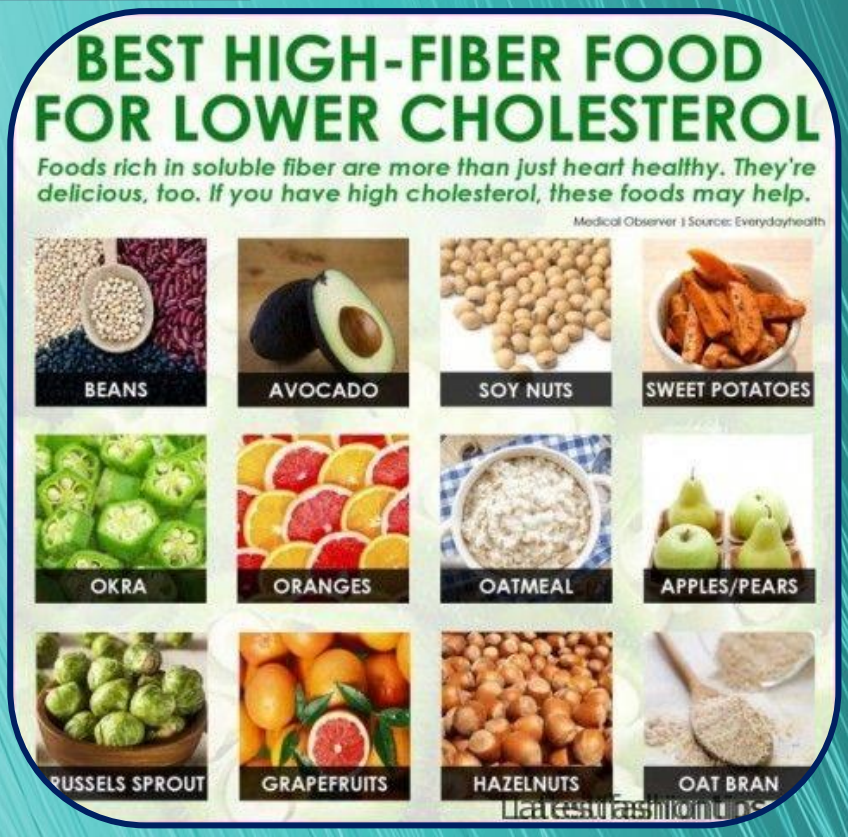
- ***Various studies have revealed an unimaginable fact in front of us, they say;***
- ***Low level of the so called "Bad Cholesterol" i.e. low density lipoprotein(LDL), seemingly protects us from developing cardiovascular diseases or strokes, but it increases our mental health risk at the same time. The researchers' have seen men with a greater risk of depression have low levels of the "bad" form of cholesterol, LDL. On the other hand, low levels of the "Good Cholesterol" i.e. high density lipoprotein (HDL) leading to higher risk for vascular disease, including stroke, by increasing their risk for developing lesions in their blood vessels called atherosclerotic plaques; alongwith a better mental well being.***
- ***A large number of epidemiological and clinical studies showed that low serum total cholesterol alters the metabolism of serotonin along with the viscosity and functions of serotonin receptors and transporters. Besides these defects in the gene encoding lecithin-cholesterol acetyl transferase (LCAT), located on chromosome 16; lead to defective cholesterol esterification and decreased lipid micro viscosity in neural membranes. As LCAT is responsible for esterification of cholesterol. Both of these phenomena lead to depression and poor control of aggressive impulses, resulting in increased suicidal behaviour and microarray experiments have shown genes involved in this pathway.***
- ***Therefore, the authors suggest that properly regulating the levels of HDL and LDL may help to prevent depression in the elderly.***

HOW TO MAINTAIN CHOLESTEROL LEVELS :

- ***Although there are various other risk factors(like: family history of heart disease, high blood sugar, smoking, lack of physical activities, obesity etc.) that can increase chances of having heart disorders, cholesterol(specially LDL & VLDL) is also responsible for it. We all should target to maintain our blood cholesterol levels may be slightly lower or higher depending on age, sex, and heart disease risks. The ideal levels are as follow:***
- ✓ ***Total blood cholesterol(TC) : less than 200mg/dl***
- ✓ ***LDL cholesterol : less 100mg/dl***
- ✓ ***HDL cholesterol : 60 mg/dl or higher.***

DIET AND LIFESTYLE CHANGES:

- *Making a few changes to your diet can help bring your numbers to healthy levels. Avoid or limit foods that contain these types of fats:*
- ✓ *Saturated fats. Animal-based products increase LDL cholesterol. Red meat, whole fat dairy, eggs, and vegetable oils like palm and coconut oil are all high in saturated fat.*
- ✓ *Trans fats. Manufacturers produce these artificial fats through a chemical process that turns liquid vegetable oil into a solid. Foods high in trans fats include fried foods, fast foods, and baked goods. These foods are low in nutrition and can raise your LDL cholesterol.*



HOME REMEDIES TO NATURALLY REDUCE CHOLESTEROL:

- *Get More Vitamin C.*
- *Home Drink Some Green Tea.*
- *Eat Your Oatmeal.*
- *Make Sure Your Thyroid is Functioning Normally.*
- *Eat some fruits, like apples, pears, and berries.*
- *Choose Coconut Oil for Lower Cholesterol and a Slimmer Waist and healthy oils, like sunflower, safflower, avocado, and olive oil.*
- *products fortified with sterols and stanols, like orange juice and margarine.*
- *Enjoy Some Garlic.*
- *Supplement with Fish Oil-fatty fish, like salmon, mackerel, and herring.*
- *Get a Little Nutty and whole grains, like oats and barley, nuts and seeds, avocados, beans.*
- *Ditch Transfats, Don't Smoke, and Eat Less Processed Food-like Products.*
- *Exercise regularly- A fast walk or cycling each day can boost your HDL cholesterol, which helps sweep excess LDL cholesterol out of your bloodstream. Try to get in at least 30 to 45 minutes of moderate-intensity aerobic exercise 5 days a week.Extra fat around your middle section can increase your LDL cholesterol and lower your HDL cholesterol. Losing just 10 percent of your body weight will help manage your cholesterol. Better nutrition and regular exercise can help you lose extra weight.*

CONCLUSION:

- *There is no need to be worried about cholesterol, but definitely should beware of it. It is the time to change our rooted idea and misconceptions about cholesterol that it is a curse to our life. We all should take preventive measures and try to maintain LDL level up to the normally physiological limit whether we have high LDL level or not.*

DIABETES : THE PROBLEM OF ALMOST ALL FAMILY

8

-By Chaitali Jana, Physiology honours Semester 6

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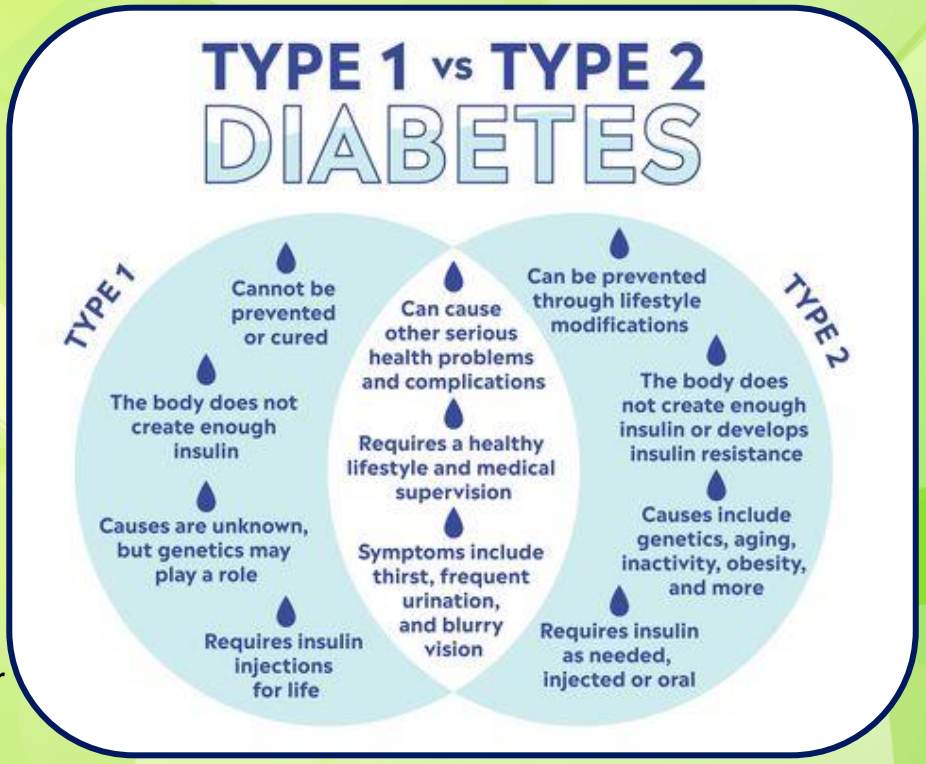
INTRODUCTION:

- *Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high.*
- *Blood glucose is your main source of energy and comes from the food you eat. Insulin, a hormone made by the pancreas, helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough.*
- *One of the common forms, type 1,is due to insulin deficiency caused by autoimmune destruction of the B cells in the pancreatic islets and the second common form,type 2,is characterized by insulin resistance.*
- *A blood sugar level less than 140 mg/dL is normal. A reading of more than 200 mg/dL after two*

SYMPTOMS OF DIABETES:

- **Symptoms of diabetes include:**
- ✓ *Increased thirst.*
- ✓ *Weak, tired feeling.*
- ✓ *Blurred vision.*
- ✓ *Numbness or tingling in the hands or feet.*
- ✓ *Slow-healing sores or cuts.*
- ✓ *Unplanned weight loss.*
- ✓ *Frequent urination.*
- ✓ *Frequent unexplained infections.*

CAUSE:



Type 1

The exact cause of type 1 diabetes is unknown. Usually, the body's own immune system which normally fights harmful bacteria and viruses — mistakenly destroys the insulinproducing (islet, or islets of Langerhans) cells in the pancreas. Other possible causes include:

- ✓ *Genetics*
- ✓ *Exposure to viruses and other environmental factors.*

Type 2

Type 2 diabetes is primarily the result of two interrelated problems:

- ✓ *Cells in muscle, fat and the liver become resistant to insulin. Because these cells don't interact in a normal way with insulin, they don't take in enough sugar.*
- ✓ *The pancreas is unable to produce enough insulin to manage blood sugar levels.*

RISK FACTORS:

- ✓ *Weight. The more fatty tissue you have, the more resistant your cells become to insulin.*
- ✓ *Family history.*
- ✓ *Race or ethnicity.*
- ✓ *Gestational diabetes.*
- ✓ *Polycystic ovary syndrome.*
- ✓ *High blood pressure.*
- ✓ *Abnormality of cholesterol.*

RELATIONSHIP BETWEEN STRESS AND DIABETES (type 2):

- ***Stress can make it more difficult to control your diabetes as it may throw off your daily routine and can result in wear and tear on your body.***
- ***Hormones from stress increase your blood pressure, raise your heart rate, and can cause blood sugar to rise.***
- ***High blood sugar can make you feel down or tired, because high levels of stress may cause a person to engage in unhealthful lifestyle habits.***
- ***These lifestyle habits can increase a person's risk of developing diabetes.***
- ***Stress reduction techniques may work for some people but not others. Stress may also have different effects on each person.***
- ***If a person is living with both diabetes and stress, they can explore different strategies(like exercise, laugh, spend time with family or friends, meditate,)to relieve stress and help control blood sugar.***
- ***If the strategies are not effective, or if a person is starting to show signs of depression, they should see a doctor.***
- ***A psychotherapist or a counselor can help people manage their mood.***

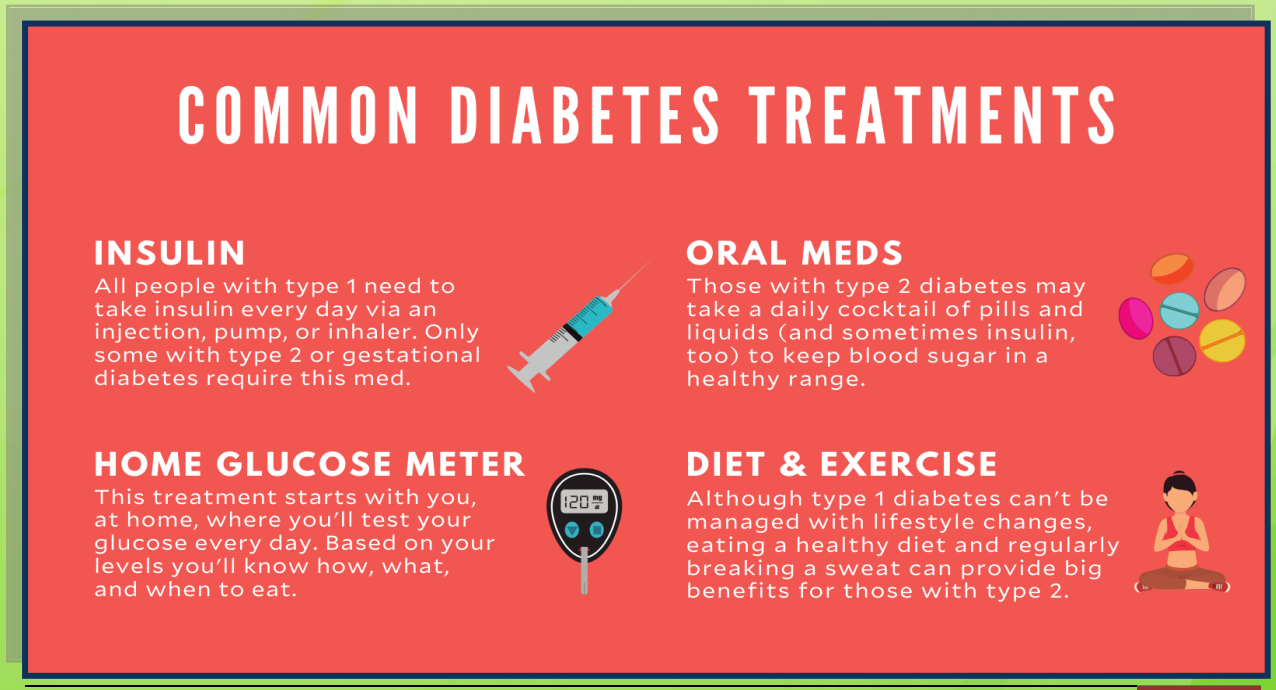
TREATMENT:

➢ ***Although diabetes has no cure, you can take steps to manage your diabetes and stay healthy.***

- ✓ ***If you have type 1diabetes, you must take insulin every day.***
- ✓ ***Carbohydrate ,fat and protein counting.***
- ✓ ***Frequent blood sugar monitoring.***
- ✓ ***Eating healthy foods.***
- ✓ ***Avoid sugar-sweetened beverages.***
- ✓ ***Exercise regularly and maintaining a healthy weight.***

➢ ***Here are seven food that Powers says can help keep your blood sugar in check and make you happy and healthy to boot.***

- ✓ ***Melon or Berries.***
- ✓ ***Raw, Cooked, or Roasted Vegetables.***
- ✓ ***Flavorful, Low-calorie Drinks.***
- ✓ ***Whole-grain, Higher-fiber Foods.***
- ✓ ***Melon or berries.***
- ✓ ***Protein.***



MODERN DAY LIFE STYLE FOR DIABETES (type 2):

- *Lifestyle changes are often advised for people at higher risk of diabetes and those who are newly diagnosed with type 2, to help manage their diabetes. So you have a good chance to delay or prevent diabetes by making a few lifestyle changes.*

❖ ***The recommended lifestyle interventions include:***

- ✓ *Taking two and a half hours each week of moderate intensity physical activity or one hour and 15 minutes of high intensity exercise.*
- ✓ *Losing weight gradually to achieve a healthy body mass index*
- ✓ *Replacing refined carbohydrates with wholegrain foods and increase intake of vegetables and other foods high in dietary fiber.*
- ✓ *Reducing the amount of saturated fat in the diet.*

❖ ***Moderate intensity physical activity includes:***

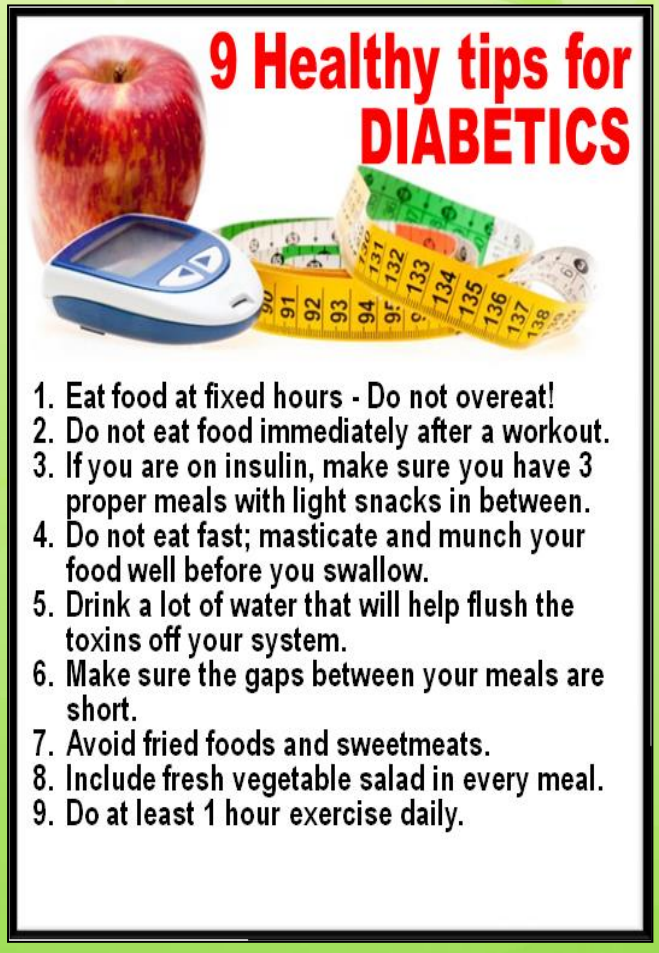
- ✓ *Brisk walking.*
- ✓ *Cycling on relatively flat terrain.*
- ✓ *Water aerobics.*
- ✓ *Hiking.*
- ✓ *Rollerblading.*
- ✓ *Using a manual lawnmower.*

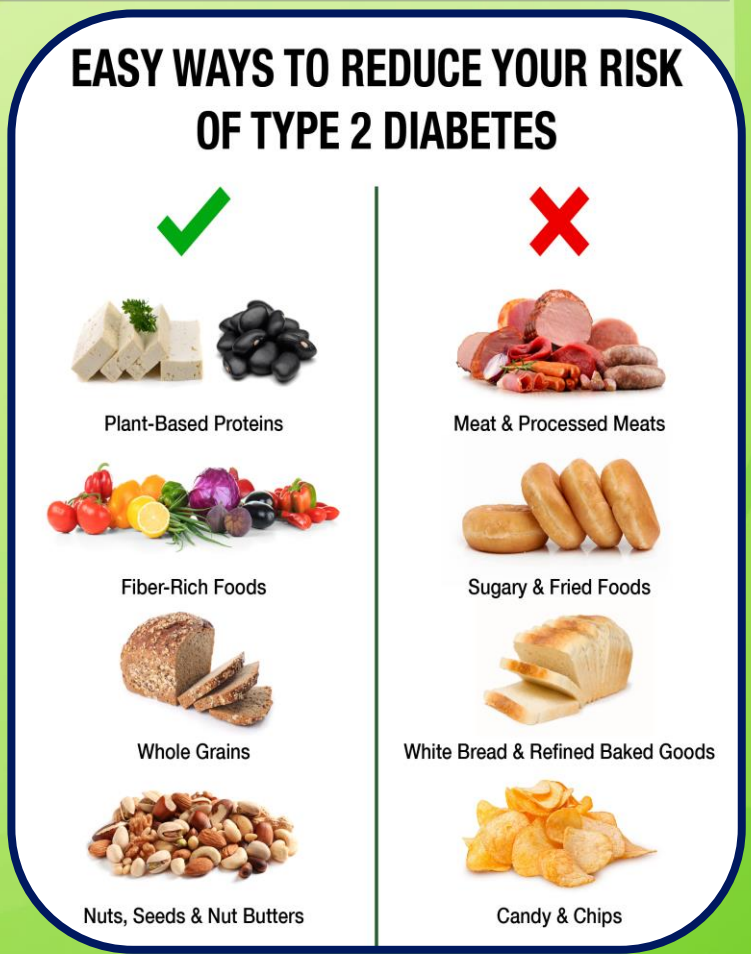
❖ ***Vigorous physical activity may include:***

- ✓ *Jogging.*
- ✓ *Swimming lengths.*
- ✓ *Cycling either rapidly or over steep terrain.*
- ✓ *Football.*
- ✓ *Gymnastics.*
- ✓ *Skipping.*

PREVENTION:

- ***If you have symptoms or risk factors for diabetes, you should get tested. The earlier diabetes is found, the earlier management can begin and complications can be lessened or prevented.***
- ***Some ways to prevent diabetes:***
- ✓ ***Cut Sugar and Refined Carbs From Your Diet.***
- ✓ ***Work Out Regularly.***
- ✓ ***Drink Water as Your Primary Beverage.***
- ✓ ***Lose Weight If You're Overweight or Obesity.***
- ✓ ***Quit Smoking.***
- ✓ ***Cut out the alcohol.***
- ✓ ***Follow a Very-Low-Carb Diet.***
- ✓ ***Avoid Sedentary Behaviors.***





EFFECT OF COVID 19 ON DIABETES PATIENTS :

- *People with diabetes are more likely to have serious complications from COVID-19.*
- *In general, people with diabetes are more likely to have more severe symptoms and complications when infected with any virus.*
- *Your risk of getting very sick from COVID-19 is likely to be lower if your diabetes is well-managed.*

CONCLUSION:

- ✓ *Diabetes Mellitus is a slow killer, three major complications are related to blindness, kidney damage and heart attack.*
- ✓ *However, its complications can be reduced through proper awareness and Timely treatment.*
- ✓ *So careful planning are important for the everyone's future.*

DRY EYE : INADEQUATE TEAR DISORDER

9

-By Ankita Bose, Physiology honours Semester 4

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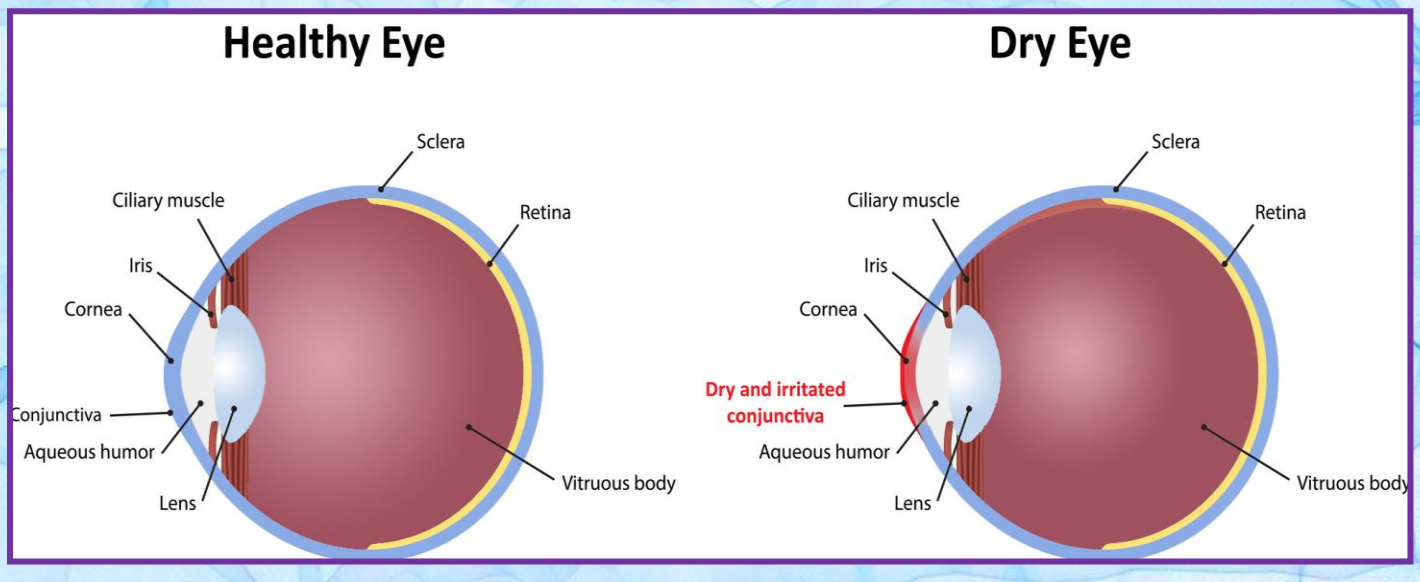
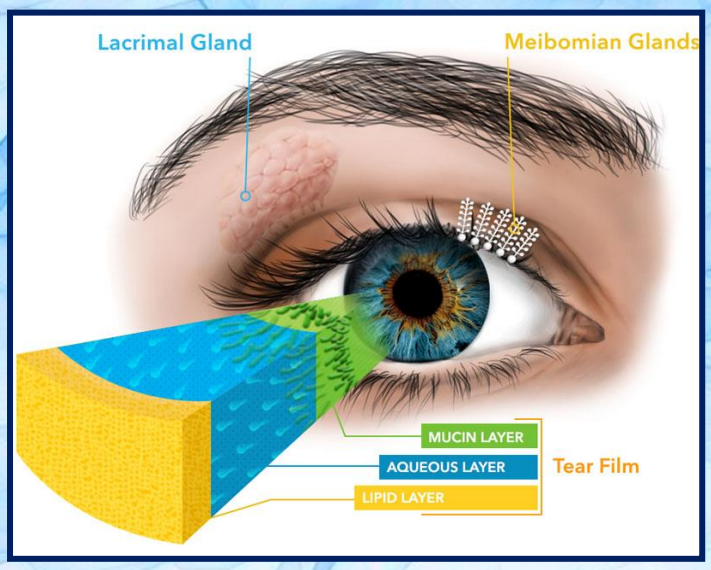
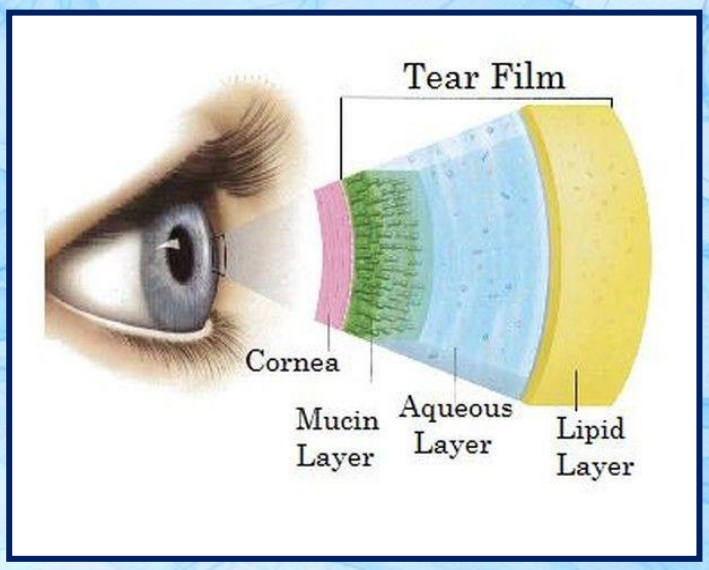
INTRODUCTION:



- ***Dry eye is a condition in which a person does not have enough quantity of tears to lubricate and nourish the eye. We all know that eye is a very sensitive organ in our body. Any problem in it may lead to severe damage in life. And tears protect the surface of the eyes from infection. Without adequate tears, one may have an increased risk of eye infection, damage to the surface of eyes. If left untreated, severe dry eyes may lead to eye inflammation, abrasion of the corneal surface, corneal ulcers and vision loss. Although it's uncomfortable, dry eye Syndrome almost never causes permanent vision loss.***





❖ *Normal tear film composition in eye: There are three layers in tear film.*

- ✓ *Outer fatty oily layer.*
- ✓ *Middle aqueous fluid.*
- ✓ *Inner mucus layer.*

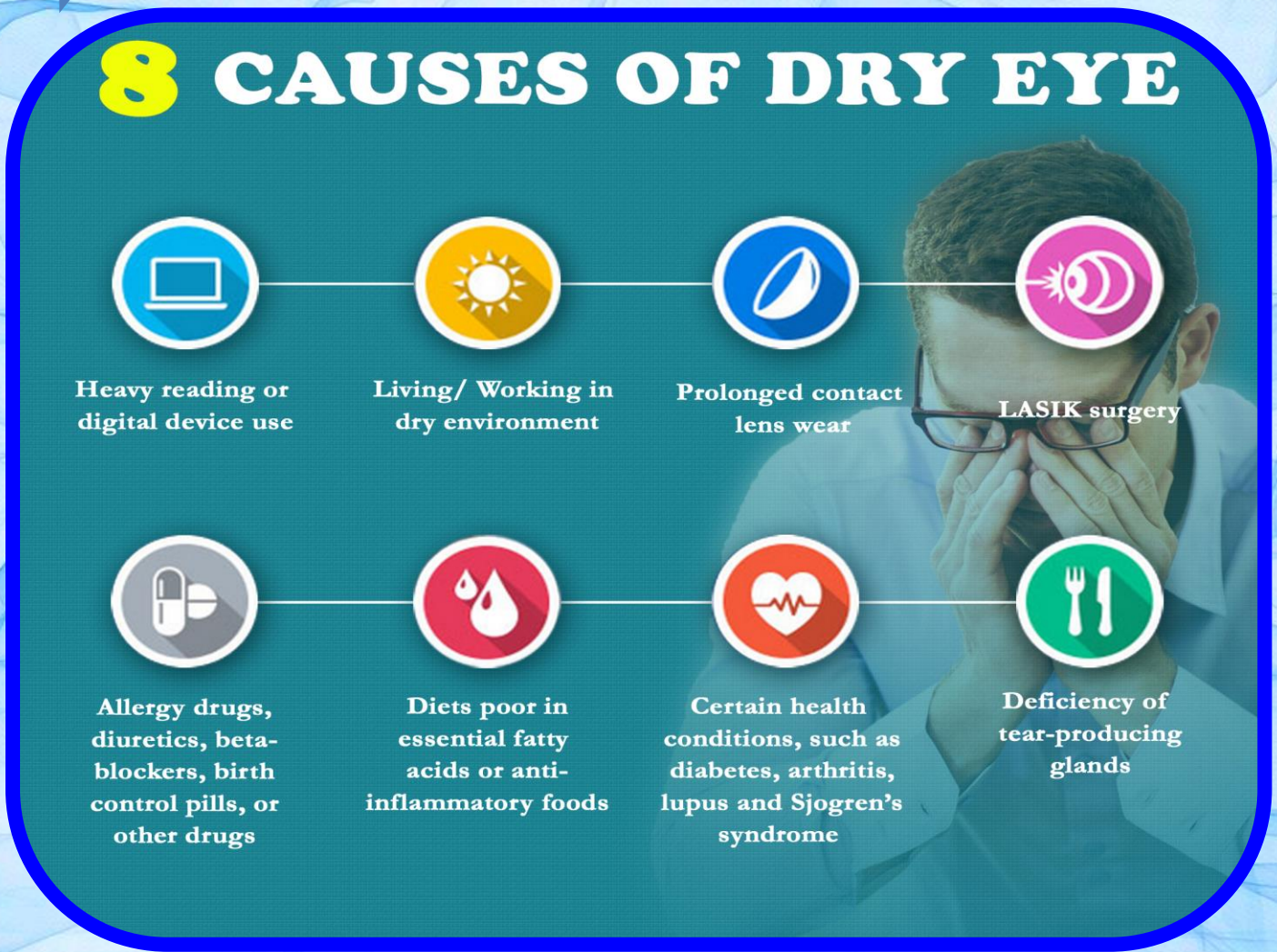
➢ *The oily outer layer is the outside of the tear film that makes the tear surface smooth and keeps tears from drying up too quickly. This layer is made in the eye's meibomian glands. The watery layer is the middle layer of the tear film. It makes up most of what we see as tears. This layer cleans the eye, washing away particles that don't belong in the eye. This layer comes from the lacrimal glands in the eyelids.*

➢ *The mucus layer is the inner layer of the tear film. This helps spread the watery layer over the eye's surface, keeping it moist. Without mucus, tears would not stick to the eye. Mucus is made in the conjunctiva. This is the clear tissue covering the white part of eye and inside the eyelids.*

➢ *Normally, our eyes constantly make tears to stay moist. If our eyes are irritated, or we cry, our eyes make a lot of tears. But, sometimes the eyes don't make enough tears or something affects one or more layers of the tear film. In those cases, we end up with dry eyes.*

➢ *Problems with any of the layers can cause dry eye. For example, if the oily layer is not properly produced, then the tear film will evaporate much more quickly than normal, tears won't be able to do their job and dry eye symptoms can result.*

CAUSES OF DRY EYE :



❖ ***Causes:***

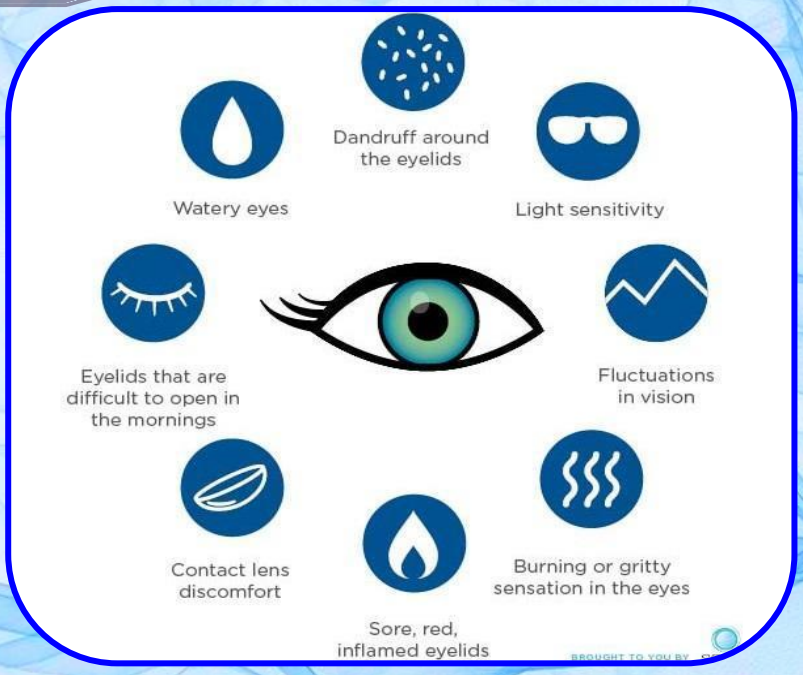
Dry eyes are caused by a variety of reasons that disrupt the healthy tear film having fatty layer, aqueous layer and mucus layer. This combination normally keeps the surface of eyes lubricated, smooth and clear. Problems with any of these layer can cause dry eyes. When oil is missing from tears, they quickly evaporate and eyes cannot maintain a steady supply of moisture.

❖ ***The causes of dry eye Syndrome include:***

- ✓ ***Hormone replacement therapy.***
- ✓ ***Exposure to the wind or dry air, such as constant exposure to a heater during the winter.***
- ✓ ***Allergies.***
- ✓ ***Aging***
- ✓ ***Long-term contact lens wear.***
- ✓ ***Staring at screen of computer, laptop, smart phones for long hours.***
- ✓ ***Not blinking enough.There are some other reasons behind dry eye problem are enlisted below-***

1. ***Aging: Even though anyone can have dry eye, this condition becomes more common the older age groups. Dry eye tends to affect people over the age of 50 because tear production declines with age. This type of dry eye can't be prevented, but using artificial tears on a regular basis can provide extra lubrication to coat eyes and relieve dryness.***
2. ***computer use: some people who work on a computer, experience eyestrain and tension headaches. In addition to these issues, staring at a computer can also affect tears and lead to dry eye. This is because people who work on a computer monitor tend to blink less often. As a result, their tears evaporate more quickly.***
3. ***Laser surgery: some people begin to experience dry eye after laser vision correction surgery. This procedure cuts some of the nerves in the cornea, causing the eyes to produce fewer tears. This type of dry eye is usually temporary and resolves after a few days or weeks. Until eyes heal, one should use lubricating eye drop to keep eyes moist.***
4. ***Menopause : Hormones can play a role in dry eye. Some women experience dry eye symptoms during pregnancy, menopause or while using birth control pills. Hormones stimulate the production of tears, so an imbalance can reduce tear production.***
5. ***vitamin A deficiency : Vitamin A promotes healthy eyes. Foods rich in vitamin A include eggs, carrots, fish, spinach, broccoli and peppers. A diet low in foods that contain this vitamin can lead to dry eye and other vision impairments, such as night blindness.***
6. ***Mild dehydration : sometimes, dry eye is the result of dehydration or not drinking enough fluids. Increasing fluid intake and drinking more water can improve mild dehydration and ease chronic dry eye.***
7. ***Allergies: Allergies can also trigger chronic dry eye. Eyes may appear itchy, red and watery. An oral antihistamine can reduce allergy, although these medications can worsen symptoms of dry eye.***
8. ***Smoke: smoking or exposure to second hand smoke can also make one's dry eye.***

SYMPTOMS OF DRY EYE:



- ***The most common symptoms of dry eye Syndrome are:***
  - ✓ ***Burning***
  - ✓ ***Pain***
  - ✓ ***Redness***
- ***Other common symptoms include:***
  - ✓ ***Watery tearing.***
  - ✓ ***Stingy mucus.***
  - ✓ ***Eyes get tired faster than they used to.***
  - ✓ ***Difficulty reading or sitting at the computer for long periods.***
  - ✓ ***Blurry vision.***
  - ✓ ***Feeling of having sand in eyes.***
  - ✓ ***Eye sensitivity to smoke or wind.***

DIAGNOSIS:

- ***To detect the dry eye problem an ophthalmologist will begin with an eye exam. He or she will look at eyelids and the surface of the eye. They will also check how one blink.***
- ***There are many different tests that help to diagnose dry eyes. Ophthalmologist may do a test that measures the quality or thickness of tears. He or she may also measure how quickly one individual produce tears.***

TREATMENT OF DRY EYE:

- ***Ophthalmologists treat dry eye problem through many ways. Some of them are enlisted below;***

  i) ***Adding tears:Ophthalmologist suggest to use artificial tears. These are eye drops that are like eye tears. If any individual use artificial tears more than six times a day or allergic to preservatives, then they should use preservative-free tears. This is because if the tears with preservatives are used a lot, these chemicals may start irritate eyes.***

  ii) ***Saving tears: Sometimes ophthalmologist may suggest blocking one's tear ducts. This makes natural tears stay in our eyes longer. Tiny silicon or gel plugs (called punctal plugs) may be inserted in tear ducts. These plugs can be removed later as needed. Some ophthalmologist can also recommend surgery that permanently block the tear ducts.***

- ***Treating dry eye culprits : If your eyes are irritated, ophthalmologist can treat these problems. They may recommend:***
  - ✓ ***Eye drops or ointments.***
  - ✓ ***Warm compress on eyes.***
  - ✓ ***Massaging eyelids and using prescribed eyelid cleaners.***

PREVENTION TIPS :

- ✓ *Try not to use a hair dryer, if possible.*
- ✓ *Stay away from very warm rooms. In the winter, add moisture to the air with a humidifier or put a pan near heater or radiator.*
- ✓ *Protect eyes from drying wind by wearing wrap-around glasses outside.*
- ✓ *When working in computer, try not to watch the screen throughout a prolonged time. Frequently blink eyes so that tears can not evaporate from eyes.*
- ✓ *One should drink plenty of water in a day to prevent body from dehydration. As dehydration may lead to dry eye.*
- ✓ *If one feels dryness in eye, he or she must consult an ophthalmologist immediately to deal with the*

Now-a-days we live in such a world where we all are very much dependent on technologies. We use hair dryer, room heater, computer, smartphone very frequently. But unknowingly these gadgets are responsible for the problem of dry eye. But smart use of such gadgets can lessen the problem of dry eye. For example, one should use computer, smart phones in a limited manner. Try not to use hair dryer, room heater if possible. As a whole, a healthy life style including vitamin A rich foods, drinking water can lessen the problem of dry eye.

food additives : enhance flavour, but could be dangerous to our health

10

-By Ankit Kumar Gupta, Physiology honours Semester 6

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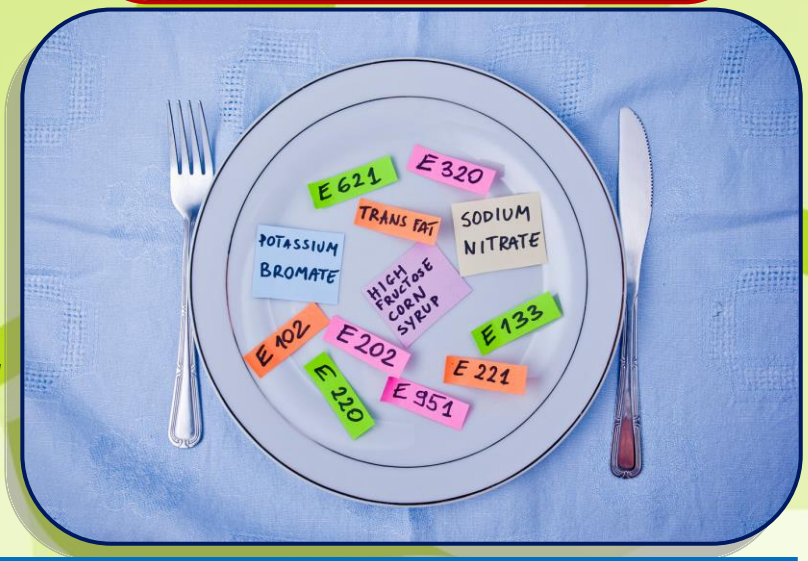
ABSTRACT :

- *The concept of adding 'non-food' substances to food products is not new.*
- *Food Additives have been used for centuries to enhance the appearance and flavour of food and prolong shelf life.*
- *Additives are used to maintain product consistency and quality improve or maintain nutritional value,colour.*
- *Some additives are known to be harmful to the human body,some are classified as carcinogens or cancer causing agents.*
- *The excessive intake of food addities for a prolonged period of time will effect our health.*



INTRODUCTION :

Food Additives

Substances we add to food to make them taste better, last longer, look, nicer, etc.

Natural	Nature Identical	Artificial
Substances found naturally, such as beetroot juice, which we use to color foodstuffs.	Synthesized copies of substances that exist in nature, such as ethyl acetate.	Synthesized substances that do not exist in nature, such as vanillin or ethyl maltol.

- *Food additive means any substance not normally consumed as a food by itself or used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its by products becoming a component of or otherwise affecting the characteristics of such food but does not include- contaminants or substances added to food for maintaining or improving nutritional qualities (THE FOOD SAFETY AND STANDARDS ACT, 2006)*

NEED FOR ADDING FOOD ADDITIVES :

- *Additives provide protection against food spoilage during storage transportation, distribution or processing. Food additives are used for the purpose of maintaining or improving the keeping quality, texture, consistency, appearance and other technological requirements. Food additives do not include use of vitamins, minerals, herbs, salt, spices, yeast, hops. starter cultures, malt extract etc. Many foods, particularly those with high moisture contents, do not keep well. All foods are subjected to microbial attack. Fats or oily foods become rancid, particularly when exposed to humid air. The conversation of the quality of foods against agents causing such deterioration of food requires the addition of preservatives. Additives are also used to colour foods, add flavour, impart firmness, and retard or hasten chemical reaction in food. The use of food additives is to maintain the nutritional quality of food, to enhance stability with resulting reduction in waste, to make food more attractive, and to provide efficient aids in processing. packaging and transport.*

Advantages and Disadvantages of Using Food Additives

Advantages	Disadvantages
Make food stay fresh longer, look nicer and taste better	Associated with serious diseases like cancer and asthma
Make food last longer	Toxic effect

CLASSIFICATION OF FOOD ADDITIVES :

- ***Food additives are classified on the basis of their functional use and are grouped as:***

✓ ***PRESERVATIVES: (E Number 200-299) Preservatives aim to prevent the growth of micro-organisms which could cause food spoilage and lead to food poisoning:extend the shelf-life of products, so that they can be distributed and sold to the consumer with a longer shelf-life.***

✓ ***COLOURS: (E number 100-199) Restore original appearance of the food which is lost during heat processing or storage. Uniformity of colour as a result of natural variations. It intensify colour as a result of natural variations. It protect light-sensitive vitamins. It impart attractive appearance to foods. It serve as visual indication of foods quality.***

✓ ***ARTIFICIAL SWEETENERS: The substances that sweeten food, beverages, medications, etc., such as sugar, saccharine or other low-calorie synthetic products.eg Saccharin, Aspartame.***

✓ ***ACIDS: (E number 300-399)Food acids are added to make flavours "sharper", and also act as preservatives and antioxidants. Common food acids include vinegar, citric acid, tartaric acid, malic acid, fumaric acid, and lactic acid.***

✓ ***ANTIOXIDANTS: (E number 300-399) Antioxidants are used as food additives to preserve food for a longer period of time. Antioxidants act as oxygen scavengers as the presence of oxygen in the food helps the bacteria to grow in the food. In the absence of antioxidant food additive oxidation of unsaturated fats takes place rendering to foul smell and discoloration of food.***

✓ ***FLAVOURS: (E number 600-699) Flavourings are added to foods in order to impart taste and or smell. The natural food flavours which are derived from herbs, spices and substances having an exclusively sweet. sour or salt taste. Flavour enhancers Flavour enhancers are used to enhance the existing flavour in the food. Flavour is the sensory impression of food or other substance, and is determined primarily by the chemical senses of taste and smell.***

✓ ***NUTRIENT SUPPLEMENTS When foods are processed, there may be loss of some nutrients and additives may be added to restore the original value.***

✓ ***EMULSIFIERS: (E number 400-499) It also allow water and oil to remain mixed together in an emulsion, as in mayonnaise, ice cream, and homogenized milk.***

✓ ***STABILIZERS: (E number 400-499) It is added in the food to smoothen the texture of the food & give a definite body to the food. Food stabilisers are added in relatively small amount which aggravate the effect of emulsifiers. "Stabilisers are substances or chemicals that allow food ingredients, which do not mix well, to remain in a homogenous state after blending."***

✓ ***THICKENING AND GELLING AGENTS : (E number 400-499) Thickening substances are added to food preparations for increasing their viscosity without changing other properties like taste. When a food thickener or a thickening agent is added to beverage, it absorbs the fluid and the fluid thickens.***

TYPES OF FOOD ADDITIVE

- **Direct/ Intentional Additives:** Food additives are those that are added to a food for a specific purpose in that food. For example, xanthan gum -- used in salad dressings, chocolate milk, bakery fillings, puddings and other foods to add texture.

- **Indirect/Unintentional Additives:** They are those that become part of the food in trace amounts due to its packaging, storage or other handling. Examples include radioactive fallout, chemicals used in agricultural production and accidental contaminants during food processing

FLAVOUR ENHANCERS, IMPROVING THE FLAVOUR OF PROCESSED FOODS AND BEVERAGES :

❖ .**FLAVOUR ENHANCERS AS FOOD ADDITIVES :-**

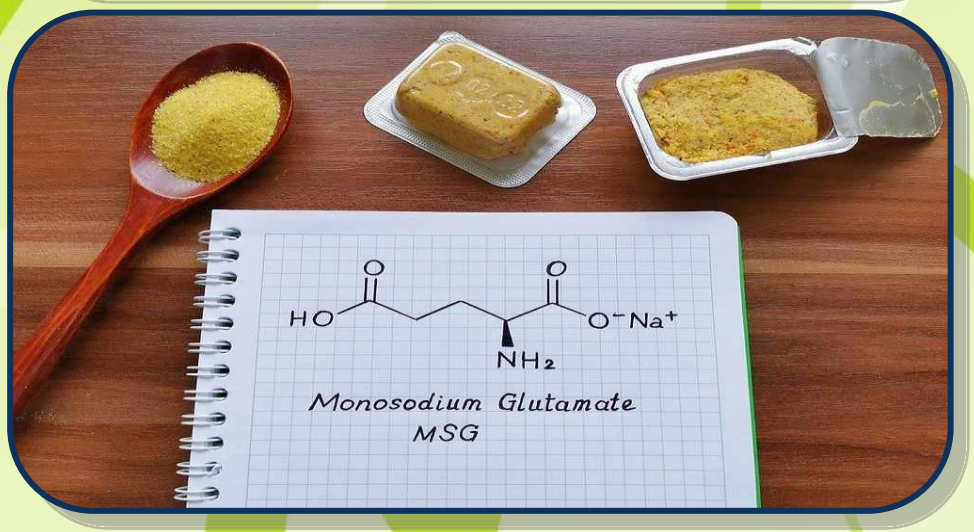
EXAMPLES	CATEGORY	COMMON USES	HEALTH HAZARDS	REPLACEMENTS FOR NATURAL INGREDIENTS
1.Monosodium Glutamate (MSG) (E621):	Flavour enhancer	✓ *Used in processed foods and drinks,soup mixes.*	✓ *Destroys nerve cells in brain and linked with aggravating or accelerating Huntington's,Alzheimer's and Parkinson's diseases.* ✓ *Causes cancer,DNA damage and fetal abnormalities in animals.* ✓ *Increases hyperactivity.*	✓ Sea Salt
2.Hydrolyzed Soy Protein:	Flavour enhancer	✓ *Used as a seasoning and flavouring in processed savoury food.*	✓ *Causes allergic reactions involving rash,itching,and anaphylaxis in some people.* ✓ *Causes intestinal side effects such as constipation ,bloating and nausea.*	✓ Milk protein ✓ Soy beans

EXAMPLES	CATEGORY	COMMON USES	HEALTH HAZARDS	REPLACEMENT FOR NATURAL INGREDIENTS
3.Aspartame(E951):	**Flavour enhancer**	✓ ***Used in So-called "diet" or"Sugar free" products.*** ✓ ***Used in desserts,sugar free gum,drink mixes,table top sweeteners,cereal,pudding,ice tea.***	✓ *Aspartame is a neurotoxin and carcinogen,known to erode intelligence and affect short term memory.* ✓ *The toxicity of aspartame leads to a wide variety of ailments including brain tumor,diseases like lymphoma,diabetes, multiple sclerosis,chronic fatigue,headache,mental confusion,seizures and anxiety attacks.*	✓ **Molasses** ✓ **Yacon syrup** ✓ **Stevia (from plant stevia rebaudiana)**
4.Disodium guanylate (E627):	**Flavour enhancer**	✓ ***Used in instant noodles,potato chips and snacks,savoury rice,tinned vegetables,curedmeats,packet soup.***	✓ *Causes lack of sensation ,or numbness.* ✓ *Behavioural problems in childrens.* ✓ *Leads to Attention deficit disorders.* ✓ *Causes Lethargy,sleepiness,insomnia,seizures,sciatica,slurred speech,chills and shakes,shuddering.*	✓ **Sardines** ✓ **Yeast extract**
5.Glutamic acid (E620) :	**Flavour enhancer**	✓ ***Act as a salt substitute.*** ✓ ***Used in sausagesand seasonings,savoury snacks.***	✓ *Could kill nerve cells ,resulting in diseases such as Huntington's,Alzheimer's and Parkinson's diseases.*	✓ **Molasses** ✓ **Vegetable proteins such as gluten or soy protein**

EXAMPLES	CATEGORY	COMMON USES	HEALTH HAZARDS	REPLACEMENTS FOR NATURAL INGREDIENTS
6.Calcium guanylate(E626):	**Flavour enhancer**	✓ ***Used in instant noodles,potato chips and snacks,savoury rice,tinned vegetables,curedmeats,packet soup.***	✓ *Trigger gout inflammated people.* ✓ *Worsen the condition of asthmatic people.*	✓ **Sardines** ✓ **Yeast extract** ✓ **Seaweed** ✓ **Fish extract**
7.High fructosecorn syrup (HFCS):	**Flavour enhancer**	✓ ***Used in most processed foods,bread,candy,flavoured yoghurts,salad dressings,canned vegetables,cereals.***	✓ *Increases LDL (LOW DENSITY LIPOPROTEIN) or bad cholesterol levels.* ✓ *Thus contributes to the developments of obesity and diabetes.* ✓ *Causes fatty liver,chronic diarrhea, and irritable bowel syndrome.* ✓ *Increases triglycerides which may contribute to hardening of the arteries or thickening of the artery walls (arteriosclerosis) which increases the risk of stroke,heart attack and heart disease.* ✓ *Increases uric acid may eventually lead to permanent bone,joint and tissue damage,kidney disease (e.g,kidney stones) and heart disease.*	✓ **Sugar** ✓ **Stevia (from plant stevia rebaudiana)** ✓ **Yacon syrup**

EXAMPLES	CATEGORY	COMMON USES	HEALTH HAZARDS	REPLACEMENTS FOR NATURAL INGREDIENTS
8.Disodiu minosinate (E631):	**Flavour enhancer**	✓ ***Used in instant noodles,potato chips and snacks,savoury rice,tinned vegetables,cure dmeats,packet soup.***	✓ *Causes side effects like;* *- flushed skin,* *-burning sensations,* *-numbness and tightness,* *-swelling ,etc.*	✓ **Sardines** ✓ **Tapioc astarch** ✓ **Parmesa ncheese** ✓ **Yeast extract**
9.Maltol(E636):	**Flavour enhancer**	✓ ***Used in baked goods to give a 'fresh baked' taste and smell in bread and cakes,chocolat esubstitute ,soft and fizzy drinks,ice creams,jams.***	✓ *Causes Alzheimer's disease.* ✓ *Affect the liver and kidney functions.* ✓ *Causes side effects like;* *-abdominal pain,* *-flatulence,* *-constipation,* *-abdominal discomfort,* *-diarrhoea.*	✓ **Wheat** ✓ **Yoghurt** ✓ **Malt** ✓ **Honey**
10.Dioctyl sodium sulfosuccinate :	**Flavour enhancer**	✓ ***Used in dry gelatin desserts,dry beverage base,fruit juice drinks and in processed foods.***	✓ *Causes* *-eye irritation,* *-skin irritation,* *-respiratory tract irritation,* *-gastrointestinal irritation with nausea,vomiting and diarrhoea.*	✓ **Palm oil** ✓ **Coconut oil** ✓ **Butter**
11.Acesulpha me pottasium (E950):	**Flavour enhancer**	✓ ***Used as a sweetener in baking and beverages like carbonated water based flavoured drinks.***	✓ *Contains carcinogen methylene chloride which causes headaches and cancers.* ✓ *Linked to hypoglycaemia,lun gtumours,increased cholesterol,obesity and leukemia.*	✓ **Sugar** ✓ **Honey** ✓ **Stevia (from plant stevia rebaudiana)** ✓ **Yacon syrup**

EXAMPLES	CATEGORY	COMMON USES	HEALTH HAZARDS	REPLACEMENTS FOR NATURAL INGREDIENTS
12.Monopottasium L-glutamate (E622):	**Flavour enhancer**	✓ ***Used in sausagesand seasonings,savoury snacks.***	✓ *Can cause nausea,vomiting,diarrhoea,abdominal cramps.*	✓ **Molasses** ✓ **Vegetable proteins such as gluten or soy protein**



OTHER HARMFUL EFFECTS OF FOOD ADDITIVES ON HUMAN HEALTH:

- ***The increasing demand for ready-to-eat fresh food products has led to challenges for food distributors regarding the safety and quality of their foods.***
- ***Artificial Food Colours can cause allergies, asthma, hyperactivity; possible carcinogen.***
- ***Nitrites and Nitrates. can develop into nitrosamines in body, which can be carcinogenic.***
- ***Sulphites (sulphur dioxide) can cause allergic and asthmatic reactions.***
- ***Sugar and Sweeteners can cause obesity, dental cavities, diabetes and hypoglycaemia, increased triglycerides (blood fats) or Candida (yeast).***
- ***Artificial Sweeteners (Aspartame and Saccharin) can cause behavioural problems, hyperactivity, allergies and possibly carcinogenic.The government cautions against the use of any artificial sweetener by children and pregnant women.***
- ***MSG (monosodium glutamate) can cause common allergic and behavioural reactions, including headaches, dizziness, and chest pains.***
- ***Preservatives can cause allergic reactions, hyperactivity, possibly cancer-causing: BHT may be toxic to the nervous system and the liver.***
- ***Artificial Flavours can cause allergic or behavioural reactions.***
- ***Salt can cause fluid retention and blood pressure increases.***

HOW TO REDUCE YOUR FAMILY'S EXPOSURE TO FOOD ADDITIVES :

- ***Wash your hands. Because chemicals from plastics are so common in items we touch throughout the day, be sure to wash your hands thoroughly before and after handling food.***

- ***Buy fresh or frozen. It's best to buy and serve fresh or frozen fruits and vegetables when possible.***
- ***Eat fewer processed meats. Try to avoid processed meats, such as hot dogs, ham and meats in pre-packaged meals, especially during pregnancy.***
- ***Wash plastic food containers and utensils by hand, rather than in the dishwasher Heat can cause plastics to leak BPA and phthalates into food. Avoid microwaving food or beverages including infant formula and breastmilk-in plastic, if possible.***
- ***Use glass and stainless steel. Especially when cooking or serving hot foods,use alternatives to plastic, such as glass or stainless steel, when possible.***
- ***Learn plastic recycling codes. Look at the recycling code on the bottom of products to find the plastic type. Try to avoid plastics with recycling codes 3 (phthalates), 6 (styrene), and 7 (bisphenols) unless plastics are labeled as "biobased"or "greenware, which means they are made from corn and do not contain bisphenols.***

COMMON QUESTIONS FROM PARENTS ABOUT FOOD ADDITIVES :

❖ ***How do I find out which additives are in foods?***

➢ ***Additives that are put directly in foods are listed on ingredient labels, but often with their chemical names. For example, salt may be listed as sodium chloride, sugar as sucrose, vitamin C as ascorbic acid, and vitamin E as alpha-tocopherol. Artificial colors are usually listed by their numbers, such as Blue #2 or Yellow #5. However, there are also indirect additives from processing or packaging materials that are not listed on the ingredient labels. These can include chemicals from plastic,glues, dyes, paper, cardboard, and different types of coatings.***

❖ ***Are additives a problem in any baby products?***

➢ ***The FDA recently banned BPA from baby bottles and sippy cups, but the chemical is still used in some food and beverage containers. Many companies have voluntarily removed BPA from their products, but in many cases replaced it with chemicals such as bisphenol S (BPS) that may have similar health effects. In 2017, the Consumer Product Safety Commission banned the use of some phthalates in child-care products such as teething rings.***

❖ ***Do artificial food colors cause childhood hyperactivity?***

➢ ***More research is needed to better understand how artificial food colors (AFCs) may or may not impact a child's behavior. This is because much of the original research on these additives were animal studies that did not include behavioral affects. For some children with attention-deficit/hyperactivity disorder (ADHD) and other problem behaviors, the food safety says that until we know more, it may be helpful to eliminate AFCs from their diet if they seem to worsen symptoms.***

Many new techniques are being researched that will improve how additives are produced. One approach is the use of biotechnology, which can use simple organisms to produce food additives. These additives are the same as food components found in nature.

ALLERGIES

11

-By Meghna Kundu, Physiology honours Semester 2

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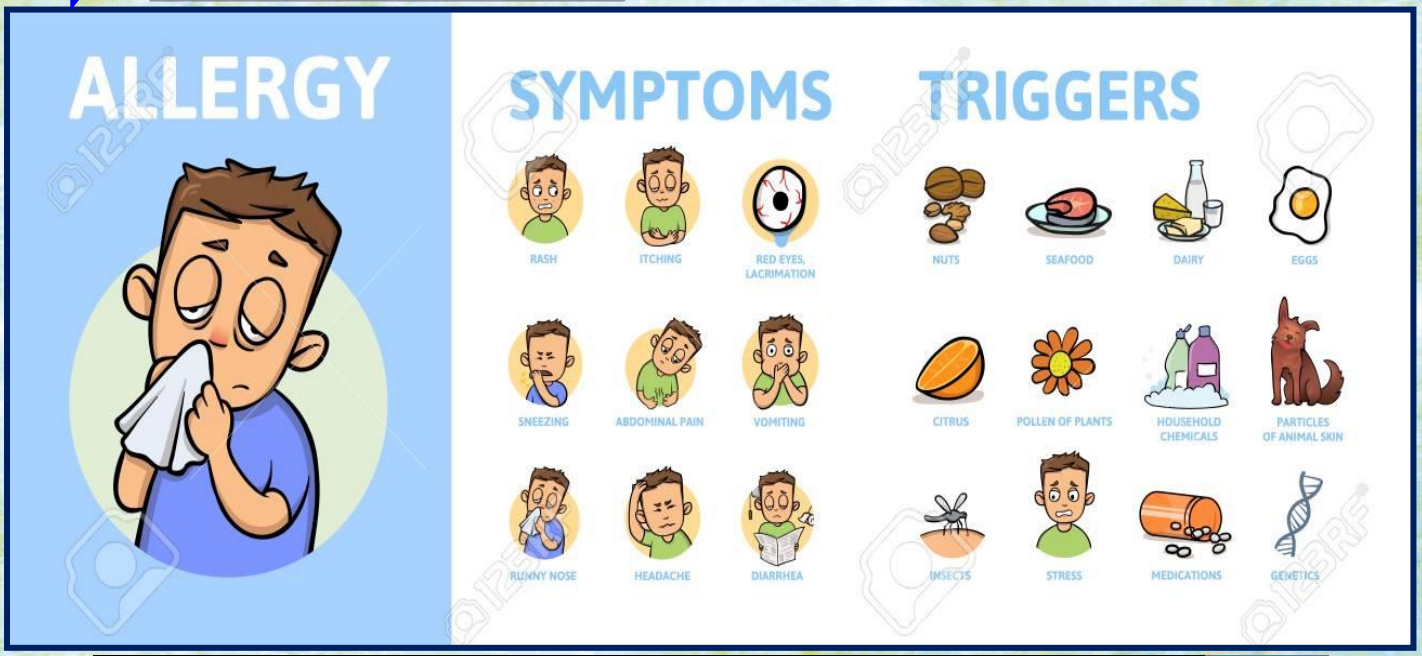
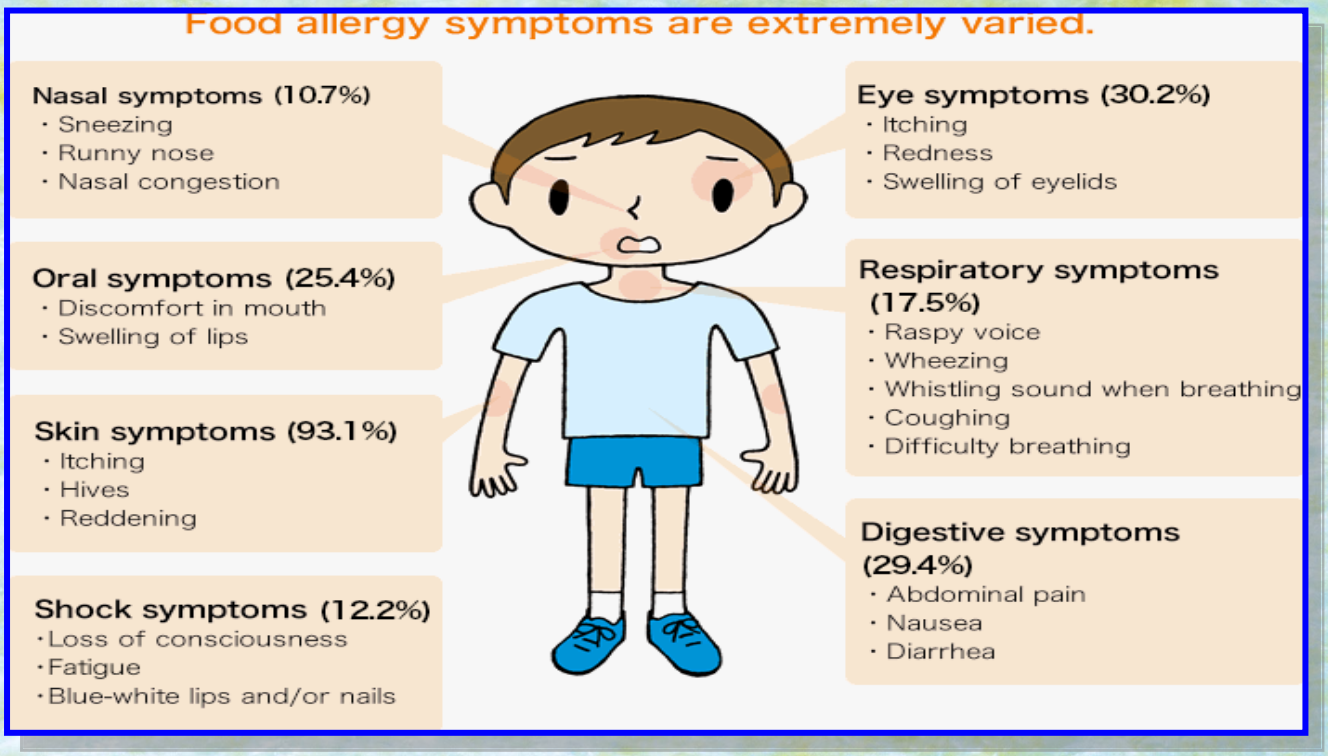
- *An important undesirable effect of immunity is the development,under some conditions, of allergy or other types of immune hypersensitivity. There are several types of allergy and other hypersensitivities, some of which occur only in people who have a specific allergic tendency. The allergy tendency is genetically passed from parent to child and is characterized by the presence of large quantities of IgE antibodies in the blood. Some allergies go away with age,but others are lifelong.*

PATHOPHYSIOLOGY :



- ***Allergies occur when immune system reacts to a foreign substance. People with allergies have especially sensitive immune system that react when they contact allergens.***
- ***<u>Some allergens are</u>:-***
  - ✓ ***Foods (specially protein containing items like: eggs, shellfish, milk etc.)***
  - ✓ ***Pollen***
  - ✓ ***Pet dander or bee venom***
  - ✓ ***Mold***
- ***As there are so many possible causes the symptoms of allergies vary.***
- ***<u>Symptoms for airborne allergies, like pollen and pet dander are</u> :***
  - ✓ ***Runny nose***
  - ✓ ***Stuffy nose***
  - ✓ ***Sneezing***
  - ✓ ***Eye irritation***
  - ✓ ***Watery eyes***
  - ***Itching***
- ***<u>Symptoms for food allergens are:</u>***
  - ✓ ***Wheezing, chest tightness, shortness or breath and a cough***
  - ✓ ***A raised, itchy, red rash in skin or hives***
  - ✓ ***Swollen lips, tongue, eyes or face***
  - ✓ ***Tummy pain, feeling sick, vomiting or diarrhoea.***
  - ✓ ***Fainting***
- ***When a specific allergen is injected directly into the circulation, the allergen can react with basophils of the blood and mast cells in the tissues located immediately outside the small blood vessels if the basophils and mast cells have been sensitized by attachment of IgE reagins. Therefore a widespread allergic reaction occurs throughout the vascular system and closely associated tissues. This reaction is called anaphylaxis. It's symptoms are severe, potentially life-threatening. Symptoms include a skin rash, nausea, vomiting, difficulty breathing and shock.***



ALLERGIES , STRESS AND COVID-19:

1) Various studies shows that , COVID-19 is characterized by some typical symptoms which are same in common cold, from fever and breathing difficulty to acute respiratory distress; in allergic persons this may lead to its severity and complexity in establishing an effective treatment.

2) In this pandemic situation, when almost all of us are stucked indoor; our mental as well as physical health both are suffering and resulting into alteration of the stress axis and leading to increase in the tension, depression , anxiety. With this switching cortisol level people are becoming more prone to allergies.

TREATMENT OF ALLERGY :

- *The easiest and most effective way to treat allergies is to get rid or avoid the case. Where unavoidable some lifestyle changes can reduce allergy symptoms.*

  For example, if allergic to dust, make an effort to keep room clean and free of dust by frequent vacuuming, dusting and washing of bedding.
- *Allergies are caused by a response on the immune system and are not contagious. Medication can treat symptoms and immunotherapy can help those with allergies find relief.*
- ***Antihistamines:-***
  - ✓ *Histamine is released into the circulation and causes body-wide vasodilation, as well as increased permeability of the capillaries with resultant marked loss of plasma from the circulation. Occasionally, a person who experiences this reaction dies of circulatory shock within a few minutes unless treated with epinephrine to oppose the effects of the histamine. And antihistamines help relieve or prevent the sneezing, itchy eyes and throat and postnasal drip that the allergen may cause. Epinephrine and nor-epinephrine are potent antihistamine agents. They are ails in many forms i.e. pills, nasal sprays, liquids etc.*
  - ✓ *Cetirizine is an antihistamine medicine that relieves the symptoms of allergies.Cetirizine oral is used in adults and children to treat cold or allergy symptoms such as sneezing, itching, watery eyes, or runny nose.*
  - ✓ *Desloratadine is an antihistamine used to relieve allergy symptoms such as watery eyes, runny nose, itching eyes/nose, sneezing, hives, and itching. It works by blocking a certain natural substance (histamine) that your body makes during an allergic reaction.*
  - ✓ *Other antihistamines are Fexofenadine, Levoceritizine, Loratadine.*
- ***Decongestants:-***
  - ✓ *It help reduce congestion in nasal membranes by narrowing the blood vessels that supply those membranes.*
  - ✓ *They can be purchased in several forms (liquid, pill or nasal spray) and may be used with an antihistamine or alone to treat nasal swelling related to allergies.*
  - ✓ *Limit use of nasal sprays to fewer than two to three days in a row because prolonged use can cause the nasal membrane swells, resulting in severe nasal obstruction.*

STRESS may lead to CANCER ?

-By

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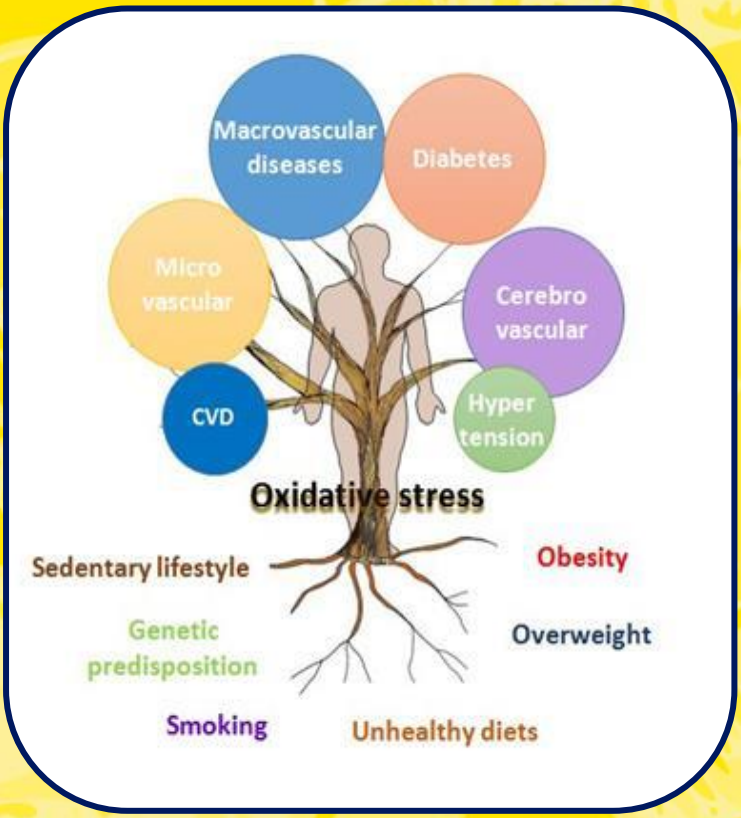
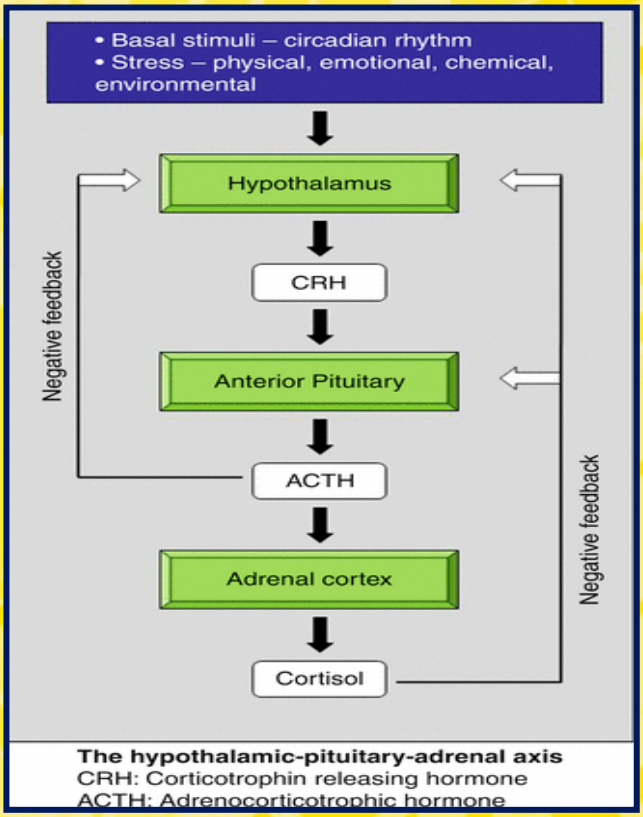
WHAT IS STRESS ???

- *With the modernisation of the world in terms of industrialisation and digitalisation there are gradual changes in our lifestyle patterns. In this modern world we all are going through some kind of stress and strain in our lives unlike in the past. Actually this strain or stress is not always "bad", and is called eustress. These are the awareness to any situation in which our body needs to pay attention and the central dogma behind the survival of the fittest. Sometimes it motivates as well as spur us to fulfill our target. But in the case of long-term or chronic stress in and above the physiological tolerance level with improper and poor stress-management strategies and capabilities our life and health both can be adversely affected.Stress, either physiological(e.g. disease, accident , adverse environmental conditions) and/or psychological, an organism responds to the stressors body reacts to overcome the threat, challenge or physical and psychological barrier. Stimuli that alter an organism's internal environment are responded to, by multiple systems in the body. In humans and most mammals, the autonomic nervous system and hypothalamic-pituitary-adrenal (HPA) axis are the two major systems that are responsible to handle the stress and spread and roll the effects throughout the body.*





The hypothalamic-pituitary-adrenal axis
CRH: Corticotrophin releasing hormone
ACTH: Adrenocorticotrophic hormone

- ***Physiologists define stress as how the body reacts to a stressor - a stimulus, real or imagined, that causes stress. Actually, stressor is a chemical or biological agent, environmental condition, external stimulus or an event seen as causing stress to an organism. Stressors can cause physical, chemical and mental responses internally. Acute stressors affect an organism in the short term however chronic stressors over the longer period of time.***

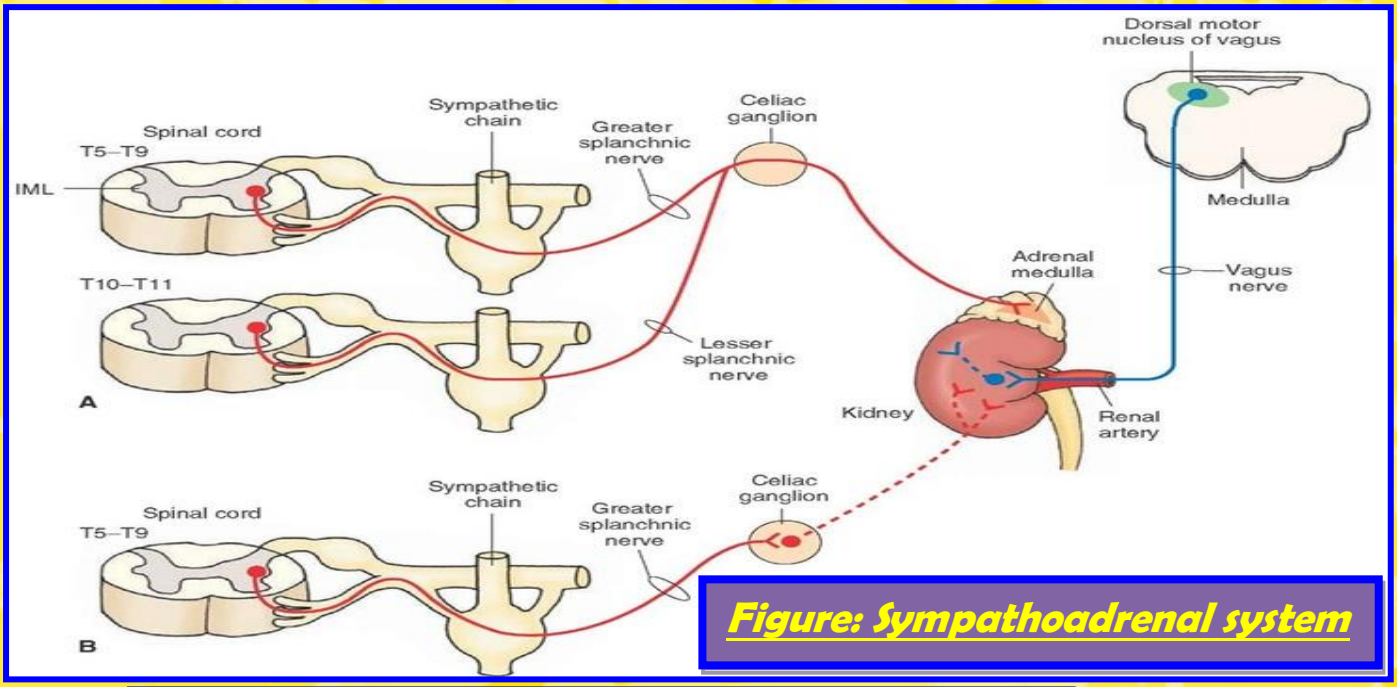


Figure: Sympathoadrenal system

The crosstalk between "CHRONIC STRESS" and CANCER :

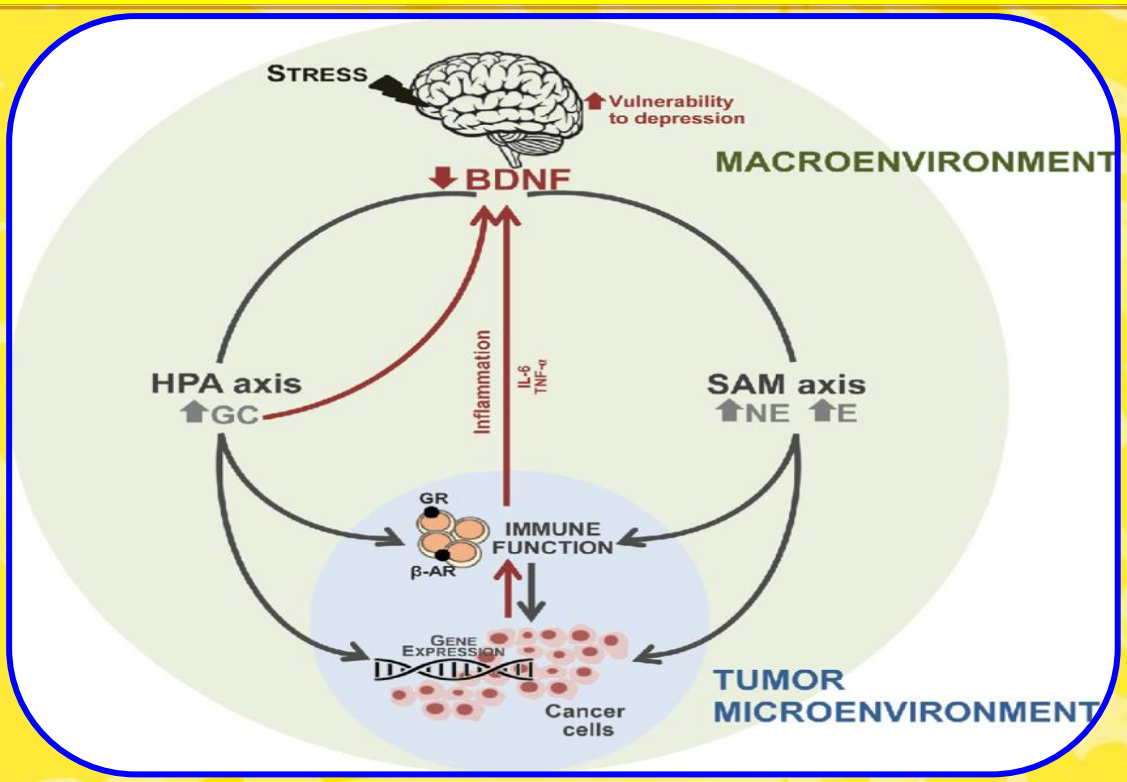
- ***We usually get worried about any disease of us or our near and dear ones; and if it is a COVID or deadly disease like cancer , then the mind becomes several times more disturbed than the body. Here comes the greatest enemy of human health of the modern era , "Stress". This may lead to induction of the lines of continual activation of the stress responses, causing an allostatic shift in bodily functions, or just as "prolonged stress".***

  Patients having cancer may find the physical, emotional, and social effects of the disease to be stressful.

- ***But, how does this happen ?***

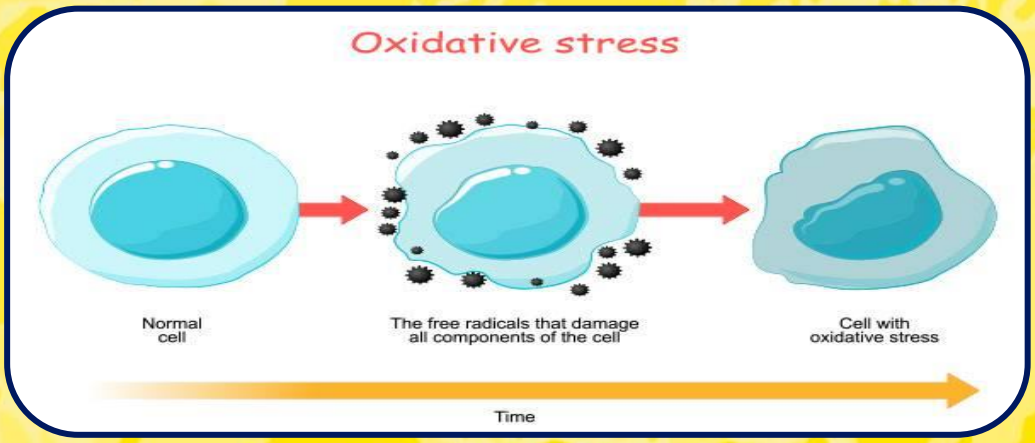
  Primarily, chronic stress activates the classic neuroendocrine system (that is the hypothalamic -pituitary -adrenal axis) and the sympathetic nervous system that leads to a decline and dysfunction of the prefrontal cortex and the hippocampus area of brain under stress. Stress hormones like cortisol produced during the activation of both the HPA axis and the SNS can promote tumorigenesis and cancer development through a variety of mechanisms. Their chronic stress causes corresponding changes in the body's immune function and inflammatory responses, which are significant because a long-term inflammatory response and the decline of the immune surveillance capabilities are implicated in the tumorigenesis . Surveys have shown that approximately 1 million new cancer cases occur every year among the people aged 20 to 39 years and they have been partly attributed to stress. The relationship between chronic stress and cancers has aroused widespread interest and is a great concern in the medical community. Many scholars have performed research on the relationship between stress and cancers such as prostate , breast , gastric , lung and skin cancer and have found evidences indicating that chronic stress can induce tumorigenesis and promote cancer development.

Schematics of neuroendocrine-immune regulations involved oin stress-induced cancer :



➢ ***Another biological villain "OXIDATIVE STRESS":***

The epidemiological studies show that the overproduction of free radicals is an important factor of cancer induction as well as progression. Loss of antioxidant system efficiency is associated with an increased risk of carcinogenesis. This condition leads to the development of oxidative stress , which is defined as a relative excess of reactive oxygen species (ROS) when compared with antioxidants. Oxidative stress, reflects an imbalance between the systemic manifestation of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. Disturbances in the normal redox state of cells can cause toxic effects through the production of peroxides and free radicals that damage all components of the cell, including proteins, lipids, and DNA. Oxidative stress from oxidative metabolism causes base damage, as well as strand breaks in DNA. Base damage is mostly indirect and caused by reactive oxygen species (ROS) generated, e.g., O2− (superoxide radical), OH (hydroxyl radical) and H2O2 (hydrogen peroxide). Further, some reactive oxidative species act as cellular messengers in redox signaling. Thus, oxidative stress can cause disruptions in normal mechanisms of cellular signaling



Oxidative Stress as a cause of Increased Cancer Risk:

- *ROS are potent stimulators of apoptosis and can activate the intrinsic mitochondrial pathway, the extrinsic death receptor pathway and the endoplasmic reticulum (ER) stress pathway. In each of these instances, mitochondria are central to triggering apoptosis. ROS stimulate events that lead to loss of the inner mitochondrial membrane permeability and control of the mitochondrial permeability transition pore complex, disrupting membrane potential and resulting in release of cytochrome c and activation of caspase-3, 6, and 7.*

- *ROS can also trigger ferroptosis, an iron-dependent form of cell death, distinct from apoptosis, autophagy, and necrosis, requiring redox cycling of Fe2+/Fe3+ that stimulates peroxidation of membrane phospholipids. Free intracellular redox-active iron allows increased ROS production via Fenton chemistry and/or increased lipoxygenase activity. In turn, this results in oxidation of membrane phospholipid-polyunsaturated fatty acids, presumably altering membrane pores, integrity, or curvature.*

- ***ROS Production Is Heightened in Malignant Disease:***

  Cancer cells contain higher levels of ROS than normal cells, and this sustains the phenotype. Sources of increased ROS production in tumor cells have been attributed to oncogene- and/or damage-stimulated production of (1) O2●– by mitochondria, associated with altered assembly of the electron transport chain, hypoxia, or anchorage-independent growth; (2) O2●– by NOX, associated with hyperproliferation or centrosome abnormalities; (3) H2O2 by 5-lipoxygenase, associated with cell mobility; and (4) H2O2 within the ER, associated with protein folding.

- ***Experimental Discussion :***

  Evidence from experimental studies does suggest that psychological stress can affect a tumor's ability to grow and spread. For example, some studies have shown that when mice bearing human tumors were kept confined or isolated from other mice—conditions that increase stress—their tumors were more likely to grow and spread (metastasize). In one set of experiments, tumors transplanted into the mammary fat pads of mice had much higher rates of spread to the lungs and lymph nodes if the mice were chronically stressed than if the mice were not stressed. Studies in mice and in human cancer cells grown in the laboratory have found that the stress hormone norepinephrine, part of the body's fight-or-flight response system, may promote angiogenesis and metastasis.

  In another study, women with triple-negative breast cancer who had been treated with neoadjuvant chemotherapy were asked about their use of beta blockers, which are medications that interfere with certain stress hormones, before and during chemotherapy. Women who reported using beta blockers had a better chance of surviving their cancer treatment without a relapse than women who did not report beta blocker use. There was no difference between the groups, however, in terms of overall survival.

MANAGEMENT:

- ***Emotional and social support can help patients learn to cope with psychological stress. Such support can reduce levels of depression, anxiety, and disease- and treatment-related symptoms among patients. Those who attempt to manage their stress with risky behaviors such as smoking or drinking alcohol or who become more sedentary may have a poorer quality of life after cancer treatment. In contrast, people who are able to use effective coping strategies to deal with stress, such as relaxation and stress management techniques, have been shown to have lower levels of depression, anxiety, and symptoms related to the cancer and its treatment. However, there is no evidence that successful management of psychological stress improves cancer survival.***

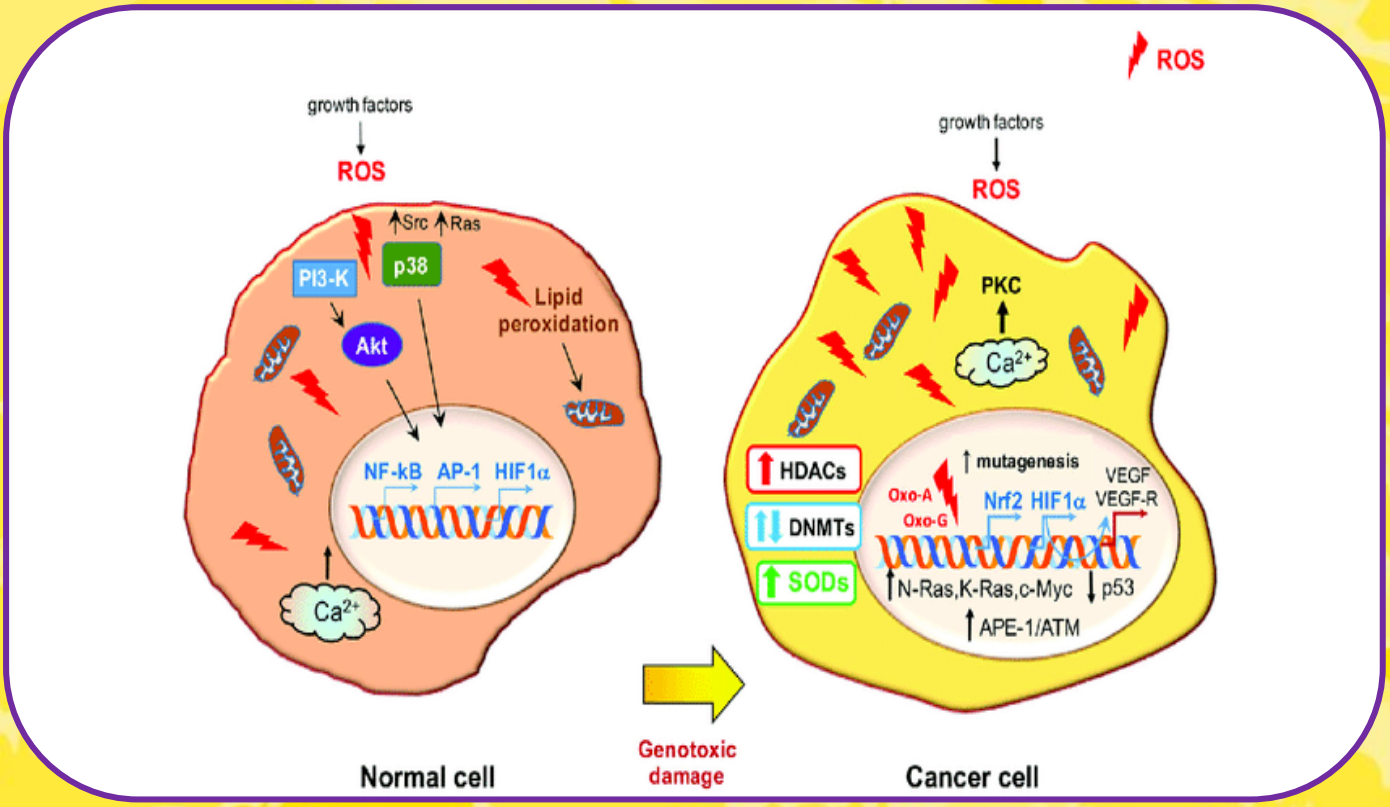
- ***Six herbs and spices to help fight cancer:***

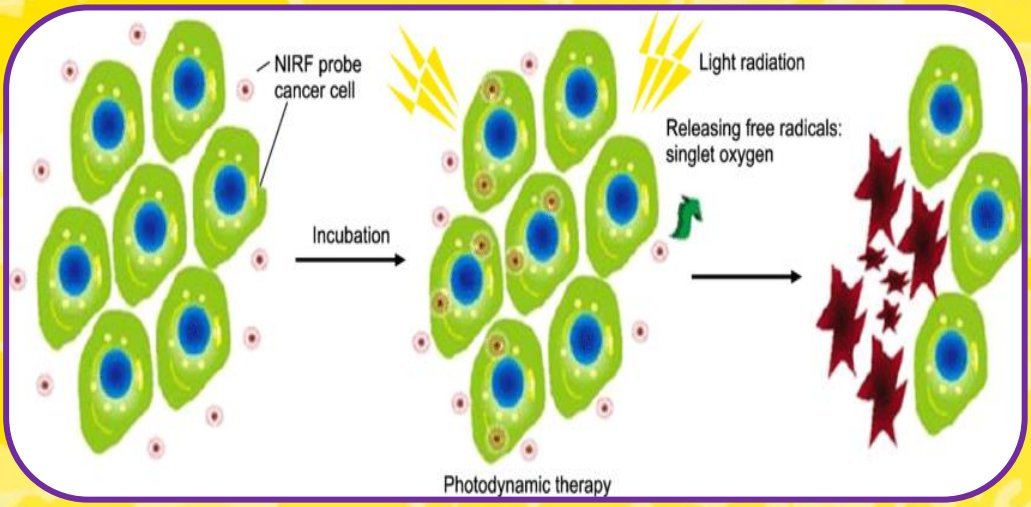
1) ***Turmeric:*** ***It's a yellow curry powder (active polyphenol ingredient is curcumin) that is shown to inhibit growth of cancer cells. It is also an anti-inflammatory.***
   - ✓ ***Tip: Mix with black pepper (piperine) and olive oil to activate and help with absorption. It can be used as a dry rub or added to soups, sauces and stews.***
2) ***Ginger:*** ***Its antioxidant and anti-inflammatory properties protect against cancer. It is also used as a herbal remedy for upset stomach and nausea, and can serve as an appetite stimulant.***
   - ✓ ***Tip: Steep a few thin slices in hot water for 10 minutes to create a soothing tea.***
3) ***Cayenne Pepper:*** ***This hot pepper contains capsaicin, a powerful antioxidant that helps with weight loss and is an anti-inflammatory food. Cayenne also contains beta-carotene. It is known to be toxic to cancer cells and helps prevent growth of cancer cells.***
4) ***Saffron:*** ***This spice may be the most expensive, but it packs a good punch. It contains crocins (water-soluble carotenoids) that may inhibit tumor growth and progression of cancer.***
5) ***Oregano:*** ***The richest source of antioxidants among herbs slows cancer growth and promotes apoptosis (cell death). It carries antibacterial properties and is a natural disinfectant.***
   - ✓ ***Tip: Marinating with oregano can help reduce the formation of heterocyclic amines (HCAs) created when meat is cooked at high temperatures.***
6) ***Garlic:*** ***The most powerful anti-cancer spice is part of the cancer-fighting allium group (onions, shallots, scallions, leeks, chives). Garlic helps boost the immune system to help fight diseases, as well as colds and flu. It also decreases the growth of cancer cells.***
   - ✓ ***Tip: Take one daily dose - 1 clove and remember to "chop and stop" – chop and then let it sit for 10 minutes before using to allow for the formation of allicin (enzyme).***

- ***Approaches can include the following:***
  - ✓ ***Maintaining mindfulness , relaxation and regular practice of meditation.***
  - ✓ ***Management of stress through practicing personalized physical medicine in the form of "YOGA" and exercise(prescribed by professionals).Consulting a neuropsychiatrist for counseling or talk therapy.***
  - ✓ ***Cancer education sessions.***
  - ✓ ***Social support in a group setting.***
  - ✓ ***Medications for depression or anxiety.***
  - ✓ ***Providing positive information and incidents about how cancer patients are coping up as well as fighting with it worldwide.***

ROS IN CANCER THERAPY : THE BRIGHT SIDE OF TYHE MOON :

✓ *There is no doubt that an improved understanding of the sophisticated mechanism of redox biology is imperative to conquer cancer.*





CONCLUSION:

Although there is still no strong evidence that stress directly affects cancer outcomes, some data do suggest that patients can develop a sense of helplessness or hopelessness when stress becomes overwhelming. This response is associated with higher rates of death, although the mechanism for this outcome is unclear. It may be that people who feel helpless or hopeless do not seek treatment when they become ill, give up prematurely on or fail to adhere to potentially helpful therapy, engage in risky behaviors such as drug use, or do not maintain a healthy lifestyle, resulting in premature death.

References:

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2) *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7439808/#R199*
3) *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7439808/#R58*
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10) *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6525891/*
11) *https://www.nature.com/articles/s41598-021-94729-w*

1) Name the biggest killer disease of the world?

2) Which is the semi autonomous cell organelle of the plants ?

3) What is the genetic memory of entire diploid human genome in terms of bytes ?

4) Is there any true "Universal donor blood group" ? if yes , can you mention it's name .

5) Which is the codon for the 21st amino acid ?

6) Do you know how many musscles are behind-the-scene for just a single frown ?

7) Which is the first organ to sense the decreased blood glucose concentration in our body ?

ANSWERS WILL BE ON THE NEXT ISSUE

THINK LOGICALLY OR BIOLOGICALLY

Facts & Myths

An apple a day keeps the doctor away.

- ✓ Apples are packed with vitamin C and fiber, both of which are important to long-term health, but they aren't all you need.And if certain viruses or bacteria get into your system, an apple will unfortunately do nothing to protect you.Go ahead and get that flu shot, even if you eat apples.
- ➢ Source: Business Insider

Organic food is pesticide-free and more nutritious.

- ✓ Organic food isn't free of pesticides and it isn't necessarily better for you.
- ✓ Farmers who grow organic produce are permitted to use chemicals that are naturally derived — and in some cases are actually worse for the environment than their synthetic counterparts. However, pesticide levels on both organic and non-organic foods are so low that they aren't of concern for consumption, according to the USDA.
- ✓ Eating organic food also doesn't come with any nutritional benefits over non-organic food, according to a review of 98,727 potentially relevant studies.
- ➢ Sources: University of California - Berkeley, Annals of Internal Medicine, The American Journal of Clinical Nutrition

"Left-brained" people are creative. "Right-brained" people are analytical.

- ✓ It's a common old canard: Creative people are right-brained, while the logically-minded are left-brained. False.
- ✓ It's true that different hemispheres of your brain are more engaged in certain tasks (the left side is dominant in language, for example), but studies have never found overall left- or right-brain dominance in individuals.
- ➢ Sources: Business Insider, Psychology Today

Eating ice cream will make your cold worse.

- ✓ If you're home sick with a cold, you can totally go ahead and comfort yourself with some ice cream.
- ✓ The idea that dairy increases mucous production is very fortunately not true, according to researchers and a doctor at the Mayo Clinic, who says "in fact, frozen dairy products can soothe a sore throat and provide calories when you otherwise may not eat."Bless him.
- ➢ Sources: Business Insider, American Review of Respiratory Disease, Mayo Clinic

Your blood turns blue when it's out of oxygen.

- ✓ Your blood is never blue: It turns dark red when it's not carrying oxygen.
- ✓ Blood only looks blue because you are seeing it through several layers of tissue, which filters the color.
- ➢ Source: UCSB ScienceLine

Feel sleepy after having a heavy meal !

- ✓ *Many factors are responsible for this post meal phenomenon.Some types of foods and the timing of meals can also make people feel tired after a meal.*
- ✓ *The fact is that, the most important function after eating is digestion which requires energy.A decrease in energy levels after eating is called postprandial somnolence. Feeling tired, or having difficulty in concentrating, after a meal is relatively common. Foods that are rich in protein and carbohydrates make people feel sleepier than other foods.*
- ✓ *It is believed that a person feels tired after heavy meal because their body is producing more serotonin. Serotonin is a chemical that plays a role in regulating mood and sleep cycles. An amino acid called tryptophan, which is found in many protein-rich foods, helps the body to produce serotonin. Carbohydrates help the body absorb tryptophan. For these reasons, eating a meal rich in both protein and carbohydrates may make a person feel sleepy.*
- ✓ *After a heavy meal, insulin level of body, spike. This is because, for everything that we eat, our pancreas produces insulin to regulate blood sugar levels. The heavier the meal, the greater will be the production of insulin. This increased secretion of insulin, is responsible for production of sleep hormone that gets metabolised into serotonin and melatonin and induce drowsiness.*
- ✓ *Another reason for this post-meal phenomenon may be that the body streams more blood to the digestive system to better digest foods in massive amounts, that causes a temporary blood and nutrients shortage in the brain and as a nervous response, a person starts feeling sleepy and let the body and mind focus on digestion.*

Do worms grow inside human body and if yes then why they become active after eating sweets ?

- ✓ *Worms, such as, flatworms, tapeworm, flukes, pinworm etc., got entered in to the body by various sources as mostly by eating undercooked contaminated food. These can also be transmitted via food prepared by an infected person who hasn't washed hands and also from vegetables grown in soil contaminated by faeces of infected animals.*
- ✓ *Worms mature and grow inside the body and spread through the intestines and abdomen. Common symptoms of intestinal worms are abdominal pain, diarrhea, vomiting, weight loss etc. They often live in the gut, but some of the smaller ones can also enter the blood and cause problems in other areas of the body. They caused harm by upsetting the balance of beneficial flora in the gut, causing irritation and damage to the gut lining, and reducing our absorption of nutrients. These parasites and certain yeasts and bacteria feed off sugar as their main energy source, that is why they got highly activated after eating sweets. These can also feed on starch and unhealthy fats.*

Sharks can smell a drop of blood from miles away.

- ✓ *This one is a big exaggeration. Jaws is not coming for you from across the ocean if you bleed in the water.Shark have a highly enlarged brain region for smelling odors, allowing some of the fish to detect as little as 1 part blood per 10 billion parts water — roughly a drop in an Olympic-size swimming pool.But it the ocean is much, much, much bigger and it takes awhile for odor molecules to drift. On a very good day when the currents are favorable, a shark can smell its prey from a few football fields away — not miles.*

➢ *Source: American Museum of Natural History*

TIPS FOR HEALTHY LIFESTYLE

- *Living fast and dying young is all fun and games, until you start growing older. You find out it?s not so fun anymore, and wish the time would go back so you could change a thing or two. And while most of the serious illnesses hit when your body grows all old and wrinkly, the consequences of neglecting your health shows as early on as in your younger years. So what defines ?healthy?? You?ll find a lot of guidelines to a healthier lifestyle everywhere. Bottom line of all, living healthy making the most of your life.*

- ***That said, here are 10 ways you can follow to maintain a healthy lifestyle:***

1. Watch your diet

- *Watching your diet doesn?t mean starving to death. It also isn?t only directed at those wishing to lose weight. The way you feed your body and the kind of nutrients you consume make all the difference in how energized, focused, active or just the opposite your body will be.*
- *These are points to keep in mind: Eat more meals, less portions in each. 5 controlled meals a day is a great way to go.*
  - ✓ *Make a variety in the kinds of food you eat, so you can give your body all of the nutrients it needs.*
  - ✓ *Never forget your veggies and fruits.*
  - ✓ *Don?t underestimate the power of protein.*
  - ✓ *Cut out on junk foods, and replace saturated fats with unsaturated.*
  - ✓ *Cut down on the salt and sugar intake.*

2. Exercise

- *Never underestimate the effect regular exercise has on your body, mind and spirit. Not only does working out regularly make your body stronger and energized, it helps your mind stay more focused. It also lifts your spirit and puts you in a better mood overall, a result of the natural feel-good chemicals (aka. endorphins) your brain produces after regular intense sessions of exercise. Integrating exercise into your everyday life doesn?t have to be expensive or time consuming. Surely you can hit the gym if you prefer that, but you can also do a bodyweight workout at home, jog for 20-30 in the morning, or start doing yoga. Yoga is an excellent exercise to build physical and mental strength, stability and improve overall flexibility.*

3. Maintain good posture

- *A bad posture does a lot of damage to your spine, ligaments and muscles. Putting conscious thought into your posture and how you walk, sit, carry stuff might take some time getting used to, but eventually, you?ll build up the habit. Maintaining good posture goes a long way in preserving your body. This is especially important for elevating seniors to prevent kyphosis, which is the abnormal curvature of the spine caused by Osteoporosis.*

4. Hydrate

- *Water constitutes around 60% of our bodies. It?s essential for all of the major and tiny processes taking place; lubrication of joints, regulating of temperature, blood flow, digestion, and even respiration. On an average, eight 8-ounce glasses of water is needed daily. Of course, if you?re following intense exercise schedule or having a more active lifestyle, more water is needed.*

5. Get your beauty sleep

- *More than just for beauty, getting a good 7-9 hours of sleep helps you deal with stress, be more focused and increases your productivity overall. If you often feel tired, you can go here to find out what the cause may be.*
- *Do not compromise sleep quality. A bad quality mattress can cause a lot of trouble in sleep and pain. It is advisable to invest in a good quality such as lucid mattress. You can always find a good and budget deal if you read online reviews and comparisons of different mattresses on different online sites. It will help you to choose the right quality mattress as per your requirements*

6. Work smart

- *For the sake of your mental health and feeling as an individual, putting goals and striving hard to achieve them gives you a sense of achievement, which is a reward of itself. Working smart in this case means optimizing your time, approaching work with creativity and constantly learning and improving your methods.*

7. Play hard

- *You can only play hard after you?ve worked hard and smart. So give yourself that needed and well-deserved break every once in a while. Make the most out of it!*

9. Watch your social habits

- *It?s easy to get caught up in social gatherings and parties, picking up bad habits that are difficult to overcome afterwards. Keep track of your social habits, whether it?s drinking, smoking or any other bad habit, and think twice before picking up any. It?s always easy to start and doesn?t seem like a big deal, until you find yourself stuck in it.*

10. Make it a habit

- *Last but not least, consistency is key. Put conscious thought into the habits you?re building, and keep at it until you no longer have to put thought into it. Change doesn?t come from a single time of trying things out, it comes as a result of consistent, persistent, effort.*

HAVE POSITIVE MINDSET

SEVEN PRACTICAL TIPS TO HAVE POSITIVE MINDSET :

- *The "power of positive thinking" is a popular concept, and sometimes it can feel a little cliché. But the physical and mental benefits of positive thinking have been demonstrated by multiple scientific studies Positive thinking can give you more confidence,improve your mood, and even reduce the likelihood of developing conditions such as hypertension, depression and other stress-related disorders.*
- ***HERE ARE SEVEN EXAMPLES TO BE EFFECTIVE IN THINKING AND BEING MORE POSITIVE :***

1.Start the day with positive affirmation.

How you start the morning sets the tone for the rest of the day. Have you ever woken up late, panicked,and then felt like nothing good happened the rest of the day? This is likely because you started out the day with a negative emotion and a pessimistic view that carried into every other event you experienced.Instead of letting this dominate you, start your day with positive affirmations. Talk to yourself in the mirror, even if you feel silly, with statements like, "Today will be a good day" or "I'm going to be awesome today." You'll be amazed how much your day improves.

2.Focus on the good things, however small.

Almost invariably, you're going to encounter obstacles throughout the day—there's no such thing as a perfect day. When you encounter such a challenge, focus on the benefits, no matter how slight or unimportant they seem. For example, if you get stuck in traffic, think about how you now have time to listen to the rest of your favorite podcast. If the store is out of the food you want to prepare, think about the thrill of trying something new.

3.Find humor in bad situations.

Allow yourself to experience humor in even the darkest or most trying situations. Remind yourself that this situation will probably make for a good story later and try to crack a joke about it. Say you're laid off; imagine the most absurd way you could spend your last day, or the most ridiculous job you could pursue next—like kangaroo handler or bubblegum sculptor.

4.Turn failures into lessons.

You aren't perfect. You're going to make mistakes and experience failure in multiple contexts, at multiple jobs and with multiple people. Instead of focusing on how you failed, think about what you'regoing to do next time—turn your failure into a lesson. Conceptualize this in concrete rules. For example,you could come up with three new rules for managing projects as a result.

5.Transform negative self-talk into positive self-talk.

Negative self-talk can creep up easily and is often hard to notice. You might think I'm so bad at this or Ishouldn't have tried that. But these thoughts turn into internalized feelings and might cement your conceptions of yourself. When you catch yourself doing this, stop and replace those negative messages with positive ones. For example, I'm so bad at this becomes Once I get more practice, I'll be way better at this. I shouldn't have tried becomes That didn't work out as planned—maybe next time.

6.Focus on the present.

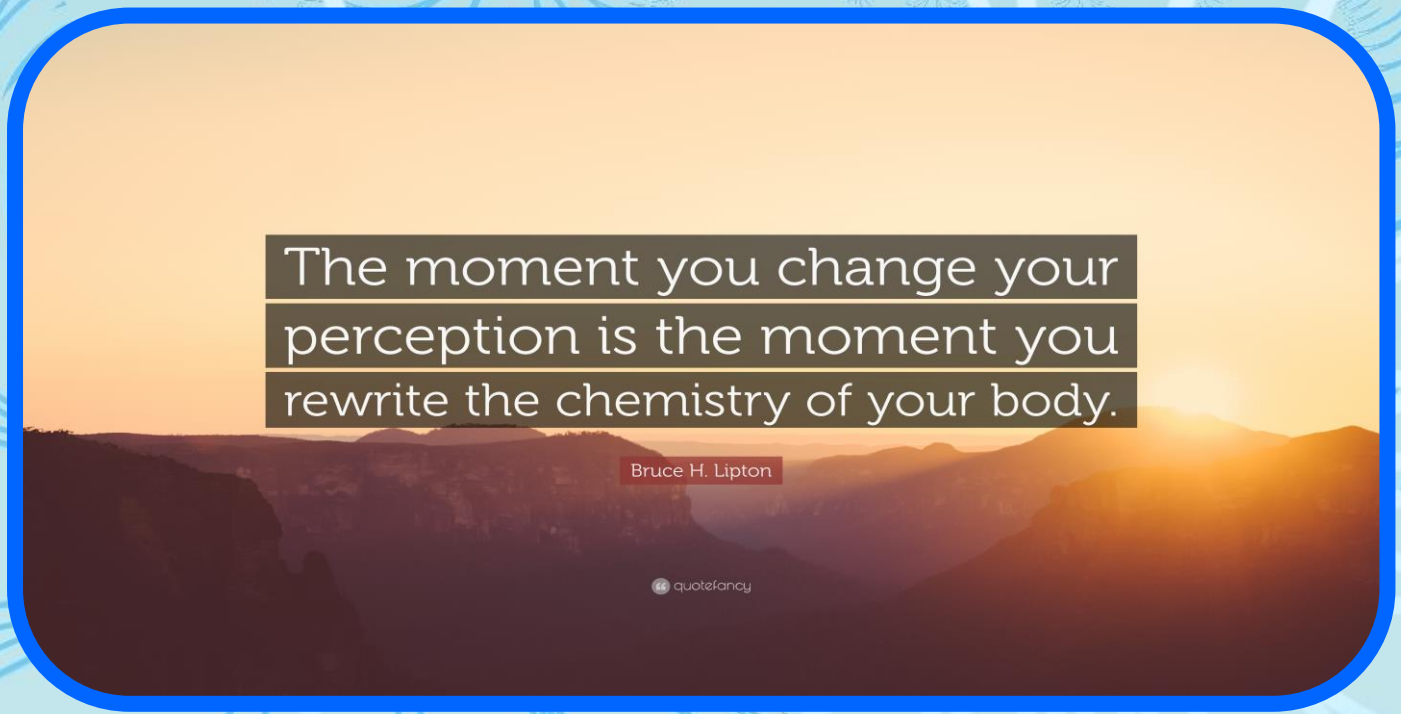
I'm talking about the present—not today, not this hour, only this exact moment. You might be getting chewed out by your boss, but what in this exact moment is happening that's so bad? Forget the comment he made five minutes ago. Forget what he might say five minutes from now. Focus on this one, individual moment. In most situations, you'll find it's not as bad as you imagine it to be. Most sources of negativity stem from a memory of a recent event or the exaggerated imagination of a potential future event. Stay in the present moment.

7.Find positive friends, mentors and co-workers.

When you surround yourself with positive people, you'll hear positive outlooks, positive stories and positive affirmations. Their positive words will sink in and affect your own line of thinking, which then affects your words and similarly contributes to the group. Finding positive people to fill up your life can be difficult, but you need to eliminate the negativity in your life before it consumes you. Do what you can to improve the positivity of others, and let their positivity affect you the same way.

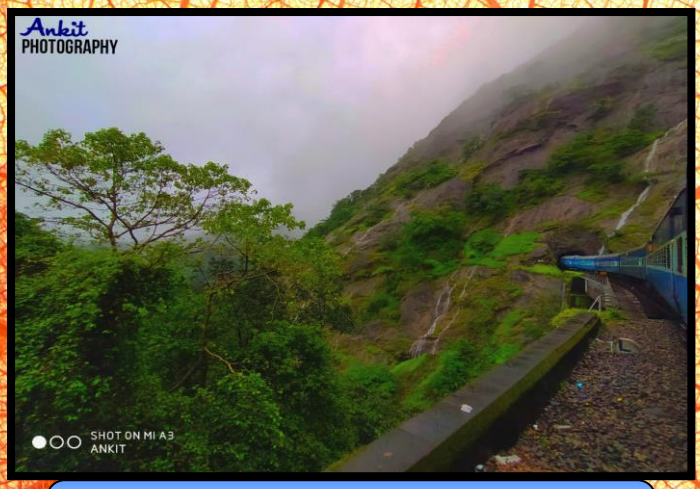
Almost anybody in any situation can apply these lessons to their own lives and increase their positive attitude.As you might imagine, positive thinking offers compounding returns, so the more often you practice it, the greater benefits you'll realize.

SOURCE-Success.com,written by larry alton

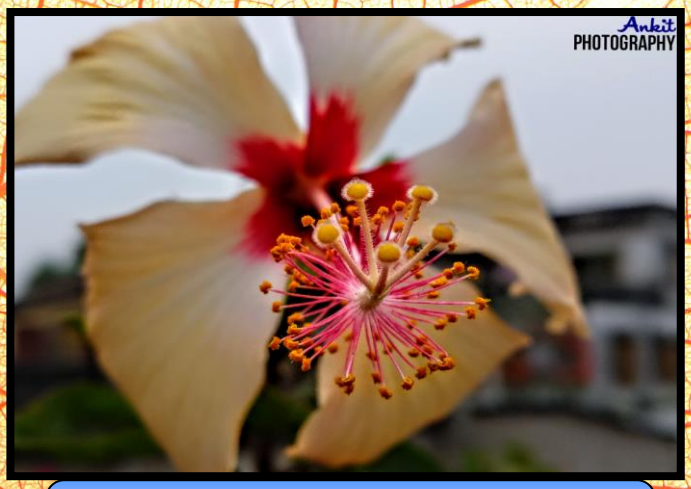


CREATIVE CORNER

Creativity is the greatest expression of liberty.

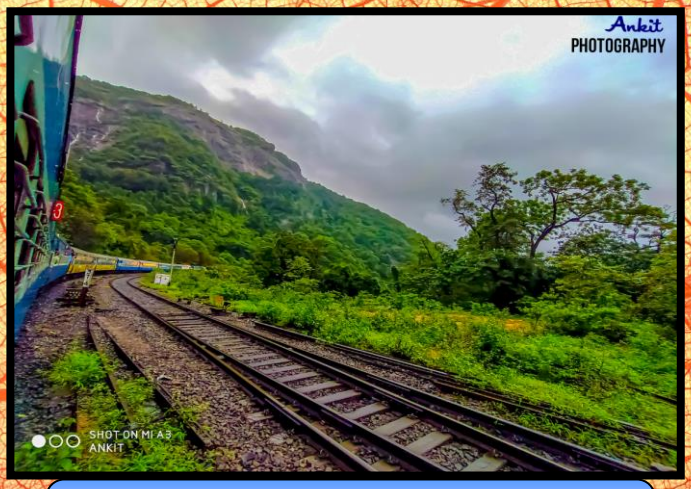


Nature has a great simplicity and therefore a great beauty.

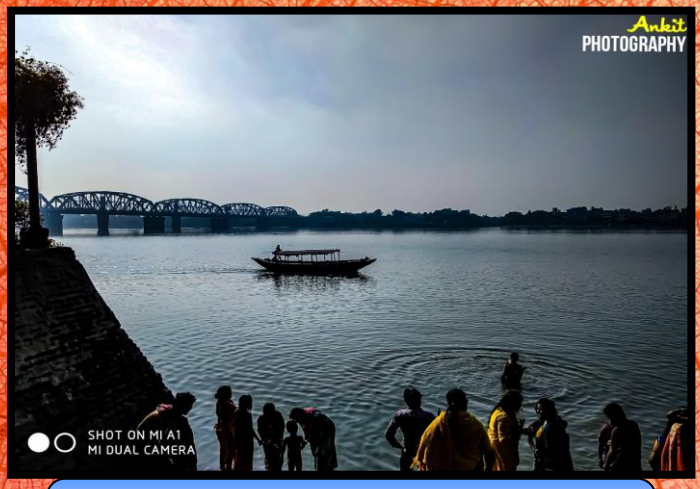


Bloom where you are planted.

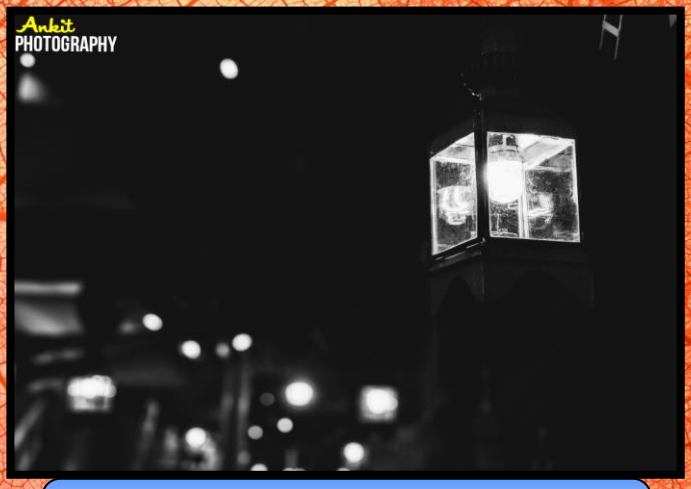
Every flower is a soul blossoming in nature.



When everything around you is beautiful. Way to Goa.



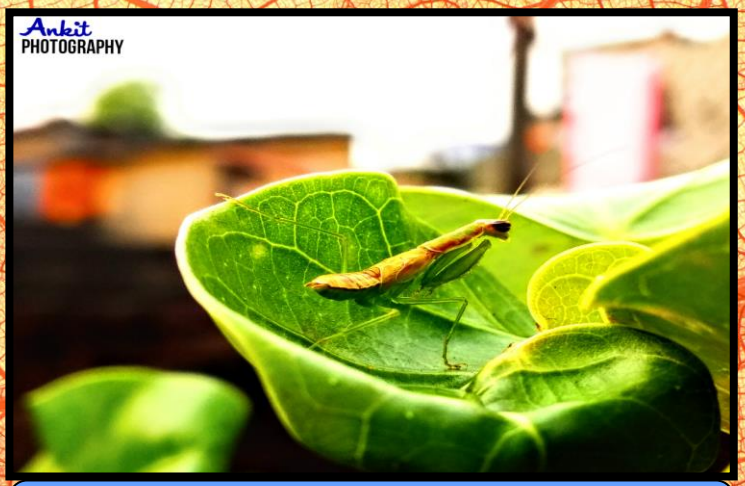
The beautiful,holy,pure Ganga.



Black and white can transform a scene into something magical.

Temples are an expression of god's love.

Even when the sky is filled with clouds the sun rays still shines above.



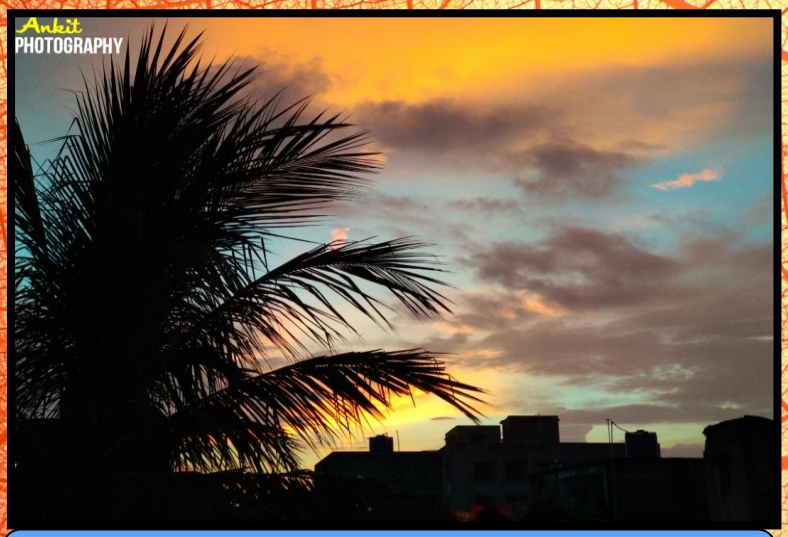
Green on green.

There's something beautiful about the clouds. Scattered yet beautiful.

The way you feel in the temple is a pattern for how you want to feel in your life.

True joy of nature is when every drop of water shines like a pearl.

Look beyond the horizon.



A sunset is the sun's fiery kiss to the night.

Even an ant sees the value of being persistent.

Nature is the art of god.

-BY ANKIT KUMAR GUPTA ,
PHYSIOLOGY HONOURS SEMESTER - 6

ইলশেগুঁড়ি

শরীর মনে শীত নেমেছে,
বিষের বছর মৃতপ্রায়;
বুকের আঁচে আগুন বাঁচে
ফড়িং ছুঁলো নীল পরাগ....

শহর জুড়ে প্রেম ছড়ালো,
শিশির ভেজে রাইকমল;
তাপের মায়া, গরম পোশাক,
উষ্ণতা চায় ঠোঁট অবিকল...

গন্ধ নামে ফুলের চোখে,
সন্ধ্যে আনে হিমের গান;
বরফ পাতের স্বপ্ন দেখে,
রাত্রি জাগা কিশোর প্রাণ।

তোমার জন্য নতুন বছর,
নতুন করে বাঁচার তাগিদ,
তোমার জন্য নীলচে আকাশ,
তোমার জন্য জিনের প্রদীপ...

তুমিও নাহয় আমার জন্য,
অনেক কিছু সাজিয়ে রেখো,
সবটুকু তেই ভালবাসা থাক,
ইলশেগুঁড়ি মনের মতো...

কাঞ্চন মুখার্জী।

Physiology Honours,Semester-6

EXTRACURRICULAR ACTIVITIES OF PHYSIOLOGY STUDENTS

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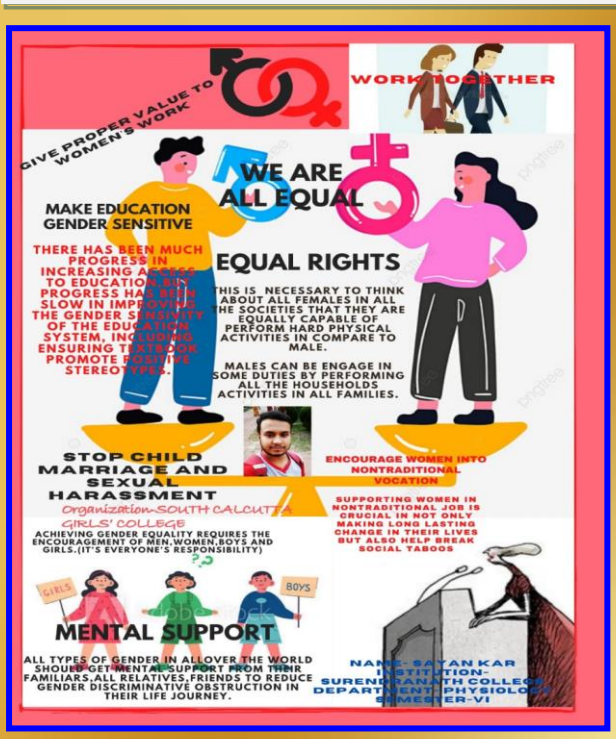

"IMPACTS OF HIGHLY EXPENSIVENESS LIFE STYLE ON HUMAN HEALTH"

PRESENTED BY SAYAN KAR
STUDENT OF PHYSIOLOGY,
SURENDRANATH COLLEGE, CALCUTTA UNIVERSITY.

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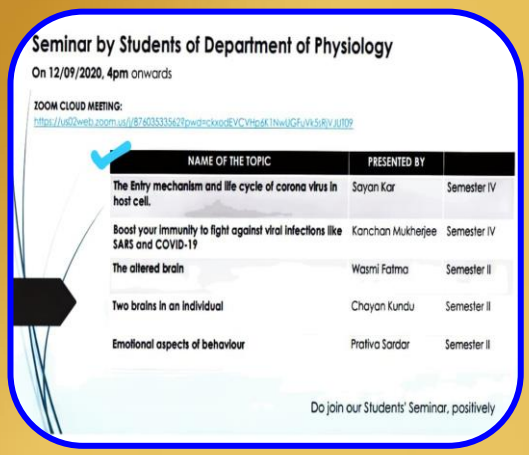

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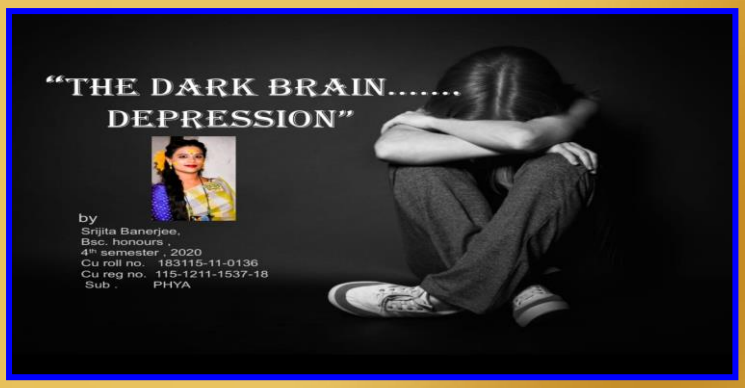

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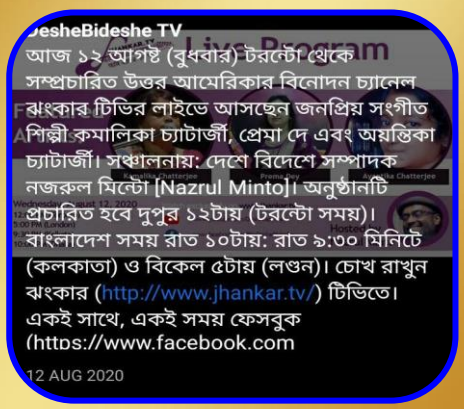

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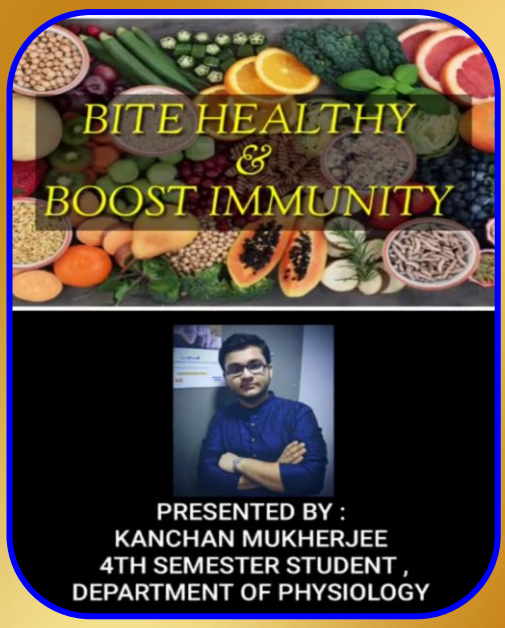

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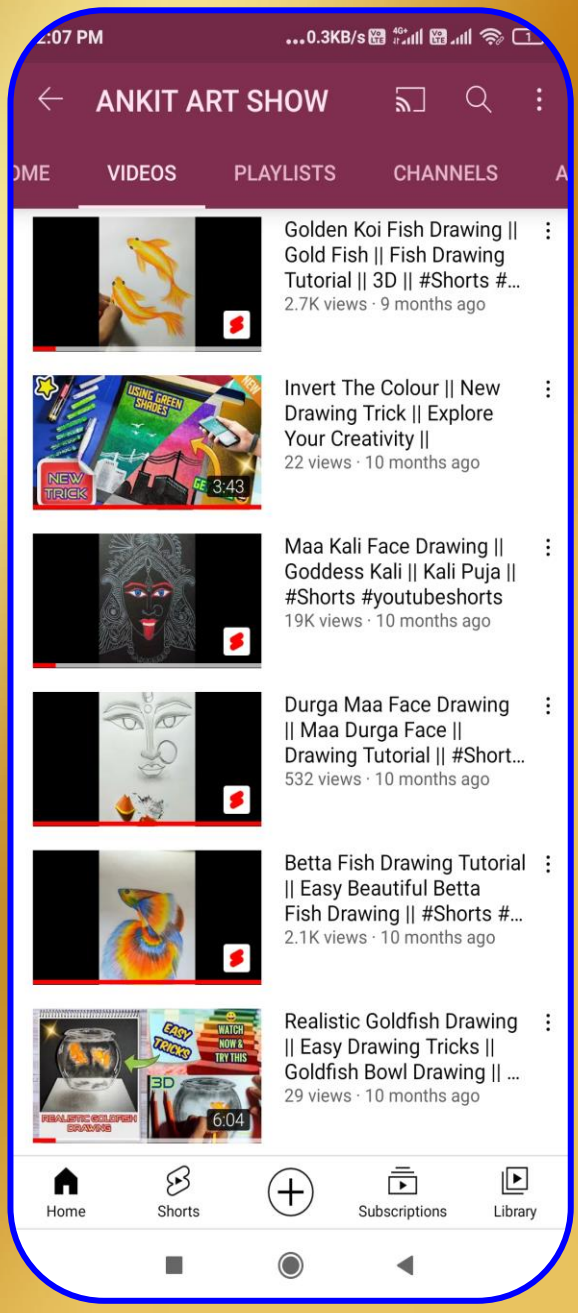

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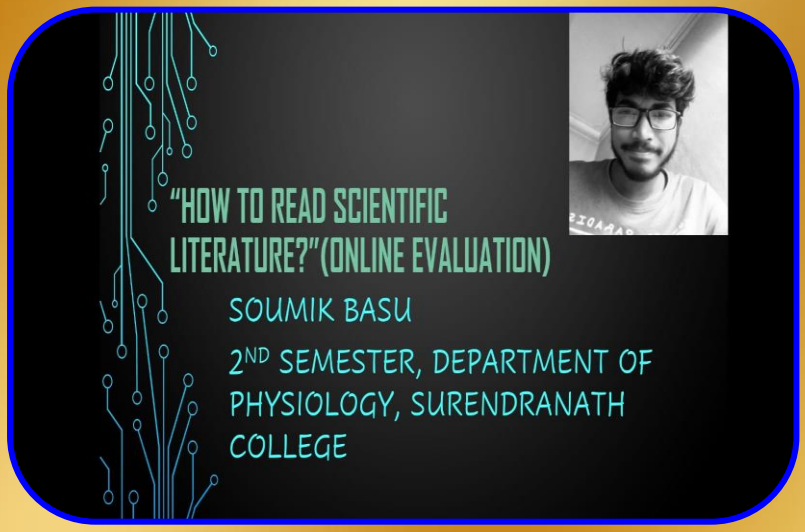

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