

বীক্ষন

The Observation



September, 2022

Department of Zoology

Seth Anandram Jaipuria College

A Student magazine

वीक्षण

THE OBSERVATION

September, 2022

Department of zoology

Seth Anandram Jaipuria College

वीक्षण • द्वितीय संख्या • 2

Dear Readers,

Greetings to you!!!

Magazine 'बीक्षण' (The Observation) was conceptualized during covid period to motivate students for creative activities and engage them as much as possible in different extra-curricular activities in an effort to wipe out the trauma, monotony, depair and frustration caused by bereft, isolation and social distancing. This is completely a students' magazine, published on the college website as e-version. The magazine is based on science and includes scientific events, story, poetry, drawing and photograph. The design of front and back cover pages, and editing are done by the students. The magazine committee is formed in a democratic way that include editor and members from students of different semesters. The magazine also documents achievement of students in curricular as well as co-curricular activities and different cultural programme throughout the year. Within the tight schedule of curriculum, classes and examination, our department provides students space to breathe in and nurture their passion, skill and talent to help wholesome development of knowledge, understanding and reasoning.

This is the second issue of the magazine 'बीक्षण' (The Observation), designed very passionately with full dedication by the students. Hope this issue will also attract the interested readers as previous year and achieve great success. Best wishes.

Dr Ipsita Chanda
HOD, Department of Zoology,
Seth Anandram Jaipuria College

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Editor's column

Dear Readers,

The world after covid-19 is unlikely to return to the world that was, though the fear still not gone completely. Now in the 'new normal', a lot of changes have come in the field of the education in post pandemic times. So in this situation, science awareness has been identified as the main issue. As we know, there are lot more scientific things in our surrounding environments, a lot of things happening all over the world all the time. So we tried to summarized some of those events through our writings and this is the second time, we are going to publishing our magazine.

The main objective of our magazine is: "Learning from Nature" and from that point of view, we decide our magazine name is "Bikkhon"(The Observation). Though according to dictionary "Bikkhon" means "To See" or more specifically "To Observe". This is the second edition Here we have different science related write ups, photographs, drawing, everything has been done by our students, professors, some ex-students of our department. Apart from this, a lot of seminar, local filed studies, educational excursion were organized throughout the year.

So we also tried to add some of those glimpses. And with all these things, we decorate our magazine. Though it is not in a binding form, it is a e-magazine, afterall it is also a gift of modern technology. The main moto of our magazine is to cultivate the light of modern science in everyone's mind, to imagine, invent and inspire with a modern approach.

Lastly we would like to thank our beloved professors, without their help we could not able to complete all these things. Also thanks to all the magazine committee members, students of our department and our ex-students for participating with us. Hope you all will enjoy this presentation.

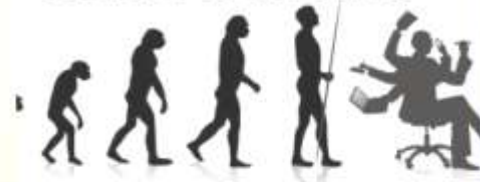
Abhilasha Ganguly
Editor

Ayan Bhar
Co-editor



সূচিপত্র

Evolution
Mutation
Natural selection



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TIC- A SYNDROME!

Shreya Dutta, Semester - VI

Tics are fast, repetitive muscle movements that result in sudden and difficult to control body jolts or sounds. When tics become severe and occurred oftenly without control it causes **TOURETTE SYNDROME**. It is a neuro developmental disorder. It involves repetitive movements or unwanted sounds that can't be control by individuals. It is discovered by neurologist **GEORGES GILLES DE LA TOURETTE**. Approx 1% children and adolescents less than 18 years old are affected specially in North America. Blinking, coughing, throat clearing, sniffing, facial movements, echolalia, palilalia, stress, fatigue, anxiety etc. It is associated with the **coprolalia**- utterance of obscene words or socially inappropriate and derogatory remarks. These symptoms are occurred for some times but completely out of control of individual.



Genetic and environmental factors are responsible for this. It is **highly heritable**. The reason behind this syndrome is still unknown. Research says that only a single genome wide significant locus on chromosome 13. **Cortico-striato-thalamo-cortical** pathway provides inputs to the basal ganglia from the cortex. This circuit connects the basal ganglia with other areas of the brain to transfer information that regulates **planning, decision making, learning** etc. Abnormalities in this pathway cause this syndrome. Tics are believed to result of the dysfunction of this pathway.

In some patients have **ADHD – Adult attention deficit or hyperactivity disorder** causes less attention, poor activity. Also have **obsessive compulsive disorder (OCD)**.

2 types of tics are present-1.**Simple tics**-These sudden brief and repetitive tics involve a limited number muscle groups.2. **Complex tics**- These distinct, coordinated patterns of movements involve muscle groups.

One or more vocal tics over a period of year onset must have occurred before 18.It is naturally diagnosed by **vulnerability of ADHD, OCD, psychiatric and neurological conditions. The diagnosis is occurred by the observation of individual’s symptoms and family history. No screening test** is present regarding this syndrome.

No cure is present. No medicine effectively treats all symptoms. Treatment is focused on individual’s troubling symptoms and helping individual to manage it.

Habit reversal training and exposure and response prevention are first line interventions in the management of Tourette syndrome.

Education, reassurance, psycho-behavioral therapies are often sufficient for the majority of these cases.

Watchful waiting, symptom management may include behavioral, psychological and pharmacological therapies.



Tourette syndrome suffering people are the part of our society. They also have right to survive with proper dignity like us. They have to face many problems even ragging in school, college, office, and other fields. We have to understand they are like us while containing some differences. It’s our responsibility to accept them as our friends, peers with their different features.

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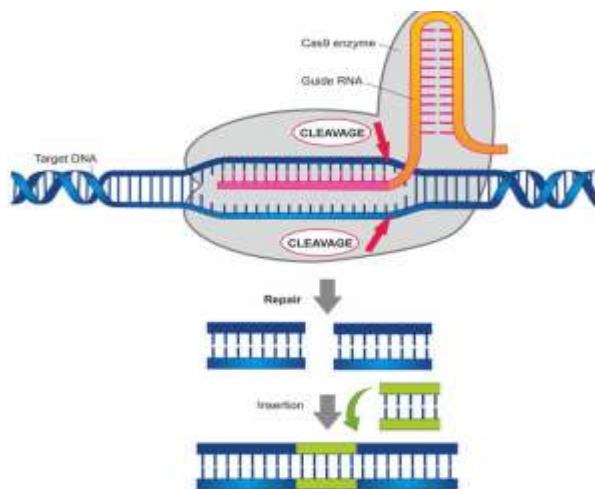
Picture courtesy: Google, Wikipedia

<https://www.cdc.gov/ncbddd/tourette/features/tourettesyndromeawareness.html>

"CRISPR: A Revolution in the world of Bio Science"

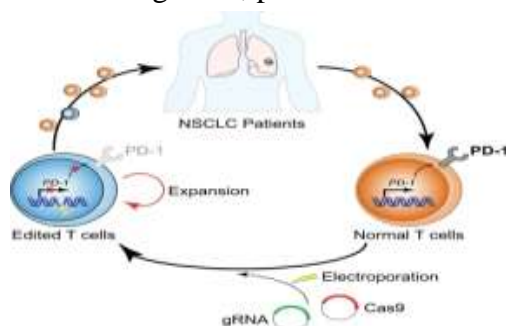
Oiendrilla Chakraborty, Semester- II

We all love superheroes. How one can become spider man on being bitten by a spider and how several experiments on human beings can turn them into a very strong superhero has always been a subject of immense interest to almost all of us in our childhood. Then as one grows up they realize it's all fictional and not possible in the real world. But what if this was possible? Even though we cannot actually make superheroes, did you know that there are techniques discovered by scientists that can change the world?



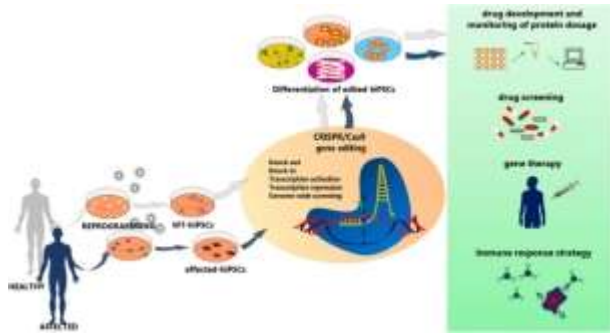
CRISPR is such a technique that can be used to edit, add and omit genes. It is a way of finding a specific part of DNA inside a cell and then alter that piece of DNA as per need. Jennifer Doudna is called the mother of CRISPR and Emmanuelle Charpentier is the co-inventor of CRISPR. Dr. Doudna and Dr. Charpentier were involved in the biochemical characterization of guide RNA and Cas9 enzyme-mediated DNA cleavage, and several other experiments necessary for the discovery of CRISPR.

CRISPR is basically a storage of all the past infections and diseases. They contain severely harmful viruses, which allows a cell to recognize the CRISPR sequences and there establish a successful defense against the next infection. CRISPR sequences also contain genes that encode for Cas enzymes, which form the second part of this defense mechanism. Thus including the CRISPR sequences and some other associated proteins the process in simpler words is that the CRISPR sequence is responsible for finding the foreign partial and the Cas proteins is responsible for destroying it. Then the cell transcribes the spacer sequences into RNA molecules resulting in formation of complexes with a Cas enzyme, which moves throughout the cell till it comes into contact with any genetic material that matches the RNA. Once the specific RNA is found, the CRISPR RNA tightly binds to the matching DNA which allows the Cas enzyme to cut the foreign DNA, thus preventing the virus from performing further replication. After killing off the invading virus, pieces of viral DNA are cut and stored as spacer sequences by some other proteins for future use.



Since the discovery of CRISPR, it has been experimented in case of various diseases in human beings. In the year 2016, CRISPR based therapy was first performed on an individual with lung cancer. According to the records, the patient was injected

with PD-1 edited T cells in a Chinese clinical trial. Along with this an American clinical trial using CRISPR-based immunotherapies for cancer have also been completed. Various other clinical trials using CRISPR-based immunotherapies, mainly to treat blood cancers, are ongoing.



In humans, it can also cure sickle cell disease. Scientists have cured muscular dystrophy in mice using the CRISPR technique. It is also said that this technique can cure high cholesterol, Huntington's disease, blood disorders, blindness, AIDS, cystic fibrosis and even covid 19. Further studies and experiments are still being

performed to excel in the field CRISPR and make medical advancements.

CRISPR, being modified into a gene editing technique by the researchers can be used to make crops more nutritious, to correct mutations that are responsible for genetic diseases such as Huntington's disease or cystic fibrosis, invent antivirals and antibiotics etc. Thus, it is a revolution in the world of Bio-Science leading to the advancement in the field of genes.

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HOW AND WHY? – FLASHING OF FIREFLIES

Nisa Tandon, M.Sc. Zoology, 2nd year, Ballygunge Science College

Fireflies, as we all know, are small insects which are seen in summers or during the onset of the rainy season. They are identified by their tiny blinking lights which look mesmerizing in the dark background of the evening or at night. But have you ever wondered, why or how the tiny creatures blink? How is it possible to generate light without electricity?

Mother nature provides for the answers, which scientists have 're-searched' and provided us with an explanation.

The most studied genus of firefly is that of *Photinus sp.* This tiny insect is found in abundance in India, except in the mountainous regions of the North. There are specific light producing cells in their bodies called Light cells which contain a compound called Luciferin. On reacting with molecular oxygen (which is transferred at intervals) in a complex biochemical reaction, this compound is responsible for producing energy in the form of 'cold light' (light without heat)



and is the cause of the twinkling in the firefly, called Bioluminescence.

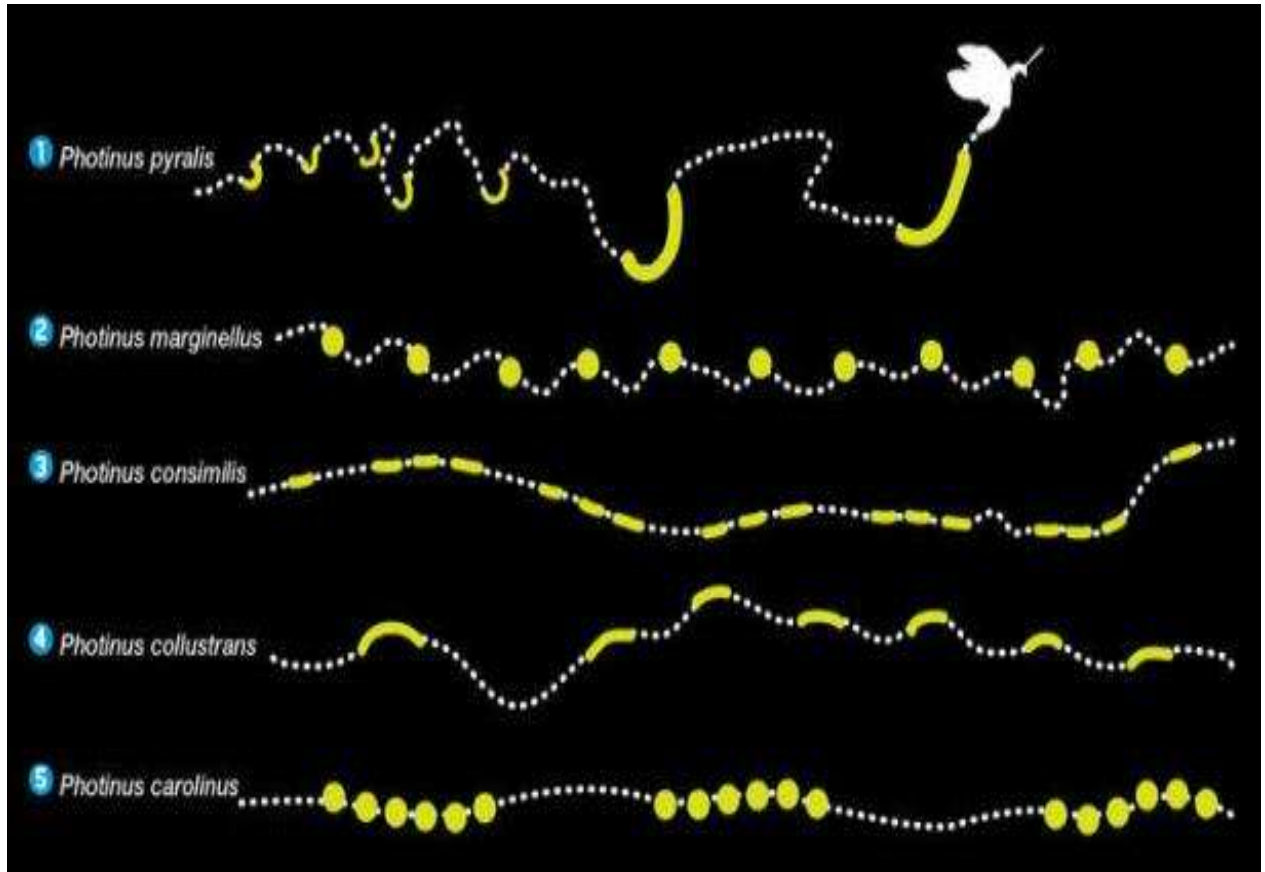


Now the question arises, as to why they twinkle? In fireflies, it is only the males who are able to produce light and not the females. Scientists have found out that the reason for this male based function is for the sole purpose of attracting females during the favourable mating season.

Adult *Photinus sp.* live for only a week during which they mate, and it is during his short period of time in which they produce their beautiful flashing. This flashing however is species specific. Scientists have studied the flashing patterns of several species of fireflies and have concluded that no two species of flies have the same flashing patterns, because

no species wants to attract a mate of another species which will be completely unnecessary.

Thus, we see that even before the discovery of signalling and telegram, Mother Nature has provided us with a natural Morse code-like signalling system which even the tiny insect like a firefly is capable of using. It is a subject of crucial importance, however, to ponder of what the human mind is capable of achieving. Needless to say, Homo sapiens are placed the highest in the classificatory hierarchy.



Picture courtesy: Google, Wikipedia

Black & White

(Photography)

Aakash Bhakta, ex student of Department of Zoology, SAJC



Indian cormorant or Indian shag

The Bengali name of Indian Cormorant is পানকৌড়ি

Scientific classification

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Suliformes

Family: Phalacrocoracidae

Genus: *Phalacrocorax*

Species: *P. fuscicollis*

Habitat

This cormorant fishes gregariously in inland rivers or large wetlands of peninsular India and northern part of Sri Lanka. It also occurs in estuaries and mangroves but not on the open coast.. They extend north-east to Assam and Thailand, Burma and Cambodia.

(White) Pigeon

White pigeons are a **symbol of peace** in many religions and traditions. The white color also symbolizes peace and that is why white pigeons are seen as a symbol of peace and harmony.

Scientific classification

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Columbiformes

Family: Columbidae

Genus: *Columba*

Species: *C. livia*

Habitat

Pigeons are familiar birds of cities and towns. You'll also see them around farmland and fields, as well as in their archetypal habitat, rocky cliffs.



Biotope: A mini ecosystem

Soumyajit Talukdar, Semester IV

'Biotope'. Biotope aquarium is the man made eco system in a home or exhibition aquarium , created on the basis of a natural environment . A biotope can be set according to a geographical , ecological or species only point of view . There are many criteria for a biotope like -

- Arranging the right according to the specific biotope to give it a more natural look with combination of natural substrate (gravel,sand,etc) , river rocks, driftwood, bogwood, dried leaves, twigs, decaying plant matters, corals(for marine) and many other natural additions.
- Selection of various fishes, plants and invertebrates that are naturally specific to the biotope. Maintaining healthy fishes with proper stocking density is a must.
- Maintaining environmental qualities like water parameters , lighting, temperature, biological cycle etc.

Importance - Biotope aquaria is undoubtedly a important aspect of aquarium hobby not only for its natural look (aesthetic value) but it can also help people to study the natural environment and behaviour of a particular species in a aquarium. Biotope can also be used for conservation of native species by breeding them outside the nature and then rehabilitate them in nature to increase their numbers.

Examples of Biotope --



First picture is South Bengal Black Water Biotope (consist of Native Badis)Second picture is Lake Tanganyikan Biotope (consist of Brichardi Cichlid)

Credit to 1. Google Search Engine for the information 2. Soumya Sarkar (Pirates Den) for the pictures

ANOSOGNOSIA : DENIAL & MENTAL ILLNESS

Kaninika Goswami, Semester II

Anosognosia is a condition where persons can't recognize other health conditions or problems that they have. Experts commonly describe it as "Denial of Deficit" or "Lack of Insight." It falls under the family of Agnosias, all of which happen when your brain can't recognize or process what your senses tell it.

This condition can happen with mental illnesses, keeping a person with a disorder like schizophrenia from recognizing that they have a condition and need to take their medication. Anosognosia isn't contagious.

Anosognosia isn't fatal or dangerous on its own, but it increases risk of complications from other problems. People with this condition are also more likely to resist or avoid medical treatment for the condition they can't recognize.

✳ **AFFECT ON BODY** : Anosognosia affects people with other medical conditions, especially certain mental health conditions. Such conditions including:

- Alzheimer's disease.
- Dementia.
- Bipolar disorder.
- Schizophrenia.

Experts estimate that it affects between 50% to 98% of people with schizophrenia, about 40% of people with bipolar disorder, and more than 80% of people with Alzheimer's disease. It also happens to between 10% and 18% of people who have one-sided paralysis after a stroke

Brain of the person, suffering from Anosognosia, keeps track of what's going on with their body using a "self-image." If they have an injury, their body updates their self-image to reflect that, and it will keep updating as their body heals. People with Anosognosia have damage in the areas of their brain that update their self-image.

Because that person's mind can't update their self-image, they can't process or recognize that they have a health problem. That's what makes this condition different from the kind of denial described by the Kübler-Ross model (commonly known as the five stages of grief). A person in denial rejects or avoids accepting reality because it's unpleasant or distressing. A person with anosognosia can't recognize the problem at all. Because they can't recognize they have a medical problem, people with this condition often don't see the need to care for that problem. In more severe cases, they actively avoid or resist treatment.

✳ **SYMPTOMS** : People with Anosognosia usually show that they can't recognize a medical problem they have, either through action or what they say. In some cases, people with this condition will rationalize what's happening to them, or they may try to cover up symptoms. They may recognize some symptoms but not others.

Anosognosia means a person can't do one or more of the following:

- Recognize that they have an illness or medical problem.
- Recognize the signs and symptoms of the condition that they experience.
- Connect their signs and symptoms to that condition.
- Understand and agree that the condition is serious and needs treatment.
- In some cases, a person with this condition may avoid the truth about their condition, and they might do so consciously or without even realizing it. Some might confabulate, which is when a person's mind fills in gaps in their memory with false memories.
- Anosognosia can also happen in certain ways with specific symptoms, with some examples below.

One-Sided Sensory & Movement Problems :-

Anosognosia got its name from French neurologist Joseph Babinski in 1914, who created the term to describe someone who'd lost the ability to use or feel the left side of their body. That person was unaware of the problem, even though they couldn't use the left side of their body.

Anosognosia that has this one-sided effect more commonly affects the left side of your body, but it can affect the right side. The two key symptoms that happen with this are:

a• **HEMIPLEGIA** : Pronounced hem-ee-plee-gee-uh, a paralysis on one side of the body. A person with anosognosia who can't move one side of their body will still believe they can.

b• **HEMISENSORY LOSS** : This is a loss of your senses, including vision, hearing and touch, on one side of body.

Anton's syndrome :-

Anton's syndrome, Visual Anosognosia, is an extremely rare type of anosognosia that affects eyesight in one of two ways:

a• **DENIAL OF BLINDNESS** : This is when a blind person can't recognize that they are blind. This usually affects both eyes, but there are a few exceptions. One such exception is "Gun-Barrel Vision," when a person can see only in the center of their field of vision.

b• **DENIAL OF VISION** : This is when a person says and believes they're blind but shows signs they can still see. This type is much rarer than Denial of Blindness.

✱ CAUSES :-

Anosognosia can happen for many different reasons, all of which fall into one of two categories:

1. BRAIN DAMAGE :-

Brain is prone to injury like any part of their body. Damage to their brain causes injuries called lesions. Lesions that cause anosognosia can happen for any of the following reasons:

- Brain Tumors (Including Cancerous and Non-cancerous Growths).
- Head Injuries such as Traumatic Brain Injuries (TBIs).
- Cerebral Hypoxia (Brain damage from lack of oxygen).
- Infections (Such as those that cause Encephalitis).
- Seizures and epilepsy, Sleep apnea.

Strokes, Toxins, such as carbon monoxide poisoning.

2. DEGENERATIVE DISEASES :-

Many different brain diseases disrupt person's brain's network of connections. That kind of disruption can affect ability to update their self-image, leading to anosognosia. Conditions that cause or involve this kind of disruption include:

- Alzheimer's disease.
- Bipolar disorder.
- Dementia.
- Huntington's disease.
- Schizophrenia.

✱ DIAGNOSIS : Anosognosia is effectively invisible unless a provider already knows people have a health problem and they see the signs that they don't recognize that problem. In many cases, that means a provider first has to diagnose a condition that's having a significant impact on your life. Then they have to see signs that they can't recognize that problem, leading them to suspect anosognosia.

One common evaluation technique is the "**LEAP**" method, which is done by:

- Listening to the person.
- Empathizing with the person
- Agreeing with the person
- Partnering with the person

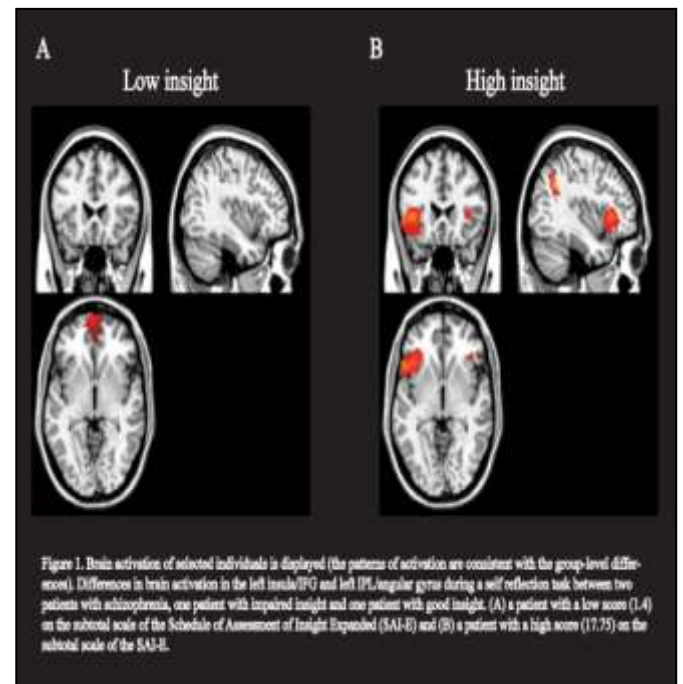
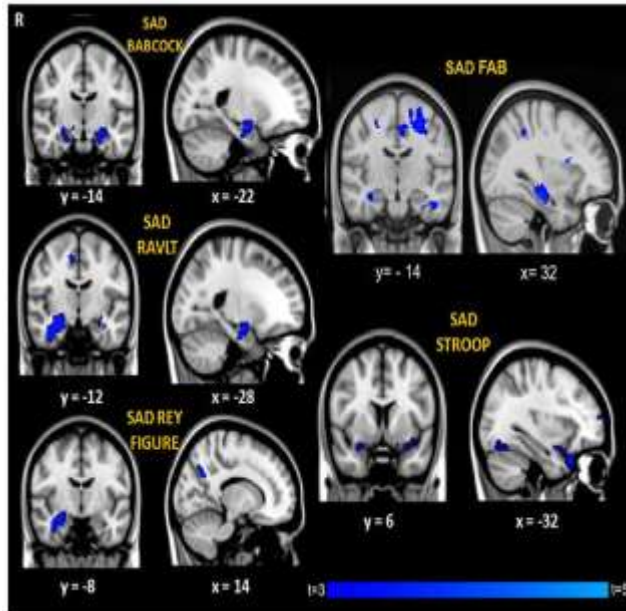
This method helps open a dialogue between a doctor and the person with anosognosia. This allows the person to develop an awareness of the objective facts of their situation as well as understand that people around them are supportive and understanding.

It's also common for people with Anosognosia to rationalize or cover up signs of health problems, which happens because their mind tries to fill in the gaps for what it can't explain or understand. So, diagnosing this condition often requires a combination of the following:

- A physical and neurological exam, diagnostic testing and imaging.
- Asking questions about a person's health history and life circumstances.

✳ **TESTS:-** Diagnostic and imaging tests that are possible with anosognosia include, but aren't limited to, the following:

- Computerized Tomography (CT) scan
- Electroencephalogram (EEG).
- Magnetic Resonance Imaging (MRI).



✳ **MEDICATIONS OR TREATMENT :-** Anosognosia is difficult to treat and isn't curable. When it happens because of an injury to brain, treating the underlying injury may help this condition over time. However, some people will have lingering or even permanent effects. Anosognosia also isn't treatable when it happens because of degenerative diseases. But some forms of therapy and treatment programs may help a person with this condition.

There are no treatments or medications that directly help anosognosia. Therapy and treatment programs can help a person with anosognosia develop habits that compensate for this, but these do not treat the condition itself. Common therapy include the following:

Antipsychotic Therapy :

Doctor may recommend medications known as antipsychotics to treat symptoms of conditions like schizophrenia or bipolar disorder. Some examples of antipsychotics that may be used include:

- Chlorpromazine (Thorazine)
- Clozapine (Clozaril)
- Loxapine (Loxitane)
- Aripiprazole (Abilify)

Antipsychotics don't typically work the same way for each person, so medication will be prescribed based on symptoms, overall health, and response to the medication. Patient may even need different types of antipsychotics throughout their life as their cognitive ability changes or their body responds to the medication differently over time.

Motivational Enhancement Therapy (MET) :

MET uses techniques to motivate someone to either alter their self-image to accept that they have a condition or encourage them get treatment for their condition. MET often consists of helping someone look at their symptoms, behaviours, and relationships objectively. This often leads to a realization that facts point to the existence of a condition.

✳ **COMPLICATIONS :-**

The possible complications with anosognosia depend entirely on the disorder that the person has but can't recognize. That's because people with anosognosia can't recognize they have a

problem, which means they're less likely to accept and undergo treatment. Because the complications can vary so widely, a healthcare provider is the best person to explain the possible complications. They can tailor the explanation and information to the specific situation affecting you.

✿ PREVENTION :-

Anosognosia isn't a condition that one person should try to self-diagnose or treat on their own. It is a condition that happens unpredictably, so it's not preventable. It also has to happen alongside other conditions or problems like stroke or schizophrenia. While some of these conditions are preventable, having them isn't a guarantee that one person can develop Anosognosia.

It's still a good idea to take care of and protect your brain. The best things you can do include:

- Eat a balanced diet and maintain a weight that's healthy.
- Many conditions related to person's circulatory and heart health, especially stroke, can cause brain damage. Preventing stroke and similar conditions is a key way to reduce the risk of developing conditions that can lead to anosognosia.
- Don't ignore infections. Eye and ear infections that spread to person's brain can easily become serious or deadly. They can also cause brain damage that leads to conditions involving Anosognosia.
- Wear safety equipment. Brain damage from head injuries can cause problems that also involve anosognosia. That means safety equipment, especially helmets, are essential both at work and during off-hours.
- Manage health conditions. It's essential to manage conditions that can lead to or involve anosognosia, especially mental health conditions like schizophrenia. Managing those conditions can help a person to avoid serious complications or situations where an unmanaged condition becomes much worse.

✿ TAKE CARE FROM ANOSOGNOSIA :- If one person has Anosognosia, following their healthcare provider's guidance and advice is important. Relying on and trusting their expertise is essential because of their inability to see their health conditions. That includes seeing their provider as recommended, taking medications as prescribed and watching for any changes in their symptoms.

✿ CONCLUSION :-

Anosognosia is a condition that can be confusing and frightening. To others, it might seem like stubbornness or living in denial, when in reality, this condition affects a person's ability to understand what's happening to their own body. For people who have this condition, it's important to build a trusting relationship with your healthcare provider and to rely on their expertise. If you or a loved one has anosognosia, it's also important to be as patient and understanding as possible. A strong support system and the help of loved ones can make a big difference with this condition, hopefully minimizing its effects on any other connected condition(s) and the health and well-being of everyone involved.

Picture courtesy: Google

Antique Moose (skeleton)
(Photography)
Abhilasha Ganguly, Semester VI



Scientific name: *Alces alces*

The moose or elk is a member of the New World deer subfamily and is the largest and heaviest extant species in the deer family.

[The skeleton is exhibited inside the Indian Museum at Kolkata.]

Amazon Rainforest: The most bio-diverse Region on Earth

Ayan Bhar, Semester 6



Amazon rainforest is the most bio-diverse region on earth, providing shelter to three million species on plants and animals. Billions of trees absorb tons of carbon dioxide every year and slow down the climate change along with producing 20% of earth's oxygen, hence named '**Lungs of Earth.**' The beauty and biodiversity of rainforests are nothing short of awe-worthy. We often catch ourselves mid-daydream about taking an adventure to

experience it with our own eyes one day. Amazon Rainforest animals set the fashion curve for South America. Some blend in with their surroundings, while others show off a wildly eclectic palette of bright colors, spots, and patterns. As the largest rainforest in the world, the Amazon boasts incredible biodiversity unlike anywhere else.

Some of the most incredible animals of the Amazon are felines, monkeys, and river critters. But that's not all! The Amazon Rainforest is home to many incredible mammals: at least 430 different species!



Jaguar (*Panthera onca*) Cheetah spots are to the plains of Africa as jaguar spots are to the jungle of South America. You will need to travel pretty deep into the jungle for a good chance at seeing a jaguar

Giant River Otter:(*Pteronura brasiliensis*)The giant river otters found in the Amazon are the largest otters in the world. With some reaching up to 5.6 feet (1.7 meters), these otters swim through the Amazonian rivers and lakes using their strong tails and webbed feet.



Black-capped Squirrel Monkey:(*Saimiri boliviensis*) The black-capped squirrel monkey is found in the Peruvian, Brazilian, and Bolivian Amazon. They live in female-dominated groups with about 40 to 75 monkeys. Unlike many other monkeys that use their tail to climb, these squirrel monkeys typically use their tail for balance.



Spangled Cotinga:*(Cotinga cayana)*__Male spangled cotinga birds are characterized by vibrant turquoise feathers covering their body with a patch of dark pink feathers on their throat. This Amazon Rainforest animal lives high in the canopy and, unlike the other birds on this list, does not have the ability to make sounds

Paradise Tanager:*(Tangara chilensis)*:This multicolored songbird is a common bird to spot in the Amazon.with bright green head and sky blue underbellies, they generally stand out from their surroundings. This bird nests high in the canopy, far from predators that might go after their eggs.



poison Dart Frog:*(Dendrobatidae:* Some of the most colorful amphibians in the jungle are poison dart frogs. These small, poisonous jungle creatures typically have intricate patterns on their brightly colored bodies. Ranging from hues

of red, blue, yellow, and everything in between, their bright colors are a key defense mechanism to ward off predators.)



Leaf cutter Ant*(Atta cephalotes)*:The leafcutter ants live in large, complex colonies, with each ant playing a specific role based on its size. Leafcutter ants eat more vegetation than any other creature in the rainforest. In addition to vegetation, these ants cultivate fungus underground that turns poisonous plants into an edible mushroom.



Blue Morpho Butterfly: (*Morpho peleides*): The Amazon is home to at least 7,000 species of butterflies – 35% of the world’s known butterfly species. One of the most striking butterflies in the jungle is the blue morpho. With brilliant blue wings, you cannot miss them fluttering around the rainforest.



Amazon rainforest, the world's largest rain forest is at the risk of getting burned out completely. The rainforest, which contributes almost 20 percent of the earth’s oxygen, has been burning for over 16 days resulting in a major loss of trees and biodiversity. It will get completely burned out if it is not put out soon. Amazon rainforest fire impact can already be seen in different regions in South America including the Atlantic coast and Sao Paulo, Brazil’s largest city. According to scientists, the Amazon rainforest fire could deliver a huge blow to the global fight against climate change. The fire will not only result in a major loss of

trees and biodiversity but also release excess CO₂ into the atmosphere. The forest fires also release pollutants including particulate matter and toxic gases such as carbon monoxide, nitrogen oxides and non-methane organic compounds into the atmosphere. Researchers found that, since 2001, between 40,000 and 73,400 square miles of Amazon rainforest have been impacted by fires. Those fires have affected 95% of all Amazonian species and as many as 85% of the region’s species that have been identified as threatened.



The Govt. agree to strengthen coordinated action on forests and biodiversity to combat deforestation and forest degradation; increase initiatives for restoration, rehabilitation and accelerated reforestation; and promote initiatives for connectivity of priority ecosystems. The countries also agree to establish mechanisms for regional cooperation and information exchange to combat illegal activities that threaten the conservation of the Amazon and to exchange experiences in integrated fire management. Amazon countries also agree to increase the participation of indigenous communities, including the empowerment of indigenous women.

Reference:

<https://www.indiatimes.com/trending/environment/animals-amazon-rainforest->

A superstar



Payel Das, Semester II

Starfish or sea stars are star-shaped echinoderms belonging to the class Asteroidea. Common usage frequently finds these names being also applied to ophiuroids, which are correctly referred to as brittle stars or basket stars. Starfish are also known as asteroids due to being in the class Asteroidea.

সাত ডোরা

Priya Kuila, M.Sc Zoology, Thakurpukur college



আমাদের দেশের অতি পরিচিত একটা প্রজাপতি "সাত ডোরা" বা, "রুঁরুঁ"। আমাদের আশেপাশেই এ ঘুরে বেড়ায়। ইংরেজিতে বলে **Common lime butterfly**। বৈজ্ঞানিক নাম *Papilio demoleus*। খুব অস্থির এই রুঁরুঁ।। দেখতে খুবই সুন্দর। লেবু জাতীয় গাছের ফুলেই উড়াউড়ি বেশি তবে সব ধরনের ফুলের মধুই খায়। লেবু জাতীয় গাছে বংশবৃদ্ধির কারণে এরা 'লেবুর প্রজাপতি' নামেও পরিচিত। ফুলের পরাগায়নে তাই এর ব্যাপক ভূমিকা আছে।



Larva of Papilio clytia

Seven Wonders

ANUSKA SARKAR, Semester IV



1. The leg bones of a bat are so thin that out of 1,200 species of bats, only 2 can walk on ground. These are the Vampire bat and the Burrowing bat.

2. Even Small amount of alcohol placed on a scorpion makes it go crazy and sting itself to death!!



3. The flea can jump up to 200 times its own height. This is equal to a man jumping the Empire State Building in New York.



4. A 'haw' is the third eyelid of a cat, which can only be seen when the cat isn't well.

5. The sentence "The quick brown fox jumps over a lazy dog." uses every letter of the alphabet.



6. The loudest animal in the world is a mere 2cm long, prawn. The Pistol Shrimp is capable of snapping its claw shut so rapidly, that it creates a bubble which collapses to produce a sonic blast, louder than a Concorde's sonic boom.

7. The Inland Taipan (also known as, Western Taipan) is the most venomous snake in the world. A single bite contains enough venom to kill at least 100 fully grown men and can kill within just 30 mins, if left untreated.



Melanoplus bivittatus

Nisa Tandon, Msc. Zoology Ballygaunge Science College



Scientific Name : *Melanoplus bivittatus*

Kingdom: Animalia

Phylum: Arthropoda

Order: Orthoptera

Family: Acrididae

Common name: Two striped grasshopper

The two-striped grasshopper, is a poikilothermic species of grasshopper belonging to the genus *Melanoplus*. It is commonly found in North America, with high quantities inhabiting Canadian prairies and farmland.

গুবরের চোখে মহাবিশ্ব

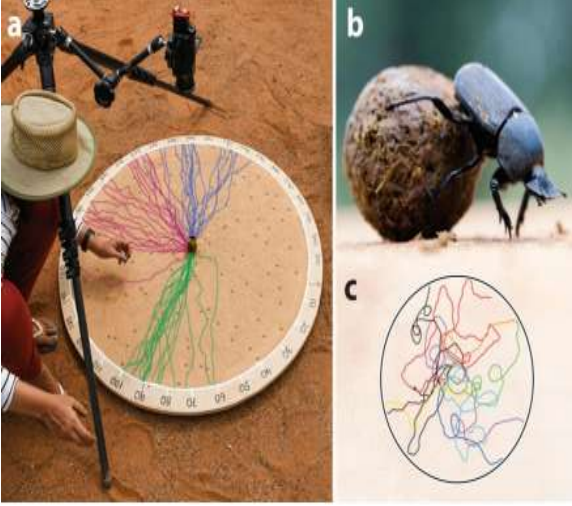
সার্থক বসাক, তৃতীয় সেমিস্টার, স্নাতকোত্তর প্রাণিবিদ্যা বিভাগ, কলকাতা বিশ্ববিদ্যালয়

গুবরে পোকা, ইংরেজিতে যাকে বলে dung beetle, মূলত আর্থ্রোপোডা (Arthropoda) শ্রেণিভুক্ত ইনসেক্টা (Insecta) পর্বের অন্তর্গত কোলিওপ্টেরা (Coleoptera) গোত্রের প্রাণী। আলাদা করে বলে দিতে হবে না যে অন্যান্য সব পতঙ্গদের মতই এদের চোখও পুঞ্জাক্ষী ধরনের। অর্থাৎ ক্ষুদ্র ক্ষুদ্র কয়েক হাজার ওমাটিডিয়া (ommatidia) একসঙ্গে মিলে তৈরি হয় এক একটি চোখ। ওমাটিডিয়া হল কর্নিয়া, লেন্স ও আলোকসংবেদী কোশ দ্বারা নির্মিত এক একটি ক্ষুদ্র একক, যা আলোর উজ্জ্বলতা ও রং শনাক্ত করতে সক্ষম। এই ধরনের পুঞ্জাক্ষীর গঠন দেখলে বোঝা যায় এগুলির বাইরের প্রান্তে থাকে কঠিন কোন শিখ (cone sheath)-এর একটি স্তর। এই স্তর থেকে ভেতরের দিকে নির্গত হয় কোন ট্র্যাক্ট (cone tract), যার সঙ্গে যুক্ত থাকে রেটিনিউলার কোশ (retinular cell)। এই রেটিনিউলার কোশ মূলত আলো ও অন্ধকারে পতঙ্গদের অভিযোজন ঘটিয়ে পরিবেশের দৃশ্যমানতা বজায় রাখতে সাহায্য করে।

একটা সময় ছিল যখন মানুষ নিজের প্রয়োজনে আকাশের তারা-নক্ষত্র দেখে দিক নির্ণয় করত। এই একই ধরনের দিক নির্ণয় ক্ষমতা লক্ষ্য করা গেছে বিভিন্ন পোকামাকড়ের মধ্যেও। যার মধ্যে গুবরে অন্যতম। এদের মধ্যে বেশ কিছু প্রজাতির গুবরে নিশাচরা দেখা গেছে রাতের বেলা খাবার জোগাড় করতে গিয়ে গোবরের গুলি পাকিয়ে এরা তার ওপর উঠে পড়ে, এবং সেখানেই নিজের চারপাশে অনবরত ঘুরপাক খেতে থাকে। প্রথম প্রথম বিজ্ঞানীরা মনে করতেন এরা হয়ত খাবার খুঁজে পাওয়ার আনন্দে নৃত্য করছে। কিন্তু পরে বোঝা গেল তা নয়! এরা আসলে নিজের চারপাশে ঘুরপাক খেয়ে আকাশের তারার অবস্থান দেখে নিচ্ছে। আর সেখান থেকে ঠিক করে নিচ্ছে তাদের গতিপথ।

গুবরে পোকার এহেন আচরণ নিয়ে যেসব বিজ্ঞানী বছরের পর বছর ধরে গবেষণা করে আসছেন, তাদের নাম করতে গেলেই সবার প্রথমে উঠে আসবে সুইডেনের মেরি ড্যাকে এবং তাঁর সহকর্মীদের কথা। মোটামুটি ২০১২-১৩ সাল নাগাদ এনারা দিনের বেলায় যেসব গুবরে পোকা চলাফেরা করে তাদের নিয়ে প্রথম গবেষণা শুরু করেন। তাঁদের পর্যবেক্ষণ অনুযায়ী তাঁরা বলেন, দিনের বেলায় এইসব গুবরের দল সূর্যের অবস্থান দেখে দিক নির্ণয় করে। খাবার জোগাড় করার পরে সূর্যের অবস্থান দেখে মূলত সোজা পথে এরা চলতে শুরু করে। এনারা আরও বলেন, মেঘলা দিনে এদের দিক নির্ণয় ক্ষমতা লোপ পায়, এবং এরা গোবরের গুলি পাকিয়ে এলোপাথাড়ি ঘুরে বেড়াতে থাকে।

এদের চলাফেরার ধরণকে পরীক্ষা করার জন্য বিজ্ঞানীরা এদের একটি বৃত্তাকার পথের কেন্দ্রে ছেড়ে দেন। দেখা যায় পোকাগুলি গোবরের ডেলা নিয়ে ছুটে চলেছে বৃত্তাকার পথের ব্যাসার্ধ ধরে। আলাদা আলাদা দুটি ক্ষেত্রে রৌদ্রোজ্জ্বল দিন ও মেঘলা দিনের ভিত্তিতেও পরীক্ষা করা হয়। দেখা যায় মেঘলা দিনে গুবরের দল দিশেহারা হয়ে এদিক ওদিক ছুটে বেড়াচ্ছে।



চিত্র: মেরি ড্যাকে ও তাঁর সহকর্মীদের পরীক্ষামূলক উপস্থাপনা: (a) তিনটি ভিন্ন প্রজাতির গুবরে পোকাকার সম্ভাব্য যাত্রাপথ। কেন্দ্র থেকে যাত্রা শুরু করে প্রত্যেকেই বৃত্তের ব্যাসার্ধ বরাবর চলতে শুরু করে। (b) এক বিশেষ প্রজাতির (*Scarabaeus lamarcki*) গুবরের খাদ্য সংগ্রহ। (c) মেঘলা দিনে গুবরের যাত্রাপথের পরিবর্তন।

(ছবিসূত্র: Marie Dacke, Emily Baird, Basil el Jundi, How Dung Beetles Steer Straight, Annual Review of Entomology, 14 August, 2020)

এরপর মেরি ড্যাকে এবং তাঁর দল কাজ শুরু করলেন নিশাচর গুবরেদের নিয়ে দেখা গেল চাঁদনি রাতে এরা চাঁদ

দেখে নিজেদের অবস্থান ঠিক করে নিচ্ছে। প্রশ্ন উঠল, যদি আকাশে চাঁদ না থাকে? যদি হয় অমাবস্যা? তখন এরা কীভাবে পথ খুঁজে পাবে? এই প্রশ্নের উত্তর খুঁজতে গিয়ে জানা গেল এক বিস্ময়কর তথ্য। ছোটবেলায় ভূগোলের বইতে আমরা অনেকেই ছায়াপথের ব্যাপারে পড়ে এসেছি। এটি হল আমাদের গ্যালাক্সি। সূর্যের মত হাজার কোটি তারা নিয়ে একটি নক্ষত্র-সমাবেশ। যদি কোনোভাবে আমরা ছায়াপথের বাইরে থেকে তাকে দেখতে পেতাম তাহলে তাকে দেখাত পাতলা চাকতির মত। যেহেতু আমরা এই চাকতির মধ্যে রয়েছি, তাই আমাদের আকাশে ছায়াপথকে একটি ফিতের মত দেখা যায়। শহরের উজ্জ্বল আলোয় ছায়াপথকে ভালো করে ঠাহর করা যায় না ঠিকই, কিন্তু গ্রামেগঞ্জে বা পাহাড় চূড়ায় উঠলে এর প্রকৃত রূপ ধরা পড়ে। বিজ্ঞানীরা বললেন গুবরে পোকাকার চোখে এই ছায়াপথের ছবি ধরা পড়ে।

নিশাচর গুবরেদের আচরণ পরীক্ষা করার জন্য ২০১৩ সালে প্ল্যানেটোরিয়ামের ভেতর একটি বৃত্তাকার প্ল্যাটফর্ম বানিয়ে এদের ছেড়ে দেওয়া হয়েছিল। প্ল্যানেটোরিয়ামে এই পরীক্ষা করার কারণ প্ল্যানেটোরিয়ামের ভেতরে রাতের আকাশের চিত্র ইচ্ছেমত বদলানো যায়। এইভাবে বিভিন্ন ধাপে কখনও উজ্জ্বল তারা দেখিয়ে, কখনও ছায়াপথ দেখিয়ে, আবার কখনও নিকষ কালো অন্ধকার করে পর্যবেক্ষণ করা হল তাদের গতিবিধি। দেখা গেল যে সময় প্ল্যানেটোরিয়াম জুড়ে ছায়াপথের দৃশ্য দেখানো হচ্ছে, একমাত্র সেই সময়েই গুবরের দল খাদ্য সংগ্রহ করে ঠিকঠাকভাবে গন্তব্যে পৌঁছতে পেরেছে। অন্য ক্ষেত্রে যদি ছায়াপথকে ঢেকে দিয়ে শুধু তারার আলোগুলো জ্বালিয়ে রাখা হয়, তাহলে দেখা যায় তাদের কিছুটা দিকভ্রম হচ্ছে।

আগেই বলেছি গুবরের চোখ অসংখ্য ছোটো ছোটো সংবেদনশীল একক দিয়ে গঠিত পুঞ্জাক্ষী ধরনের। সেই চোখ দিয়ে কয়েক আলোকবর্ষ দূরের ছায়াপথের ছবি এরা আবছা বা অস্পষ্ট দেখবে এটাই স্বাভাবিক। এদের চোখে ধরা পড়ে ছায়াপথের হাজার হাজার নক্ষত্রের একটি সম্মিলিত রূপ। কিন্তু তবুও এরা ছায়াপথের সামগ্রিক চেহারা বুঝতে পারে। এরপর বিজ্ঞানীদের মনে প্রশ্ন জাগে তাহলে কি বৃহস্পতি বা মঙ্গলের মত উজ্জ্বল গ্রহগুলিকে এরা শনাক্ত করতে পারে? বুঝতে পারে তাদের অবস্থান?

এই প্রশ্নের উত্তর এখনও অজানা। হয়ত ভবিষ্যতে এই নিয়ে আরও গবেষণা হলে আমাদের কাছে আরও নতুন নতুন তথ্য উঠে আসবে।

Do you Know?

Soma Banerjee, Semester II

“WHAT WE KNOW IS A DROP,
WHAT WE DON'T KNOW IS AN OCEAN.”

-Isaac Newton, *Physicist.*

Scientists are learning new things all the time. Something we don't know today could be discovered tomorrow, so we can always expand our knowledge.

1. **Animals use Earth's magnetic field for orientation**-Lost land animals may not be able to find their way home, but sea animals might. According to the U.S. Geological Survey (USGS), “there is evidence that some animals, like sea turtles and salmon, have the ability to sense the Earth's magnetic field and can use this sense for navigation.
2. **A cloud can weigh around a million pounds**-Our childhood dreams of floating on a weightless cloud may not withstand this science fact: The average cumulus cloud can weigh up to a million pounds, according to the USGS. That's about as heavy as the world's largest jet when it's completely full of cargo and passengers.
3. **Soil is full of life**-In just one teaspoon of soil, there are more microorganisms than people on the planet. “Millions of species and billions of organisms—bacteria, algae, microscopic insects, earthworms, beetles, ants, mites, fungi, and more—represent the greatest concentration of biomass anywhere on the planet,” according to the U.S. Department of Agriculture.
4. **Hot water freezes faster than cold water**-This may seem counterintuitive, but it's called the Mpemba effect. Scientists now believe this is because the velocities of water particles have a specific disposition while they're hot that allows them to freeze more readily. If proven correct, this finding could also be applied to everyday things, like cooling down electronic devices, according to research out of Universidad Carlos III de Madrid.
5. **have genes from other species**-We like to think of humans as being superior to other living creatures, but the reality is, our genome consists of as many as 145 genes that have jumped from bacteria, fungi, other single-celled organisms, and viruses, according to a study published in the journal *Genome Biology*.
6. **Solar flares are incredibly powerful**-The energy solar flares release is equivalent to millions of 100-megaton atomic bombs exploding at once, according to NASA. It's a good thing the Earth's atmosphere protects us from their radiation.
7. **About half of our body is bacteria**-Experts estimate that the human body consists of 39 trillion bacteria and 30 trillion human cells—a roughly 1:1.3 ratio. In the past, researchers thought we were much more bacteria than human, with a ratio of 10:1.
8. **We have no idea what most of the universe looks like**-About 96 percent of the universe is made up of dark matter and dark energy, which are undetectable to humans, *Space.com* reports. Scientists believe this is because the particles that make up these substances don't interact with regular matter or light.

DOSTARLIMAB – DRUG THAT CURED CANCER

Suchismita Banerjee , Semester IV

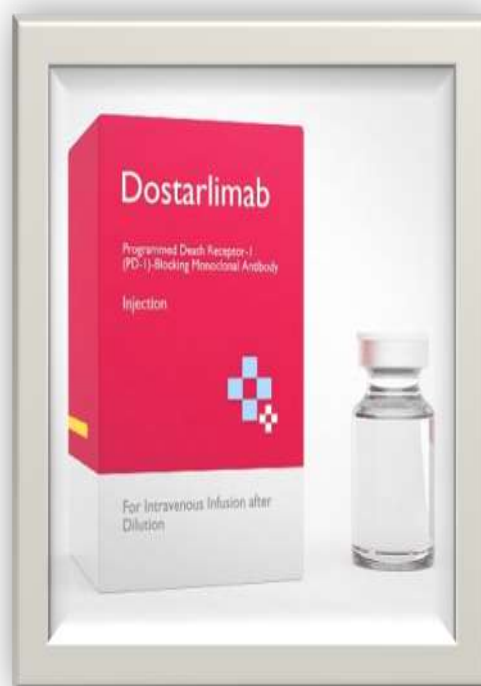
A study has found that a drug named **DOSTARLIMAB** has helped to treat rectal cancer. This has been described as a ‘first time in history’ kind of result in cancer treatment with disease simply vanishing in patients after the experimental treatment.

- The clinical trial comprised a group of 18 patients. All of them were battling rectal cancer at the Memorial Sloan Kettering Cancer Centre in Manhattan, US.
- In all the patients, rectal cancer was locally advanced. This means the tumours had spread within the rectum and in some cases, to the lymph nodes, but not to other organs.
- The drug, Dostarlimab was administered to the patients for a period of six months. The medicine was given in prescribed dosages every three weeks for the said period.
- At the end of the trial, cancer was checked for and remained undetected through physical exam, endoscopy, PET scan or MRI scan.
- Patients showed a complete absence of significant post-treatment complications as well as any signs of recurrence of cancer in the patients until 25 months from the end of the trial.

Dostarlimab works by improving the body’s immunity, and it helps the body’s own immunity to go and kill the cancer cells.

Dostarlimab is an IgG₄ humanized monoclonal antibody targeted against the human programmed death receptor-1 (PD-1). PD-1 receptors are found on T-cells and when activated serve to inhibit immune responses.

Dostarlimab is currently under investigation for the treatment of rectal cancers with mismatch repair deficiency.



Phrynoidis asper

Sumita Pattanayak , M.Sc in Marine Science , University of Calcutta



Common name: Asian giant toad

Phylum: Chordata

Family: Bufonidae

Class: Amphibia

Scientific name: *Phrynoidis asper*

The Asian giant toad, sometimes referred to as the river toad, is a species of true toad native to Mainland Southeast Asia and the Greater Sundas. It is a medium-large toad, but it is easily confused with its larger relative, the giant river toad.

Dashavatar- theory of evolution

Soumyajit Talukdar, Semester II

When we talk about Dashavatar (ten avatars of Vishnu), many will talk about its religious aspect but it also carries a scientific concept behind it. The concept of Dashavatar explains the Darwin's theory of evolution. According to British evolutionary biologist J.B.S Haldane - 'Dashavatar is a true sequential depiction of the great unfolding of evolution'. In a way we can say that Dashavatar concept explained the idea of evolutionary theory way before Charles Darwin with a religiomythological taste. Ten avatars that follows the concept in a sequence

- Matsya avatar depicts the aquatic life which shows that the first life emerges in water.
- Kurma avatar depicts the amphibious life that shows the migration of aquatic life to land.
- Varaha avatar represents the early mammals like Morganucodontids in earth.
- Narasimha avatar represents semihuman creature which shows humans links to animals.
- Vamana avatar represents early human like Flores man that resided in earth
- Parshurama avatar represents humans who lives in caves and devoid of social life.
- Rama avatar represents modern human who creates civilizations to settle down.
- Krishna avatar represents a social human being with high intellect and a deep understanding towards life
- Buddha avatar represents a enlightened man with enhanced view towards life and its meaning.
- Kalki avatar yet to come has been depicted as a being with superior qualities than a modern man.

This is how the evolutionary sequence is depicted through the mytheme of Dashavatar.



ECOSYSTEM AND IT'S RESTORATION

Debtanu Podder, Semester: IV

Ecosystem is a place where plants, animals and other organisms, in conjunction with the landscape around them, come together to form the web of life. Ecosystem can be large, like a forest, or small, like a pond. Many are crucial to human societies, providing people with water, food, building materials and a host of other essentials. They also provide planet-wide benefits like climate protection and biodiversity conservation.

But in recent decades, humanity's hunger for resources has pushed many ecosystems to the breaking point. There are the eight main types of ecosystem and some of the things that can be done to revive them.

Over-intensive use, soil erosion, excess fertilizer and pesticides are exhausting many farmlands. Ways to restore them include reducing tillage, using more natural fertilizer and pest control, and growing more diverse crops, including trees. The restoration of farmland also creates habitats for wildlife.

Forests and trees are being cleared to feed humanity's hunger for land and resources. Logging, firewood cutting, pollution, invasive pests and wildfires are damaging what remains. Restoring forest ecosystems means replanting and reducing the pressure on forests so that trees regrow naturally. Food systems are a major driver of forest loss.

Safe and abundant water has become a luxury. Restoration means halting pollution, reducing and treating waste, managing demand for water and fish, and reviving vegetation above and below the surface.

Shrublands, grasslands and savannahs are being overgrazed and eroded, converted to agriculture and invaded by alien species. Lost plants and animals can be re-introduced and protected until they are established.

In mountain regions, clearing slopes for farming or houses can trigger dangerous erosion and pollute rivers at their source. Humanity can counter the trend by reviving forests and restoring the protection they provide against avalanches, landslides and floods.

Cities and towns can seem like ecological deserts. There's little room for vegetation amid the houses, roads and factories. Permeable sidewalks and urban wetlands protect against flooding and pollution. Contaminated industrial areas can be rehabilitated and turned into places for nature and recreation.

Marine ecosystems are under assault from pollution, climate change and overexploitation. But the solutions are as common as the threats. Government and communities can make fishing and mangrove harvesting more sustainable. They can properly treat sewage and other waste and stop plastic trash from entering the water.

Peatlands and their massive stores of carbon and water are being drained and converted for agriculture and degraded by fire, overgrazing, pollution and peat extraction. Avoiding dangerous climate change means holding peatland carbon where it is –wet, and in the ground. Peatlands cover only 3 percent of the world’s land but store almost one third of all the carbon in its soil.



[Different types of ecosystems]

Eutropis longicaudata

Sumita Pattanayak , M.Sc in Marine Science , University of Calcutta



Kingdom: Animalia
Phylum: Chordata
Class: Reptilia
Order: Squamata
Family: Scincidae
Genus: *Eutropis*
Species: *E. longicaudata*

Common name: Long tail mabuya

Eutropis longicaudata, the longtail mabuya or long-tailed sun skink, is a species of skink. It is found in southern China, Hong Kong, Taiwan, Laos, Vietnam, Thailand, Cambodia, and Peninsular Malaysia. Some populations have been found to exhibit paternal care in response to predation by egg-eating snake.

CHINA, The King of The Space Kingdom

Anindita Banerjee, Semester IV

Once, an epic question was asked, “Sir, space me Fountain pen, Ball pen chalta nahin hain, to Astronauts ne pencil ka istemal kyun nahin kiya?”. In the areas of human life and education, this Space Observation has demonstrated tremendous benefits.

“Success ke peeche mat bhaago , excellence ka peeche karo , success jhak maarke tumhare peeche ayegi” – this famous dialogue was again proved as an Universal Truth by China. “Observation of earth from space” has already helped us in Vaccine Development in this current Covid situation, not only that, it assists with Disaster Relief and Farming, Education Programs that inspire future scientists, engineers and space explorers. When the world says “Give Up” , hope whispers, “Try it one more time” – this proverb is ultimately established by China.

According to Wolf Amendment Law (2011), China was effectively banned from participating in International Space Station (ISS) by NASA. After ten years, that NASA has bowed down before China as they have planned to destroy their ISS because currently, NASA is facing various technical issues in their space station. And from now onwards, China is going to be the king of the entire space. China has built “Tiangong Space Station” in this recent year, which means “Heavenly Palace”. China has proved “if there is a will, there’s a way” by launching 23-tonne Research Lab Module to this ‘Heavenly Palace’ – which is expected to carry out biological and life science research. But America is suspecting that , this Space leading power of China is going to shake other countries horribly ; as from now , Beijing is going to be more powerful to destroy any satellites of other countries. The entire world is going to be in the grip of China’s hand. Tiangong is present in the orbit approximately 400 km above the earth surface. From this “Heavenly Palace” , the great king China is going to rule over the universe from space. They have plotted to build the whole world into their own kingdom. China shows us the importance of their strong will power and determination by launching this space station , where **NASA** surrendered and accepted their disability of building any kind of space station in these upcoming years till 2030.

China was keen to develop its satellite and Space Technology to determine how the stresses of space flight environment affect living systems at the basic cellular and molecular levels, using contemporary cell and molecular biology techniques and measures. This includes characterizing and identifying changes in Gene and Protein Expression , DNA Function and Structure , Cellular Structure and Morphology , Cell to Cell Communication.

China has taught us a great lesson by this remarkable invention. When their dream had fallen and broken into thousand pieces; inspite of being afraid , they picked one of those pieces up and began again. And finally, this year has become the fruitful result of their consistency and incredible hard work.

Penguins

Sreya Sarkar, Semester VI

Penguins are flightless, aquatic birds. These birds live almost exclusively south of the Equator with the exception of the Galapagos penguin which lives in the Galapagos Islands of Ecuador. Penguins usually feed on crustaceans, cephalopods, and fishes found in the sea. These birds spend nearly half of their lives in water and half on land. More or less all of us know this much about Penguins. But are you aware that there are about 19 types of penguins are found on earth? Let me introduce you with different types of penguins.

1. Emperor penguin (*Aptenodytes forsteri*)



- It is the tallest and heaviest among all types of penguins.
- It is an endemic species to Antarctica.
- The penguins can attain a height of about 122 cm and weight between 22 to 45 kg. The head and dorsal surface of the species is black in colour while the belly is white and breast is pale yellow in colour.
- The ear patches are bright yellow.
- Fish is the primary food for these large penguins which also feed on crustaceans and cephalopods.
- The emperor penguins can remain under water for as long as 18 minutes.

2. King penguin (*Aptenodytes patagonicus*)



- The king penguin is the 2nd largest penguin after the emperor penguin.
- Two subspecies of king penguin have been recognised – *A.P. patagonicus* and *A.P. halli*.
- The former is found in south Atlantic and latter in other parts of penguin's range.
- The King penguins feed on small fish, squid and lantern fish. The penguins breed on the subantarctic islands scattered at Antarctica's northern reaches.

3. Adelle penguin (*Pygoscelis adeliae*)



- Lives along the coast of Antarctica
- One of the most southerly distributed of all seabirds
- They are mid sized ranging from 46-71cm.
- Distinguished by the white ring surrounding their eye and feathers at the base of the bill.
- Feed mainly on variety of krill and also glacial squid
- Although their population is quite stable but climate change threatens their future survival

4. Chinstrap penguin (*Pygoscelis antarcticus*)



- Lives on the islands and shores of Antarctic ocean and the southern Pacific ocean .
- They get their names from narrow black band under its head which appears as if it is wearing helmet
- Average length 72 cm and weight around 3 to 5 kg
- Krill, squid fish and shrimp are the food of these penguins

5. Gentoo Penguin (*Pygoscelis papua*)

- They are closely associated with adelle penguin .
- most characteristic phenotype of these penguins is the wide white stripe stretching like a bonnet the top of the head
- they also possess a bright orange – coloured bill and a fairly long tail
- height 51-90 cm.....3rd largest penguin species



- They breed in many sub Antarctic islands with the major colonies based in south Georgia , Kerguelen Islands, and the Falkland islands .
- Feed on krill and other crustaceans as well as fish
- Sea lions , killer whales and leopard seals often prey on the gentoos while many seabirds steal their eggs

6. Little Blue Penguin(*Eudyptula minor*)



- The little penguin is the smallest species of penguin that grows to an average of 33 cm only in height.
- These penguins can be observed along the coastlines of New Zealand and southern Australia.
- Due to their blue plumage and small size, they are fondly named as the fairy penguins.

7. White-Flipped Penguin

(*Eudyptula minor albosignata*)



- The white-flipped penguin is a small penguin that stands at about 30 cm tall.
- It obtains its name from the white markings on its flippers.
- The penguins nest on the Motunau Island and the Banks Peninsula near New Zealand's Christchurch city.

8. Magellanic Penguin

(*Spheniscus magellanicus*)

- The Magellanic penguin breeds in the coastal areas of Chile, Argentina, and the Falkland Islands.
- Some of these penguins even migrate to Brazil and are occasionally sighted in the coastal waters of Rio de Janeiro.
- The penguins grow to attain lengths of 61–76 cm.



- The penguins are characterized by two black bands between their breast.

9. Humboldt Penguin

(Spheniscus humboldti)



- The Humboldt penguin is a species of penguin living in South America. Coastal Chile and Peru serve as the breeding grounds of these penguins.
- The Humboldt penguin is named after the cold water current of the same name through which it swims.
- The penguins range in size from 56 to 70 cm. They feature a black head where a white border that runs from the top of both the eyes, around the ear covers and chin, to join at the throat.

10. Galapagos Penguin

(Spheniscus mendiculus)



- The Galápagos penguin is endemic to the Galapagos Islands and is the only penguin living north of the Equator.
- The penguin is 49 cm long and about 2.5 kg in weight. These penguins are found primarily on the Fernandina Island and Iasabela Island of the Galapagos but small populations are also scattered throughout other islands.

11. African Penguin (*Spheniscus demersus*)



- The African penguin has a range confined to the African waters.
- The penguins possess a black facial mask and distinctive pink patches of skin above the eyes. The penguins live in colonies spread across 24 islands between Algoa Bay and Namibia
- It is one of the most threatened species of penguins living today.

12. Yellow-Eyed Penguin (*Megadyptes antipodes*)



- The yellow-eyed penguin is a penguin species that is closely related to the little penguin.
- These penguins breed along the coasts of New Zealand's South Island, as well as other nearby islands.
- The penguins are medium-sized, measuring about 62 to 79 cm in length. The penguins have a bright yellow band running from the eyes around the back of the head.

13. Fiordland Penguin (*Eudyptes pachyrhynchus*)



- The Fiordland crested penguin breeds on the Stewart Island/Rakiura and South Island's south-western coasts in New Zealand. Here, the penguins nest in colonies within dense temperate forests.
- The penguins feed mainly on cephalopods and, to some extent, on crustaceans and fish..

14. Snares Penguin (*Eudyptes robustus*)



- The Snares penguin breeds on a group of islands called The Snares off the southern coast of New Zealand's South Island.
- The penguin is medium-sized, at 50 to 70 cm. The penguin has a dark blue-black dorsal surface and white ventral surface.

15. Erect-Crested Penguin

(*Eudyptes sclateri*)



- The erect-crested penguin is a penguin species that is known to live only in New Zealand. Here, it breeds on the Antipodes and Bounty Islands.
- It is primarily due to this restricted range that this species is classified as endangered.

16. Eastern Rockhopper Penguin

(*Eudyptes chrysocome filholi*)



- They inhabit sub-Antarctic islands located in the Indo-Pacific ocean like the Campbell, Auckland, Antipodes, Heard, Crozet, Prince Edward, Kerguelen, and other islands.
- They are crested penguins with yellow crest feathers.
- They have distinctive pink margins around their bills.

17. Northern Rockhopper Penguin

(*Eudyptes moseleyi*)

- Also known as the Moseley's penguin,
- 99% of the population of the northern rock hopper penguin breeds exclusively on the Gough Island and the Tristan da Cunha in the south Atlantic Ocean.



- It is described as distinct from the southern rockhopper penguin.

18. Royal Penguin

(*Eudyptes schlegeli*)



- The royal penguin, , is a penguin species that lives on the sub-Antarctic Macquarie Island and other islands in proximity.
- One of the species of crested penguins, the royal penguins are quite similar in appearance to the macaroni penguins and thus there is controversy regarding their classification as a separate species.
- One of the physical differences between the two types is that the royal penguin features a white face and chin instead of black in the case of the macaroni penguin. However, the two species are known to interbreed.
- The royal penguins can be sighted in the waters around Antarctica and spend a greater part of their time at sea than on land.

19. Macaroni Penguin

(*Eudyptes chrysolophus*)



- The macaroni penguin, , is a penguin species whose range stretches from the Antarctic Peninsula to the Subantarctic.
- One of the 6 species of crested penguins, the macaroni penguin features a yellow crest, black face and upper parts, and white under parts.

Mystery Wing

Abhilasha Ganguly, Semester VI



Antheraea polyphemus basically a tarantula with wings. It is a North American member of the family Saturniidae, the giant silk moths. It is a tan-colored moth, with an average wingspan of 15 cm. The most notable feature of the moth is its large, purplish eyespots on its two hindwings. The eyespots give it its name – from the Greek myth of the cyclops Polyphemus. The species was first described by Pieter Cramer in 1776. The species is widespread in continental North America, with local populations found throughout subarctic Canada and the United States. The caterpillar can eat 86,000 times its weight at emergence in a little less than two months.

Picture courtesy : Facebook

‘ডায়াবেটিস’ এই রোগটি দেশে এখন সর্বত্রই লক্ষ্য করা যায়। বর্তমানে দেশের বেশিরভাগ মানুষই এই রোগের শিকার। এটি একটি বিপাকীয় সমস্যা যদিও এই রোগের সঠিক কারণ ও চিকিৎসা সম্পর্কে বহু মানুষই এখনও অজ্ঞাত।

বর্তমানে সমাজে দুই ধরনের ডায়াবেটিস লক্ষ্য করা যায়। যথা –**ডায়াবেটিস মেলিটাস ও ডায়াবেটিস ইন্সিপিডাস**।

ডাক্তারের মতঅনুযায়ীডায়াবেটিসদুইপ্রকারযথা- কৈশোর ও প্রাপ্তবয়সের ডায়াবেটিস।কৈশোরেরডায়াবেটিস :২০বছরের নিচের ব্যক্তিদের মধ্যে ইনসুলিনের অভাবে এই ধরনের ডায়াবেটিস ঘটে,আক্রান্তরা অপুষ্টির শিকারহয় ও অত্যন্ত শীর্ণকায় হয়।প্রাপ্তবয়স্কদের ডায়াবেটিস : মেদবহুল ব্যক্তির এতে বেশি আক্রান্ত হয়।

ডায়াবেটিস ইন্সিপিডাস-এ আমাদের দেশে আক্রান্তদের সংখ্যা অতি নগন্য। এটি সহজাত ও বংশগত সূত্রে প্রাপ্ত। এই রোগের প্রধান উপসর্গগুলি হলো শুষ্কতা,প্রচুর পরিমাণে প্রস্রাব ও তৃষ্ণা, মূলত ADH হরমোনের অভাবে দূরসনবর্তনালিকা ও সংগ্রাহকনালিকা থেকে জলের পুনঃবিশোষন ঘটেতে পারে না, ফলে প্রচুর জল মূত্রের মাধ্যমে নির্গত হয়।এই রোগে আক্রান্তদের **water drinkers** আখ্যা দেওয়া হয়।

ডায়াবেটিস মেলিটাস একাধারে বহুমূত্র বা মধুমেহ যেটি অগ্নাশয়ের আইলেটস অব ল্যাঙ্গারহান্সের বিটা কোষ থেকে ক্ষরিত ইনসুলিন হরমোনের অভাবে বা যতটুকু ক্ষরিত হয় সেটি সঠিকভাবে কাজে না লাগার ফলে রক্তে শর্করার পরিমাণ বৃদ্ধি পায়। এছাড়াও দুশ্চিন্তা, উদ্বেগ,মেদাধিক্য,অনুপযুক্ত খাদ্যাভ্যাস, নিয়মিত শরীরচর্চার অভাব ডায়াবেটিস মেলিটাসকে প্রভাবিত করে।

এই রোগের উপসর্গগুলি হলো :- ১)ঘন ঘন মূত্র ত্যাগ, ২)তৃষ্ণা বৃদ্ধি, ৩)রক্তে শর্করার মাত্রা বৃদ্ধি, ৪) মূত্রে চিনিদেখা দিতে পারেহলো ক্ষত নিরময়ে বিলম্ব হওয়া, ৫) আহারে ইচ্ছা বৃদ্ধি।

ডায়াবেটিস মেলিটাস আবার বিভিন্ন ধরনের হয়ে থাকে-

- সাধারণত ৫% মানুষ ইনসুলিন নির্ভর ডায়াবেটিসে ভোগে।
- ৮৫-৯০% রোগী ইনসুলিন নিরপেক্ষ ডায়াবেটিসে ভোগে, এক্ষেত্রে যতটা ইনসুলিন ক্ষরিত হয় তা কোনো শারীরিক কারণে কাজে লাগে না।
- গর্ভাবহায় ১% মহিলা অপুষ্টিজনিত ডায়াবেটিসে ভোগে।

ডায়াবেটিস মেলিটাস-এর ফলে শরীরে নানা রোগের প্রাদুর্ভাব ঘটে যেমন - নিউরোপ্যাথি, কোলেস্টেরল বেড়ে যায়, হৃদরোগের আশঙ্কা ঘটে, পায়ে ঘা হয় ও অসাড় হয়ে যায়, শরীরে জলের অভাবে কিটোন জমে গিয়ে কিটোসিস হয়, চোখের রেটিনা ক্ষতিগ্রস্ত হয়।

এই রোগ থেকে আক্রান্তদের রক্ষা করার জন্য তাদের বিভিন্ন পুষ্টি যুক্ত খাদ্য দিতে হবে। ডায়াবেটিস রোগীদের খাদ্যে শর্করার পরিমাণ কমাতে হবে। অনেকের মতে হলুদ, ছোলা, পেঁয়াজ, শশা, মেথি, রসুন ইত্যাদি রক্তে শর্করা কমায় তাই এগুলি খাদ্য তালিকায় রাখতে হবে। প্রাপ্তবয়স্কদের রিডউসিং ডায়েটের সঙ্গে নিয়মিত ওষুধ খেতে হবে ও প্রয়োজনে ইনসুলিন ইনজেকশন দিতে হবে। খাদ্য উপাদানের অদল বদল ঘটিয়ে সঠিক পুষ্টি যুক্ত খাদ্য গ্রহণ করার মাধ্যমে এই রোগ নিরাময় করা যেতে পারে।

Homing Pigeons : masters of navigation & mind-mapping

Jayashree Chakraborty ,Semester II



Overview

The Homing pigeon, is a variety of domestic pigeons (*Columba livia domestica*) or which is also commonly known as the mail pigeon or messenger pigeon. The *Columba livia domestica* aka the homing pigeon is derived from the wild rock dove, which is selectively bred due to its innate ability to find out its way back to its home despite of extreme distances. In similarity to wild rock dove, homing pigeons has the skill of

magnetoreception enriched in itself by birth due to the evolutionary adaptations earned by its ancestors in the course of several years. According to several studies, conducted across the globe, these homing pigeons are recorded to have travelled the flight distances as long as 1800 km in competitive pigeon racing. Average speeds acquired by these breeds are up to 97 kmph over moderate distances which may reach up to 160/kmph as observed over short distance racing.

Homing pigeons or the domesticated pigeons , due to having the innate homing ability and good-to-go average speed in long duration flights, were used as messengers during wars until the telephones were introduced. The system of sending and receiving messages via pigeons was often referred to as “pigeon post” if used in postal service and “war pigeon” in wartime service.

Brief history of domesticating homing pigeons

Domesticating the homing pigeons and using them as effective messenger or postal system had started long back before the 19th century references observed so far. In the ancient Egyptian History dating back to 3000 BC, positive traces are found where Egypt was using homing pigeons as pigeon post. In general, short messages in written were tied to the legs and the pigeons were freed to reach the so called nest or the desired destination of the sender.

The sports including these pigeons were also traced back to these ancient times.

During the 1150s, pigeon post was quite a popular postal service in the areas near Baghdad, which was later adopted by Genghis Khan also.

Sultan Nur ad-Din established this system in regular basis in 1167 in communication between Baghdad and Syria.

In 1436, Damietta, by the mouth of Nile, Pedro Tafur encountered the use of messenger pigeons as postal service for the first time in his life.

Historical references from the Republic of Genoa also support the pigeon post system.

Tipu Sultan of Mysore also implemented these postal services in his kingdom during his reign from 1750-1799.

Shockingly, in 1815, even the outcome of Battle of Waterloo is believed to be delivered by a pigeon.

The great Cannonball race, Brussels in 1818 was the first of its kind including pigeons in race which was recorded in written.

In the later years, from the message delivery in Franco-Prussian War ,Great barrier mails to news collection by NYC newspapers in 19th-20th century and later on even in 21st century the reliability on pigeon post still exists in many parts of the world even today. To utter surprise, India's only pigeon post/messenger system that is India's Police Pigeon Service messenger system was positively being used till 2002 until its retirement in the state of Odisha.



Significant Roles

Postal Carriage: as mentioned in the historical evidences the use of pigeons as a postal service is an age old system dating back to 3000BC and the use of which is still traceable even in 21st century.

Wartime postal service/communication:

pigeon messenger system used in wartime situations was one of the most efficient way of sending and receiving necessary messages in turmoil situations and in the most remote areas. The use of pigeon post in wars can be justified by the historical background of many wars of which several are mentioned above in

previous section.

Smuggling: to the very contrast of many useful roles of this postal service here is one demerit which came into the limelight in the between the late 1980s to 2010s. Where homing pigeons are reported to be used as smuggling technique for international smuggling of narcotics, several contraband items like cell phones, SIM cards, batteries, USB chords and even Drugs were smuggled with the help of homing pigeons.

Computing and data transfer: this point might seem a bit fictional but it's very true that pigeons were used many a times in various parts of the world to transmit messages or transfer data. One instance of this was recorded in 2001, April 28, where the humorous IP Over Avian Carriers(RFC 1149) which is an internet protocol built in its way to transmit messages via pigeons which was originally intended as an April Fool's Day RFC entry. Another instance was in September,2009 when a South-African IT company based in Durban used a 11-month-old bird loaded on with a data packed 4GB memory stick against ASDL service from the country's biggest service provider, Telkom. And to the surprise the bird managed to transfer data to the desired place with 1 hour and 8 minutes covering a distance of 80Kms whereas it took 2 hours and 6minutes but could only deliver 4% of the data to the receiver at the other end over the same ASDL digitally.

Navigation of the homing pigeons

Numerous studies across the globe have been conducted since the past few decades in order to decode the fundamentals of the efficiency in navigation achieved by the homing pigeons. Several researches have been performed to find out how come the pigeons are able to get the way back to their nests even after being transported to distant places which they have never visited before.

In the course of these studies and experiments, many came to the conclusion that homing ability of pigeons is either based on “map and compass model”, in which the compass feature allows birds to orient and simultaneously the map feature helps to determine their location w.r.t. the destination (their nests). However, while the compass is believed to be relying on sun but the map mechanism is quite debatable. Many say that it is dependent upon the ability of the birds to detect Earth’s magnetic field.

Several studies have approved the theory of birds being able to detect the magnetic field in order to get their way to home. An experiment under some zoological researchers was suggested such that a mount of Iron particles are found on the top of a pigeon’s beak which gets aligned to earth’s magnetic north similar to man-made compass, thus up to an extent acting as a compass for the pigeon to find its way back to home. But this very theory was being disproved by a 2012 study again arising with some fundamental questions in the context of the previous theory thus putting the field on course to search again for a proper and justified explanation/theory.

Other researches elucidate the navigation of these homing pigeons to be performed with the help of visual landmarks by following roads, trees, buildings, etc. some even compare them to the humane type of navigation by following habitual routes.

GPS Tracing studies show that the gravitational anomalies may also play a significant role as well.

Use of infrasound by pigeons as suggested by a geological survey by Jon Hagstrum of USGS. He highlighted that sound waves as low as 0.1Hz are able to disrupt the navigation of a homing pigeon. Since pigeon ears are very small they aren’t able to interpret such long waves for which in turn it tends to fly in a circle in its initial flight so as to mentally map such long infrasound waves.

Researches conducted by Floriano Papi (Italy, 1970s) and many other recent studies by Hans Wallraff, also suggest that homing pigeons may also use Olfactory navigation techniques by using spatial distribution of atmospheric odours which proved to be a vital breakthrough in the study.

Various studies indicate that difference in breeds creates a difference in the navigational cues to different extents.

Another most important breakthrough in the research about resolving the mystery of the cause of efficiency of homing pigeons in navigation came when the concept of Magnetoreception was contrasted with the whole matter. Here, a light mediated mechanism involving the eyes and is lateralized has been examined thoroughly but developments have implicated the terminal nerve in magnetoreception. Scientists have spent decades of research on exploring the possible techniques used by pigeons to perform magneto reception to find their way to home. And now the study has come into a bicameral house of two mainstream theories:

1. Free Radical pair: here the protein present in the retina of pigeons named “ cytochrome” enables them to visually access earth’s magnetic fields.

2. Magnetic particles inside pigeons: various studies show the presence of magnetic particles or **magnetotactic bacteria** inside or on the pigeons body that causes it to have its own magnetic field interact with the field of earth and map its route.

Activity corner



Field study at,

SASYA SHYAMALA KRISHI VIGYAN KENDRA, SONARPUR



Date: 24th April, 2022

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Visit to,

The Indian Museum, Kolkata



Date: 9th April, 2022

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Seminar



FRESHER'S & FAREWELL PROGRAMME



Date: 25th March 2022,
Place: College Common Room

Read about organisms, New inventions , Scientific Aspects behind Religious Beliefs and a lot more things in this edition of our magazine made by the joint effort of the students and teachers of Zoology Department of Seth Anandram Jaipuria College.

DOSTARLIMAB : DRUG THAT CURED CANCER

In the history of cancer treatments , this is considered to be the first time that cancer was cured by the use of a drug.

গুবরের চোখে মহাবিশ্ব

একটি গুবরের চোখে আমাদের এই মহাবিশ্ব টা ঠিক কেবোম ? ভেবে দেখেছেন কোনোদিন?

DASHAVATAR : THE THEORY OF EVOLUTION

The Dashavatar of Vishnu that we all have heard and speak about... is it just religious? What is the scientific aspect behind it?

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Seth Anandram Jaipuria College