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DISAPPEARING of FROGS IN INDIA

The future for frogs looks bleak, unless humans change their habits

Seven new species of night frogs found in India

Why Do Onions Make You Cry?

Impact of climate Change on Women

Want to lose weight use Vegetarian diet

A new twist in old tale- Omega fatty acids

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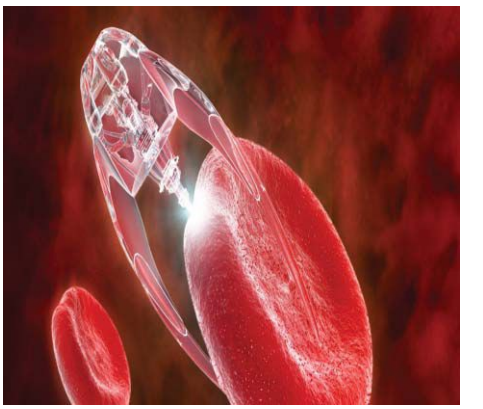

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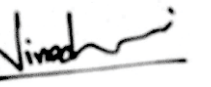
EDITORIAL NOTE

Disappearing of Frogs In India

Now every part country monsoon reached. In most of India's cities, the sound of frogs croaking is no longer a nightly accompaniment to the rain. To increase our GDP, we are harvesting the nature continuously. We use pesticides to kill insects and don't realize the importance of frogs in controlling pests. Once commonly sighted during the monsoon, species such as the common toad, the skittering frog, the cricket frog, the bull frog and the narrow-mouthed frog have all slowly disappeared from the urban areas of India.

In addition to this, we have also explore Health related topics like Illegal levels of arsenic found in baby foods, A new twist in old tale- Omega fatty acids, want to lose weight use vegetarian diet and other stories like importance of adopting green chemistry, impact of climate change on women, Why Do Onions Make You Cry? etc.



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Frogs are disappearing, not only in India but worldwide. The problem is both complex and serious - complex, because we don't fully understand the causes and serious because it points to problems in the environment.

Frogs, like all amphibians, have moist, permeable skins, or skin patches, that allow both inward and outward movement of water and dissolved gases. This water and gas exchange across a frog's skin makes it particularly prone to the effects of toxic chemicals such as pesticides and herbicides. For this reason, frogs are important indicator species. When frogs start to disappear we know things are seriously wrong in the natural world.

Declines in frog numbers have been reported in North and South America, Europe, and South Africa - all areas with active frog research communities. However, little to no frog monitoring occurs in south-east Asia and New Guinea, both of which have highly diverse frog faunas. Whether populations in these areas are stable or also in decline is not known.
A new U.S. government study shows just how quickly many amphibians are disappearing from ponds and creeks across the United States.
The average rate of decline for U.S. amphibians is about 3.7 percent a year, which may sound small but compounds over time, scientists with the U.S. Geological Survey reported in the peer-reviewed online journal PLOS One.
Biologists recognized an international amphibian crisis in 1989, when scientists' compared their disparate tales of vanishing species in locations around the world.
A global assessment in 2004 suggested nearly one-third of the amphibians species in the world, and the United States specifically, were declining.
An assessment of India's amphibian population under the Conservation Assessment and Management Plan (CAMP) lists 32 species as critically endangered, 71 as endangered, 52 as vulnerable and nine as near threatened. It says no data is available on another 63. More than 50 species are thought to be lost.

Causes of declines

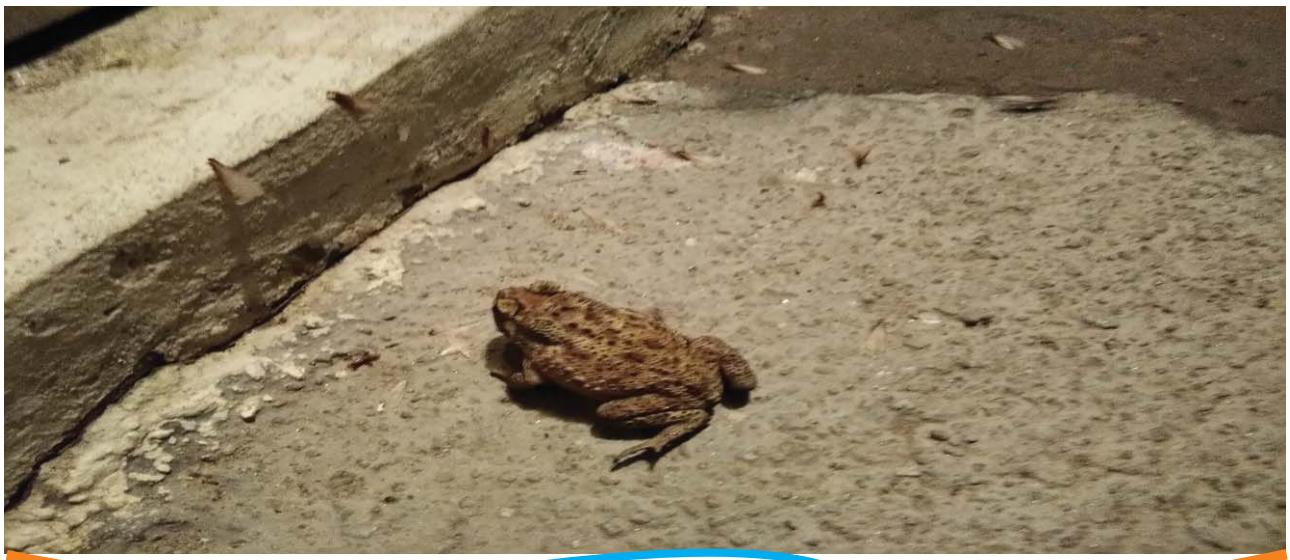
Climate change
Global warming will cause worldwide changes to rainfall and temperature. In areas where rainfall becomes less regular, the breeding success of frogs will be severely impacted. A number of poor breeding years in succession may push a species to extinction.

Pesticides
Use of pesticides are lethal to many frog species

Habitat destruction
Drought and heavy rainfall events – can decrease the number of amphibians. The amphibians' response depends on a balance between these two key factors. If ponds dry up while aquatic juveniles are developing, survival of the next generation is lowered.

Chytridiomycosis, a fungal infection
Over the past 30 years, around 200 species of amphibians have disappeared due to chytridiomycosis, a fungal infection. The scientific community has attempted to fight the pathogen, without success according to a research.

Source: Queensland Museum, reuters.com, livemint.com, usgs.gov



The future for frogs looks bleak, unless humans change their habits

Amphibians, the oldest group of land vertebrates, are regarded as the most threatened across the globe. From Brazil's tropical rain forests, to Canada's temperate boreal forests, from fresh streams in the Alps to Australia's temporary ponds, most populations are declining. Contributing factors include habitat destruction, invasive species, disease spread and rapid climate change. Most are human induced.

Frogs are ectotherms: they generate their heat from the environment around them. When the temperature changes in their native areas, frogs need to change their behaviour or habitat to stay at their preferred temperature.

Frogs are also generally regarded as poor dispersers among land vertebrates. This means that, unlike birds or large mammals, they find it difficult to move – or they move slowly – across landscapes. As a result, it has been suggested that they will not be able to keep track of rapid climate change because they cannot cover the distances required to match the particular climate they require.

South Africa's Cape region, comprising both succulent semi-desert and fynbos vegetation, has a unique amphibian fauna that has been recognised globally. It consists of more than 50 species of frogs, 37 of which are endemic (they occur nowhere else in the world). Cape frogs are important because of their global uniqueness.

But their future may be under threat, and the climate of the future looks to be changing faster than the steady climate they evolved into in the past. How can we target conservation interventions to pinpoint which species or sub-populations need particular help?

Confined to smaller and smaller areas

Biologists have already observed that species use different methods to keep up with changes in climate. These methods broadly involve species shifting their distribution to track suitable climate, and changes in behaviour and genetic make-up to enable them to survive new climate regimes.

In a recently published study, we looked at how changes in global climate have affected the spread of the endemic Cape frog community during two key periods in recent history: the Last Glacial Maximum about 21,000 years ago; and the Holocene Glacial Minimum about 6,000 years ago. We then projected the distributions forward into two possible future scenarios using two emission scenarios. This allowed us to ask whether the forecasted climates would significantly change the distribution of Cape frogs. By predicting these future distributions, we were able to assess whether these species are likely to move in specific directions, like north or south, or whether their distributions are likely to become fragmented. It also established which particular group of frogs is likely to be more negatively affected.

The results were startling. Our models suggested that the area occupied by Cape frogs today is just a fraction of the area of suitable climate space they would have had available at the Last Glacial Maximum. But comparing the current distribution with that at the Holocene Glacial Minimum provided very little evidence for change. The biggest surprise was the massive loss in suitable climate space between current distributions and future forecast scenarios in 2080.

Not only are Cape frogs likely to be confined to a much smaller area, but the rate at which they will be forced to move is faster than anything that they have experienced in a very long time. This would mean that many of the species would experience a fragmentation effect: their sub-populations would be separated beyond what they're likely to be able to bridge through their own hopping abilities. In other words, sub-populations would become isolated from each other – and too far apart to reach each other to breed. This effectively makes each small sub-population more vulnerable to extinction.

Our models predict that the suitable climate space is likely to shift Cape frog distributions to

the north. Based on the estimates, this has been a trend since the Last Glacial Maximum. But in the past this would have seen a movement rate equivalent to 1km per 1,000 years. The movement between the present and the worst emission scenario in 2080 is more than 500 times faster.

Is there any hope?

Our interest is in the trends that the data show, and asking how these potential scenarios could be mitigated by conservation actions today. For example, in the future lowland species are expected to be more fragmented than highland species. This shows the need to establish corridors of suitable habitat between existing sites for many species. These areas need to be made up of both terrestrial and aquatic habitats, allowing animals to track suitable climate space as they move. Where possible, corridors should not only move between lowland sites, but link lowland to upland sites.

By making predictions of what may happen to the Cape community of frogs, we are providing information that may be typical for any animal with limited dispersal ability, including lizards and flightless insects.

The comparative datasets for many smaller invertebrates are absent. But our results could be generalised to a much larger group of ectothermic animals that are limited in their ability to move.

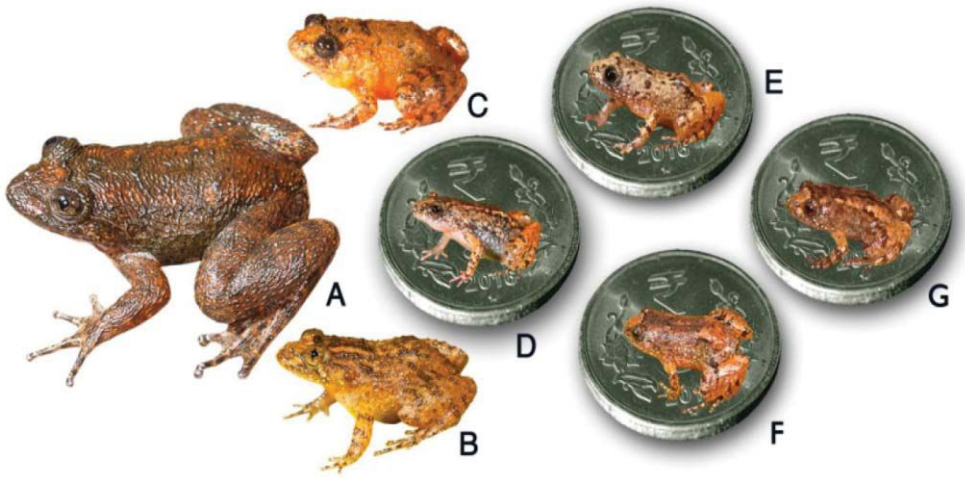
Our study has shown that despite major changes in climate, as well as available habitat in the Cape, the frogs continue to survive. Their resilience is likely to require our help in the future through conservation actions that not only preserve their current breeding and foraging sites but also enable them to move into areas with suitable climate conditions.

There is hope. If the global community can stick to the recent Paris Agreement, our scenario suggests that the biotic velocity – the distance and/or time to move between the point where a population is and the nearest climatically suitable space – of the Cape frog community will be roughly double that of historical rates.

Many conservation agencies have started taking specific actions that would see many coastal and upland areas linked through areas of continuous reserves. The study has also helped identify areas where the frogs can be monitored to assess whether climate change is likely to affect them. These include lowland areas that are already very heavily affected by humans for agriculture and living space. These areas won't be changed back to their original state, but they could be made more tolerant of the flora and fauna that could be used as corridors. Today, frogs are reliant on the spaces that we humans make for them.

Source: This article published in The Conversation by John Measey, Senior Researcher at the CIB based in the Department of Botany and Zoology, Stellenbosch University. Mohlamatsane Mokhatla, Scientist at South African National Parks & PhD student at the CIB, Department of Botany and Zoology, Stellenbosch University

Seven new species of night frogs found in India



Indian scientists have discovered seven new frog species belonging to the genus Nyctibatrachus, commonly known as Night Frogs. This find is a result of five years of extensive explorations in the Western Ghats global biodiversity hotspot in India. Four out of seven of the new species are miniature-sized frogs (12.2-15.4 mm), which can comfortably sit on a coin or a thumbnail. These are among the smallest known frogs in the world.

Unlike other frogs in the genus that are predominantly stream dwelling, the new miniature frogs were found under damp forest leaf litter or marsh vegetation. Scientists were surprised by the relative abundance of these previously unknown species at their collection localities In fact, the miniature species are locally abundant and fairly common but they have probably been overlooked because of their extremely small size, secretive habitats and insect-like calls according to researchers.

In the lab, the newly sampled frogs were confirmed as new species by using an integrated taxonomic approach that included DNA studies, detailed morphological comparisons and bioacoustics. Evidence from these multiple sources confirmed that the diversity of Night frogs is higher than previously known and particularly remarkably for the miniaturized forms. Previously, the Night Frog genus composed of 28 recognized species of which only three were miniature-sized (<18 mm). Now the total number of known *Nyctibatrachus* species has increased to 35, of which 20 percent are diminutive in size. This frog genus is endemic to the Western Ghats of India and represents an ancient group of frogs that diversified on the Indian landmass approximately 70-80 million years ago.

The discovery of several new species of ancient origin can provide useful insights into the evolution of endemic frog lineages in the Western Ghats, which is a leading amphibian hotspot. The past decade has witnessed an exponential increase in the number of new amphibian species described from this region. Of the total new species of amphibians (1581) described globally between the years 2006-2015, the highest number were from the Brazilian Atlantic Forest (approximately 182) followed by the Western Ghats-Sri Lanka biodiversity hotspot (approximately 159), with 103 species described alone from the Western Ghats region.

However, the future of many of the new species may be bleak. All the newly described species are currently known only from single localities in the southern Western Ghats, and some lie outside Protected areas. Researchers found the Radcliffe's Night frog and the Kadalar Night Frog inside private or state-owned plantation areas facing threats such as habitat disturbance, modification and fragmentation.

Illegal levels of arsenic found in baby foods

Credit: Alexandra Grablewski / Getty Images-verywell.com

Babies are particularly vulnerable to the damaging effects of arsenic that can prevent the healthy development of a baby's growth, IQ and immune system to name but a few.

In January 2016, the EU imposed a maximum limit of inorganic arsenic on manufacturers in a bid to mitigate associated health risks. Researchers at the Institute for Global Food Security at Queen's have found that little has changed since this law was passed and that 50 per cent of baby rice food products still contain an illegal level of inorganic arsenic.

Rice has, typically, ten times more inorganic arsenic than other foods and chronic exposure can cause a range of health problems including developmental problems, heart disease, diabetes and nervous system damage.

As babies are rapidly growing they are at a sensitive stage of development and are known to be more susceptible to the damaging effects of arsenic, which can inhibit their development and cause long-term health problems. Babies and young children under the age of five also eat around three times more food on a body weight basis than adults, which means that, relatively, they have three times greater exposures to inorganic arsenic from the same food item.

The research findings, published in the PLOS ONE journal today, compared the level of arsenic in urine samples among infants who were breast-fed or formula-fed before and after weaning. A higher concentration of arsenic was found in formula-fed infants, particularly among those who were fed non-dairy formulas which includes rice-fortified formulas favoured for infants with dietary requirements such as wheat or dairy intolerance. The weaning process further increased infants' exposure to arsenic, with babies five times more exposed to arsenic after the weaning process, highlighting the clear link between rice-based baby products and exposure to arsenic.

In this new study, researchers at Queen's also compared baby food products containing rice before and after the law was passed and discovered that higher levels of arsenic were in fact found in the products since the new regulations were implemented. Nearly 75 per cent of the rice-based products specifically marketed for infants and young children contained more than the standard level of arsenic stipulated by the EU law.

Rice and rice-based products are a popular choice for parents, widely used during weaning, and to feed young children, due to its availability, nutritional value and relatively low allergic potential

Common painkillers may raise risk of heart attack

Risk of myocardial infarction is greatest in first month of taking NSAIDs such as ibuprofen if dose is high, say researchers.
Researchers from the University of Copenhagen found other NSAIDs, such as diclofenac, present an even greater risk of cardiac arrest – when the heart suddenly stops pumping blood around the body.
Commonly prescribed painkillers including ibuprofen increase the likelihood of having a heart attack within the first month of taking them if consumed in high doses, a study suggests.
All five nonsteroidal anti-inflammatory drugs (NSAIDs) examined could raise the risk as early as the first week of use, an international team of researchers found.
They concluded that there was a greater than 90% probability that all the NSAIDs they studied were associated with a heightened risk of heart attack.
The study only looked at people taking the drugs continuously and not those taking the odd painkiller for a headache or other minor ailment.
The findings were published online by the British Medical Journal.

Source: TheGuardian.com, Telegraph.co.uk Independent.co.uk

Source: Heart Attack

Natural oxygen therapy to CURE stage 4 mouth cancer

Hyperbaric oxygen therapy (HBOT)

Hyperbaric oxygen therapy (HBOT) is breathing 100% oxygen while under increased atmospheric pressure. Hyperbaric oxygen therapy is a well-established treatment for decompression sickness, a hazard of scuba diving. Other conditions treated with hyperbaric oxygen therapy include serious infections, bubbles of air in your blood vessels, and wounds that won't heal as a result of diabetes or radiation injury.

Credit: Spa Cielo Cabo

When a patient is given 100% oxygen under pressure, hemoglobin is saturated, but the blood can be hyperoxygenated by dissolving oxygen within the plasma. The patient can be administered systemic oxygen via two basic chambers: Type A, multiplace; and Type B, monoplace. Both types can be used for routine wound care, treatment of most dive injuries, and treatment of patients who are ventilated or in critical care.

The global hyperbaric oxygen therapy market is estimated to grow at an impressive CAGR during the forecast period 2016-2022. There are various factors like the growing incidences of acute and chronic wounds and increase in the prevalence of wound site infections which is driving the global hyperbaric oxygen therapy market. The increasing patient pool worldwide is also injecting huge growth opportunities in the global market. Increase in the demand for low cost treatment is increasing medical tourism in the emerging countries which has increased the patient's pool in the emerging countries. Also, the growing technological advancements are also accelerating the growth in the global hyperbaric oxygen therapy market.


Credit: Long Room

Sabrina Gauer was 27 years old when she learned a sore on the side of her tongue was actually stage 4 mouth cancer.

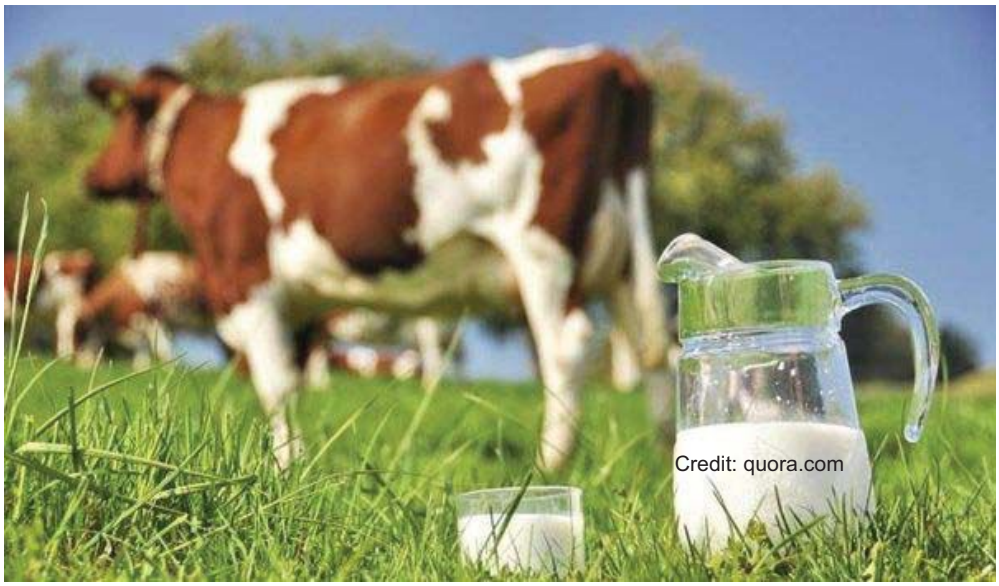
The singer had to have part of her tongue removed and reconstructed in an intensive surgery to carve out the aggressive oral squamous cell carcinoma tumor in October 2015.

When Gauer was told the next step in her treatment was radiation therapy, she opted for a controversial method against her doctor's recommendation: oxygen therapy.

Now, the 28-year-old from Rochester, New York, has been cancer-free for 20 months after spending six weeks in a hyperbaric oxygen therapy tank - and can still sing.

Source: emedicine.medscape.com, DailyMail.co.uk ResearchandMarkets.com, mayoclinic.org

Kids Might Be Shorter If They Drink Non-Cow's Milk


Credit: quora.com

Cow milk consumption in childhood has been associated with increased height, which is an important measure of children's growth and development.

Young children who drink soy, almond or other milk "alternatives" may be a bit shorter than kids who drink cow's milk, a new study suggests.

Researchers found that among more than 5,000 Canadian children, a 3-year-old who drank three cups of non-cow's milk each day was, typically, a half inch shorter than a child who drank the same amount of cow's milk.

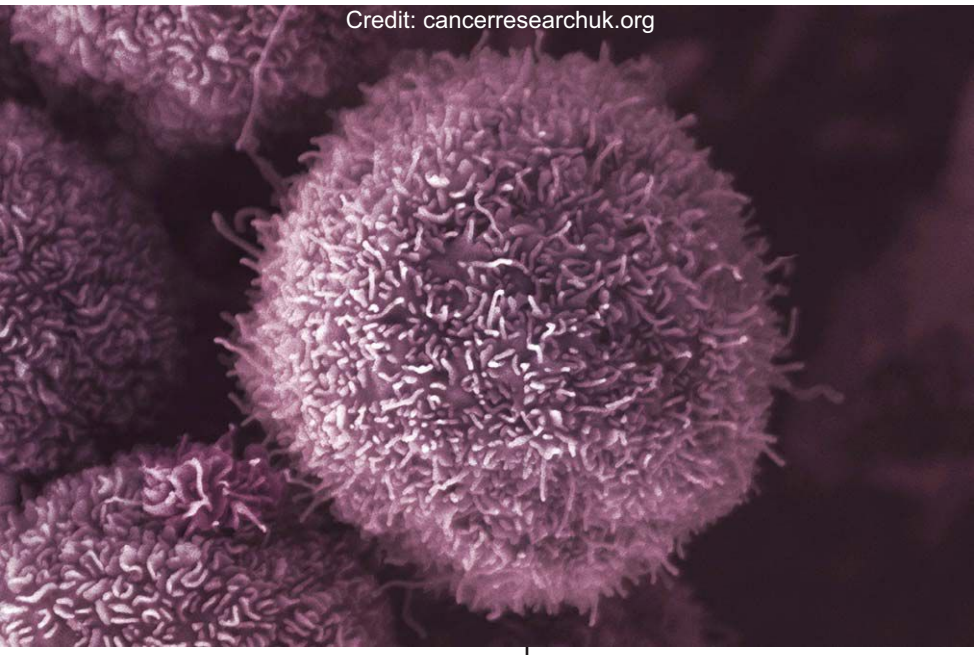
The study - which was funded by the Canadian government and St. Michael's Hospital Foundation - doesn't prove that parents' milk choices were the culprit.

According to the study, the height difference for a 3-year-old who consumed 3 cups of non-cow milk per day relative to 3 cups cow's milk per day was 1.5 cm.

It can sometimes seem to parents that there is an infinite amount of reasons why or why not to feed certain foods to their children. Milk may help height, but it can also pack on the pounds. Eggs have recently been shown to be good for growth in children, but are also high in cholesterol.


Credit: childteaching.com

Exposure to Pesticides May Increase Risk of Liver Cancer


Credit: cancerresearchuk.org

A new report provides an overview of incidence, mortality, and survival rates and trends for liver cancer, a cancer for which death rates have doubled in the United States since the mid-1980s, the fastest rise of any cancer in the U.S. The report appears in CA: A Cancer Journal for Clinicians, and says differences in major risk factors as well as inequalities in access to care have led to significant racial disparities in liver cancer mortality.

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Pesticide exposure was associated with a 71 percent increased risk of liver cancer, according to the meta-analysis, which was presented on April 3 at the American Association for Cancer Research's annual meeting in Washington, D.C. The findings have not yet been published in a peer-reviewed journal.

In another study showed that a possible association between specific pesticides and liver cancer risk, with the strongest evidence observed in biomarker-based studies. In particular, organochlorine pesticides, including DDT, may increase liver cancer risk.

According to natural news In fact, pesticide use has been linked to the development of at least nine chronic diseases:

1. Alzheimer's Disease
2. Other types of cancer
3. Birth defects
4. Endocrine disruption
5. Fertility issues
6. Asthma
7. Diabetes
8. Parkinson's Disease
9. Neurodevelopmental disorders

Source: LiveScience.com, NaturalNews.com, DOI:10.1007/s10552-017-0854-6,


Credit: Pesticide Action Network

A new twist in old tale- Omega fatty acids

Credit:activebodynutritions.com

Omega fatty acids also known as polyunsaturated fatty acids [PUFAs] are a group of naturally occurring lipids. They are also known as essential fatty acids (EFA) because they not synthesized in the human body and hence have to be obtained through diet. Decreased risk of cardiovascular disease and incidence of cancer was observed in Greenland Eskimos and Alaskans who consumed fish enriched with long chain polyunsaturated fatty acids [LCPUFAs]. Since Burr and Burr's discovery of EFA in 1954, the subject on EFAs has opened to a better understanding of their importance in human health and disease.

Importance Of Omega-Fatty Acids In Human Health

Omega fatty acid And Brani

Docosahexaenoic acid is the most abundant omega-3 fatty acid present in the brain. It is essential for prenatal brain development and normal maintenance of brain function and visual learning ability in adults. It has neuro-protective function. A preponderance of the research studies around the globe has focused on DHA, that is preferentially deposited in brain phospholipids and has been beneficial in reducing anxiety, suicide, mood disorders, depression, schizophrenia, aggression, attention deficient hypersensitivity disorder and the risk of neurodegenerative diseases such as Dementia, Huntington's Disease, Alzheimer's and Parkinson's disease. Docosahexaenoic acid in baby formulas for new borns (both premature & full term) influences their visual and cerebral capacities including both cognitive and intellectual functions. Therefore, most of the baby formulas that has been marketed in recent years have been supplemented with polyunsaturated fatty acids in general and DHA in particular.

Omega fatty acid And Cardiovascular Diseases

Globally, cardiovascular disease is one of the leading causes of mortality and morbidity. Trans fatty acids, cholesterol and saturated fats are chiefly responsible for various kinds of cardiac associated problems. Cardiovascular protective nature of LCPUFAs is attributed to its property of reducing cholesterol, blood triglyceride levels and thus the risk of heart attack, atherosclerosis, serum triglyceride in blood serum level of hyperglycemia patients, blood pressure, platelet aggregation, thrombosis and inflammation. Intake of

omega fatty acids in the form of fish oil capsules has shown beneficial effects on asthmatic patients.

Prevention of cardiovascular diseases appears to be achieved by replacing saturated fats with healthy omega-3-fatty acids. Cardiac societies from across the globe recommend intake of 1g/day of the two LCPUFAs namely EPA and DHA for cardiovascular disease prevention, treatment after myocardial infarction and secondary prevention of cardiovascular disease.

Recent Development: The Omega-3 Index

Research studies reports that, higher levels of omega-3 fatty acids in blood have been shown to be associated with lower risk of cardiovascular events. Omega-3 index is defined as the percentage of EPA and DHA in the red blood cell membrane. It helps in determining biomarkers of omega-3 fatty acids (determining EPA + docosapentaenoic acid + DHA in whole blood, fatty acid composition of cardiac samples, serum EPA and DHA).

When considering biomarkers of omega-3 fatty acids, concentration-risk dependence is observed: Persons with 6.5% omega-3 fatty acids in red blood cell membranes have 90% less risk for sudden cardiac death as compared to persons with 3.3%. These data are from a case control study in Seattle, performed on victims of sudden cardiac death and matched controls. In the Physicians health study, similar results have been observed: Physicians with 6.87% omega-3 fatty acids in their whole blood had 90% less risk for sudden cardiac death, as compared to physicians with 3.58%.

Omega fatty acid And Pregnancy

Intake of various kinds of diet by pregnant women influences her pregnancy, foetal, overall infant development and lactation. Docosahexaenoic acid has been of particular interest in pregnancy nutrition because of beneficial effects on maternal health and the development of foetus. Metabolic demand for DHA increases as pregnancy advances. In the third trimester, increase in accumulation of LCPUFAs in the foetal blood circulation, in particular DHA is observed, in order to support brain growth and visual development.

Credit: Bodybuilding.com

Growing lines of evidence suggest that, last trimester of pregnancy is the time when DHA accretion into the foetal brain and nervous system is maximum. Growing foetus accumulates on an average of 67mg of omega fatty acids, predominantly in the form of DHA per day during the last trimester of pregnancy. This increased metabolic need for DHA during pregnancy may be supplied by maternal diet rich in docosahexaenoic acid. Imbalance in the fatty acid composition is considered as one of the leading causes of attention deficit hyperactivity disorder (ADHD), a neurobehavioral disorder that is defined by persistent symptoms of hyperactivity and inattentiveness most commonly seen in childhood and adolescence, which often extend to the adult years.

Omega fatty acid and Cancer

Despite progress in cancer therapy, conventional cytotoxic therapies lead to unsatisfactory long-term survival, mainly related to development of drug resistance by tumour cells and toxicity towards normal cells. Long chain polyunsaturated fatty acids can exert anticancer

property in human cancer cells either alone or in combination with conventional therapies. Indeed, LCPUFAs potentially increase the sensitivity of tumour cells to conventional therapies, possibly by improving their efficacy especially against cancer cells which are resistant to treatment. Moreover, in contrast to traditional therapies, LCPUFAs appear to cause selective cytotoxicity towards cancer cells with little or no toxicity on normal cells.

Research studies conducted by various researchers reported potential applications of LCPUFAs in the treatment of breast, prostate and colon cancer.

Omega fatty acid and Inflammation

Anti-inflammatory properties of LCPUFAs are used in the treatment of inflammatory diseases such as inflammatory bowel disease (IBD), eczema, psoriasis and rheumatoid arthritis etc

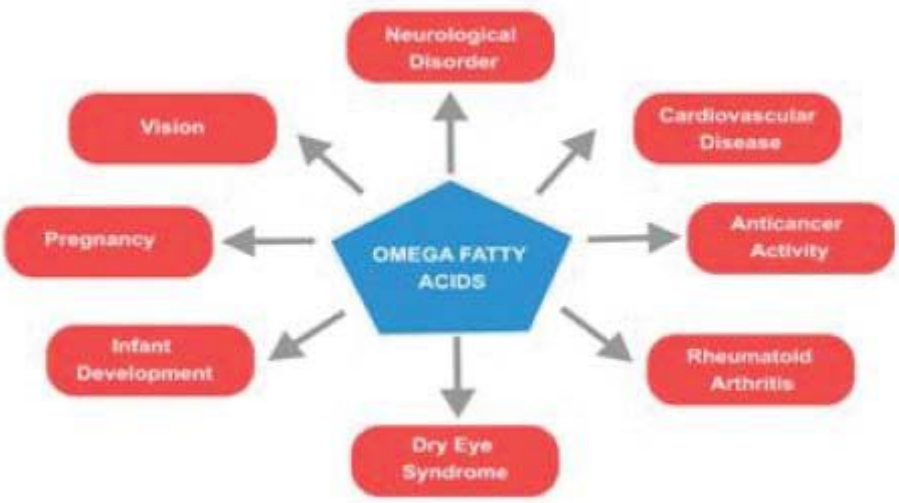
Types of Polyunsaturated Fatty Acids

Long chain polyunsaturated fatty acids belong to the family of omega-fatty acids. There are two classes of PUFAs namely- omega-3 fatty acids and omega-6 fatty acids. Examples of omega-3 fatty acids are Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA) and examples of omega-6 fatty acids are Gamma-linolenic acid (GLA), Arachidonic acid (AA) and Di-homo- gamma-linolenic acid (DGLA).

Sources of omega fatty acids

Fishes such as cod, fresh tuna, sardines, salmon, mackerel, oyster, halibut, haddock, herring etc are enriched with omega fatty acids. Plant seed oils such as flax seed oil, canola oil, rapeseed oil, chia seed oil, olive oil etc predominantly contains omega fatty acids. Nuts such as walnuts, hazel nuts, almond etc also contain omega fatty acids in various proportions. Lipids obtained from micro-organisms such as bacteria, fungi and algae also serve as an alternative source of omega-fatty acids. Breast milk comprises of all types of omega fatty acids essential for infant growth.

People of all the age groups have to be advised to consume fish on a regular basis. Those who do not consume fish may be advised to take fish oil capsules as a supplement. It is important, particularly during pregnancy to avoid fish that may contain relatively high levels of methyl mercury and other contaminants. Consuming foods such as fruits, vegetables, whole-grain products and consuming low amounts of saturated fat and trans-fatty acids have to be encouraged. In addition, maintaining a healthy weight, regular exercise, avoiding smoking and alcohol are other important strategies for preventing of various health complications.



-Dr. Sukrutha S.K, Assistant Professor, Sri Kalabyraveshwara Swamy College Of Nursing, Bengaluru, Karnataka

Sports Bra Checks Your Heart Rate and Recharges as You Move

Scientists have invented an electrically conductive coating that turns any fabric into a simple circuit.

In the not-too-distant future, our shirts, shorts and shoes will all be "smart," embedded with subtle circuitry that might collect sunlight to power our smartphones or continuously monitor our vital signs like a full-body Fitbit. Researchers recently brought this wearable electronics future one step closer to reality with the creation of a stretchable, washable, non-metal coating that transforms any piece of clothing into a robust electrical conductor.

One of the biggest obstacles in wearable electronics is making smart clothing that people actually want to wear. That means cotton T-shirts that feel like cotton T-shirts — soft, lightweight and bendable, instead of stiff, heavy and threaded with metal wires.

A team of scientists and engineers at the University of Massachusetts at Amherst may have solved the wear ability problem by inventing an impossibly thin conductive coating that can be applied at room temperature to any textile or material cotton, wool, silk, polyester, leather, or plastic without altering the look and feel of the garment.

Source: 10dailythings.com, seeker.com

Mars astronauts at increased risk of cancer

Astronauts travelling to Mars or on long-term missions outside the protection of the Earth's magnetic field would face much higher cancer risk than conventional risk models suggest, a study says.

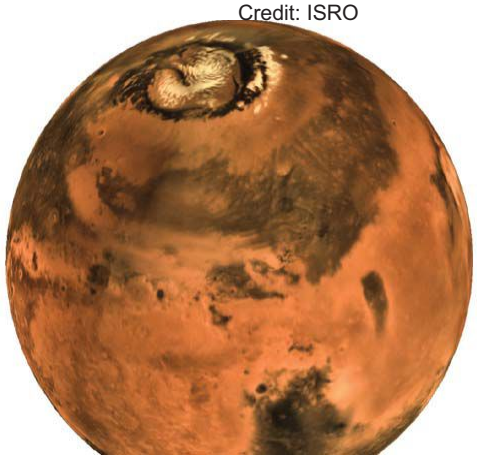
The cancer risk for a human mission to Mars has effectively doubled following a UNLV study predicting a dramatic increase in the disease for astronauts traveling to the red planet or on long-term missions outside the protection of Earth's magnetic field.

Previous studies have shown the health risks from galactic cosmic ray exposure to astronauts include cancer, central nervous system effects, cataracts, circulatory diseases and acute radiation syndromes. Cosmic rays, such as iron and titanium atoms, heavily damage the cells they traverse because of their very high rates of ionization.

Conventional risk models used by NASA and others assume DNA damage and mutation are the cause of radiation cancers. This is based on studies at high doses where all cells are traversed by heavy ions one or more times within much shorter-time periods than will occur during space missions

Source: nature.com, marsdaily.com

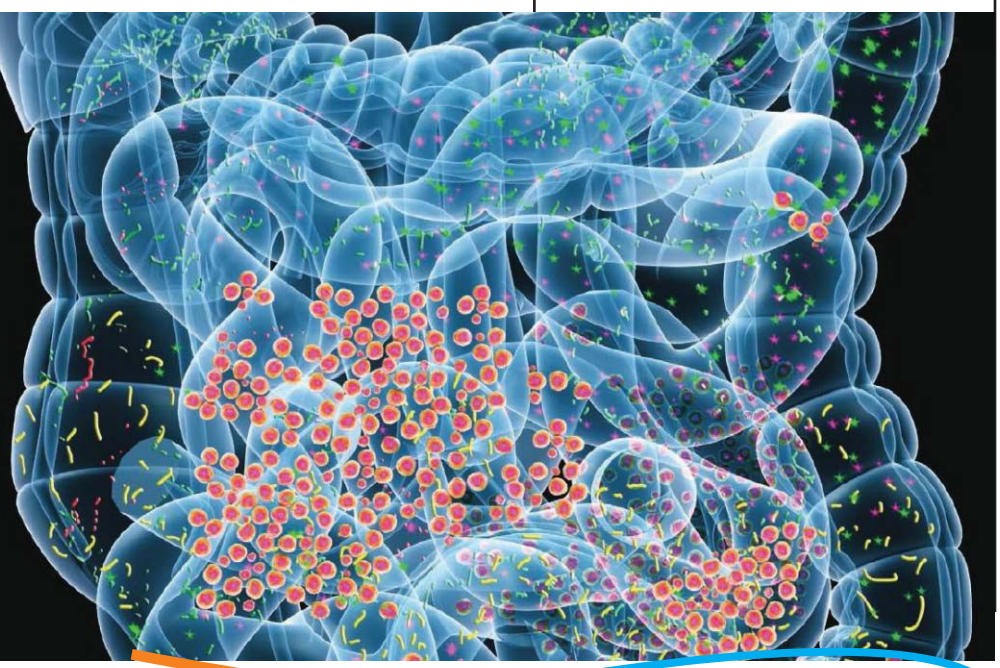
Credit: ISRO



Gut Microbiota: A potential biomarker to define individuals health

It has scientifically been proven that we are not born alone, as we get colonized by innumerable number of bacteria at the time of birth and by adulthood we have trillions of bacteria colonizing every surface of the body. Human Microbiome Project (HMP) evidenced that there are approximately 10 times as many microorganisms within the gastro-intestinal (GI) tract of humans (approximately 100 trillion) as there are somatic cells within the body. Also, these microbes contain 3.3 million genes which are significantly higher than 23,000genes in human genome. Thus, it can be considered that we are more bacteria than human. Particularly, the gut is inhabited by bacteria, yeasts, single-cell eukaryotes, viruses and small parasitic worms in varying proportions along the entire length of the GI tract but the majority is found within colon where they contribute to food remnants break down, immune system modulation, vitamins and amino acids synthesis, drugs metabolism etc.

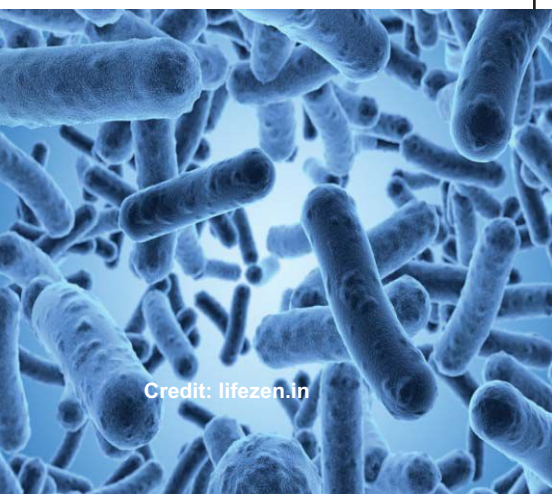
Phylogenetically, Bacteroidetes and Firmicutes together constitute 70–90% of the total gut bacterial community followed by Actinobacteria and Proteobacteria. Some of the bacterial genera commonly found in the human gut are *Bifidobacterium, Lactobacillus, Bacteroides, Clostridium, Escherichia, Streptococcus and Ruminococcus*. This microbial community/gut microbiota is dynamic and known to vary among individuals. The microbial composition of each individual depends on several factors such as age, ethnicity, diet, exposure to chemicals and many more as shown in figure 1. Despite this variation in taxa the microbial genome for basic or house-keeping metabolic activities are quite similar between individuals.



The increasing awareness of the role of the microbiota in maintaining healthis actually dragging interest of researchersas well as commercial investors. Human gut harbors both good (beneficial) bacteria as well as bad (pathogenic/harmful) bacteria. And their distribution and proportion basically influences the human health.It is evident that gut microbes can influence health by producing certain bioactive compounds (by good bacteria), but some may also produceharmful metabolites (toxins from bad bacteria).

Intestinal epithelial barrier and immune defenses along the intestine together help prevent potentially harmful bacteria from causing damage to tissues. The maintenance of a diverse and thriving population of beneficial gut bacteria helps to limit the survival of harmful bacteria in gut either by competing for nutrients or for adhesion/colonization. Thereby, the maintenance of this homeostasis is important from health point of view. And, any disturbance in this homeostatic condition (known as dysbiosis) i.e. variation in microbial composition may lead to disease condition.

The link between the dysbiosis and diseases has been a mystery as to whether the gut microbiome has any impact on human health other than the basic roles. But, the advancement in technologies and human microbiome studies made it possible to unravel the unknown facts about the composition of gut microbiota, their dynamics and their relevance to human health. The gut microbiota as measurable biological indicators allows physicians to assess the health state of their patients, diagnose conditions and predict disease risks. Human Microbiome Project made two essential discoveries; (a) the gut microbiota can be regarded as an organ in itself, (b) the gut microbial communities provide a huge potential of new biomarkers.For example, a body mass index (BMI) or glucose levels are common biomarkers used for diagnosing or predicting metabolic disorders such as obesity, insulin resistance or type two diabetes (T2D), but now these 'classical' parameters can be joined by the gut microbiota composition as a new kind of biomarker. Researchers have reported the significant alteration in gut microbiota composition in patients with metabolic conditions. Besides, it must be considered that not all kinds of variations/alterations in microbial composition can be regarded as biomarkers of the disease condition.


Credit: lifezen.in

This is due to the fact that not only antibiotics but also other drugs might impact the gut microbiota. Thereby, gut microbiota examination may help to identify individuals at an early stage who are at risk to develop metabolic diseases. Hence, connecting classical clinical biomarkers with distinguishing different types of microbial composition may provide diagnostic patterns that allow selecting the kind of prevention or treatment which is best suited for the particular individual.

It hereby can be concluded that the microbial composition varies among the individuals and is well suited to serve as an indicator for a wide range of health conditions as the gut microbiota composition is closely linked to the food consumed as well as to several other factors affecting gastrointestinal health state. Recent findings also suggest that the gut microbiota composition can be even more than mere indicators. They can also be causal factors in the onset as well as in the management and treatment of disease conditions.

-Tejinder Pal Singh[1]*, Rachna[2],Ruby Siwach[3]
Assistant Professor, College of Dairy Science and Technology (CoDST), Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar

Want to lose weight use Vegetarian diet


Credit: ourhealthyway.com

Dieters who go vegetarian not only lose weight more effectively than those on conventional low-calorie diets but also improve their metabolism by reducing muscle fat, a new study published in the Journal of the American College of Nutrition has found. Losing muscle fat improves glucose and lipid metabolism so this finding is particularly important for people with metabolic syndrome and type 2 diabetes, says lead author, Dr. Hana Kahleová, Director of Clinical Research at the Physicians Committee for Responsible Medicine in Washington DC.

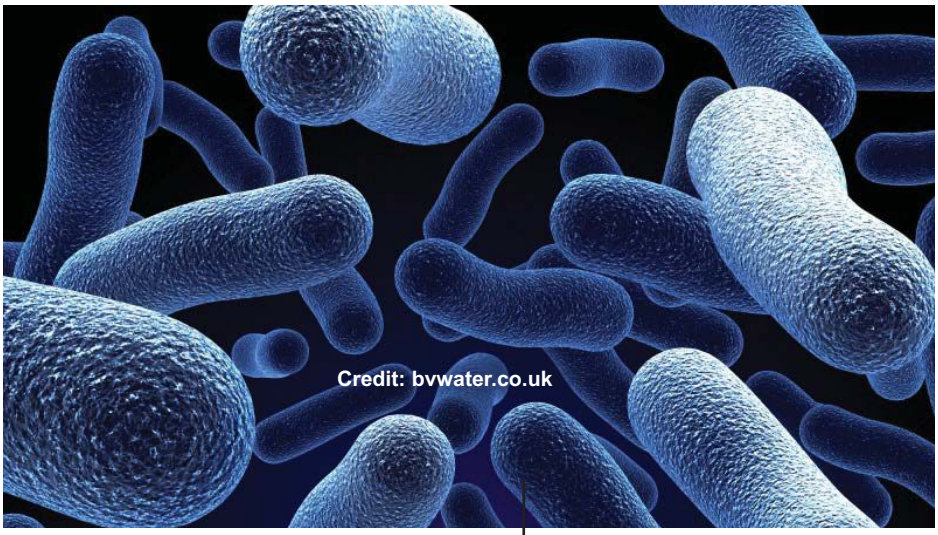
Seventy-four subjects with type 2 diabetes were randomly assigned to follow either a vegetarian diet or a conventional anti-diabetic diet.

The vegetarian diet consisted of vegetables, grains, legumes, fruits and nuts, with animal products limited to a maximum of one portion of low-fat yoghurt per day; the conventional diabetic diet followed the official recommendations of the European Association for the Study of Diabetes (EASD). Both diets were restricted by 500 kilocalories per day compared to an isocaloric intake for each individual. The vegetarian diet was found to be almost twice as effective in reducing body weight, resulting in an average loss of 6.2kg compared to 3.2kg for the conventional diet.

Using magnetic resonance imaging, Dr. Kahleová and colleagues then studied adipose (fat-storage) tissue in the subjects' thighs to see how the two different diets had affected subcutaneous, subfascial and intramuscular fat (that is, fat under the skin, on the surface of muscles and inside muscles). They found that both diets caused a similar reduction in subcutaneous fat.

However, subfascial fat was only reduced in response to the vegetarian diet, and intramuscular fat was more greatly reduced by the vegetarian diet. This is important as increased subfascial fat in patients with type 2 diabetes has been associated with insulin resistance, so reducing it could have a beneficial effect on glucose metabolism. In addition, reducing intramuscular fat could help improve muscular strength and mobility, particularly in older people with diabetes.

Antibiotic Resistance – Making Antibiotics Useless



A microbe is a living organism which cannot be seen with the naked eye (without using a microscope). Microbes may be beneficial or harmful to the human. Bacteria, fungi, virus and protozoa all are microbes. The microbe which causes disease is called a pathogen. For example, *Mycobacterium tuberculosis* (Bacteria) causes tuberculosis (TB) in humans,Polio virus causes polio in humans, *Plasmodium falciparum* (protozoanparasite) causes malaria. The drugs used to kill or inhibit the growth of these pathogens are called antimicrobials. When a pathogen resists the effect of a previously effective antimicrobial agent, the phenomenon is called as antimicrobial resistance. The emergence of antimicrobial resistance in pathogens has increased the morbidity and mortality rates of patients worldwide. Common diseases which were easy to cure some decades ago have become more problematic and life threatening. Antimicrobial drugs are of several types which include antibiotics, antifungals, antiparasitic and antivirals. Most commonly used antimicrobial drugs are antibiotics which are used to kill or inhibit the growth of bacteria. Some examples of antibiotics include amoxycillin, streptomycin, erythromycin etc. Antibiotics play a major role in the treatment of infectious diseases in humans and domestic animals. Without antibiotics, the control of infections caused by both common and rare bacteria would be really difficult. If antibiotics were not there to cure the bacterial infections,a part of world population would die of infections. Thus, antibiotics have played and are still playing an essential role as life savers for the human population.

Resistance in bacteria towards the commonly used antibiotics has emerged which is making the treatment of otherwise easily curable infections more difficult. This results in increased stay in hospitals, increased expenses and chances of nosocomial infections. The most common causes of emergence of antibiotic resistance in an organism include un-prescribed use of antibiotics, use of left-over antibiotics, using antibiotics against viral infections, not completing the full course of antibiotics and continuing antibiotics even after the completion of course. All these practices impel the pathogenic bacteria to evolve certain genes responsible for antibiotic resistance. Or else, these genes can be obtained from the other 'already resistant' bacteria by genetic recombination(s).So, the next generations of those bacteria become habitual to the misused antibiotic and won't be killed by the same. Due to the emergence of antimicrobial resistance, diseases caused by pathogens such as *Mycobacterium*

tuberculosis (TB), *Leishmaniadonovani (Leishmaniasis), Klebsiellapneumoniae(Pneumonia), Pseudomonas aeruginosa* (UTIs) have become more life threatening than before. The antimicrobials which are most commonly used without proper prescription include amoxycillin, azithromycin, ciprofloxacin and metronidazole.

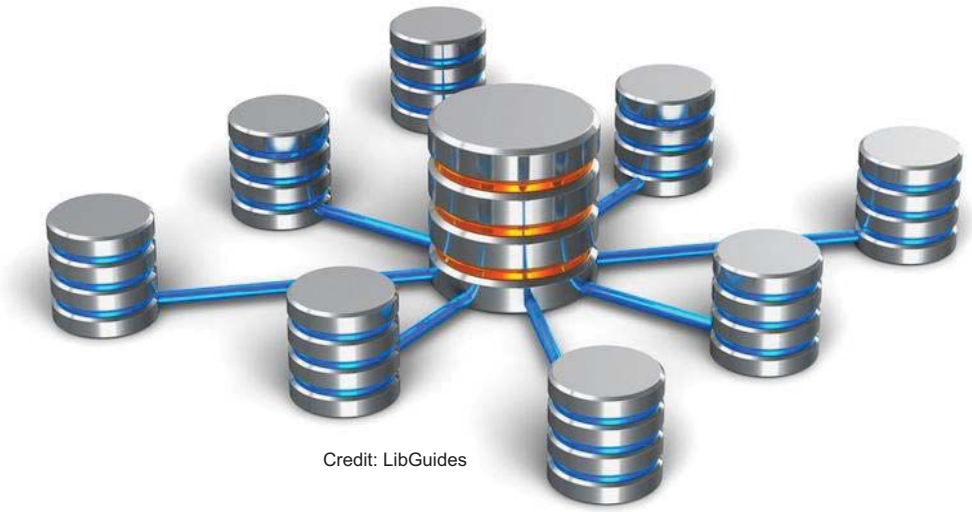
Antimicrobials should not be taken without prescription of a certified doctor. Also, there should be a proper procedure to prescribe an antibiotic. In the Department of Microbiology, Indira Gandhi Medical College and Hospital, Shimla a very refined procedure is followed before prescribing an antibiotic to the patient. For example, if a patient has severe throat infection, a throat swab from that patient is received in our department. It is then cultured on suitable media to grow the infectious agent responsible for throat infection. Next day the infectious agent/bacteriais identified using various methods. Subsequently, it is subjected to Antimicrobial Susceptibility Testing (AST) which tells us the most suitable antibiotic for that particular strain of bacteria isolated from the infection site. Commonly, seven antibiotics are tested simultaneously for each bacterial strain. The doctor then prescribes the antibiotic showing highest activity against that particular bacterial strain. This is the proper procedure which should be followed in all the government health centres all over the country. The plate in figure 1 is showing that out of seven tested antibiotics, only three were active against this bacterial strain. Cefoxitin (in the center) has shown the maximum inhibitory activity followed by tobramycin. Thus, cefoxitin would be prescribed for the patient from whom this isolate was obtained. The four drugs for which this bacterial strainis resistant will not cure the patient even if he takes those four antibiotics for a really long time.

We conducted a survey in our department to get the information about the knowledge of the citizens of Himachal Pradesh about antibiotic resistance. Himachal Pradesh is 11th most educated state in India with a literacy rate of 82.80%. Indira Gandhi Medical College and Hospital is the oldest medical college and hospital in Himachal Pradesh. From our survey we found that, out of 430 patients, only 80 (18.6%) had heard about antibiotic resistance. If these are the results in a state with 82.80% literacy rate, what would be the picture in the other states?

Our country has no law against the sale of antibiotics without prescription, whereas in some states the sale of sedative drugs is banned by state/central government. The central government should take some steps forward to minimize the sale of antibiotics without proper prescription which will help to some extent in controlling the antibiotic resistance in our country. Till then, people for their own benefit should not consume antibiotics without prescription of a doctor or else the small microscopic super-bugs will become really nasty and may make them sick for long time.

-Dr. ArushdeepSidana, Assistant Professor Microbiology, Dept. of Biological and Paramedical Sciences, RIMT University, Mandi Gobindgarh, Punjab-147301

Databases and their implications in biological Sciences



Credit: LibGuides

Research in Biological sciences is the richest source of data in the field of Life Sciences; which is essential to find answers to many questions in medicinal, agricultural and biological oriented basic sciences. Hence the need for storing large data – sets are crucial to explore the research time to time. Obvious examples are Sequence Database of protein, Nucleic acids(DNA & RNA), Enzymes, 3D Structural database of X-ray (PDB) and NMR (Membrane) proteins , Metabolic pathway , Molecular interaction database etc., a new field of science has emerged to organize all new challenges and possibilities created by these database called bioinformatics and System/ Computation biology. Data base is a collection of required data in well organized manner which will help end users in navigating their research in biological sciences efficiently.

Need of databases

As much as possible, the particular information is made available to all scientific community with reliability in a single place. Because making the availability of all information from all Possible resources like published books, literature review, made less time consuming work. Making them in computer ready made readable forms in database approach is more efficient and user friendly approach. Database development approach is a new technology which is much implemented on the classical biology like Botany, Zoology in order to turn the conventional biological subjects in to advanced level. Regular updating of database in all objectives will provide knowledge to the specific subject concern.

Biological Databases

Animal database

The importance of animal database is to know the divergence or distributional range, population of animal sps., in a different places/landscape, location of reservoirs. Animals which are all in the endangered stage with alternative solution have to be included to save them. Also to explore the other threats related to wild animals welfare like forest fire, De-forestation etc., in India our country Wild life institute of India (WII) maintain a data set for wild animals.

Plant database

Plant database provides information about distribution of various plants in different places/ landscape, including Rare, Endangered and Threatened Plants, Common Medicinal Plants, Allergic pollen angiosperms, Ethno-botanical information obtained from various ethnic communities, Mangroves, Carnivorous Plants. Botanical survey of India is the government organization that maintains the database for plant data-sets.

Plant disease management database

Plant disease management is a crucial process in the field of agricultural sector, in order to increase the productivity of food grains to ensure food security. In Plant disease management database provides information about the Distribution, Development and Management of various diseases in the crops. Government of India maintains the database for management of disease in various food crops to overcome and manage plant diseases.

Marine organism's database

Two third of the planet surface is filled with ocean, studying the divergence of ocean is the big challenge in over the word, i.e., diversity of Marine organisms in ocean depends on many factors. WoRMS is one of the international databases, which has the global set of marine organism's data like Global Species Databases (GSD), Regional Species Databases (RSD), Thematic Species Databases (TSD) and External Global Databases (EGD).India Ocean Census of Marine life sciences is sharing the datasets with Census of marine life sciences.

Algal biodiversity database

Algae are the photosynthetic organisms that converted the anaerobic atmosphere of the earth into an aerobic atmosphere by their process of oxygenic photo-phosphorylation. Algal Image Database of India (AIDI) explores algal diversity of various regions of India and documented encountered biodiversity in the form of an image database to navigating algal research. In addition, AIDI will be very effective in illustrating morphological variation (phenotypic plasticity) and helping researchers deal with taxonomical ambiguity in algae. AIDI also provides information about the algal biodiversity from a different biogeographically region (the sub-tropical region), which is otherwise lacking on the web.

Entomology database

This database is developed for the fulfillment of showcases the images of common insects found in Indian agricultural ecosystems. The reported eco systems are Field crops, Vegetable crops, Fruit crops, Spices, Plantation crops and Mulberry. This useful entomology database is effectively maintained by National Bureau of Agricultural Indian resources – IARI.

Microbiology database

Microbes are ubiquitous in nature, NEMiD is the first web-based database of microbial diversity in North-East (NE) India, which gives information on cultivable/culturable microbes (bacteria, fungi and actinomycetes) from surface and sub-surface soils across the seven states of the region (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura), Sikkim and parts of North Bengal. The database is based on the survey, isolation and characterization carried out for microbes from across the above geographical regions. Information on a particular microbe in the database covers detailed aspects of phylogenetic information on taxonomic outline and classification, morphological, biochemical and molecular characterization, general and cultural characteristics, geographical/location information, history of cultures, preservation details, hazardous information, patent information etc., The developed database is dedicated to microorganisms from a mega biodiversity region, and is expected to help in understanding the microbial diversity pattern of the region as well as its

relationship to climate change studies.which is maintained by Department of electronics and information technology-India.

Sequence and structural databases

Data bases are broadly divided in to primary, secondary and composite. Primary database contains information about sequence or structure alone eg., Swiss port, PIR for protein sequence, Genbank & DDBJ.PDB for protein structure. Secondary database provides the information derived from primary database eg., entries of PDB in an organized manner according to their nature like α proteins, β sheets and Ω turn. Composite database is the mixture of above, which gives the information from multiple resources. These sequence and structural data bases are the ancestors for development of various databases in the universe.

Organization of data sets in database

At present organization of data sets in the database in a simple form but with fulfilling the end user complex queries is still difficult. Still enormous research in algorithm sciences is going to overcome such kind of issue in the field of bioinformatics and Computational biology.

Advantages of Biological Databases

· Clarifying the queries of end users
· Connecting the experimental work/ collected / calculated data with programming skills (via algorithms, codes)
· Data base must be user friendly
· Easy access of Data/information
· Information to answer specific biological questions
· Open access to all users
· The DB helps the end users access biological data/information, such access lead them to respond rapidly for their purpose.
· Up gradation of old books and review in the form of database.

Disadvantages of Biological Databases

· Additional entries are regularly added to the database to refine the search criteria
· Avoid duplication of information / uniformity across the different database
· Cross references have to be included in the data base
· Data base must be supported in all operating system(Windows/Linux) of the computers
· Database has to be designed / built to answer complex queries
· Formulating queries is a serious issue in biological databases. Often the quality of results depends on the quality of the queries.
· Incorrect link
· Presence of redundant records
· Regular up gradation is essential
· The developed database must be available in the internet for long time (Server must be maintained) to access the data at any time.

Web based systems have become more important due to the fact that the Internet and the World Wide Web have become ubiquitous and superior to all other technological developments in our history. The web based system approach is multiuser system. It is compatible with all the modern operating system and provides information to the user about the knowledge in the subject concern. Data bases not only helps researchers, students, farmers, state and central government bodies for timely decision making. The different database provides accurate information which helps in utilization of the data for research purpose and problem solving approach. There is no doubt that bioinformatics; Computational biology/ System biology tools for efficient research will provide significant impact on biological sciences.

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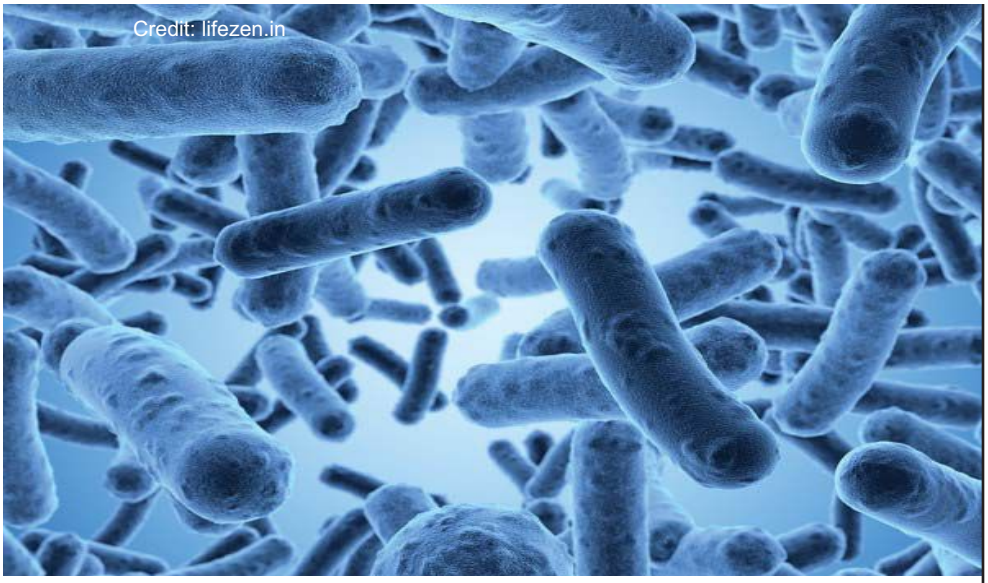
Marine Environment and Marine bacteria: Nature's hidden treasure


Credit: lifezen.in

97% of the earth's total water is saline in nature. These saline water covers 70.8% of surface of the earth.Marine environment is the primary source of food, energy and water. Ocean can be considered as the major highway for international trade. It is also responsible for the stabilization of world's climate. Though it is one of the most adverse environmental conditions for the sustenance of any life forms, the oceanic environment accounts for 32% of world's net primary production. A recent study showed the presence of around 178,000 species of marine organisms constituting 34 phyla.

These varieties of organisms are present in the form of minute microorganisms to the large mammals. In this regard, the marine environment possesses many unique characteristic features that need to be overcome for the sustenance of the marine lives.

Microbes in Ocean

About 80% of the life on earth are present in the marine ecosystem and ocean comprises of around 99% of total organic form. Oceanic environment is home to a huge diversity of life forms ranging from the microscopic phyto- and zoo-planktons to the large cretaceans such as whales in a vast range of specific habitats i.e. sea mounts and thermal vents, coral reefs, kelp forests, tide pools, muddy, sandy and rocky bottoms as well as the open ocean the pelagic zone. These are a huge source of food and medicine.

Any bacteria isolated from marine water, sediments, mangroves, surface of marine organisms or deep-sea hydrothermal vents can be called as marine bacteria. The exclusive feature of the marine bacteria includes their requirement of Na+ and K+ ion for their growth. It has been estimated that in nature i.e. 3.6 × 1029 bacterial cells, 1.3 × 1028archeal cells and 4 × 1030 viruses are found.Marine microbes may be either the microalgae, bacteria, archea, protozoa, fungi or viruses. They are either prokaryotes i.e. they lack membrane bound organells and nucleus in their cells or the eukaryotes i.e. true nuclei are present in the cells. These organisms are extremely small roughly 1/8000th the volume of that of a human cell. The abundance of these marine microbes includes the presence of around one million microbial cells in one ml of sea water.

Applications of Marine Bacteria

Bioremediation

The technique in which microbes are used to clean up the contaminated environments is called as bioremediation. Certain types of microbes feed upon the contaminants i.e. they require the contaminants as their energy source. For effective bioremediation to take place,

the presence of correct temperature, nutrients and environmental conditions are required. If these conditions are not perfect, the microorganisms grow very slowly or may die. In this process the contaminants are not cleaned up. The contaminated environments are always adverse in their conditions thus limiting the growth of microbes. However, marine microbes are capable of sustaining the adverse environmental conditions as they inhabit in one of the most adverse marine environments. Thus they possess a de novo characteristics of growth and survival in adverse environmental conditions. When marine microbes are used for in-situ or site specific bioremediation purposes, due to their natural capabilities they carry out bioremediation of toxic contaminants very efficiently.Many studies have reported the huge bioremediation capabilities of marine bacteria for hydrocarbons, heterocyclic compounds, pharmaceutical substances, radionuclides and toxic metals.

Production of Bioactive pigments

Though the isolation and harvest of marine bacteria is highly difficult, the by-product of their metabolism are of highly useful as some of them yield unique colored pigments. The textile industry uses huge amount of synthetic dyes. Thus, their effluents pose serious threat to the environment. In this regard, the natural sources of colors are a huge source of hope for the textile industries. Natural color sources are mostly the microorganisms and the marine microbes are a huge source of natural pigments that have the potential to be used in textile industries as dyes. Some examples of these marine microbes include *Monascus, Rhodotorula, Bacillus, Achromobacter, Yarrowia* and *Phaffia* reported to produce various colored pigments such as golden, yellow, red, pink and orange.

As Probiotics

The term first coined by Lily and Stillwell in 1965 describes a live microbial supplement that improves the intestinal microbial balance. In this regard, few examples of marine microbes with probiotic applications include Lactobacillus sp., *Bifidobacterium* sp., *Enterococcus* sp., *Lactococcus* sp. etc. Many studies have also reported that, *Lactobacillus plantarum*, L. *brevis*, *Weissellaconfusa*, *Lactococcuslactis* and L. *delbrueckiis* how inhibition against pathogenic microbes. Thus, they possess the potential of application as a probiotics in marine shrimp culture i.e. the *Litopenaeusvannamei*.

Application of marine enzymes

Marine microbes are an excellent source of novel molecules due to their unique metabolic properties. Marine microbial enzymes are of huge importance as the extreme marine environment enables the marine enzymes to be energetic in adverse environmental conditions. A common example of application of marine enzyme in daily life includes the alkaliphilic proteases. The thermostable alkaline proteases isolated from marine organisms are being added in laundry detergents that help in cleaning the clothes even in presence of the organic solvents. Additionally, certain thermostable solvent tolerant enzymes are used in industries associated with biofuel production. Certain group of enzymes isolated and utilized from marine microbes include the proteases, lipases, polysaccharide degrading enzymes such as chitinase and chitosanase, alginate lyases, agarases, Carrageenases and Cellulose and hemicellulose hydrolase.

Source of Drugs

The first antibiotic in history, the penicillin was discovered in late 1920s from a microorganism. Since then many new drugs have been discovered from the microbes and more than 120 drugs produced from microbes are in use now-a-days to treat various infectious diseases, cancer as well as to suppress the immune response to facilitate organ transplant.

-Hirak Ranjan Dash, Scientific Officer, DNA Fingerprinting Unit Forensic Science Laboratory, Sagar, Madhya Pradesh, India

Exotic Fish Species Introduced In India And Its Impacts


Credit: fishesofaustralia.net.au

An exotic species is any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that habitat. During the period 1870-1947 under the British rule, 9 species of exotic fishes were introduced. They were temperate food carps, *Tinca tinca, Carassius carassius, Cyprinus carpio (European strain), and the tropical osphronemid, Osphronemus goramy*; the salmonid game fishes, the brown trout and the rainbow trout and *larvicidal Gambusia affinis and Lebistes reticulatus*. The post- independence India witnessed introductions of 8 exotic species. They were the *cyprinids*, *Cyprinus carpio*, (*chinese strain), Ctenopharyngodon idella, Hypophthalmicthys molitrix, Puntius javanicus, and the cichlid, Tilapia mossambica*, all of food species and the *salmonids, Salvelinus fontinalis, Onchorhyncus nerka*, and *Salmo salar*. Unauthorized introductions were: *Aristicthys nobilis, Tilapia nilotica* and red tilapia.

Some of the important exotic fish sps introduced in India

Cyprinus carpio (European Carp or Common Carp) : Depending on the texture of the skin and size of scales, the fish has been divided into 3 main varieties. They are:Scale carp (*C. carpio* var. communis) body completely covered with smaller scales. Mirror carp (Var. specularis) with large size shiny scale over the body. *Leather carp* (Var. nudus) body almost without any scales, has a leathery appearance. In India the German strain of Mirror carp was 1st introduced in 1939 from Ceylon. The species was stocked in the Ooty lake and since then has established itself very well in Nilgiri waters. As the German stock of the common carp was not breeding freely in tropical waters in India, a consignment of Chinese stock of the common carp (variety :scale carp) was brought from Bangkok to Cuttack in August 1957. In 1946, the German strain of this fish was introduced in Bhowali hatchery (Uttara Khand) for stocking the Kumaon lakes. Later, it found a home in Kashmir lakes where the Dal was invaded and heavily infested with the species to the exclusion of all other local species, specially the schizothoracids.

It was stocked in Gobindsagar in Himachal Pradesh where is forms a lucrative fishery despite of dominating silver carp. Due to bottom habitat it competes with the indigenous *Cirrhinus mrigala, magur (C. batrachus)* and the scampi (M. rosenbergii) both for the space as well as for space and food.

In the absence of adequate food in ponds, it burrows for food damaging the pond dykes and makes the water turbid thus reducing the natural productivity through suppressing the phytoplankton production. Of late, it has also been recorded from almost all the major rivers as a result of overflowing of ponds and reservoirs. In perennial ponds, the disadvantage lies in its prolific breeding where it upsets the proportion of the different species and at the same time a large number of small mouths compete for food, space and oxygen. They are not easily harvestable in the reservoirs due to their bottom dwelling habit and gill nets are not that much useful for catching them as they move very slow in water. Instances of commoncarp causing the decline of *Cirrhinus* spp. and Krishnarajasagar reservoirs. Detailed accounts of mirror carp affecting the survival of native fish species in Gobindsagar reservoir, upland lakes of Kashmir and Kumaon Himalayas (*Schizothorax* spp.), and Loktak lake in the northeast (*Osteobrama belangiri*).A study on the catch composition of carp availability along the stretches of Ganga revealed that the population of Common carp has been increased where as the availability of Gangetic carps has been declined.

Tilapia mossambica: Tilapia, a native of South Africa was brought to India by CMFRI at 1952. In the same year few fingerlings were brought to Madras. For making detailed investigations a few fingerlings were brought to CIFRI centre cuttack,1953. It was stocked in the reservoirs of Tamil Nadu and Kerala where its performance was initially quite good as large- sized tilapias (1.5-2.5 kg) were caught, but soon the reservoirs, being small in size, were overpopulated and the size of the fish started declining and so was its value in the market. In ponds, it did not do well from the very beginning as stunted population made their appearance rather soon and the impact was found to be quite severe on major carps, pearl spot and milk fish.

Hypophthalmicthys molitrix: The Silver carp was introduced to India in the year 1959 and was confined to ponds till 1969 when 239 fingerlings were introduced into the Kulgarhi reservoir.

Ctenopharyngodon idella: The grass carp was introduced in the year 1959 primarily for controlling submerged vegetation. However, due to its fast growth rate soon it became the integral part of composite fish culture. The Grass carp feed on only selected *macrophytes* such as *Hydrilla verticillata*, but it do not consume any of the floating plants, especially *Eichhornia crassipes*, *Pistia stratiotes* and *Salvinia molesta* -three most menacing weeds- that are abundant in ponds and tanks, lakes and small reservoirs all over the country. Its daily requirement is as much as its body wt, & so it is a problem to provide it large quantity of preferred weeds.

On one hand, by controlling the weeds, it brings in circulation the nutrients locked up by the weeds and produces valuable fish protein, on the other hand, it impacts the survival of those fishes and prawns that hide in the weeds to escape the predators, especially the murrels. The negative impacts on environment by grass carps are: Alteration of water quality including an increase in turbidity, reduced dissolved oxygen, and an increase in plant nutrients. Removal of aquatic vegetation may alter the invertebrate community, thereby influencing species abundance and composition of fishes.

Pangasius sutchi: Another exotic catfish that has been introduced, rather recently in 1994-95 and again

illegally is the Thai catfish, from Bangladesh where it was brought from Thailand and bred in hatcheries.

Other exotic fish species

Silver Barb (*Puntius gonionotus*):

The fish has gained popularity in West Bengal on account of its fast growth rate but was never considered a weed-eating fish and a competitor of grass carp. Experiments on its compatibility with the Indian major carps have shown it to be affecting the growth and production of Rohu.

Black carp (*Mylopharyngodon piceus*):

It is stocked in composite carp culture to control mollusks and it is found to grow fast and attain a weight of 4 kg. Due to this the culture of indigenous *Labeo calbasu* & *Pangasius pangasius* is being neglected.

Pangasius sutchi:

Owing to its fast growth about 1 kg in 3 months, the fish is already established as a profitable species for aquaculture in West Bengal and Andhra Pradesh. It is reported that it has also invaded the natural waters. The fish, however, was found to be infected with at least 6 species of myxozoan parasites in Malaysia. Whatsoever may be the reason for its limited area of cultivation particularly coastal belt, the impact of this exotic catfish still requires studies.

Trouts:

Both brown trout (*Salmo trutta fario*) and rainbow trout (*Oncorhynchus mykiss)* are now being regularly stocked in different river stretches in Himachal Pradesh, Jammu and Kashmir as well as Uttaranchal. However, there is no organized study to assess the impact of this kind of unplanned introductions of trouts in open water. Whatsoever may be the impact of such introductions, the recent mass mortality in rainbow trout in Himachal Pradesh during 2002 possibly on account of severe problem has indeed drawn attention of the scientists calling for quarantining need and ecological concern.There are reports that the introduction of Salmo truttafario has eradicated the local cold water spp.

Although the introduction of exotic species can be regarded as a boon to aquaculture production as it has maximum growth potential but we have to judiciously manage our own native ecosystem and biodiversity so that the impact of the introduction of exotic fishes negative impact can be minimized.

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Importance of Adopting Green Chemistry

Credit: IndiaCelebrating.com

United Nations Conference on human environment was held in " Stockholm " on 5th June 1972 and decision was taken to take appropriate and timely steps for the preservation of natural resources of the earth, including control of water, land and atmospheric pollution and to maintain a clean environment.

India has also participated in this conference. and there after it was decided to celebrate 5th June as World Environment Day.

Accordingly, in 1974 the Water (Prevention and Control of Pollution) act was passed by the Parliament and formed a Pollution Control Board in the country.

In 1977 the " Water cess Act " has been passed and authorized the board to collect the cess from the industries based on their water consumption.

An expert group meeting on environment protection legislation for South-East Asia was held in Bangkok during 13-17 December, 1977 to study the status on environmental pollution and decided to meet again in July, 1978 to finalize and confirm recommendations received for the legislation.

For the first time Gujarat State celebrated ' World Environment Day ' on 5th June 1976 and as a first efforts in Gujarat, vigorous steps have been taken to grow more trees and generate forest and conserve wild life. Over Four crore trees have been planted.

And now 5th June is celebrated regularly for reaffirming our concern for preservation and enhancement of environment.

So far India has framed more than 36 legislative rules & Acts for Environment Preservation & to Control Environment Pollution in the field like environment, Air, Water, Tribunal, Forest & wild life etc.

Rapid increase of population & so their per capita needs, led to deforesting & developing industries & finally landed into creating all sort of pollution problems & Damaging Environment, now it is beyond control to abate environment pollution unless we go for using very costly technology & use of costly equipments but this disturbs economical production to compete globally.

So only way now left out to go for environment friendly production through green chemistry & technocrats to provide economical ways for clean environment.

Fast industrial growth has created serious problems like ozone depleting, depletion of biodiversity, Global warming, soil erosion, land degradation Air and water quality deterioration. Owing to continued deterioration of environment, sustainable development has become a global issue. It is thus imperative that the concept of environmental and economic development move together with harmony towards the achievement of sustainable growth.

While looking at the nature, see how it has given simple technology to mankind. For the years, tress have been producing health care medicines, pigments, gums, cotton, aroma & many more likewise products without capital investment, without working capital, without costly utility plant, & without creating air, water, land, sound pollution complying all statutory requirements.

Green chemistry is a way of bringing back the perspective that chemicals are not all bad.

The mission in search of a solution to the problem of environment protection, environmental conservation, has converted into a distinctive discipline with the strategic objectives being increased efficiency, sustainability and finally social benefit, and this discipline is that of "CLEAN TECHNOLOGY" more commonly referred to as "GREEN CHEMISTRY".

By definition, Green Chemistry is the design, development and implementation of chemical products and processes to reduce or eliminate the use of substances hazardous to human health and environment.

Chemistry governs the Chemical Process industries and is key for achieving a clean and green industry. Green chemistry is the use of chemistry for pollution prevention. More specifically green chemistry emphasizes on promotion of research, development and implementation of innovative chemist technologies through design of chemical products and process that are more environmentally benign i.e. accomplish pollution prevention is in a scientifically sound and cost-effective manner.

The Major Seven principles of Green Chemistry now considered as a guiding factor for the working chemist & technologists & these are :

1. Prevent waste, leave no waste to treat or clean up.
2. Design less hazardous chemicals syntheses.
3. Use renewable feedstock.
4. Use safer solvents and reactions condition.
5. Increase energy efficiency: Run chemical reaction at ambient temperature and pressure.
6. Design chemicals and products which are bio-degradable.
7. Minimize the potential for accidents.

Sustainable development is the one that meets the needs of the present generation without compromising the ability of future generations to meet their own needs, the basic principle of sustainable development is to be all the activities in an environmentally acceptable way with minimum utilization of resources. Conservation of resources and preserving our valuable assets for the next generations is our duty and responsibility. Today all technocrats have to provide economical measures to clearing up yesterdays waste and have a significant role to play in preventing tomorrow's pollution.

Industries should cover more area for development of green belt, to honor national policy like rain water harvesting, ground water recharging as monsoon approaching soon and should workout mitigation measures on energy conservation.

WE ALL NEED A HELPING HAND TO PROTECT THE ENVIRONMENT

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New parrot species with a call like a hawk discovered

PHOTOGRAPH BY TONY SILVA (CC BY), CREATIVE COMMONS

A new species of parrot – described as "phlegmatic" with a call like a bird of prey – has been discovered by scientists, it has been revealed.

Ornithologist Dr Miguel Gomez Garza and colleagues found the newly named blue-winged amazons while on a trip to a remote part of the Yucatan Peninsula in Mexico in 2014. Research then established it was a distinct species, based on its shape, colour pattern, call and behaviour.

"A very distinctive feature is its call, which is loud, sharp, short, repetitive and monotonous. the researchers wrote. "In flight, the call is a loud, short, sharp and repetitive yak-yak-yak."

One species-rich parrot genus is Amazona, which is widely distributed in the New World. Here we describe a new Amazona form, which is endemic to the Yucatán Peninsula. This parrot is clearly separable from other Amazona species in eleven morphometric characters as well as call and behavior. The clear differences in these features imply that the parrot most likely represents a new species. In contrast to this, the phylogenetic tree based on mitochondrial markers shows that this parrot groups with strong support within A. albifrons from Central America, which would suggest that it is a subspecies of A. albifrons.

Source: Silva T, Guzmán A, Urantówka AD, Mackiewicz P. (2017) A new parrot taxon from the Yucatán Peninsula, Mexico—its position within genus Amazona based on morphology and molecular phylogeny. PeerJ 5:e3475 https://doi.org/10.7717/peerj.3475, nationalgeographic.com, independent.co.uk

How eggs got their shapes ?

The evolution of the amniotic egg - complete with membrane and shell -- was key to vertebrates leaving the oceans and colonizing the land and air. Now, 360 million years later, bird eggs come in all shapes and sizes, from the almost perfectly spherical eggs of brown hawk- owls to the tear-drop shape of sandpipers' eggs. The question is, how and why did this diversity in shape evolve?

The answer to that question may help explain how birds evolved and solve an old mystery in natural history.

An international team of scientists led by researchers at Harvard and Princeton universities, with colleagues in the UK, Israel and Singapore, took a quantitative approach to this question. Using methods and ideas from mathematics, physics and biology, they characterized the shape of eggs from about 1,400 species of birds and developed a model that explains how an egg's membrane determines its shape.

Using an evolutionary framework, the researchers found that the shape of an egg correlates with flight ability, suggesting that adaptations for flight may have been critical drivers of egg-shape variation in birds.

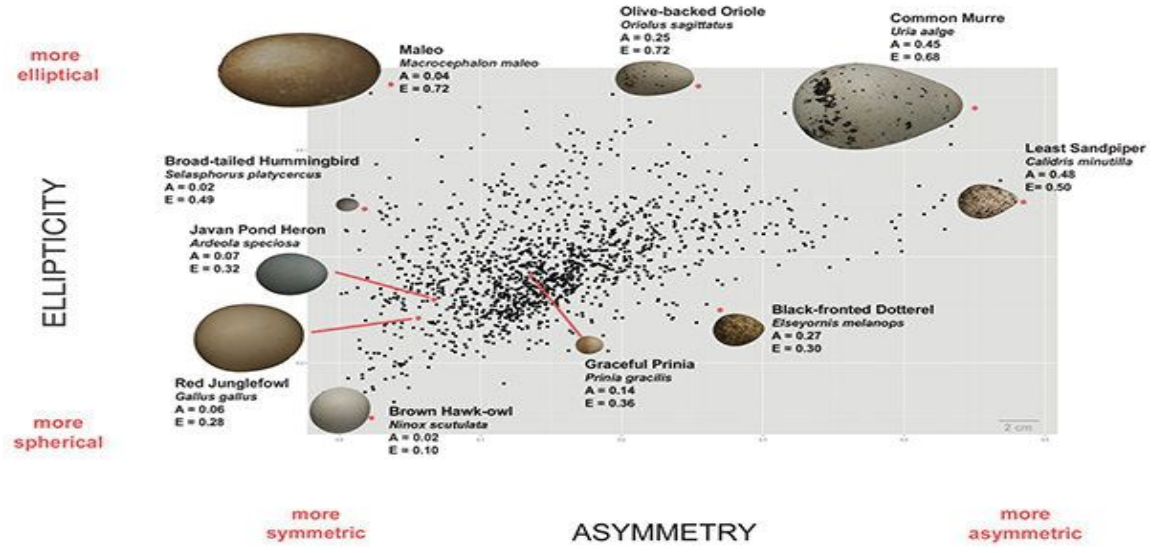
The research is published in Science.

The researchers began by plotting the shape - as defined by the pole-to-pole asymmetry and the ellipticity - of some 50,000 eggs, representing 14 percent of species in 35 orders, including two extinct orders.

The researchers found that egg shape was a continuum - with many species overlapping. The shapes ranged from almost perfectly spherical eggs to conical-shaped eggs.

So, how is this diverse spectrum of shapes formed?

Researchers have long known that egg membranes play an important role in egg shape - after all, if an egg shell is dissolved in a mild acid, like vinegar, the egg actually maintains its shape. But how do the properties of the membrane contribute to shape?



Average egg shapes for each of 1400 species (black dots), illustrating variation in asymmetry and ellipticity. (Image courtesy of L. Mahadevan/Museum of Vertebrate Zoology, Berkeley)

Impact of climate Change on Women


Credit: autonomistablog.wordpress.com

Climate change is one of the most fundamental challenges facing the international community today, with ample impacts not only on the environment but also on economic and social development. The effects of climate change will vary among regions, income groups and occupations, between different generations as well as gender. A report issued by the World Bank suggests that India's economic progress could be severely hampered, with an additional 45 million pushed into poverty, due to the effects of climate change. According to UNFCC, Climate change has a greater impact on those sections of the population, in all countries, that are most dependent on natural resources for their livelihoods.

Women commonly face higher risks and greater burdens from the impacts of climate change in situations of poverty and the majority of the world's poor are women. Women's unequal participation in decision-making processes and labour markets compound inequalities and often prevent women from fully contributing to climate-related planning, policy-making and implementation. Men and women are differentially affected by climate change, especially when it comes to safeguarding their food security and livelihoods. Climate variability amplifies food shortages in which women consume less food and suffer from reproductive tract infections and water-borne diseases after floods. Table 1 show that the 10-year drought in Australia's Murray-Darling Basin differentially affected men and women, owing to their distinct roles within agriculture. Alston (2011) noted social disruption and depression, most profound in areas with almost total reliance on agriculture, no substitute employment, and limited service infrastructure. In India, more women than men, especially women of lower castes, work as wage labourers to compensate for crop losses.

Climate-related disasters or gradual environmental deterioration can affect women's mental health disproportionally due to their multiple social roles. Anecdotal evidence suggests that women tea pickers in Malawi, Kenya, India, and Sri Lanka suffer and die from heat stress as payment by quantity discourages rest breaks. Social conditioning affects mortality for women and men.

Although women are important food producers and providers, they have limited access to and control of resources, on the one hand. On the other hand, because of their central role in agriculture, women are great agents of social change. In fact, the FAO State of Food and Agriculture 2010-11 estimates that more than 100 million people could be lifted out of poverty if women had the same access to and control of resources as men. Therefore, responses to climate change in agriculture must be gender-specific. Initiatives need to ensure that women are included in climate change mitigation and adaptation activities and strategies designed to enhance food security and livelihoods. To date, however, there has been little focus on how men and women mitigate risks and adapt to challenges brought about by climate change.

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Table 1: Examples of gendered climate experiences

Experiences	Male farmers	Female farmers
Increased workload	Demanding tasks such as feeding livestock, carting water, destroying frail animals (A)	Assistance with farm tasks and working off the farm for additional income (A)
	Increased migration for wage labour, typically farther away from home (I)	Increased collection of firewood and uptake of wage labour (especially lower castes) in neighbouring villages (I)
Community interactions, isolation, and exploitation	Locked into farms, loss of political power (A)	Increased interactions and care giving work, taking care of others' health at the expense of their own (A)
	Exploitation by labour contractors when migrating (I)	Disadvantage in accessing institutional support and climate information (I)
Physical and psychological toll	Feel demonized (farmers seen as responsible for crisis), increased stress, social isolation, depression, and high suicide levels (A)	Working lives appear indefinite, resulting in increased stress (A)
	Increased anxiety to provide food and access loans and escape trap of indebtedness, increase in domestic fights, sometimes suicide (I)	Increased pressure to provide food and save some more from sale for consumption, less food intake, increase in domestic fights (I)

(A) = Australia (ten-year drought, 2003 –2012), based on Alston (2011); (I) = India (climate variability and changing climatic trends), based on Lambrou and Nelson (2013). (Source: Olsson, L., et al., 2014)

Why Do Onions Make You Cry?

Credit: organiclife.ec

According to the National Onion Association (yes, that's a thing), approximately 170 countries grow onions, and it's estimated that 9.2 million acres of onions are harvested annually around the world. Onions are low in calories and packed with vitamins, minerals and antioxidants. They also go great in your salads, omelets and guacamole recipes. However, as everyone from expert chefs to culinary novices has learned, onions can bring a tear to your eye, and an expert from the Texas A&M College of Medicine explains why that happens.

It starts underground

Onions are vegetables that grow underground, and beneath the surface are a lot of critters who are trying to grab a bite to eat, but onions have a way to protect themselves.

Sulfur in the dirt mixes with the growing onion and creates amino acid sulfoxides, which are sulfur compounds that readily turn into a gas. When an onion breaks apart, the sulfoxides and onion enzymes are released, and this creates sulfenic acid. The sulfenic acid and onion enzymes react and create syn-propanethial-S-oxide—a tough-to-pronounce gas. This gas floats up from the chopped (or bitten) onion and deters critters (and causes humans to shed tears). It takes a lot of precise chemical reactions, and some vegetables related to onions will produce fewer tears. White, yellow and red onions all have higher concentration of the onion enzyme necessary to create syn-propanethial-S-oxide while sweet onions, green onions and scallions have fewer of the necessary enzymes.

Onions and your eyes

Your eyes are sensitive, and considering their responsibilities, it's good that they have defenses to harmful gases. Your eyes have a set of nerves that detect anything that's potentially harmful to your eyes. *Your eyes react to the gas that is formed, and your eyes try to flush it out with tears. Luckily, the gases that are produced from chopping onions are more nuisance than harm. Chopping onions can cause some burning and irritation and tears. It's a temporary sensation with no known long-term effects, nor will it worsen any other conditions, like pink eye.* Also, some people may have more sensitive eyes than others, which is why not everyone will tear up when they chop onions but why others may feel the effects on the other side of the room.

Avoiding the tears

There are a few different ways to avoid tears when you're cutting onions. You can prevent the gas from reaching your eyes by wearing protective goggles, but that may be a bit excessive considering you're in a kitchen and not a laboratory.

Meditation and yoga can 'reverse' DNA reactions which cause stress

Credit: hotelvillacimbrone.com

Mind-body interventions (MBIs) such as meditation, yoga and Tai Chi don't simply relax us; they can 'reverse' the molecular reactions in our DNA which cause ill-health and depression, according to a study by the universities of Coventry and Radboud.

The research, published today in the journal Frontiers in Immunology, reviews over a decade of studies analysing how the behaviour of our genes is affected by different MBIs including mindfulness and yoga.

Experts from the universities conclude that, when examined together, the 18 studies – featuring 846 participants over 11 years – reveal a pattern in the molecular changes which happen to the body as a result of MBIs, and how those changes benefit our mental and physical health.

The researchers focus on how gene expression is affected; in other words the way that genes activate to produce proteins which influence the biological make-up of the body, the brain and the immune system.

When a person is exposed to a stressful event, their sympathetic nervous system (SNS) – the system responsible for the 'fight-or-flight' response – is triggered, in turn increasing production of a molecule called nuclear factor kappa B (NF-kB) which regulates how our genes are expressed.

NF-kB translates stress by activating genes to produce proteins called cytokines that cause inflammation at cellular level – a reaction that is useful as a short-lived fight-or-flight reaction, but if persistent leads to a higher risk of cancer, accelerated aging and psychiatric disorders like depression.

According to the study, however, people who practise MBIs exhibit the opposite effect – namely a decrease in production of NF-kB and cytokines, leading to a reversal of the pro-inflammatory gene expression pattern and a reduction in the risk of inflammation-related diseases and conditions.

The study's authors say the inflammatory effect of the fight-or-flight response – which also serves to temporarily bolster the immune system – would have played an important role in mankind's hunter-gatherer prehistory, when there was a higher risk of infection from wounds.

In today's society, however, where stress is increasingly psychological and often longer-term, pro-inflammatory gene expression can be persistent and therefore more likely to cause psychiatric and medical problems.

Ten elephant died in eight months In Rajaji Tiger Reserve Uttarakhand

Credit: thehansindia.com

Ten elephant died in last eight months in Rajaji Tiger Reserve Uttarakhand. Director of Rajaji Sanatan Sonkar said that all the elephant deaths had taken place due to natural and other cases of railway accident , electrocution and infighting among themselves but none due to poaching.

Reports of elephant mortalities, due to train accidents and electrocution, are received from States from time to time.

Some of the steps taken to prevent elephant mortalities due to train accidents and electrocution are given below:

(i) A general advisory was issued jointly to all the railway zones and relevant States Governments suggesting measures to prevent collision of trains with wild elephants. Some of the important recommendations are given below:
(a) Clearance of vegetation on the sides of railway tracks.
(b) Underpasses/over passes/girder bridges across vulnerable stretches of railway tracks to allow safe passage elephants.
(c) Signage boards at selected points to alert train drivers.
(d) Sensitization programmes for Train Drivers/Guards/Station Masters.
(e) Engagement of elephant trackers and communication with Station Masters.
(f) To keep Railway tracks free from food wastes, that attracts elephants.

(ii) A permanent coordination committee has been constituted jointly by the Ministry of Railways and the Ministry of Environment and Forests to share information and monitor the implementation of the advisory.

(iii) In order to develop specific strategies and Standard Operating Procedures and for better coordination committees have been constituted between Zonal Railway Offices and State Forest Departments.

(iv) Ministry of Railways has also been requested to regulate the speed of trains in identified vulnerable sections between sunset and sunrise.

(v) Chief Wildlife Wardens has been requested to take up the issue with electricity departments to prevent sagging of electric transmission lines and maintenance to minimum ground clearance as per rules.

(vi) Financial and technical assistance is provided to elephant range states under the Centrally Sponsored Scheme 'Project Elephant' for conservation and management of elephants.

(vii) Twenty nine Elephant Reserves have been notified in 14 States for conservation of elephants.

(viii) Elephant is included under Schedule I of the Wildlife Protection Act, 1972, to provide it highest degree of legal protection.

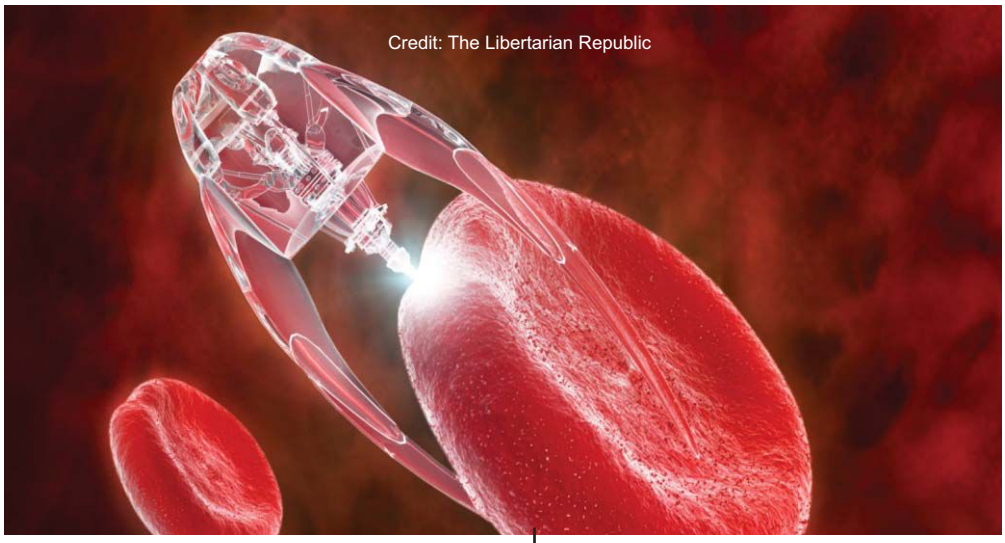
(ix) Improvement of elephant habitat, including Elephant Reserves and Corridors is carried out regularly.

(a) There is no proposal at present with the Government to formulate the policy to prevent elephant deaths due to train accidents and electrocution.

(b) Advisories have been issued to concerned agencies; consequently elephant deaths due to train accidents and electrocution have reduced significantly.

Source: timesofindia, pib.nic.in

Emerging Trend in Nanotechnology for Model Era


Credit: The Libertarian Republic

Nanoscience and technology is a broad and interdisciplinary area of research and development activity that has been growing explosively from late 1990s. Nanotechnology includes the low dimensional materials having may be different structures such as nanoparticles, nanowires, nanorods, nanotubes or nanocrystalline thin films which have much attracted attention in the different field of science and engineering. Any materials having at least one dimension between about 1 and 100 nm comes into the nano range and it shows the properties that are not found in bulk samples of the same material. These materials exhibits large surface area, higher electrical resistivity, lower thermal conductivity, greater specific heat and thermal expansion coefficients, and superior soft magnetic properties and due to these properties, these nano materials can be used in the different important fields such as in medical, environmental remediation, electrochromic or photochromic devices, gas sensors, solar energy transformation, semiconductors, and solar cells, catalysis and biotech industries, adsorption industries and defence etc.

In medical: One application of nanotechnology in medicine currently being developed involves employing nanoparticles to deliver drugs, heat, light or other substances to specific types of cells (such as cancer cells). Particles are engineered so that they are attracted to diseased cells, which allows direct treatment of those cells. This technique reduces damage to healthy cells in the body and allows for earlier detection of disease. For example, nanoparticles that deliver chemotherapy drugs directly to cancer cells are under development. Tests are in progress for targeted delivery of chemotherapy drugs and their final approval for their use with cancer patients is pending. CytImmune Company has published the results chemotherapy drug system. Nanoparticle attaches to a lymphoma cell and it blocks the cancer cell from attaching to real HLD cholesterol, starving the cancer cell.

Another application of nanoparticles is as a detection of biomolecules. Nanoparticles have been widely used as signal reporters to detect biomolecules in DNA assay, immunoassay and cell bioimaging. Usually, they are derivatized with different functional groups such as nucleic acid-targeted oligonucleotide probes, antibodies and protein to produce nanoprobes. Gold nanoparticle-based probes were used in the identification of pathogenic bacteria in DNA-microarray technology. Scientist have developed nano bubbles which formed around gold nanoparticles. When a nano bubble formed around a solid nanoparticle (such as gold) is heated with a laser then thisnanobubble opens a temporary hole in a cell wall and allows drugs to be injected.

The scientific community are planning this method to selectively destroy certain types of cells, and modify others. Currently, researchers have also combined bee venom with nanoparticles to poke holes in the protective envelope around virus particles which kills the virus. This method is being evaluated in lab testing on the HIV virus, however researchers believe the method may be used to fight other viruses.

Nanoparticles are also using as Quantum Dots (crystalline nanoparticles) to identify the location of cancer cells in the body, as a deliver chemotherapy drugs directly to cancer cells, as a cream that releases nitric oxide gas to fight staph infections. As a micelles to carry and deliver a chemotherapy drug paclitaxel to bladder cancer cells.

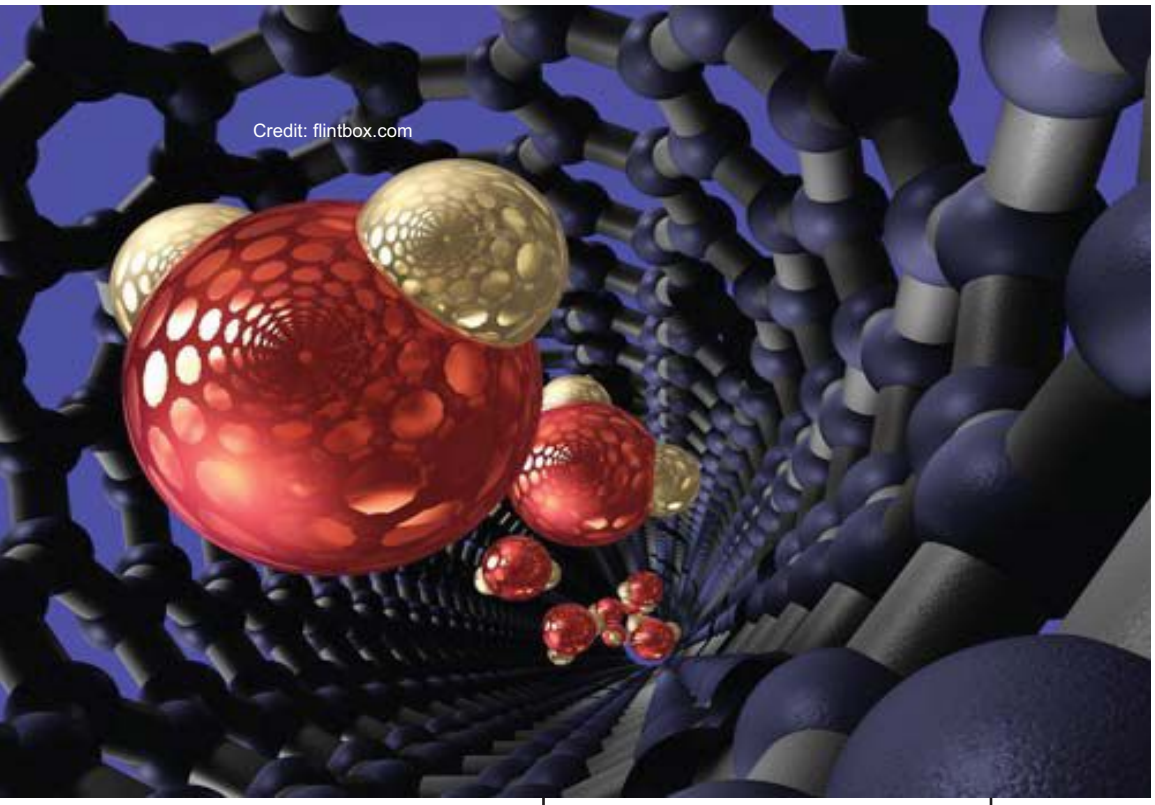
In skin product: Nanoparticle also used for the preparation of materials for synthetic skin that may be used in prosthetics. This material is a composite of nickel nanoparticles and a polymer. Silicates nanoparticles can be used to provide a barrier to gasses or moisture in a plastic film used for packaging. This could slow down the process of spoiling or drying out in food. Zinc oxide nanoparticles can be dispersed in industrial coatings to protect wood, plastic, and textiles from exposure to UV rays. Silver nanoparticles in fabric are used to kill bacteria, making clothing odor-resistant. To glow up the skin, nanotechnology is used.

In Energy and Electronics: Researchers have used nanoparticles called nanotetrapods studded with nanoparticles of carbon to develop low cost electrodes for fuel cells. This electrode may be able to replace the expensive platinum needed for fuel cell catalysts. Combining gold nanoparticles with organic molecules creates a transistor known as a NOMFET (Nanoparticle Organic Memory Field-Effect Transistor). This transistor is unusual in that it can function in a way similar to synapses in the nervous system. Scientist have also used nanoparticles called nanotetrapods studded with nanoparticles of carbon to develop low cost electrodes for fuel cells. This electrode may be able to replace the expensive platinum needed for fuel cell catalysts.

Combining gold nanoparticles with organic molecules creates a transistor known as a NOMFET (Nanoparticle Organic Memory Field-Effect Transistor). This transistor works similar to synapses in the nervous system. A catalyst using platinum-cobalt nanoparticles is being developed for fuel cells that produces twelve times more catalytic activity than pure platinum. In order to achieve this performance, the amorphous nanoparticles were anneal to form crystalline lattice and to reduce the spacing between platinum atoms on the surface and increasing their reactivity. Another example is silicon nanoparticles coated anodes of lithium-ion batteries which can increase battery power and reduce recharge time.Semiconductor nanoparticles are being applied in a low temperature printing process that enables the manufacture of low cost solar cells.

In environment remediation: Currently, groundwater remediation is the most common commercial application of nano remediation technologies. Using nanomaterials, especially zero-valent metals (ZVMs), for groundwater remediation is an emerging approach that is promising due to the availability and effectiveness of many nanomaterials for degrading or sequestering contaminants.

Nanotechnology also offers the potential to effectively treat contaminants in situ, avoiding excavation or the need to pump contaminated water out of the ground. The process begins with nanoparticles being injected into a contaminated aquifer via an injection well. The nanoparticles are then transported by groundwater flow to the source of contamination. Upon contact, nanoparticles can sequester contaminants (via adsorption or complexation), immobilizing them, or they can degrade the contaminants to less harmful compounds. Contaminant transformations are typically redox reactions. When the nanoparticle is the oxidant or reductant, it is considered as reactive agent.



The ability to inject nanoparticles to the subsurface and transport them to the contaminant source is imperative for successful treatment. Reactive nanoparticles can be injected into a well where they will then be transported down gradient to the contaminated area. Drilling and packing a well is quite expensive. Direct push wells cost less than drilled wells and are the most often used delivery tool for remediation with nanoiron.

In water treatment: The use of various nanomaterials, including carbon nanotubes and TiO2, shows promise for treatment of surface water, including for purification, disinfection, and desalination.Target contaminants in surface waters include heavy metals, organic contaminants, bisphenol and pathogens. For these removal, nanoparticles are using as sorbents, as reactive agents (Photocatalyst or redox agents), or in membranes used for nanofiltration. The nanoparticles possess high reactivity and large surface area due to which these nanoparticles used as effective sorbents to help concentrate target contaminants for solid-phase microextraction, particularly in the form of self-assembled monolayers on mesoporous supports. These nanoparticles also used as effective sorbent for many targets, including heavy metals such as mercury, lead, and cadmium, chromate and arsenate, and radionuclides such as Tc, CS, uranium, and the actinides.

In sensing: Nanoparticles may assist in detecting trace levels of contaminants in field settings, contributing to effective remediation. Instruments that can operate outside of a laboratory often are not sensitive enough to detect trace contaminants. Rapid, portable, and cost-effective measurement systems for trace contaminants in groundwater and other environmental media would thus enhance contaminant detection and cleanup. One potential method is to separate the analytic from the sample and concentrate them to a smaller volume, easing detection and measurement. When small quantities of solid sorbents are used to absorb the target for concentration, this method is referred to as solid-phase micro extraction.

Among the various uses mentioned above, nanotechnology is widely used in different fields from small to high and hope that current century will be known as nanoscience centaury in the science field.

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Growing Horizons of Electronic Monitoring

Credit: CEP Probation

Electronic monitoring

Monitoring of behavior, activities, or other changing information for the purpose of influence, management, direction, or protection related to human and animals has been there from time immortals. This includes observation from a distance by means of electronic equipments or interception of electronically transmitted information. Surveillance is used by governments for intelligence gathering, prevention of crime, the protection of a process, person, group or object, or the investigation of crime. It is also used by criminal organizations to plan and commit crimes, such as robbery and kidnapping, by businesses to gather intelligence, and by private investigators. Monitoring and surveillance of workers have been time immortals, however, what makes the present situation unique, is the sheer scale of the monitoring; the extent to which the overseer is unobtrusive and the capabilities of modern technology for the storage, analysis and reporting of the gathered information.

Electronic monitoring is a program to provide structure, control, and accountability of people. It can also provide an extra layer of supervision with the goal of enhancing public safety in the community. Electronic tagging is a form of surveillance which uses an electronic device fitted to the person or animal. It is commonly used as a form of electronically monitored punishment for people who have been sentenced to electronic monitoring by a court, or required to wear a tag upon release from prison. With overcrowded jails and the high cost of incarceration, many states have turned to electronic monitors as a cost-effective way to send people home and free up jail space. Thus, electronic monitoring not only saves the department money. However, electronic tagging and monitoring is also used in healthcare settings with people with dementia and in immigration contexts in some jurisdictions. If the device is based on GPS technology, it is usually attached to a person by a probation officer, law enforcement or a private monitoring services company field officer, and is capable of tracking the wearer's location wherever there is the satellite signal to do so. Electronic monitoring tags can be also used in combination with curfews to confine defendants or offenders to their homes as a condition of bail, as a stand-alone order or as a form of early release from prison. The combination of electronic monitoring with a curfew usually relies on radio frequency (RIFD) technology, which differs from GPS technology.

For the last few decades, electronic monitoring has acquired great dimensions of development in terms of monitoring devices and their applications in different areas like: employees at work place, crime control (offenders/ criminals/prisoners in and out of jails), drug de-addiction, animals (on land, in air and in water), vegetation, environmental & climate change, social amenities (health, banking, traffic, sports and air quality etc), adventurers and work seekers in remote and risky areas etc. Honesty, dedication and efficiency in the people of present civilization have become the traits of the past times. Most of us are not only shrinking away from our responsibilities but are also adopting ways of corrupt life. Inefficiency and corruption in the society have reached at alarming levels. Electronic monitoring or electronic surveillance is gaining importance and seems to be dire need of the hour under circumstances when people on their own though with limited capabilities are not doing their level best in the job they are carrying out and the situation is worst in case of government employees. What really can change people's behavior are social inputs like motivational factors, such as fun and adventure and pride and accomplishment, recognition, affection but electronic technology has also gone to make better positive reinforcement in this direction. Moreover, people's governance or monitoring is losing its sheen as people can show favoritism and can tell a lie but electronics will never. Therefore, electronic devices such as CCTV, biometric registers, sensors, GPS (radio frequency bracelet and GPS bracelet), phones, e-mails etc. are becoming the integral tools of monitoring everywhere with a hope that efficiency will improve.

Electronic monitoring devices

The technology behind the devices continues to evolve. Where once it just used radio signals to detect whether someone was home, now many devices use GPS and cell tower signals to give precise locations. Monitors can detect blood-alcohol levels through a person's sweat. However, the system can have flaws. Devices can send false alerts. Sometimes, they send so many alerts that officers can't carefully look into all of them. Researchers hope electronic monitoring can even predict if someone is about to commit a crime before they actually do. Electronic monitoring runs from keystroke counting; telephone service observation whereby statistics are gathered on the duration, time between, and number of calls; telephone call accounting; peeking on to workers computer screens and into electronic mail; and the use of active or magic badges that can keep track of an employee's movements and locations. Increasingly, computers are being used to set tasks and performances for all levels of worker. If permitted, employers may view employees on closed-circuit TV; tap their phones, E-mail, and network communications; and rummage through their computer files with or without employee knowledge or consent--24 hours a day.

Electronic identification and monitoring are important tools within the management of animal husbandry systems. Electronic monitoring of rumination activity is an indicator of health status and production of animals. Remote monitoring of animal behavior in the environment can assist in managing both the animal and its environmental impact. GPS collars which record animal locations with high temporal frequency allow researchers to monitor both animal behavior and interactions with the environment. Electronic tags are giving scientists a complete, accurate picture of migration patterns. Tracking migrations is an important tool to better understand and protect species. Scientists today still attach tags, such as metal bands, to track movement of animals. Metal bands require the re-capture of animals for the scientists to gather data; the data is thus limited to the animal's release and destination points. Recent technologies have helped solve this problem. Some electronic tags give off repeating signals that are picked up by radio devices or satellites

while other electronic tags could include archival tags (or data loggers). Scientists can track the locations and movement of the tagged animals without recapturing them using this RFID technology or satellites. These electronic tags can provide a great deal of data.

Telemetry, in general, involves the use of a transmitter that is attached to an animal and sends out a signal in the form of radio waves, just as a radio station does. A scientist might place the transmitter around an animal's ankle, neck, wing, carapace, or dorsal fin. Alternatively, they may surgically implant it as internal radio transmitters have the advantage of remaining intact and functioning longer than traditional attachments, being protected from environmental variables and wear. The use of geolocators or "geologgers is the technology that utilizes a light sensor that tracks the light-level data during regular intervals in order to determine a location based on the length of the day and the time of solar noon. Receivers can be placed in Earth-orbiting satellites and networks, or groups, of satellites are used to track animals. Each satellite in a network picks up electronic signals from a transmitter on an animal. Together, the signals from all satellites determine the precise location of the animal. The satellites also track the animal's path as it moves. Satellite-received transmitters fitted to animals can also provide information about the animals' physiological characteristics (e.g. temperature) and habitat use. Satellite tracking is especially useful because the scientists do not have to follow after the animal nor do they have to recover the tag to get the data on where the animal is going or has gone. Satellite networks have tracked the migration and territorial movements of caribou, sea turtles, whales, great white sharks, seals, elephants, bald eagles, ospreys and vultures. Additionally, pop-up satellite archival tags are used on marine mammals and various species of fish. Thanks to these systems, conservationists can find the key sites for migratory species.

Use of electronic monitoring

In sports: The present electronic monitoring systems provide new and improved apparatus and method for controlling the operation of a television system, which includes a replay recorder, at sports contests to monitor events of interest during the contest. When the indicator detects an event of interest during the contest being monitored, such as an intrusion or the presence of an object along a line or boundary, a signal is sent to a video replay recorder, also known as an instant replay system, to continue recording for a predetermined interval and thereafter cease.

Several types of indicators exist for assisting officials monitoring events of interest, particularly those along lines or boundaries, at sports contests. Examples are those for determining whether a tennis ball lands in or out of play during tennis matches. One type of indicator is an electronic-laser indicator. Other types of line indicators include those utilizing pressure sensitive tapes as the line or boundary and those based on the principle of detection of magnetic particles in the ball.

In business: Video surveillance and business security systems are now used for everything from measuring efficiency, to data security, to compliance with securities laws. The growth in employer surveillance systems is nothing less than stunning. Businesses use video surveillance systems for a lot more than catching shoplifters or reducing the time

employees spend goofing off. Employee monitoring is being used to increase customer satisfaction, improve employee performance, and enhance productivity.

Medical and health use: At present, almost all the hospital activities are electronically monitored. Continuous electronic monitoring in hospitals could save lot of money billions. Elderly people in care homes can be tagged with the electronic monitors used to keep track of young offenders. For persons suffering from dementia, electronic monitoring might be beneficially used to prevent them from wandering away.

For animals: Understanding and predicting animal movement is important as it is central to establishing effective management and conservation strategies. Electronic identification and monitoring are also important tools within the management of animal husbandry systems. Electronic monitoring of rumination activity is an indicator of health status and production of animals. Remote monitoring of animal behavior in the environment can assist in managing both the animal and its environmental impact. GPS collars which record animal locations with high temporal frequency allow researchers to monitor both animal behavior and interactions with the environment. Electronic tags are giving scientists a complete, accurate picture of migration patterns. Tracking migrations is an important tool to better understand and protect species.

For criminals: Electronic monitoring, which is used to enforce the conditions of release for criminal offenders, strengthens the ability of corrections officials and law enforcement authorities to supervise offenders in the community by keeping them under closer surveillance than they otherwise could. While it's role in community corrections and the overall criminal-justice system is still minor, as the technology has improved (especially with regard to global-positioning systems or GPS) and its potential upside made more apparent to policymakers, EM has become an increasingly used criminal-justice tool. Using tracking systems, criminal justice agencies can monitor an individual's location and be alerted to any unauthorized movements. The main potential benefits of electronic tagging are cost savings to the criminal justice system and the more optimal use of prison space. Technology, thus, can be useful in detention, restriction and surveillance. However, constant surveillance of people, particularly through the use of devices fixed to their body, or even implanted beneath the skin, raises serious civil liberty and ethical concerns.

For job performance: Powerful reasons exist to monitor employee online behavior at work which are compelling many employers for it. Reasons like: productivity issues are an employer concern and misuse of internet during working times etc. exist to place employees under electronic surveillance at work. Various studies conducted by psychological scientists have found that electronic monitoring is, in fact, associated with higher performance; not only that, more frequently workers were monitored, the better they performed. The results showed a positive association between the prevalence of electronic monitoring and job performance. The more often bosses used electronic monitoring, the better employee performance ratings were. In an effort to enhance employee performance, organizations like call centers are increasingly using technology to electronically monitor their workers on the job.

Objections to monitoring

Opponents to electronic monitoring in the workplace have been primarily concerned with the abuses of employers, and the consequent effects on workers privacy, performance and health. In many ways it is business interests that understand the issues that are stake - their ability to control the work process. Electronic surveillance invades workers' privacy, erodes their sense of dignity and frustrates their efforts to do high-quality work by a single- minded emphasis on speed and other purely quantitative measurements. Electronic monitoring produces pressure to perform. The range of stressful working conditions related to monitoring include: heavy workload; repetitive tasks; social isolation; and fear of job loss. These are exacerbated by the lack of job involvement or participation, and lack of organizational support. Therefore there are "sociotechnical" triggers that can create direct psychological effects, besides generally adverse working conditions. The monitored employees reported higher workload, less workload variation and greater workload dissatisfaction than the unmonitored employees. Monitored workers reported more somatic health complaints: musculoskeletal, psychological, and psychosomatic problems. However, what is also instructive about these results are the unacceptably high levels of health complaints for even unmonitored service representatives.

Electronics monitoring is gaining applications in various fields with lots of advantages and few disadvantages. The use of surveillance is a fundamental means by which the employer inexpensively and effectively exercises power. However, stress, inter-worker competition and performance evaluations are seen as important issues by business because of their ultimately detrimental effect on productivity and the smooth operation of the business. Management is concerned primarily with devising more efficient and less draconian means of implementing and administering monitoring systems. Generally, new monitoring technologies have been seen as extensions of traditional management prerogatives, leaving workers the opportunity to organize and collective bargain over workplace issues. Presently workers have few legal avenues to address the issue of workplace electronic monitoring. Similarly, electronic monitoring in case of animals also should be without harming their (animals) behavior, freedom and health.

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Credit: wildlifeact.com

Oldest planet in solar system

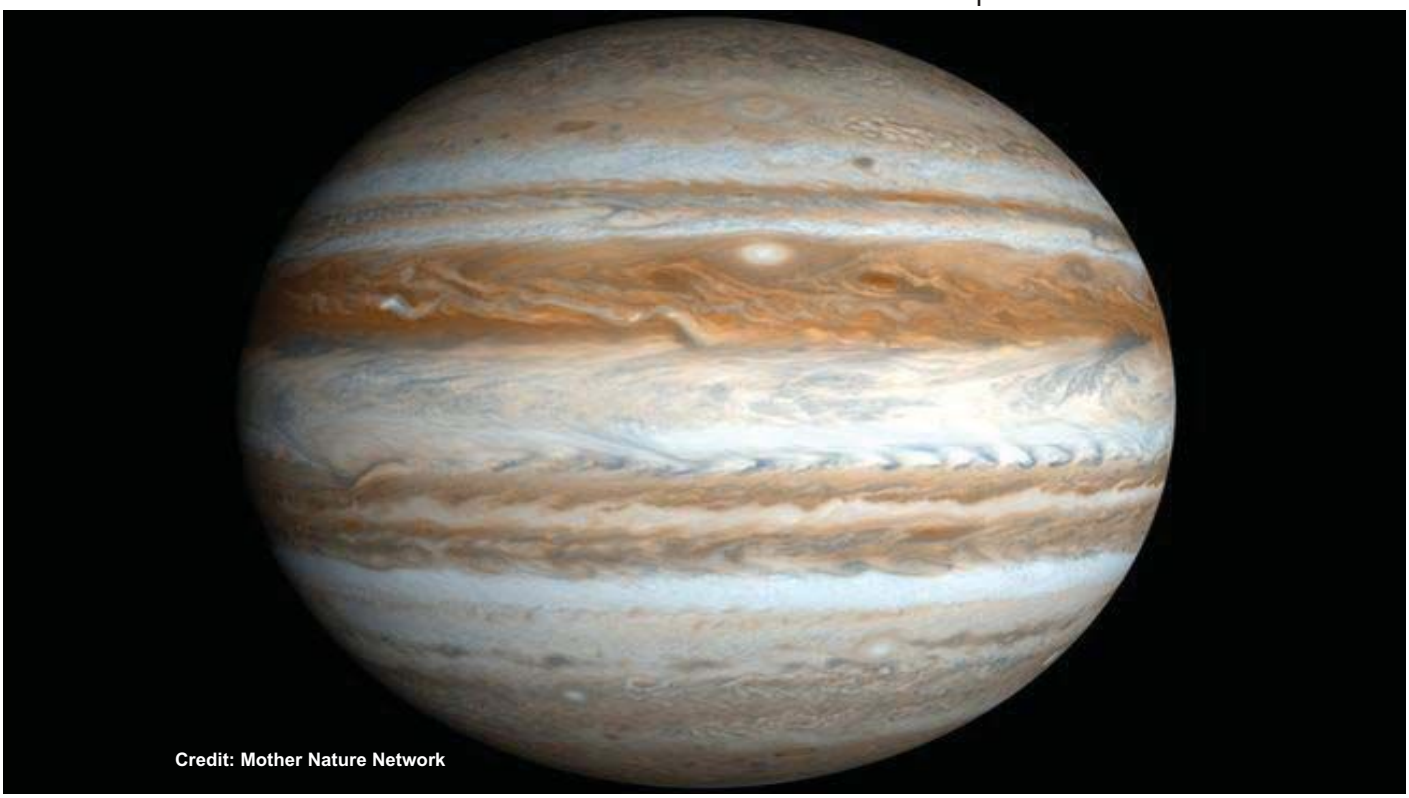
Jupiter formed in a geologic blink. Its rocky core coalesced less than a million years after the beginning of our solar system, scientists reported Monday in the Proceedings of the National Academy of Sciences. Within another 2 million or 3 million years, that core grew to 50 times the mass of Earth.

Scientists have previously built computer models of the birth of Jupiter. First time that we can say something about Jupiter based on measurements done in the lab It might seem odd that scientists used meteorites to determine the age of Jupiter, but the findings present a clear line of deduction that identifies Jupiter as the oldest planet.
Scientists showed through isotope analyses of meteorites that Jupiter's solid core formed within only about one million years after the start of the solar system history, making it the oldest planet.

Through its rapid formation, Jupiter acted as an effective barrier against inward transport of material across the disk, potentially explaining why our solar system lacks any super-Earths (an extrasolar planet with a mass higher than Earth's).

The team found that Jupiter's core grew to about 20 Earth masses within one million years, followed by a more prolonged growth to 50 Earth masses until at least 3-4 million years after the solar system formed.

Source: washingtonpost.com, popularmechanics.com, timesofindia



Credit: Mother Nature Network

India To Make Naval Ships That Can Launch Attack In Enemy Zone

Defence ministry last month cleared a mega naval project worth over Rs 20,000 crore for four Landing Platform Docks (LPD) also known as amphibious assault ships.

LPDs are warfare ship that helps armed forces to transport troops defence equipment, helicopters and amphibious vehicle into a war zone by sea.

Each of these four ships will weigh in the range of 30,000 and 40,000 tonnes. Once built and deployed, they will be the biggest battle ships to be built in India after the under-construction aircraft carrier INS Vikrant. These warfare ships will enhance India's ability to conduct sea-borne offensives in enemy areas. The ships have a huge lower decks that can be opened as a bridge to accommodate landing of tanks, defence cargo, as well as troops from sea to land. These ships do not require docking and can easily return as they can stay in sea uninterrupted for months depending upon their capacity.

Source: Economictimes.com

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