

JIVANAM



CONTENTS

Cancer genetics

Neurodegenerative diseases

Dietary Fibres

BMW

FACTS OF EXTRAORDINARY

HUMAN

BODY

artificial sweeteners

Photo Gallery

From the Desk of HOD

The Biochemistry Department of M. G. Science Institute has crossed yet another landmark. It has completed thirty-one years of its existence. This eventful journey in the Biochemistry Department is marked by some feats and wonderful memories. It is really heartening to note that this E-magazine is brought out by our students to commemorate 31 years of the Biochemistry department and its achievements. I must congratulate the student community for turning the idea of the magazine into reality. The magazine is created and conceived by the students to ignite scientific temperament and to develop the art of scientific writing. From its very inception, the Biochemistry department has carved its distinctive niche in the academic community of M. G. Science Institute. It has always given priority to impart the knowledge so as to bring the application of basic concepts which can help to serve society. Student-centric approach has taken the department to new heights of success. The department has attracted meritorious students and they have really put up lots of efforts in turning the department into a hub of intellectual curiosity. I am thankful to my colleagues in the department for contributing wonderfully for the overall success of the department. I also congratulate to the entire editorial for doing fantastic job.

Dr. HARSHANG PANDYA
H.O.D Biochemistry dept.

CANCER GENETICS

As we know cancer is one of the most dreaded disease, cancer is caused by changes to DNA, Cancer is a genetic disease, that means it is caused by mutations occurring in certain genes that play a key role in control normal cell growth and division.

DNA is the molecule that stores the genes that make up our genetic code. - The genetic changes that lead to cancer are usually acquired throughout a person's lifetime as a result of errors that occur in their genetic Data (DNA) when their oaks divide or suffer damage due to exposure to carcinogenic substances such as chemicals found in tobacco smoke, ultraviolet rays or certain foods.

*Cancer cells generally acquire a large number of genetic changes that differentiate them from normal cells. These mutations are usually specific to a certain organ. Some tumours are the result of mutations, but they are usually caused

by cancer and uncontrolled cell division. Therefore, if the cancer continues to grow, further changes will occur.

Genetic testing is only indicated when an individual has a specific type of cancer that is known to respond positively with target-specific drugs and when the doctor has decided to start treatment with the given drug therapy.





There are 2 BRCA gene mutations that are known to cause cancer BRCA1 and BRCA2. These gene mutations increase the risk of a woman developing breast cancer and ovarian cancer, BRCA2 gene mutations are linked to a higher risk of breast cancer and prostate cancer. Cancer genes cannot skip or miss a generation. If one of your parents has a gene mutation, there is a 1 in 2 (50%)

chance it has been passed on to you. So either you inherit it or you do not. If you do not inherit the mutation, you cannot pass on to your children

By Naseha Mansuri

Neurodegenerative diseases

Neurodegenerative diseases (NDs) are defined by the progressive death of neurons or progressive degeneration of the structural and physiological functions of the central and peripheral nervous systems, which then result in a decline in the physical and mental health aspects of the afflicted person. Alzheimer's Disease (AD) is the most common of the category, followed by Parkinson's Disease (PD). Huntington's disease and Amyotrophic horizontal sclerosis (ALS) are also NDs. Over 75 million adults globally are projected to develop the different types of NDs by 2030. They have recently surpassed cancer, myocardial infarction (cardio-vascular disorders), and stroke as the fourth leading cause of death. These and many other statistics prove the need for accurate diagnosis of NDs. For different ND, types of neurons getting affected are different as well, i.e. In Alzheimer's Disease (AD) – pyramidal neurons, and in Parkinson's Disease (PD) – dopaminergic neurons are affected. Here, in this article, the development of responsible biomarkers and their role in the progressing respective disease will be discussed.

DISCOVER

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History and escalating cases of Neurodegenerative Diseases have made it very essential to assay biomarkers with the utmost accuracy possible. To date, ELISA measurement of β -amyloid(1-42), total tau and phospho-tau-181 from cerebrospinal fluid (CSF), for Alzheimer's Disease and in case of Parkinson's Disease, α -synuclein, total tau, and amyloid $\text{ab42}(\text{A}\beta 42)$ from CSF is considered a most potential biomarker for diagnostics.

Recently molecular imaging techniques like positron emission tomography (PET) and single-photon emission computed tomography (SPECT) are also giving promising results.

Alzheimers is the most common cause of dementia, a general term for memory loss and other cognitive abilities serious enough to interfere with daily life. The first discernible pathology is the accumulation of amyloid β ($\text{A}\beta$) protein in extracellular plaques in the brain, occurring decades before clinical onset. Biomarker studies suggest that $\text{A}\beta$ accumulation is followed by synaptic dysfunction and increased phosphorylation and secretion of p-tau, a microtubule-binding axonal protein that is highly expressed in cortical neurons. This dysfunctional tau metabolism places neurons at increased risk of degeneration with the development of intraneuronal neurofibrillary tangles that are composed of hyper-phosphorylated and truncated Tau proteins. Neurodegeneration eventually translates into AD clinical syndrome.

By Darshil Patel

DIETARY FIBERS : SIMPLIFY THE WAY OF NUTRITIOUS AND HEALTHY LIFESTYLE

What is dietary fiber and is it beneficial?

Dietary fiber, also known as roughage, is the indigestible part of plant foods.

Fiber has a host of health benefits, including reducing the risk of heart disease and type 2 diabetes.

Dietary fiber is an essential part of a healthful diet. It is crucial for keeping the gut healthy and reducing the risk of chronic health conditions.

Benefits like Weight management, Reduced diabetes risk, Better gut health come along

Fiber intake is a delicate balance. Though it may be better to have too much than too little, you'll need to be cautious. Try not to make any drastic sudden changes to your fiber intake.

If you feel constipated and want to increase your fiber intake to help give you relief, add just a few grams of fiber to your diet each week from a variety of foods. Only take a fiber supplement if you don't think you're getting enough fiber from the foods you eat. Always be sure you're also drinking enough water to avoid constipation or indigestion.

Seek medical attention as soon as possible if you're experiencing nausea, vomiting, a high fever, or a complete inability to pass gas or stool for more than a few days.



Dietary Fibers

What is the best way to get fiber?

In general, it's better to get fiber from the food you eat than from supplements. This is because high-fiber foods also have important vitamins and minerals your body needs to stay healthy.

1. Soluble fiber- Oats, brussels sprouts, beans, peas, apples, oranges, nuts, flax, and other seeds
2. Insoluble fiber- wheat bran vegetables like green beans and dark leafy greens, root vegetables like carrots, beets, and radish, fruit skins, and intact whole grains.

Taking fiber supplements known as wheat dextrin, inulin, psyllium, and methylcellulose are other ways to get soluble fiber, though food is always best for both your body and your gut bacteria.

How does fiber affect your digestion?

There are two main types of fiber. Each type of fiber plays a different roles in digestion:

Adults (50 years or younger)
Adults (over 50)
Men 38 g 30 g
Women 25 g 21 g

Insoluble fiber adds bulk to your stool and helps food pass more quickly through the stomach and intestines. It also helps balance the pH in your intestine and may prevent diverticulitis, an inflammation of the intestine, as well as colon cancer.

Soluble fiber attracts water and forms a gel-like substance with food as it's digested. This in turn slows down digestion and helps you feel full faster, which is important in weight management. It may also help lower your risk of heart disease, regulate your blood sugar, and help reduce LDL cholesterol.

Fermentable fibers can be from both these categories, though more often soluble fibers are fermented. Fibers fermented by bacteria help increase the bacteria in the colon, which aids digestion. It also plays a major role in human health.



BMW

❖ **Biomedical waste:** BMW is the waste generated through health sectors e.g hospitals, clinics, blood banks, research laboratories, mostly the health sectors, etc, which cause life-threatening diseases.

❖ **Biomedical Waste Management: Proper Maintenance and Management** of biomedical waste produced by health sectors.

1.Segregation

Is to separate or reduce the volume of BMW depending upon the properties of waste i.e

some infectious and non infectious should be separated well. Pathological waste: In yellow bag. Syringe without needle, gloves, urine bag : in red container, Needle, syringe with needle, sharps, blades: In White container (translucent container). Lab slides, nails: in blue colour container. text

2.Storage

After segregation storage is done at the source only until and unless it is collected for clearness or further treatment.

3.Transportation

Transporting of waste from source to secondary storage area is done in this step. And the vehicle should be approved by governing body

4.Treatment

Treatment is done to eliminate harmful effects. Different types of methods are used for decontamination of BMW. Incineration, Thermal treatment, Autoclave Reverse polymerisation or thermal depolymerisation, Chemical disinfection, Biological treatment

5. Disposal

Usually Deep burial, some times recycling is done after proper sterilization.

Why need of BMW ?

What are the threatening and detrimental consequences for which BMW is at our centre of focus?

Quote

"I would ask all of us to remember that protecting our environment is about protecting where we live and how we live. Let us join together to protect our health, our economy, our community-so all of us, our children and our grand children can enjoy a healthy and a prosperous life."

Unquote.

Proper management of BMW is necessary whether we see in the area of general public or else in the environmental point of view.

Management in ecofriendly and economically feasible way is the key point that should be taken under consideration. All norms should be followed by the health sectors while managing waste.

BMW is an unseen threat, Threat which is unfathomable and can be lethal .So it is extremely important to manage the waste that is created in saving lives.

Thank you.

By Aditi Baluni

FACTS OF EXTRAORDINARY HUMAN BODY

1. When a person listens to music that gives him/her the chills it triggers a release of dopamine to the brain and dopamine is a kind of naturally occurring happy chemical.
2. The brain itself cannot feel pain because the brain itself does not have pain receptors. That doesn't mean that your head can't hurt. The brain is surrounded by loads of tissues, nerves, and blood vessels that are receptive to pain and can give you headaches.
3. The outer layer of your skin is the epidermis, it is found thickest on the palms of your hands and soles of your feet (around 1.5mm thick).
4. The femur (thigh bone) is the longest bone in the human body.
5. As well as having unique fingerprints, humans also have unique tongue prints.
6. Goosebumps evolved to make our ancestors' hair stand up, making them appear more threatening to predators.
7. Blushing is caused by a rush of adrenaline.
8. The cornea is the only part of the body with no blood supply- it gets its oxygen directly from the air.

Facts about artificial sweeteners

- Artificial sweeteners are a food additive that provides a sweet taste of sugar while containing significantly less food energy
- Also termed as a sugar substitute.
- Most artificial sweeteners are created from chemicals in a lab.
- Examples: 1) saccharin
2) sucralose
3) aspartame.

➤ Why we switch to artificial?

sweeteners from our table sugar?

- Artificial sweeteners have low-calorie value, so they give “diabetics” more flexibility in their diets, allowing them to enjoy sweet foods without affecting blood sugar.
- Cheaper than table sugar
- Research into sweeteners shows that, artificial sweeteners are perfectly safe to eat or drink on a daily basis but in a “limited” value.

Disadvantages of artificial sweeteners

- They majorly cause weight gain.
- Artificial sweeteners do not give energy as they lack major nutrients & vitamins

- Also responsible for obesity, depression, headache.

- Causes gastrointestinal distress

Mechanism of artificial sweeteners in human body

- Aspartame an artificial sweetener is digested in the small intestine and hydrolyzed components are absorbed and metabolized following their normal metabolic pathways

- Stevia glycoside is fermented by the gut microbiota to form stevia, which is absorbed into the liver & excreted in urine

- Mainly, artificial sweetener is not digested by human body, which is why they have no calories.

By Disha Marothiya

PHOTO
GALLERY





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