MICROBIOLOGISTS SOCIETY, INDIA

Prof. A. M. Deshmukh, National President +91 9822079782 mbiosociety@gmail.com http://microbiosociety.com

01 JANUARY 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
CERVICAL CANCER AWARENESS MONTH	1 GLOBAL FAMILY DAY	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26 REPUBLIC DAY	27
28	29	30 ANTI- LEPROSY DAY WORLD N T D DAY	31			

"BIOTECHNOLOGY IS THE WAY TO SAVE THE LIFE OF EVERY INDIVIDUAL."

GSBTM (GUJARAT STATE BIOTECHNOLOGY MISSION), GANDHINAGAR, GUJARAT
https://maps.app.goo.gl/WAyrs3US4ejhWDFo9

SERUM INSTITUTE OF INDIA, PUNE, MAHARASHTRA
https://maps.app.goo.gl/qonJar99Km8H93t9A

Department of Microbiology , HVHP Institute of Post Graduate Studies and Research,
A Constituent Institute of Kadi Sarva Vishwavidyalaya, S.V. Campus, Kadi-382 715. www.hvpgrkadi.ac.in
Concept by : Dr. Sanjeev Patankar, Prof. A. Archana, Dr. Minal Trivedi

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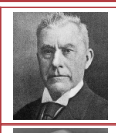
01 JANUARY 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
1st Jan 1942	Norman R Pace		He worked on the synthesis, structure and function of RNA and the application of Molecular Biology tools to detect microbes in various environments.
5th Jan 1895	Rebecca Lancefield		Lancefield is best known for serological classification of 8-hemolytic ***Streptococci***.
9th Jan 1922	Har Gobind Khorana		His work or discovering that the order of nucleotides in our DNA determine which amino acids are built Deciphering the genetic code .
12th Jan 1899	Paul Muller		Paul Hermann Muller was a Swiss chemist. In 1939, Muller discovered the insecticidal properties of DDT, which marked a major breakthrough in pest control.
17th Jan 1955	Katalin Kariko		Katalin Kariko is a Hungarian born Biochemist who developed methods for modifying mRNA molecules to make them stable and less likely to trigger an Immune response.
21st Jan 1868	Felix Hoffmann		He was a German chemist notable for resynthesizing diamorphine.
24th Jan 1885	Marjory Stephenson		She wrote Bacterial Metabolism.
24th Jan 1828	Ferdinand Cohn		Cohn was the first to classify algae as plants and to define what distinguishes them from green plants.
30th Jan 1899	Max Theiler		1951 Nobel Prize in Physiology and Medicine for developing a vaccine against yellow fever.

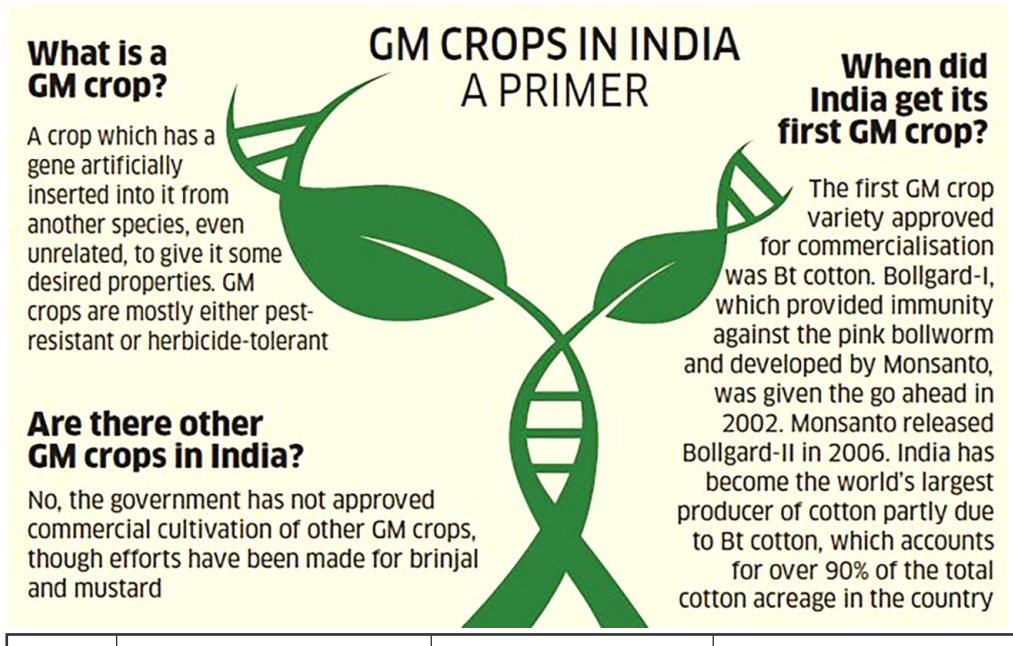
Death Anniversaries	Name of Scientists	Photographs	Contribution
1st Jan 1931	Martinus Beijerinck		The first to recognize that viruses are reproducing entities that are different from other organism.
25th Jan 1957	Kiyoshi Shiga		Discovery of the dysentery ***Bacillus shigella*** in 1897.
26th Jan 1823	Edward Jenner		Immunization and the ultimate eradication of smallpox.

BIOTECHNOLOGY IN FOOD

An important key techniques used in Biotechnology is Genetic Engineering, which allows scientists to modify the genetic makeup of organisms to achieve desired outcomes. This can involve inserting genes from one organism into another, creating new traits or modifying existing ones. Genetically Modified Organism (GMO) is a plant, animal, or microorganism that has had its genetic material (DNA) changed using technology that generally involves the specific modification of DNA, including the transfer of specific DNA from one organism to another.

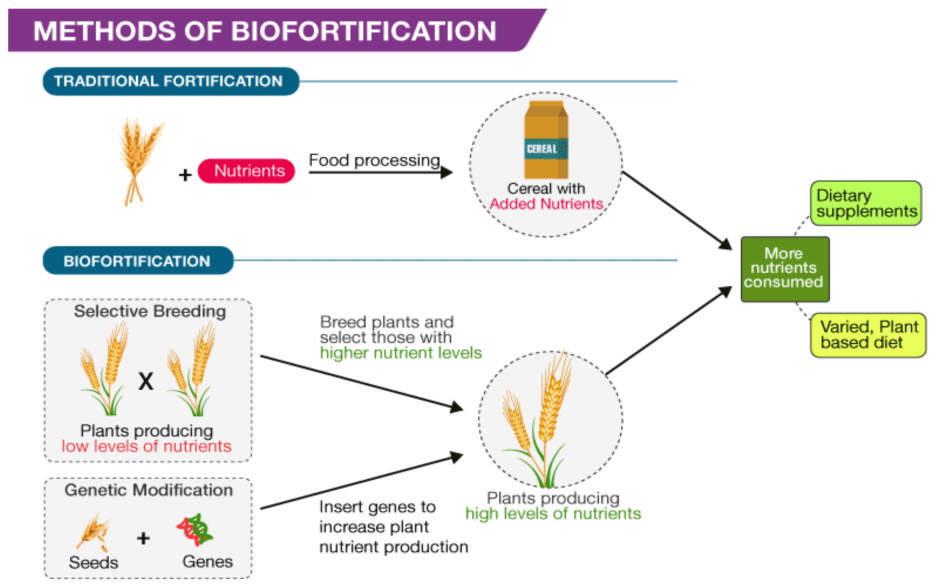
GENETICALLY MODIFIED FOOD (GM FOOD)

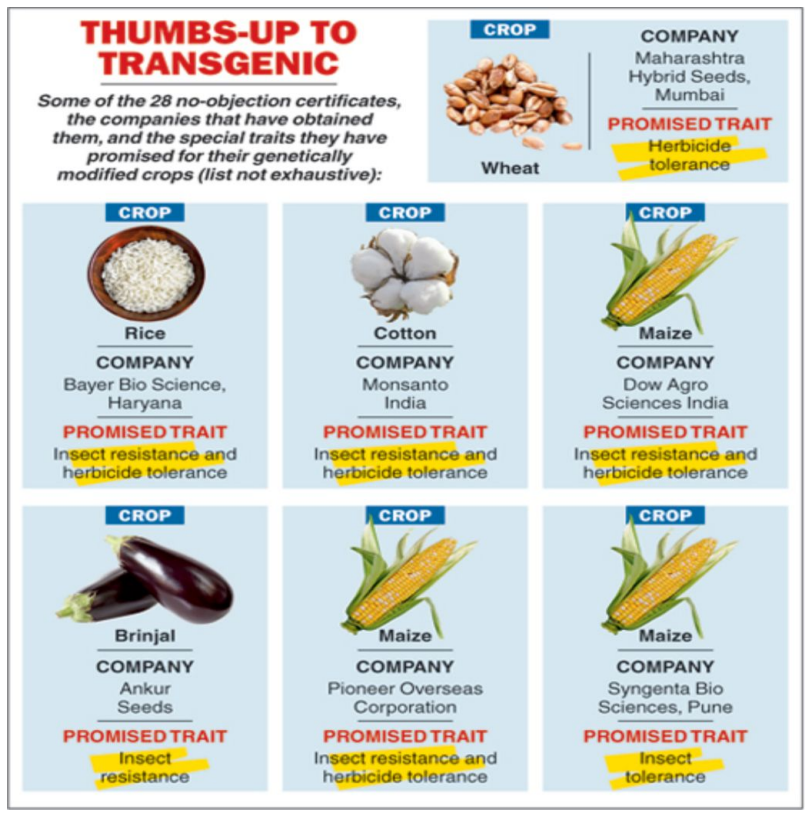
Crops produced by Biotechnology include soybeans, corn, cotton, canola, papaya, tomatoes and squash. Also, an enzyme used to make cheese and yeast to make bread is commonly produced by Biotechnology. Scientists have made some foods, such as papaya and potato, more resistant to disease.



BIOFORTIFICATION

Biofortification is the process of improving the nutritional quality of food crops. This can be achieved through agronomic practices, conventional breeding or Biotechnology based approaches like Genetic Engineering and genome editing. This involves selecting and breeding plants with higher levels of essential vitamins and minerals, such as vitamin A, iron, and zinc. Biofortified crops examples - Golden rice, iron biofortified beans, zinc biofortified wheat, biofortified sweet potatoes, biofortified maize (corn), iron biofortified rice, biofortified cassava. Biofortification is a sustainable strategy for delivering micronutrients. The strategy is targeted to rural populations in developing countries. Both conventional and transgenic methods are used to breed micronutrient-dense crops.





Sr. No.	NAME OF THE EXAMINATIONS	THE MONTHS FOR NOTIFICATION	MONTHS OF THE EXAMINATION / INTERVIEW TO BE HELD	WEBSITE LINK	REMARKS
1	AIIMS	Jan, Jul	Jan, Jul	https://aiimsexams.org/	PhD
2	ARS - NET	Feb	Apr	http://www.asrb.org.in/	JRF
3	BARC	Feb	Mar - Apr	http://www.hbni.ac.in/	Job, PhD
4	BHU	Apr	Jun - Jul	https://bhuonline.in/	M.Sc, PhD
5	BINC	Apr - May	Jun - Jul	http://bcil.nic.in/binc.html	JRF

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02 FEBRUARY 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2 WORLD EPILEPSY DAY	3
4 WORLD CANCER DAY	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27 NATIONAL PROTEIN DAY	28 NATIONAL SCIENCE DAY	29 RARE DISEASE DAY		

"THE BEST WAY TO BE ADVANCE IN SCIENCE IS BIOTECHNOLOGY"

CENTRAL RESEARCH INSTITUTE, KASAULI, HIMACHAL PRADESH
https://maps.app.goo.gl/XF3fvVod3iDVGoZ57

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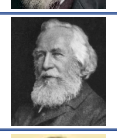
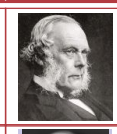
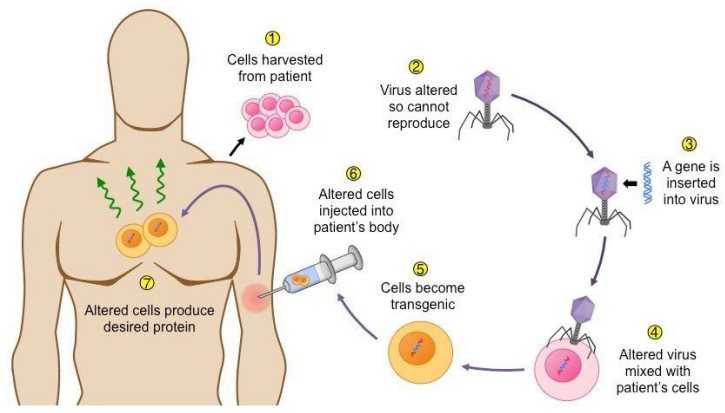
02 FEBRUARY 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
3rd Feb 1923	Hans Cohen		He worked on the development of the Salk polio vaccine
7th Feb 1971	Kiyoshi Shiga		Famous for the discovery of Shigella dysenteries, the organism, ***Bacillus shigella*** that causes dysentery.
10th Feb 1897	Johan Franklin Enders		The Father of Modern Vaccines, a leader in modern virology, Enders is credited for cultivating the polio virus in tissue cultures of human cells which led to the development of an attenuated live vaccine for polio.
12th Feb 1809	Charles Darwin		The father of evolution due to his contribution to the establishment of the theory of evolution.
16th Feb 1834	Ernst Haeckel		He proposed the term Kingdom Protista and Coined the term Ecology.
17th Feb 1949	Peter Piot		His research on Ebola and AIDS virus.
18th Feb 1626	Francesco Redi		He was the first person to challenge the theory of Spontaneous generation by demonstrating that maggots come from eggs of flies.
19th Feb 1964	Jennifer Doudna		She played a pivotal role in discovery and development of CRISPR-cas9 gene editing system.
20th Feb 1901	Rene Dubos		French-American Microbiologist, Isolation and testing of first natural antibiotic
21st Feb 1866	Aug Von Wassermann		Wassermann developed a complement fixation test for the diagnosis of syphilis in 1906, just one year after the causative organism ***Treponema pallidium.***
25th Feb 1998	William Astbury		He made the very first attempt to solve the structure of DNA, the genetic molecule.

Death Anniversaries	Name of Scientists	Photographs	Contribution
10th Feb 1912	Joseph Lister		He was the first to apply the science of Germ Theory to surgery.
28th Feb 1936	Charles Nicolle		He was responsible for the introduction of many new techniques and innovation in bacteriology

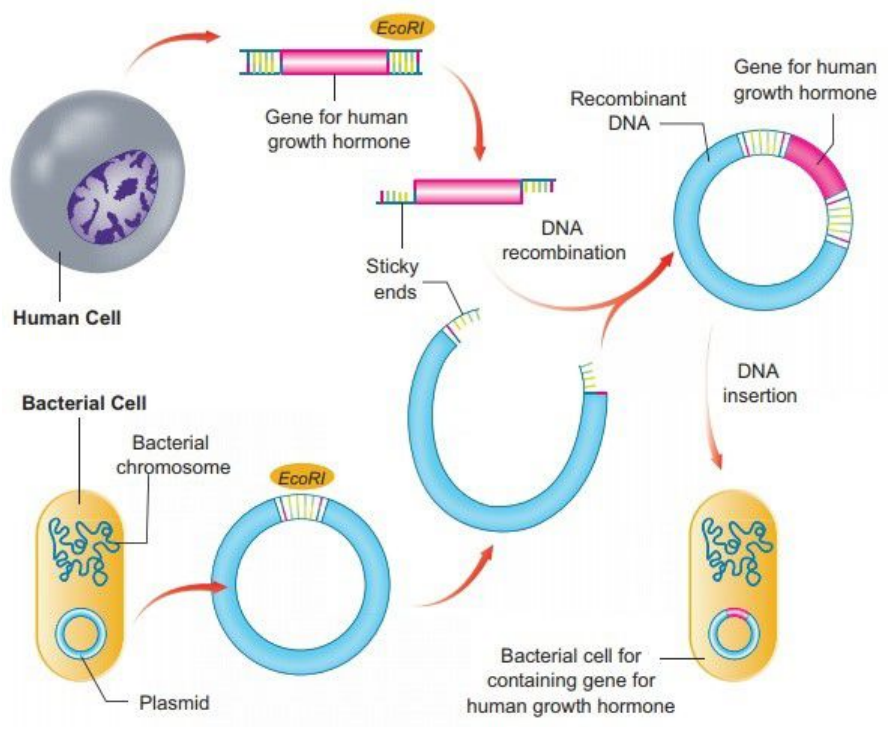
GENE THERAPY

Gene therapy is a technique used in an effort to treat or prevent disease. When a gene mutation (a permanent alteration in the DNA sequence) causes a protein to be missing or faulty, gene therapy may be able to restore the normal function of that protein. There are several different approaches to gene therapy, such as introducing a new or modified copy of a gene, turning on or off genes to avoid disease and replacing the disease causing sequence of a gene with a healthy copy of that sequence. The goal of gene therapy is to change the course of disease by targeting its genetic cause.



RECOMBINANT HUMAN GROWTH HORMONE (rhGH)

Recombinant human growth hormone (rhGH) is the primary treatment for growth hormone (GH) deficiency-induced short stature, as well as the associated abnormalities in body composition, metabolic profile, exercise capacity, and quality of life .Hormone extracted from human cadavers is abbreviated hGH. The main growth hormone produced by recombinant DNA technology has the approved generic name (INN) somatropin and the brand name Humatrope, and is properly abbreviated rhGH in the scientific literature. HGH has been linked to improved white blood cell levels, bone marrow creation, and antibody generation. Some people use the hormone and other performance enhancing drugs such as anabolic steroids to build muscle and improve athletic performance.



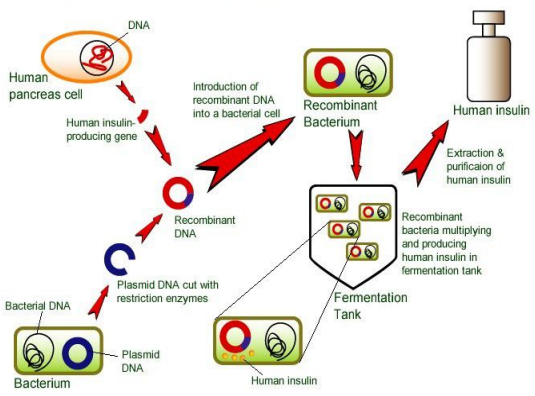
BIOTECHNOLOGY IN MEDICINE

Medical Biotechnology is the study of living cells and organisms to research, develop and produce pharmaceutical and diagnostic products that are used to treat and cure human diseases. Biotechnology has a variety of applications in the field of medicine.

RECOMBINANT HUMAN INSULIN

In comparison to the animal insulin (extracted), the biosynthetic human insulin has better purity thereby reducing antibody formation. Human insulin is introduced into plants by some researchers to figure out a new style of producing insulin (biopharming) in safflower. This new production method is expected to reduce the cost of manufacturing insulin. There are different analogues for the same. Most of them resemble the structure of human insulin and were manufactured for focusing on certain aspects of glycemic control regarding fast action (prandial insulins) and long action (basal insulins). The structure of synthetic human insulin has a striking resemblance in structure to natural insulin. However once it is injected into the human system, it would not work like natural insulin. The main reason behind this phenomenon is the fact that the injected insulin would clump together and its absorption into the human body would be delayed. Hence it would not synchronize well with the needs of the human body. The examples of human insulin: Insuman basal, Humulin I, Insulatard, Humulin S ,etc.

Human Insulin Production



Sr. No.	NAME OF THE EXAMINATIONS	THE MONTHS FOR NOTIFICATION	MONTHS OF THE EXAMINATION / INTERVIEW TO BE HELD	WEBSITE LINK	REMARKS
1	BIPT	Apr - May	Jun- Jul	http://www.bcil.nic.in/biotech_industrial-training.htm	Training
2	CDFD	Mar, Sept	Apr, Oct	http://www.cdfd.org.in/	PhD
3	CIAB	May - Jun	Jul	http://www.ciab.res.in/	PhD
4	CSIR Labs	Mar - May, Sep - Oct	Jun, Oct	https://acsir.res.in/ https://www.ccmb.res.in/ https://www.igib.res.in/	M.Sc, PhD
5	CSIR - UGC NET JRF Exam	Feb, Sept	Jun, Dec	https://csirnet.nta.nic.in/	JRF, SRF

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03 MARCH 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31					1	2
3 WORLD HEARING DAY	4	5	6 WORLD LYMPHEDEMA DAY	7	8	9
10	11	12	13	14	15	16 NATIONAL IMMUNIZATION DAY
17	18	19	20 WORLD ORAL HEALTH DAY	21 WORLD DOWN SYNDROME DAY	22	23
24 WORLD TB DAY	25	26	27	28 NATIONAL TRIGLYCERIDES DAY	29	30

"THE INVENTION OF DAILY LIFE IS BROUGHT ABOUT BY BIOTECHNOLOGY."

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NAVI MUMBAI, MAHARASHTRA
https://maps.app.goo.gl/SvLbMy3kfMPwa8hX7

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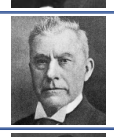
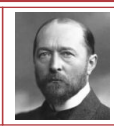
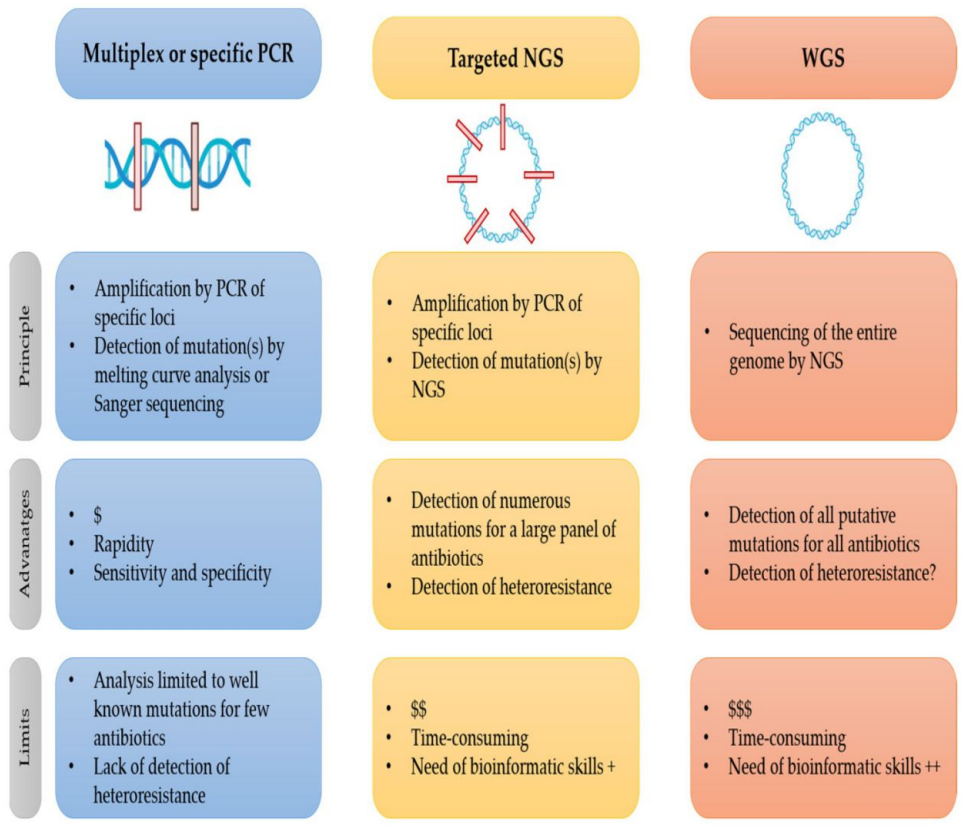
03 MARCH 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
7th Mar 1857	Julius Wagner-Jauregg		In 1927 Nobel Prize in Physiology and Medicine for discovering the neurosyphilis could be treated by inducing fever with malaria parasites.
11th Mar 1955	Alexander Fleming		In 1928 He discovered penicillin antibiotic from ***Pencillium notatum.*** He received Nobel Prize in 1945 in Physiology and Medicine.
14th Mar 1854	Paul Ehrlich		Ehrlich was the first to coin the term antibody and helped develop the first serum-based therapies Based on this he promoted the idea of using compounds, such as antibodies, as magic bullets for therapy.
15th Mar 1854	Emil von Behring		In 1901 Nobel Prize for Physiology and Medicine for ***Diphteria*** Anti Toxin.
16th Mar 1851	Martinus Beijerinck		He was one of the founders of Virology, Environmental Microbiology and general microbiology, conceptual discovery of virus Tobacco Mosaic Virus (TMV). He is the one the pioneering Soil Microbiologist.
25th Mar 1825	Max Schultze		He worked on Cell Theory of Biogenesis and recognised protoplast.
28th Mar 1837	Wilhelm Kuhne		He is best known today for coining the word "Enzyme"

Death Anniversary	Name of Scientist	Photo	Contribution
31st Mar 1917	Emil Von Behring		He introduced serum from immune horse as a method to cure and prevent diphtheria

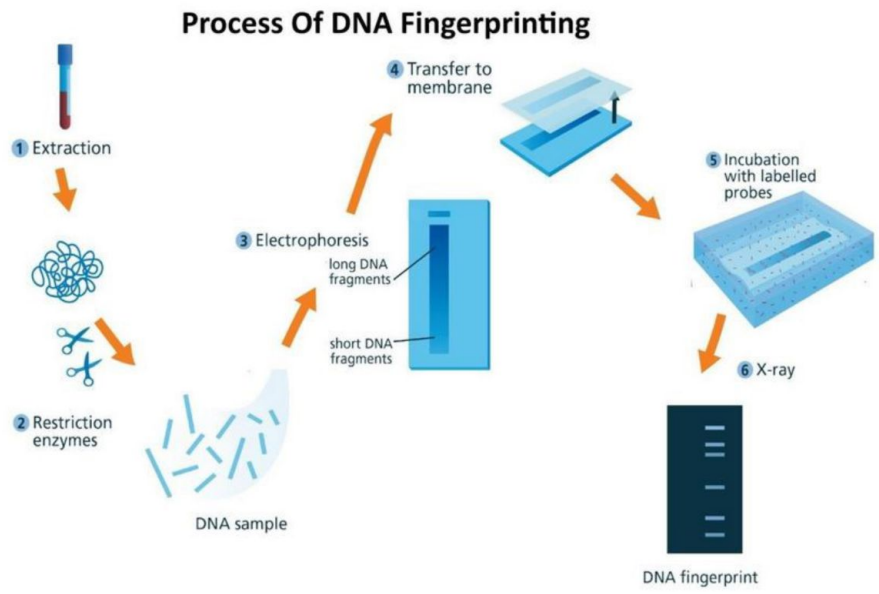
NEXT-GENERATION SEQUENCING (NGS)

Next-generation sequencing (NGS) is a massively parallel sequencing technology that offers ultra-high throughput, scalability, and speed. The technology is used to determine the order of nucleotides in entire genomes or targeted regions of DNA or RNA. NGS has revolutionized the biological sciences, allowing labs to perform a wide variety of applications and study biological systems at a level never before possible. Innovative sample preparation and data analysis options enable a broad range of applications. For example, NGS allows labs to: Rapidly sequence whole genomes, Deeply sequence target regions, Utilize RNA sequencing (RNA-Seq.) to discover novel RNA variants and splice sites, or quantify mRNAs for gene expression analysis, analyze epigenetic factors such as genome-wide DNA methylation and DNA-protein interactions, Sequence cancer samples to study rare somatic variants, tumor subclones, study the human microbiome and identify novel pathogens.



DNA FINGERPRINTING

DNA profiling is the process of determining an individual's deoxyribonucleic acid characteristics. DNA analysis intended to identify a species, rather than an individual, is called DNA barcoding. It is also used to identify inherited genetic diseases and can be used to identify genetic matches between tissue donors and recipients. DNA fingerprinting is also a valuable tool for confirming pedigree in animals, such as purebred dogs and racehorses. This technique of fingerprinting is used for DNA analysis in forensic tests and paternity tests. Apart from these two fields, it is also used in determining the frequency of a particular gene in a population which gives rise to diversity. In case of the change in gene frequency or genetic drift, fingerprinting can be used to trace the role of this change in evolution.



Sr. No.	NAME OF THE EXAMINATIONS	THE MONTHS FOR NOTIFICATION	MONTHS OF THE EXAMINATION / INTERVIEW TO BE HELD	WEBSITE LINK	REMARKS
1	CUCET	Feb	Apr	https://cucetexam.in/	M.Sc, PhD
2	DBT	Feb	Mar	http://www.bcil.nic.in/	JRF
3	GATE	Sept	Feb	http://gate.iitg.ac.in/	JRF
4	IARI	Mar	Jun	https://www.iari.res.in/en/index.php	PhD
5	ICGEB	Apr - May	Jun	https://www.icgeb.org/	PhD
6	ICMR	Apr - May	Jul	https://www.icmr.gov.in/jrf.htm	JRF
7	IISc	Feb	May	https://iisc.ac.in/admissions/	PhD
8	IISERs	Feb - Apr	Mar - Jun	https://www.iisermohali.ac.in/	MS, PhD
9	IITs	Feb - Apr	March - June	https://www.iitb.ac.in/	MS, PhD
10	ILS	May	June - July	https://www.ils.res.in/	Int. PhD, PhD
11	InStem	Sept	December	https://instem.res.in/academic/phd	PhD
12	IVRI	Mar	May	http://www.ivri.nic.in/	PhD

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04 APRIL 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11 WORLD PARKINSON'S DAY	12	13
14 WORLD CHAGAS DISEASE DAY	15	16	17 WORLD HAEMOPHILIA DAY	18	19 WORLD LIVER DAY	20
21	22 WORLD PI WEEK	23	24	25 WORLD MALARIA DAY	26	27
28 WORLD DAY FOR SAFETY & HEALTH AT WORK	29	30				

"THE FLAVOUR OF LIFE IS BIOTECHNOLOGY"

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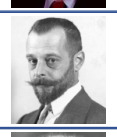
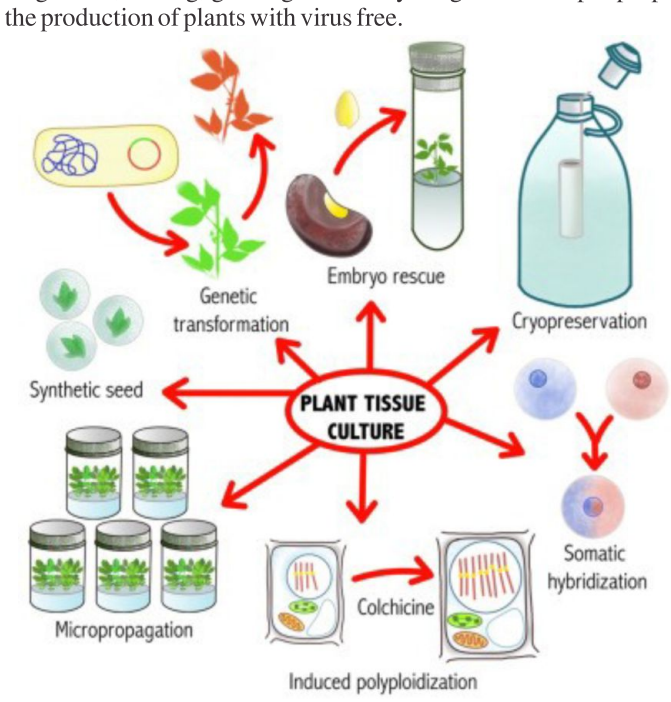
04 APRIL 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
4th Apr 1938	Ananda Mohan Chakrabarty		Created "Superbug" Developed genetically engineered *Pseudomonas spp* For biodegradation of pollutants.
5th Apr 1827	Joseph Lister		Father of Antiseptic Surgery and developed sterile surgical techniques.
6th Apr 1928	James Watson		Played a crucial role in the discovery of the molecular structure of Deoxyribonucleic acid (DNA)
8th Apr 1911	Melvin Calvin		Discovery of the Biochemical pathways of photosynthesis and gave Calvin cycle.
10th Apr 1927	Marshall Warren Nirenberg		Breaking the genetic code and describing how it operates in protein synthesis.
25th Apr 1873	Felix d'Herelle		Discovery of Bacteriophage, a bacterial virus.
26th Apr 1932	Michael Smith		Development Site directed Mutagenesis.

Death Anniversary	Name of Scientist	Photo	Contribution
24th Apr 1964	Gerhard Domagk		Mice experiment that sulfonamides could be used to counteract bacteria that cause blood poisoning.

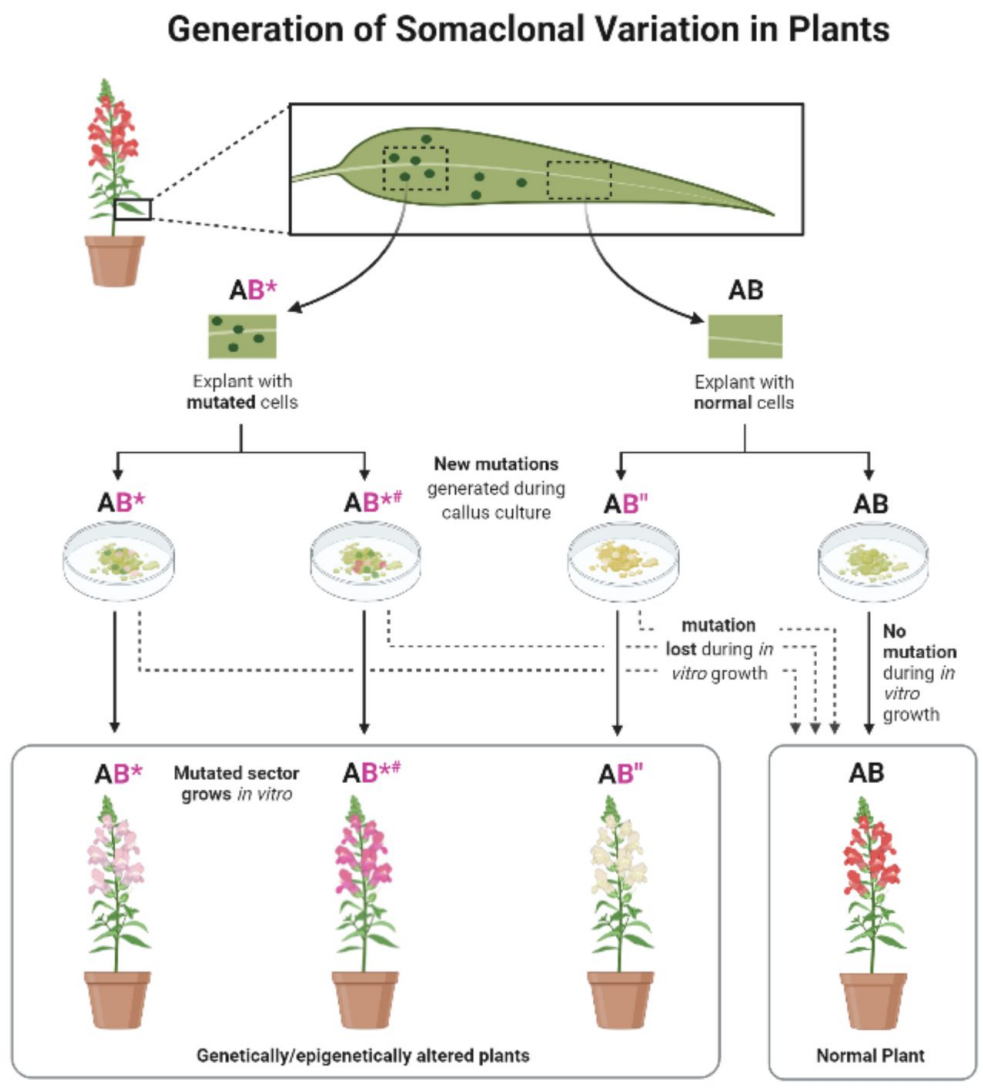
PLANT TISSUE CULTURE

Plant tissue culture technology is being widely used for large scale plant multiplication. Apart from their use as a tool of research, plant tissue culture techniques have in recent years, become of major industrial importance in the area of plant propagation, disease elimination, plant improvement and production of secondary metabolites. In addition, plant tissue culture is considered to be the most efficient technology for crop improvement by the production of somaclonal and gametoclonal variants. The micropropagation technology has a vast potential to produce plants of superior quality, isolation of useful variants in well adapted high yielding genotypes with better disease resistance and stress tolerance capacities. Certain type of callus cultures give rise to clones that have inheritable characteristics different from those of parent plants due to the possibility of occurrence of somaclonal variability, which leads to the development of commercially important improved varieties. Commercial production of plants through micropropagation techniques has several advantages over the traditional methods of propagation through seed, cutting, grafting and air layering etc. It is rapid propagation processes that can lead to the production of plants with virus free.



SOMACLONAL VARIATIONS IN HORTICULTURAL CROPS

The advancements made in tissue culture techniques has made it possible to regenerate various horticultural species in vitro as micropropagation protocols for commercial scale multiplication are available for a wide range of crops. Clonal propagation and preservation of elite genotypes, selected for their superior characteristics, require high degree of genetic uniformity amongst the regenerated plants. However, plant tissue culture may generate genetic variability, i.e., somaclonal variations as a result of gene mutation or changes in epigenetic marks. The occurrence of subtle somaclonal variation is a drawback for both in vitro cloning as well as germplasm preservation. Therefore, it is of immense significance to assure the genetic uniformity of in vitro raised plants at an early stage. Several strategies have been followed to ascertain the genetic fidelity of the in vitro raised progenies comprising morpho-physiological, biochemical, cytological and DNA-based molecular markers approaches. Somaclonal variation can pose a serious problem in any micropropagation program, where it is highly desirable to produce true-to-type plant material. On the other hand, somaclonal variation has provided a new and alternative tool to the breeders for obtaining genetic variability relatively rapidly and without sophisticated technology in horticultural crops, which are either difficult to breed or have narrow genetic base.



Sr. No.	NAME OF THE EXAMINATIONS	THE MONTHS FOR NOTIFICATION	MONTHS OF THE EXAMINATION / INTERVIEW TO BE HELD	WEBSITE LINK	REMARKS
1	JGEEBILS	Sept	Dec	https://www.ncbs.res.in/academic/admissions-JGEEBILS	MS, PhD, JRF
2	JNU PhD	Feb	May - Jun	https://admissions.jnu.ac.in/	PhD
3	JNUCEEB	Sept	Dec	https://admissions.jnu.ac.in/	M.Sc
4	NABI	May - Jun	Jun - Jul	http://www.nabi.res.in/	PhD
5	NBRC	Oct	May - Jun	http://www.nbrc.ac.in/newweb/	M.Sc, PhD
6	NCBS	Sept	Dec	https://www.ncbs.res.in/academic/phd	PhD
7	NCCS	Mar, Sept	Jun – Jul, Oct - Nov	https://www.nccs.res.in/	PhD
8	NDRI	Apr	May	http://ndri.res.in/ndri/Design/Index.html	PhD

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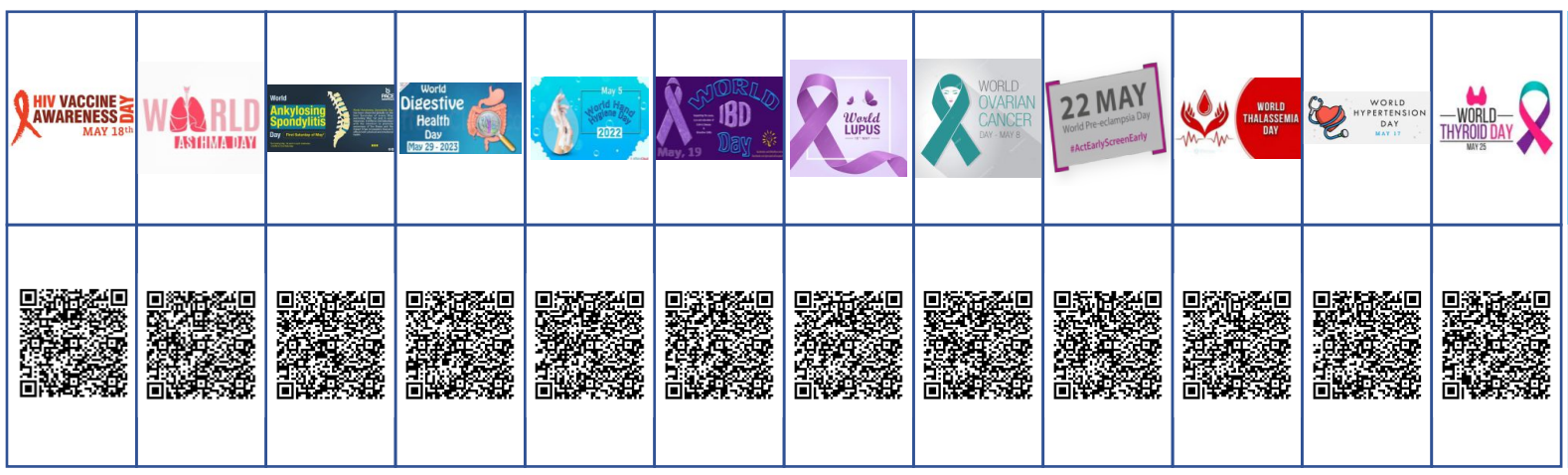
Prof. A. M. Deshmukh, National President +91 9822079782 mbiosociety@gmail.com http://microbiosociety.com

05 MAY 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4 WORLD ANKYLOSING SPONDYLITIS DAY
5 HAND HYGIENE DAY	6	7 ASTHMA DAY	8 THALASSEMIA OVARIAN CANCER DAY	9	10 LUPUS DAY	11
12	13	14	15	16	17 WORLD HYPERTENSION DAY	18 HIV VACCINE DAY
19 INFLAMMATORY BOWEL SYNDROME DAY	20	21	22 PRE-ECLAMPSIA DAY	23	24	25 WORLD THYROID DAY
26	27	28	29 DIGESTIVE HEALTH DAY	30	31	

"BIOTECHNOLOGY IS TRANSFORMING INTO LOVE DAY BY DAY."



ICGEB INTERNATIONAL CENTRE FOR GENETIC ENGINEERING AN BIOTECHNOLOGY NEW DELHI
https://maps.app.goo.gl/oBUq5uagJp6HdGtU6

Department of Microbiology , HVHP Institute of Post Graduate Studies and Research,
A Constituent Institute of Kadi Sarva Vishwavidyalaya, S.V. Campus, Kadi-382 715. www.hvpgrkadi.ac.in
Concept by : Dr. Sanjeev Patankar, Prof. A. Archana, Dr. Minal Trivedi

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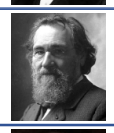
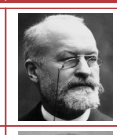
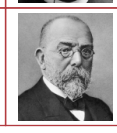
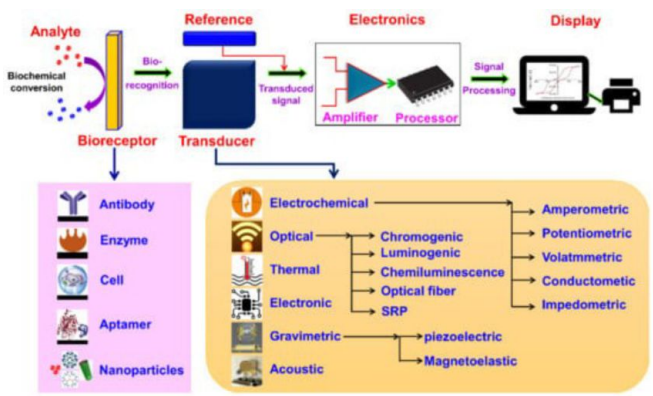
05 MAY 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
8th May 1902	Ander Lwoff		His contribution in the discoveries regarding genetic control of Enzyme and Synthesis of virus.
13th May 1857	Ronald Ross		1902 Nobel Prize in Physiology or Medicine for discovering that malaria is transmitted by mosquitoes.
15th May 1845	Elie Metchnikoff		Nobel Laureate, known for Phagocytosis mechanism.
17th May 1749	Edward Jenner		Vaccination Smallpox vaccine.
23th May 1707	Carl Linnaeus		He is known as the "Father of Modern Taxonomy" and pro-posed Binomial nomenclature system.
23th May1925	Joshua Lederberg		Discovery that bacteria can mate and exchange genes.
28th May 1942	Stanely B Prusiner		Discovery of disease-causing proteins called Prions.
31th May 1852	Julius Richard Petri		Invented "Petri dish" in which microorganism are cultured.

Death Anniversaries	Name of Scientists	Photographs	Contribution
18th May 1922	Charles Louis Alphonse Laveran		He contributed particularly to the understanding of the trans-mission of sleeping sickness.
27th May 1910	Robert Koch		He discovered the anthrax disease cycle and the bacteria re-sponsible for tuberculosis and cholera He received Nobel prize for physiology or medicine in 1905 for his research on tuberculosis.

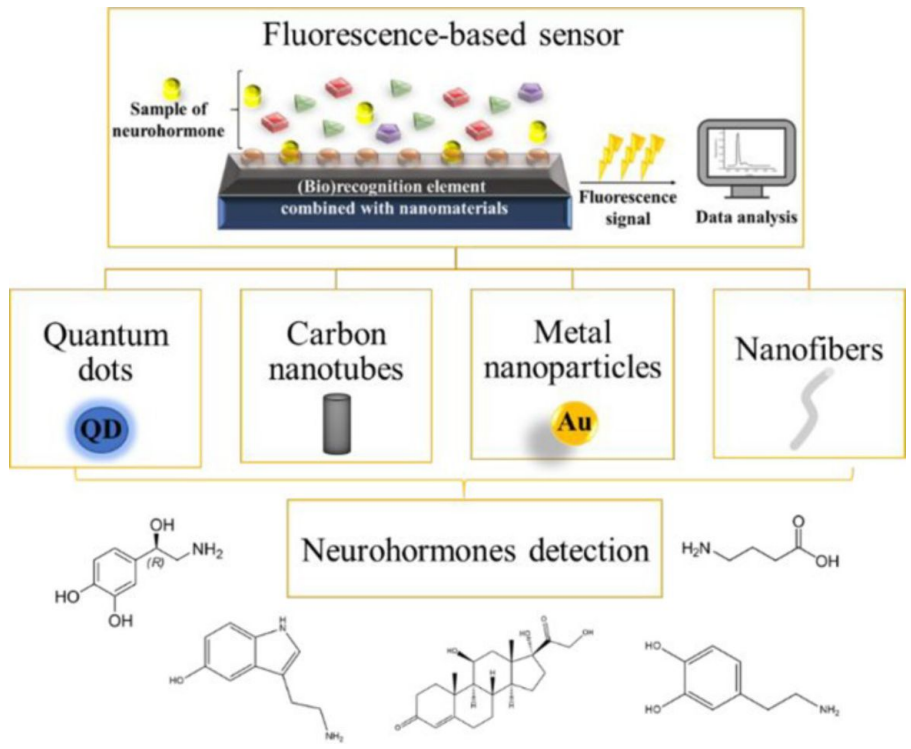
BIOSENSORS

A biosensor is an integrated receptor-transducer device, which can convert a biological response into an electrical signal. The design and development of biosensors have taken a center stage for researchers or scientists in the recent decade owing to the wide range of biosensor applications, such as health care and disease diagnosis, environmental monitoring, water and food quality monitoring, and drug delivery. Electrochemical biosensors developed for clinical diagnosis, namely for glucose, lactate, cholesterol, urea, creatinine, DNA, antigens, antibodies, and cancer markers assays. A biosensor is a device or probe that integrates a biological element, such as an enzyme or antibody, with an electronic component to generate a measurable signal. The electronic component detects, records, and transmits information regarding a physiological change or the presence of various chemical or biological materials in the environment. Biosensors come in different sizes and shapes and can detect and measure even low concentrations of specific pathogens, or toxic chemicals, and pH levels. A typical biosensor comprises (a) an analyte, (b) bioreceptor, (c) transducer, (d) electronics, and (e) display.



FLUORESCENT NANOMATERIALS BASED BIOSENSORS

Imperative utilization of biosensors has acquired paramount importance in the field of drug discovery, biomedicine, food safety standards, defense, security, and environmental monitoring. This has led to the invention of precise and powerful analytical tools using biological sensing element as biosensor. Recent advances in biological techniques and instrumentation involving fluorescence tag to nanomaterials have increased the sensitive limit of biosensors. Use of aptamers or nucleotides, affibodies, peptide arrays, and molecule im-printed polymers provide tools to develop innovative biosensors over classical methods. Various biosensors ranging from nanomaterials, polymers to microbes have wider potential applications. It is quite important to integrate multifaceted approaches to design biosensors that have the potential for diverse usage. Nowadays, stress is a general factor affecting the population, and it may cause a wide range of serious disorders. Chronic stress can have a large pathophysiological impact on neuroendocrine and hormonal functions. Continuous stressful conditions may cause not only a wide range of affective disorders or anxiety but also cardiological or neurological disorders. All living organisms respond to stress or stressful environmental changes in a number of different ways. Neurohormones, which are the main regulators of the stress response, are physiologically active substances produced by the nervous system. As very often the first symptoms of stressinduced diseases (including psychiatric disorders, such as post-traumatic stress disorder) are underestimated, the development of biosensors that would enable the monitoring of parameters related to exposure to stresul conditions is extremely important.



Sr. No.	NAME OF THE EXAMINATIONS	THE MONTHS FOR NOTIFICATION	MONTHS OF THE EXAMINATION / INTERVIEW TO BE HELD	WEBSITE LINK	REMARKS
1	NIAB	Feb	Mar	http://www.niab.org.in/	PhD
2	NIBGM	Apr	May - Jun	https://www.nibmg.ac.in/	PhD
3	NII	Nov	Mar	http://www1.nii.res.in/	PhD
4	NIMHANS	Jan	Mar	http://www.nimhans.ac.in/	PhD
5	NIPER	Apr	Jun	http://niperahm.ac.in/	MS, MTech, PhD
6	NIPGR	Apr	Jun - Jul	http://www.nipgr.res.in/home/home.php	PhD
7	RCB	May	Jun	https://www.rcb.res.in/	Int. PhD, PhD
8	RGCB	Feb	Mar	https://rgcb.res.in/	PhD
9	THSTI	Apr	Jun	https://thsti.res.in/	PhD
10	TIFR	Sept	Dec	http://univ.tifr.res.in/gs2018/	MS, PhD
11	UoD	May	Jun Jun	https://www.du.ac.in/ https://www.thebiomics.com/topic/delhi-university.html	M.Sc, PhD
12	UoH	Mar - Apr		https://uohvd.ac.in/	M.Sc, PhD

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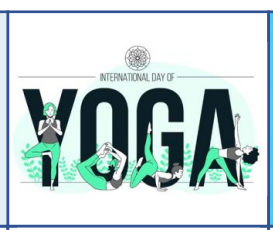
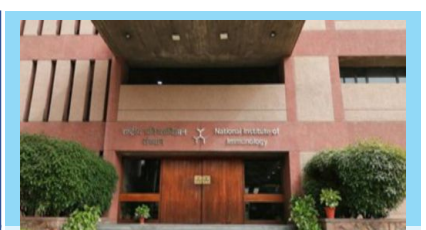
06 JUNE 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30						1
2	3	4	5 WORLD ENVIRONMENT DAY	6	7	8 WORLD BRAIN TUMOR DAY
9	10	11	12 INTERNATIONAL MEN WEEK	13	14	15
16	17	18 ALLERGY WEEK	19	20	21 INTERNATIONAL YOGA DAY	22
23	24	25	26	27 WORLD MICROBIOME DAY	28	29

'BIOTECHNOLOGY IS VERSATILE.'





NIPGR (NATIONAL INSTITUTE OF PLANT GENOME RESEARCH, NEW DELHI)
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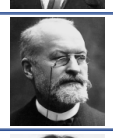
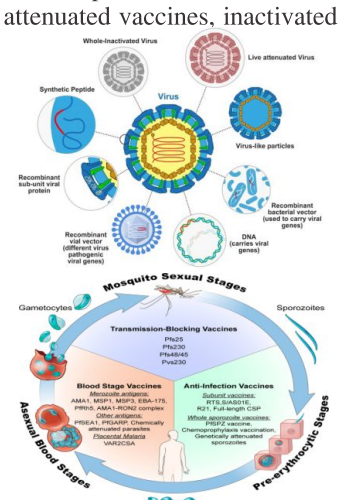
06 JUNE 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
3rd Jun 1929	Werner Arber		Discovery of the process by which enzyme could be used to break down the DNA molecules into smaller fragments without losing their inherent characteristics and could then be studies easily.
8th Jun 1916	Francis Crick		Co-discoverer of the structure of the DNA molecule, Nobel Prize winner
13th Jun 1870	Jules Bordet		Discovery of complement and development of complement fixation test, identification of the ***bacterium Bordetella*** pertussis which causes whooping cough.
14th Jun 1868	Karl Landsteiner		Received Nobel Prize for discovery of ABO blood grouping
18th Jun 1845	Charles Louis Alphonse Laveran		His discoveries of parasitic protozoans as causative agents of infectious diseases such as malaria and trypanosomiasis.
19th Jun 1906	Ernst Chain		Received Nobel Prize for Industrial production and purification of Penicillin.
22nd Jun 1850	Fanny Hesse		Pioneered use of Agar-Agar as a solidifying agent in solid culture media.
24th Jun 1852	Friedrich Loeffler		He was the first to cultivate ***Corynebacterium diptheriae***, causative agent of Diphtheria He discovered that foot and mouth disease is caused by a virus.
30th Jun 1926	Professor Paul Berg		Berg was the first to demonstrate the possibility of making recombinant DNA and helped pioneer guidelines to limit the potential harm posed by genetic engineering.

Death Anniversary	Name of Scientist	Photo	Contribution
4th Jun 1961	William Astbury		He pioneered the use of X-rays to solve the shape of giant biological molecules such as proteins.

VACCINE DEVELOPMENT

Scientists take many approaches to design vaccines against a pathogenic microorganism. These choices are dictated by the nature of pathogen and the infection as well as practical considerations about the use of the vaccine. Some of the options include live attenuated vaccines, inactivated vaccines, DNA vaccines and recombinant subunit vaccines. A recombinant vaccine is a vaccine produced through recombinant DNA technology. This involves inserting the DNA encoding an antigen (such as a bacterial surface protein) that stimulates an immune response into bacterial or mammalian cells, expressing the antigen in these cells and then purifying it from them. Advances in recombinant DNA technology, in knowledge of the host immune response, and in the genetic makeup of disease agents will lead to new vaccines against diseases that currently have few or no control measures. Recombinant vaccines is cost effective. Initiates both cellmediated and humoral response. Since the chances of contamination are less during production, the vaccine is specific and side effects are less.



Recombinant vaccines fall into three basic categories: live genetically modified organisms, recombinant inactivated vaccines, and genetic vaccines

GENETIC VACCINE

The third category of recombinant vaccines is referred to as genetic vaccines because they are actually DNA alone. Genetic or DNA vaccines usually are circular pieces of DNA, called plasmids, which contain a foreign gene from a disease agent and a promoter that is used to initiate the expression of the protein from that gene in the target animal. Plasmids can be maintained in bacteria (usually *E. coli*) and have been designed to accept foreign genes for expression in animals. The recombinant plasmids containing a foreign gene are purified from the bacteria, and the "naked" DNA is injected directly into the animal, usually intramuscularly or intradermally (into the skin). The animal's cells take up the DNA, and an immune response is induced to the protein expressed from the foreign gene. The commercially available recombinant vaccines for ruminants, swine, poultry, fish, and companion animals. Using recombinant DNA technologies, scientists have been able to develop live genetically modified organisms, recombinant killed vaccines, and genetic vaccines that no longer cause disease yet induce a strong immune response. Developing vaccines using rDNA technologies requires a thorough understanding of the disease agent, particularly the antigens critical for inducing protection and the factors involved in causing disease. In addition, it is important to understand the immune response of the host to ensure that the vaccine induces the appropriate immunological reaction.

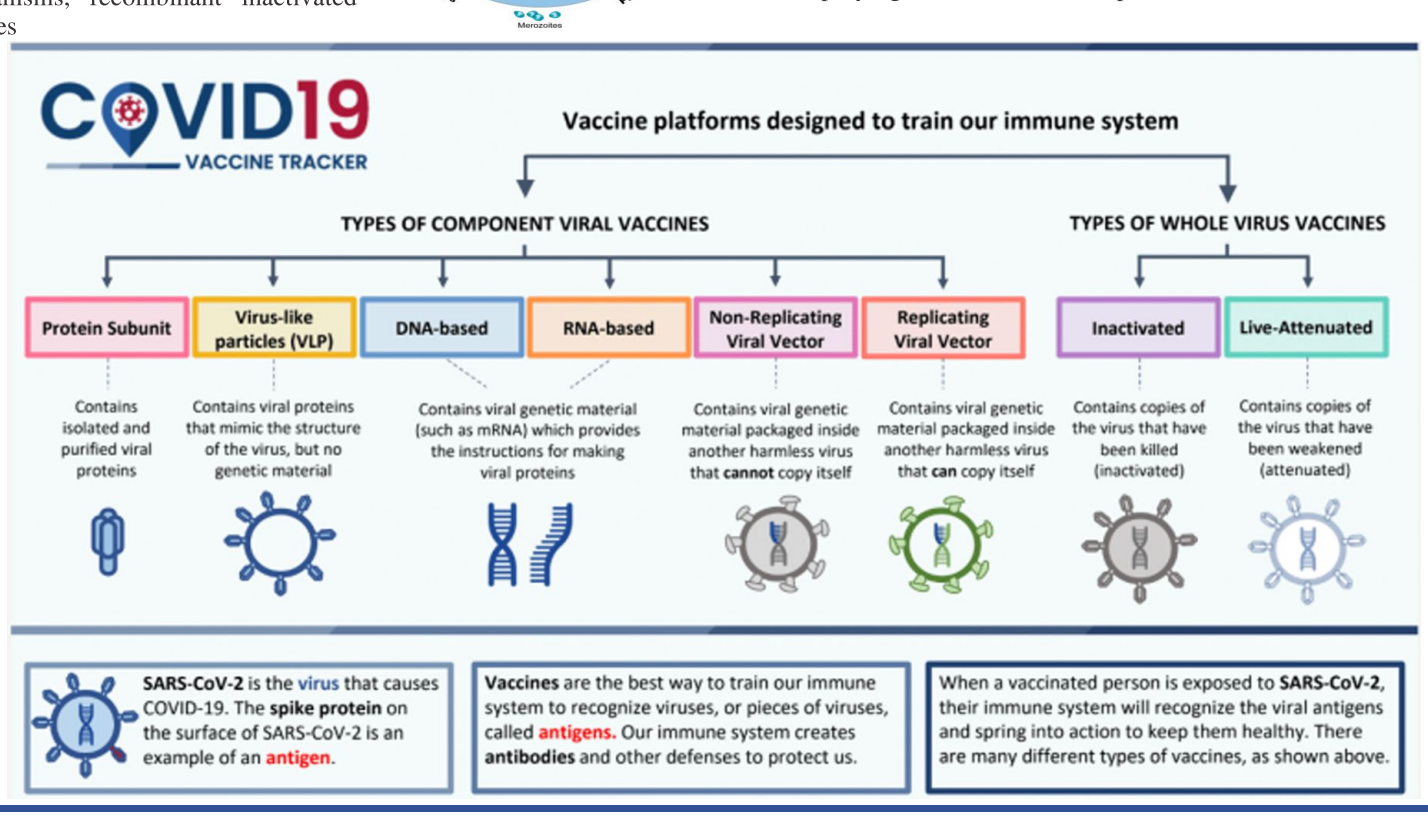
The promise of better vaccines to benefit animal agriculture and companion animals through rDNA technology is becoming a reality. A number of recombinant vaccines are available commercially, and many more are projected to be available soon, so the future of recombinant vaccines is bright. Recent research in companion animal vaccines has focused on recombinant vaccine development for parasitic diseases. Resistance to drugs used to control nematodes has led to the study of various secreted larval antigens for eliciting protective immunity. Preliminary data in mice for protection against hookworms, which affect dogs and cats as well as people, used DNA vaccines and recombinant hookworm proteins expressed in the laboratory—as well as unique route, delivery, and adjuvant formulations—to induce protection.

RECENT ADVANCES IN DNA VACCINES AGAINST LUNG CANCER

Lung cancer is regarded as the major causes of patient death around the world. Although the novel tumor immunotherapy has made great progress in the past decades, such as utilizing immune checkpoint inhibitors or oncolytic viruses, the overall 5-year survival of patients with lung cancers is still low. Thus, development of effective vaccines to treat lung cancer is urgently required. In this regard, DNA vaccines are now considered as a promising immunotherapy strategy to activate the host immune system against lung cancer. DNA vaccines are able to induce both effective humoral and cellular immune responses, and they possess several potential advantages such as greater stability, higher safety, and being easier to manufacture compared to conventional vaccination. The recent advance of clinical studies in the field of lung cancer DNA vaccine, focusing on their safety and efficacy, which might accelerate the personalized design of DNA vaccine against lung cancer.

RECOMBINANT VACCINES FOR COVID-19

SARS-CoV-2, the causative agent of COVID-19, has imposed a major public health threat, which needs effective therapeutics and vaccination strategies. Several potential candidate vaccines being rapidly developed are in clinical evaluation. Considering the crucial role of SARS-CoV-2 spike (S) glycoprotein in virus attachment, entry, and induction of neutralizing antibodies, S protein is being widely used as a target for vaccine development. Based on advances in techniques for vaccine design, inactivated, live-vectored, nucleic acid, and recombinant COVID-19 vaccines are being developed and tested for their efficacy. Assuming that clinical efficacy is shown for one or more vaccines, safety is a major aspect to be considered before deploying such vaccines to the public.



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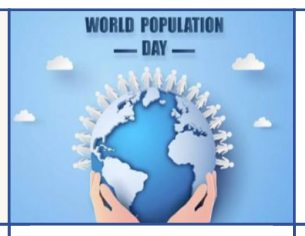
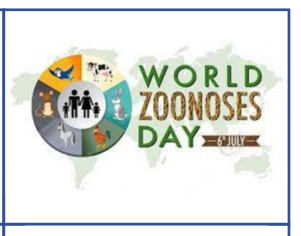
07 JULY 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
SARCOMA & BONE CANCER AWARENESS MONTH	1	2	3	4	5	6 WORLD ZOONOSES DAY
7	8	9	10	11 WORLD POPULATION DAY	12	13
14	15	16	17	18	19	20
21	22	23 WORLD SJOGREN DAY	24	25 WORLD IVF DAY	26	27
28	29	30	31			

"OUR WORLD IS BUILT ON BIOLOGY AND ONCE WE BEGIN TO UNDERSTAND IT, THEN IT BECOMES TECHNOLOGY"





NCB (SNATIONAL CENTRE FOR BIOLOGICAL SCIENCES, KARNATAKA)
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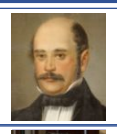
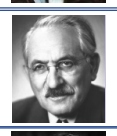
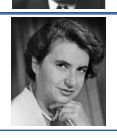
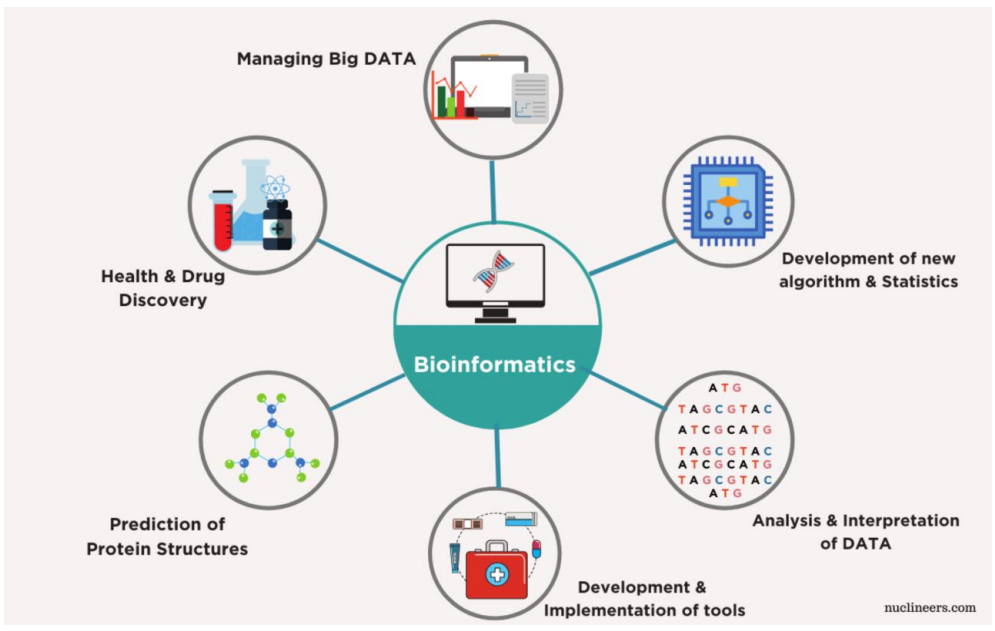
07 JULY 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
1st Jul 1818	Ignaz Semmelweis		Introducing hand disinfection standards, in obstetrical clinics, from 1847.
10th Jul 1936	Herbert Boyer		Boyer demonstrated the possibility of producing recombinant DNA in bacteria in 1973 Boyer helped found Genentech, the first biotechnology company dedicated to commercialising recombinant DNA.
15th Jul 1928	Carl Woese		Famous for defining the Archaea
20th Jul 1822	Gregor Mendel		Mendel's pea plant experiments gave Mendelian Laws
18th Jul 1635	Robert Hooke		Using a microscope, was the first to visualize microorganisms and named as "Animalcules"
22nd Jul 1888	Selman Waksman		1952 Nobel Prize in Physiology or Medicine for identifying streptomycin and other antibiotics
25th Jul 1920	Rosalind Franklin		Contributed in understanding of the molecular structure of DNA by X-ray Crystallography.

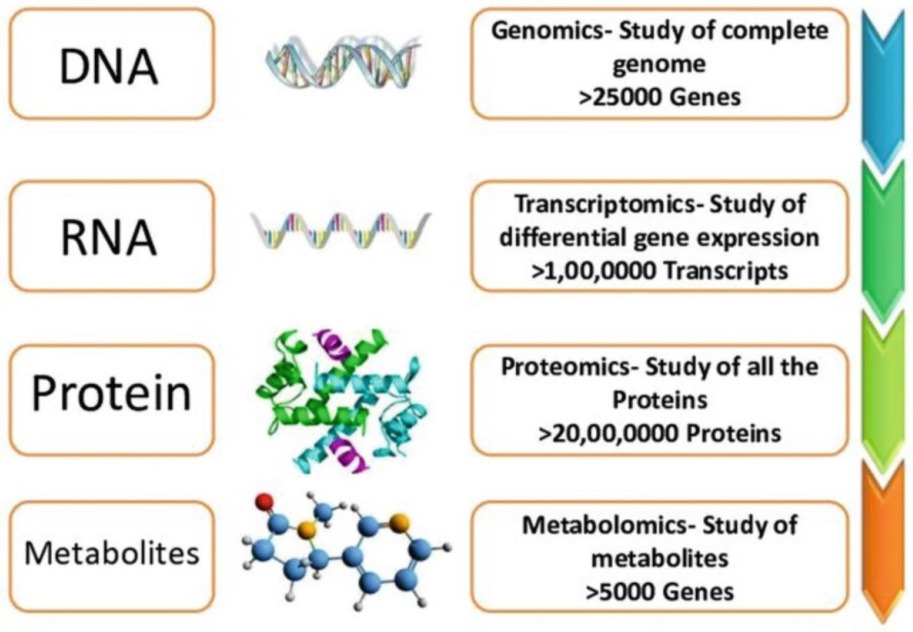
BIOINFORMATICS

Bioinformatics, as related to genetics and genomics, is a scientific subdiscipline that involves using computer technology to collect, store, analyze and disseminate biological data and information, such as DNA and amino acid sequences or annotations about those sequences. Scientists and clinicians use databases that organize and index such biological information to increase our understanding of health and disease and, in certain cases, as part of medical care. The role of bioinformatics in biological research can be compared with the role of data analysis in the age of information and the Internet. The bioinformatics work with human genomes seeks to discover practical insights about human health and biology with all its complexity. Apart from analysis of genome sequence data, bioinformatics is now being used for a vast array of other important tasks, including analysis of gene variation and expression, analysis and prediction of gene and protein structure and function, prediction and detection of gene regulation networks, simulation of environments, etc.



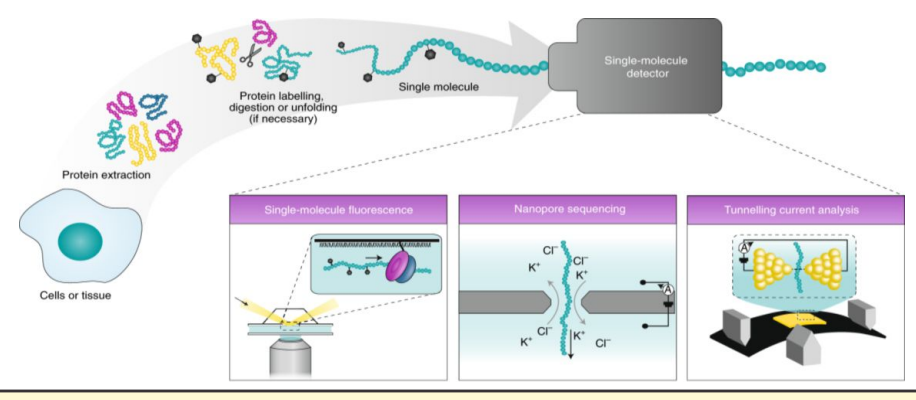
GENOMICS AND PROTEOMICS

Genomics provides an overview of the complete set of genetic instructions provided by the DNA, while transcriptomics looks into gene expression patterns. Proteomics studies dynamic protein products and their interactions, while metabolomics is also an intermediate step in understanding organism's entire metabolism. Proteomics methods are essential for studying protein expression, activity, regulate Genomic studies uncover the genetic makeup of patients, including their genetic differences and mutations. All of that information can be used to form a care plan specific to patients' individual genetic composition, rather than treating them with a one-size-fits-all approach on and modifications. Bioinformatics is an integral part of proteomics research.



SINGLE MOLECULE PROTEIN SEQUENCING ANALYSIS

Proteins are major building blocks of life. Protein sequencing is used to identify the amino acid sequence and its conformation. The identification of the structure and function of proteins is important to understand cellular processes. Knowledge of the amino acid sequence of proteins is crucial in order to facilitate the discovery of errors during the process of biological information and to distinguish some ambiguous results regarding the process of protein synthesis. Protein sequencing is used to identify the amino acid sequence and its conformation. The identification of the structure and function of proteins is important to understand cellular processes. Protein sequencing remains a challenge for small samples. A sensitive sequencing technology will create the opportunity for single cell proteomics and real-time screening for on-site medical diagnostics. The single molecule fluorescence technology to linearize protein molecules and to read signals from labeled amino acids in an ordered manner. This proof of concept of single molecule fingerprinting will open the door to single molecule protein sequencing and pave the road toward the development of a new, fast, and reliable diagnostic tool. Single molecule protein identification is an unrealized concept with potentially ground-breaking applications in biological research. The protein content of a cell and an organism provides key information for the understanding of biological processes and disease. Despite the importance of protein analysis, only a handful of techniques are available to determine protein sequences, and these methods face limitations, for example, requiring a sizable amount of sample. Single molecule techniques would revolutionize proteomics research, providing ultimate sensitivity for the detection of low-abundance proteins and the realization of single cell proteomics. In recent years, novel single molecule protein sequencing schemes that use fluorescence, tunnelling currents and nanopores have been proposed.



COMPETITIVE EXAMS	ELIGIBILITY
AIIMS biotechnology entrance exam : This exam is conducted by AIIMS (All India Institute of Medical science) every year for the candidates who are focused on medical aspects related to diagnosis and therapy using modern bio-technological tools of recombination, immunology and DNA technology.	The applicants should be qualified with at least 60% marks for General/OBC candidates (55% in case of SC/ST candidates) in aggregate in the qualifying examination (12th Std.) to apply in this examination.
ARS-NET – only for LS in agriculture :The Agriculture Scientists Recruitment Board (ASRB) conducts the ASRB NET, also known as ICAR NET (Indian Council of Agriculture Research NET) to determine the eligibility of candidates as Lecturers / Assistant Professors in State Agricultural Universities (SAUs) and other Agricultural Universities (AUs).	Master's degree in Agriculture / Botany / Microbiology / Horticulture with specialization in Agricultural Botany/ Economic Botany/ Plant Genetic Resources.
CSIR – NET: CSIR NET stands for Council of Scientific & Industrial Research – National Eligibility Test. It is a national-level exam conducted by the National Testing Agency (NTA) for candidates who want to choose Junior Research Fellowship (JRF) or Lectureship (LS) as their career.	To apply for the Council of Scientific and Industrial Research National Eligibility Test exam (CSIR NET) examination, applicants must possess the following educational qualifications: M.Sc., BE/BTech, Integrated BS-MS, BS-4 Years, B. Pharma, MBBS, or an Equivalent Degree.

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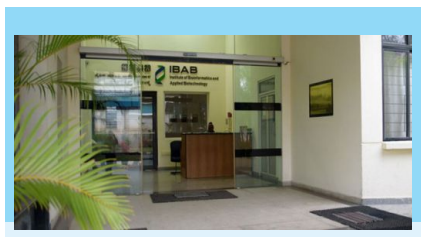
08 AUGUST 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 WORLD BREAST FEEDING WEEK WORLD LUNG CANCER DAY	2	3 NATIONAL ORGAN DONATION DAY
4	5	6	7	8	9	10
11	12	13 WORLD ORGAN DONATION DAY	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

"KEEP OUR REALITY LIVELY BY BIOTECHNOLOGY NEEDS TO BE ENSURED."



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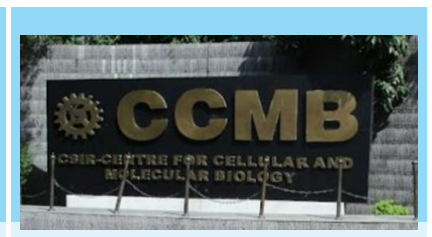

CCMB (CSIR CENTRE FOR CELLULAR AND MOLECULAR BIOLOGY), HYDERABAD

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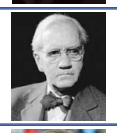
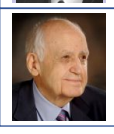
Department of Microbiology , HVHP Institute of Post Graduate Studies and Research,
A Constituent Institute of Kadi Sarva Vishwavidyalaya, S.V. Campus, Kadi-382 715. www.hvpgrkadi.ac.in
Concept by : Dr. Sanjeev Patankar, Prof. A. Archana, Dr. Minal Trivedi

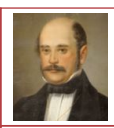
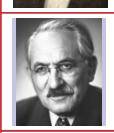
MICROBIOLOGISTS SOCIETY, INDIA

Prof. A. M. Deshmukh, National President +91 9822079782 mbiosociety@gmail.com http://microbiosociety.com

08 AUGUST 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
2nd Aug 1820	John Tyndall		Fractional sterilization known as Tyndallization
6th Aug 1881	Alexander Fleming		1945 Nobel Prize in Physiology or Medicine for discovering penicillin
7th Aug 1948	Professor James Allison		He was awarded the Nobel Prize in Physiology or Medicine for this work in 2018 Contribution James Allison is best known for helping to elucidate the mechanism behind T cells activation and for pioneering the first immune checkpoint inhibitor drug for treating cancer.
11th Aug 1905	Erwin Chargaff		Chargaff's Rule for DNA
12th Aug 1919	Vikram Sarabhai		He is internationally regarded as the Father of the Indian Space Program
13th Aug 1912	Salvador Luria		Work on Bacteriophage or viruses that infect bacteria
13th Aug 1918	Frederick Sanger		The first to determine the amino acid sequence of insulin, Sanger proved proteins have a defined chemical composition. He was also pivotal to the development of the dideoxy chain termination method for sequencing DNA molecules, known as the Sanger method This provided a breakthrough in the sequencing of long stretches of DNA in terms of speed and accuracy and laid the foundation for the Human Genome Project.

Birth Anniversaries	Name of Scientists	Photographs	Contribution
23rd Aug 1931	Hamilton O Smith		Discovery of 'Restriction Enzymes' that could cut the DNA in a cell into smaller pieces
25th Aug 1900	Hans Krebs		He was the pioneer scientist in the study of cellular respiration and TCA cycle
30th Aug 1919	Maurice Hilleman		Discovery of Antigenic shift and drift the cold causing Adeno viruses, the Hepatitis viruses, and the potentially cancer causing viruses SV 40 .

Death Anniversary	Name Of Scientist	Photo	Contribution
13th Aug 1865	Ignaz Semmelweis		He was pioneer of antiseptic procedures He discovered that the incidence of puerperal fever could be drastically cut using hand disinfection in obstetrical clinics.
16th Aug 1973	Selman Waksman		He researches on soil microbes led to the discovery of strepto-mycin and several other
26th Aug 1723	Antoine van Leeuwenhoek		He made microscopes consisting of a single high-quality lens of very short focal length

BIOPRINTING

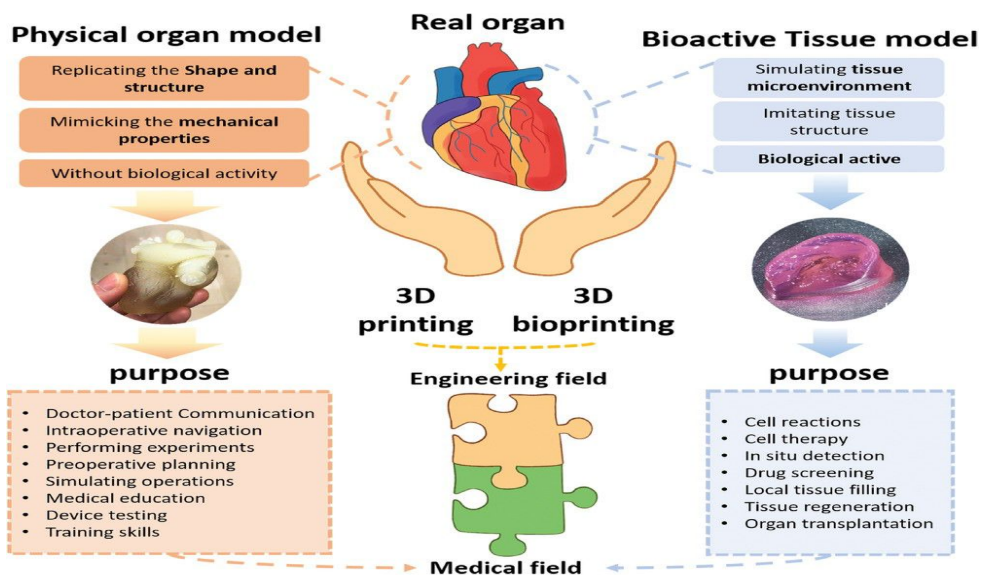
Bioprinting is an additive manufacturing process similar to 3D printing. It uses a digital file as a blueprint to print an object layer by layer. But unlike 3D printing, bioprinters print with cells and biomaterials, creating organ-like structures that let living cells multiply. Although bioprinting is a relatively new technology, it has huge potential to benefit industries like regenerative and personalized medicine, drug discovery and cosmetics. The three basic steps of bioprinting are : 1. Pre-bioprinting: This involves creating a digital file for the printer to read. Today, these files are often based on CT and MRI scans. Researchers prepare cells and mix them with their bioink, using a live-cell imaging system to ensure there are enough cells to bioprint a tissue model successfully. 2. Bioprinting: Researchers load the cell-laden bioink into a cartridge and choose one or multiple printheads, depending on the structure they're trying to build. Developing different types of tissue requires researchers to use different types of cells, bioinks and equipment. 3. Post-bioprinting: Most structures are crosslinked to become fully stable. Crosslinking is usually done by treating the construct with either ionic solution or UV light. The construct's composition helps researchers determine what kind of crosslinking to use. Then the cell-filled constructs are placed inside an incubator for cultivation.

BIOPRINTING HAS SOME IMPORTANT APPLICATIONS LIKE:

Drug development: Many of today's studies rely on living subjects – an inconvenient and expensive method for both academic and commercial organizations. Bioprinted tissues can be used instead during the early stages, providing a more ethical and cost-effective solution. Using bioprintined tissue can help researchers determine a drug candidate's efficacy sooner, enabling them to save money and time.

Artificial organs: The organ donation list is so long that patients wait years before getting the help they need. Being able to bioprint organs could help clinicians keep up with patients or eliminate the list entirely. While this solution is far down the line, it is one of the most impactful possibilities in the field.

Wound healing: A lot of tissue-specific bioinks are available today, enabling researchers to work with artificial skin cells, neurons, hepatocytes and more. One day, clinicians could use these models for therapeutic procedures like skin grafts, bone bandages for combat wounds or even plastic surgery.



COMPETITIVE EXAMS	ELIGIBILITY
DBT – NET: DBT JRF is one of the most sought after exams conducted by the Department of Biotechnology. It is conducted to shortlist talented candidates for the award of Junior Research Fellowships in the field of biotechnology.	Tech degree in biotechnology or an M.Sc/ M.Tech/ M.V.Sc. Degree in various bio technology specializations. Candidates with an M.Sc in Neuroscience and Molecular & Human Genetics are also eligible. The qualifying degree must be completed with at least 60% marks (55% for SC/ST/PWD candidates).
GAT – B: Graduate Aptitude Test or GAT Biotechnology is an All India entrance test conducted for granting admission to DBT-supported Postgraduate programs in Biotechnology and allied areas in the participating institutions. Every year, this exam is conducted by NTA .	The minimum required qualification to give the GAT B exam for the M.Sc. course is graduation in the 10+2+3 pattern in the respective field with at least 60% marks (General, EWS & OBC category). However, the candidates belonging to SC, ST & PWD categories can apply with a 55% score.
GATE: Graduate Aptitude Test in Engineering is an examination which is conducted for Master of Engineering (ME), Masters in Technology (MTech) and direct PhD admissions to Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), Indian Institutes of Information Technology (IIITs) and other institutes/universities across India. It also opens the gateway to booming public sector organisations (PSUs) and in the field of research. Some of the PSUs and research organizations which use GATE score for providing jobs include ONGC, NTPC, GAIL, HPCL, PGCIL, BHEL, BSNL, HPCL, NHPC, BARC, DRDO, etc. GATE is an All India examination administered and conducted in eight zones across the country by the GATE Committee comprising of faculty members from IISc, Bangalore and other seven IIT's.	Candidates who are studying in 3rd or higher year of an undergraduate program or have completed any government approved degree program in Engineering/ Technology/ Science/ Architecture/ Humanities are eligible to appear for GATE.

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09 SEPTEMBER 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10 WORLD SUICIDE PREVENTION DAY	11	12	13	14
15 WORLD LYMPHOMA DAY	16	17 WORLD PATIENT SAFETY DAY	18	19	20	21
22	23	24	25	26	27	28
29	30					

"BIOTECHNOLOGY IS THE BEST SCIENCE EVER."

CDFD (CENTRE FOR DNA FINGERPRINTING AND DIAGNOSTICS, HYDERABAD

https://maps.app.goo.gl/KjbYTLZEpLPgGjRYA

NCCS (NATIONAL CENTRE FOR CELL SCIENCE), MAHARASHTRA

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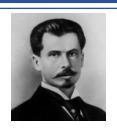
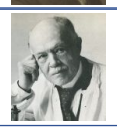
09 SEPTEMBER 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
1st Sep 1856	Sergei Winogradsky		Discovered the first known forms of chemoautotrophy, in particular lithotrophy and chemosynthesis Invented the Winogradsky column technique for the study of sediment microbes Pioneered the study of biogeochemical cycles, particularly the nitrogen cycle and the contribution of nitrifying bacteria.
3rd Sep 1899	Frank Macfarlane Burnet		Virologist & Nobel Prize Laureate for clonal selection theory
10th Sep 1926	Thomas D Brock		Founder of Thermophilic bacteria ***Thermus aquaticus*** and ***Sul-folobuus Spp***
13th Sep 1853	Hans Christian Gram		Inventing the stain, the Gram stain still a standard technique to classify bacteria and make them more visible under a microscope.
21st Sep 1866	Charles Nicolle		1928 Nobel Prize in Physiology or Medicine for determining that typhus is transmitted by body lice.

Death Anniversaries	Name of Scientists	Photographs	Contribution
16th Sep 1932	Ronald Ross		He discovered the mosquito transmission of malaria and the first Briton to be awarded the Nobel Prize for Medicine
27th Sep 1940	Julius Wagner-Jauregg		In 1927 he was awarded the Nobel Prize in Medicine for the discovery of the beneficial effect of malaria on progressive paralysis
28th Sep 1895	Louis Pasteur		His contribution in microbiology are Germ theory, Pasteuriza-tion, Fermentation, Anthrax vaccine, Spontaneous generation, Molecular asymmetry, Rabies, Pasteur effect, Vaccines, and Infectious disease.

Stem Cell Research: Gene cloning aids in creating induced pluripotent stem cells (iPSCs) from a patient's own cells. These can be used for regenerative medicine and studying disease mechanisms. Infectious Disease Research: Cloning is instrumental in understanding the genetics of pathogens. helping in the development of treatments and vaccines for infectious diseases like HIV and COVID-19.Genomic Medicine: With the ad-vancement of DNA sequencing technologies, gene cloning plays a crucial role in decoding entire genomes to better understand the genetic basis of diseases.

First Gene clone animal :-The first animal to have its gene cloned was a sheep named "Dolly." Dolly the sheep was cloned in 1996 by scientists at the Roslin Institute in Scotland. This historic achievement marked the first successful cloning of a mammal from an adult somatic cell using a technique called somatic cell nuclear transfer

GENE CLONING

The production of exact copies of a particular gene or DNA sequence using genetic engineering techniques is called gene cloning.

The term "gene cloning," "DNA cloning," "molecular cloning," and "recombinant DNA technology" all refer to same technique. When DNA is extracted from an organism, all its genes are obtained. In gene (DNA) cloning a particular gene is copied forming "clones".

Cloning is one method used for isolation and amplification of gene of interest.

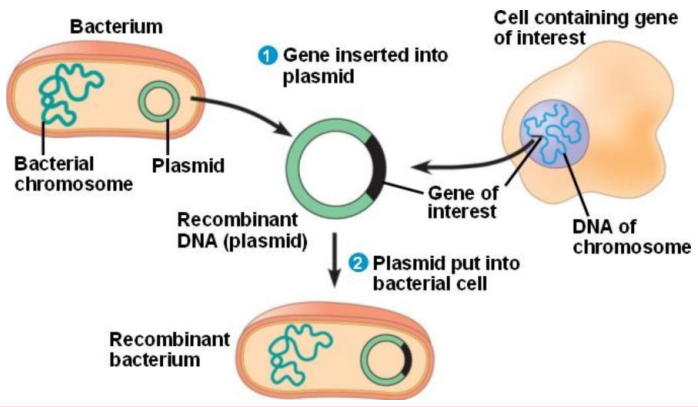
WHY IT IS IMPORTANT

Cloning can provide a pure sample of an individual gene .The Problem of selection of just one gene. Only cells containing the desired recombinant DNA molecule can divide and the clone of interest is automatically selected.

History

Gene cloning has played a significant role in advancing healthcare. A brief overview ofits history in health:1970s - Early Beginnings: Gene cloning techniques, like restriction enzymes and plasmid Vectors, were developed, enabling scientists to isolate and replicate genes. This laid thefoundation for genetic research in health.1980s - Human Insulin Production: In 1982, researchers successfully cloned the human Insulin gene and inserted it into bacteria. This breakthrough allowed for Mass production of insulin for diabetes treatment.1990s - Human Genome Project: Gene cloning contributed to the Human Genome Project, a global effort to map and se-quence all human genes. This project provided valuable insights into the genetic basis of various diseases.2000s - Therapeutic Cloning: Advances in gene cloning techniques led to therapeutic cloning, where cells and tissues could be cloned for potential medical treatments, such as regenerative medicine and organ transplantation.2010s - Precision Medicine: Gene cloning and sequencing technologies became instrumental in the development of preci-sion medicine. Genetic information helps customize treatments based on an individuall's unique genetic makeup. present - CRISPR-Cas9 Revolution: CRISPR-Cas9, a gene-editing tool, emerged as a powerful technique for modifying genes. It has the potential to treat genetic disorders and develop novel therapies for various health conditions.

Gene cloning has various applications in biology, medicine, and biotechnology. Some key applications include: Biomedical Research; Gene cloning is used to study the function of specific genes and their role in diseases. Researchers can clone genes to analyze their structure, regulation, and function. therapeutic proteins like insulin, growth hormones, and clotting factors, which are used to treat various medical conditions. Genetic Engineering: Cloning genes allows scientists to modify or manipulate them, which is crucial in genetic engineering. This includes creating genetically modified organisms (GMOs) with desir-able traits, such as disease resistance in crops. DNA Sequencing: Cloning is a crucial step in DNA sequencing.



PCR

PCR or Polymerase Chain Reaction is a technique used in molecular biology to create several copies of a certain DNA segment. This technique was developed in 1983 by Kary Mullis, an American biochem-ist. PCR has made it possible to generate millions of copies of a small segment of DNA. This tool is commonly used in the molecular biology and biotechnology labs. Principle of PCR :The PCR technique is based on the enzymatic replication of DNA. In PCR, a short segment of DNA is amplified using primer mediated enzymes. DNA Polymerase synthesis new strands of DNA complementary to the template DNA. Types of PCR: 1)Real-time PCR 2)Nested PCR 3)Multiplex PCR 4)Quantitative PCR 5)Arbitrary Primed PCR PCR Steps: DENATURATION: denaturation occurs when reaction mixture is heated to 94℃ for about 0.5 to 2 min. This breaks the hydrogen bonds between two strands of DNA and convert it into a single stranded DNA. The single strands now act as a template for the production of new strands of DNA. The temperature should be provided for a longer time to ensure the separation of the two strands. ANNEALING :The reaction temperature is lowered to 54-60℃ for around 20-40 seconds. Here, the primers bind to their complementary sequences on the template DNA . Primers are single-strand sequences of DNA or RNA around 20 to 30 bases in length. They serve as the starting point for the synthesis of DNA. he two separated strands run in the opposite direction and con-sequently there are two primers- a forward primer and a reverse primer. ELONGATION: At this step, the temperature is raised to 72-80℃. The bases are added to the 3' end of the primer by the Taq polymerase enzyme. This elongates the DNA in the 5' to 3' direction. The DNA polymerase adds about 1000bp/minute under optimum conditions. Taq Polymerase can tolerate very high temperatures. It attaches to the primer and adds DNA bases to the single strand. As a result, a double-stranded DNA molecule is obtained. These three steps are repeated 20-40 times in order to and adds DNA bases to the single strand. As a result, a double-stranded DNA molecule is obtained. These three steps are repeated 20-40 times in order to obtain a number of sequences of DNA of interest in a very short time period. obtain a number of sequences of DNA of interest in a very short time period.

COMPETITIVE EXAMS	ELIGIBILITY
ICAR AICE-JRF/SRF (Ph.D): is All India Competitive Examination for (a) admission to 25% seats in accredited Doctoral Degree Programmes of accredited Colleges of accredited Universities under ICAR-AU System (100% seats of ICAR Deemed Universities and Dr. RPCAU Pusa, ICAR-DUs in Doctoral Degree Programmes) and Award of ICAR-JRF/SRF (Ph.D) in Agriculture & Allied Sciences.	The candidate must complete the postgraduate degree in all respects and should have all the degree-completion requirements at the time of Counseling/admission in the university failing which they will not be considered for admission and the award of the fellowship.
ICAR AIEEA (PG): is All India Entrance Examination for (a) admission to 25% seats in Master Degree Programme in accredited Agricultural Universities (100% seats at IARI, IVRI, NDRI, CIFE, RLBCAU Jhansi & DR. RPCAU, PUSA) and (b) Award of ICAR-PG Scholarship/National Talent Award (PGS) in Agriculture & Allied Sciences.	Candidates must have completed their graduation in a related field from a recog-nized university or college.
ICAR AIEEA (UG): is All India Entrance Examination for (a) admission to 15% seats in Bachelor Degree Programme in Agriculture and Allied Sciences (Other than veterinary sciences) at Agricultural Universities (100% seats at NDRI Karnal, RLBCAU Jhansi & DR. RPCAU PUSA) and (b) award of National Talent Scholarship in Agriculture & Allied Science subjects (other than Veterinary Science.	ICAR Exam Eligibility for Undergraduate General and OBC candidates must obtain a minimum of 50% in aggregate. Candidates from Scheduled Caste, Scheduled Tribe, and Physically Challenged category must obtain at least an aggregate of 40% marks.

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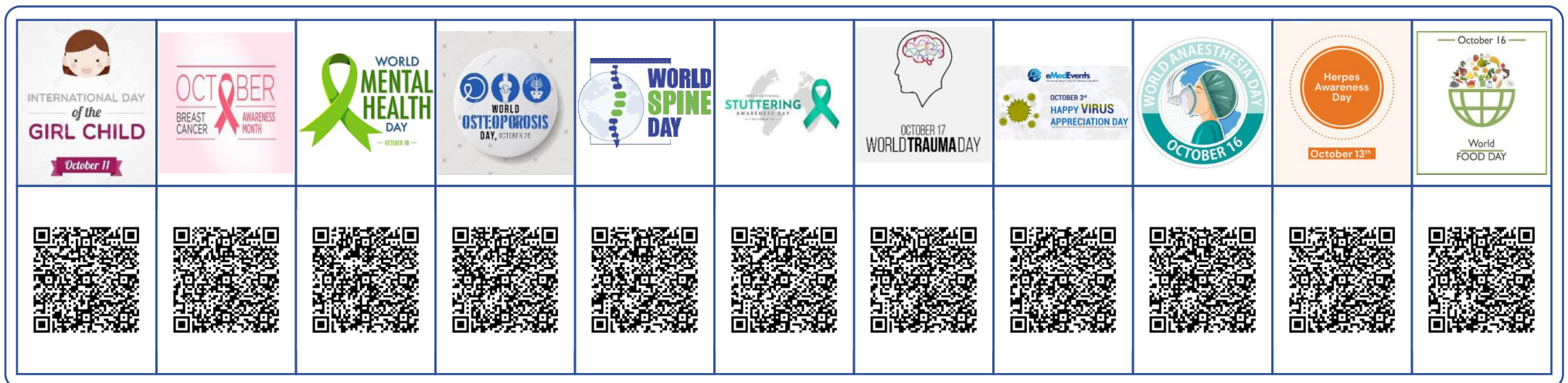
10 OCTOBER 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
GLOBAL BREAST CANCER AWARENESS MONTH		1	2	3 GLOBAL VIRUS APPRECIATION DAY	4	5
6	7	8	9	10 WORLD MENTAL HEALTH DAY	11 INT. GIRL CHILD DAY	12
13 NATIONAL HERPES AWARNESS DAY	14	15	16 WORLD FOOD DAY WORLD ANAESTHESIA DAY WORLD SPINE DAY	17 WORLD TRAUMA DAY	18	19
20 WORLD OSTEOPOROSIS DAY	21	22 INTERNATIONAL STUTTERING DAY	23	24	25	26
27	28	29	30	31		

"WE LOVE BIOTECHNOLOGY DUE TO ITS BENEFITS."



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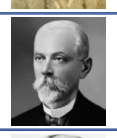
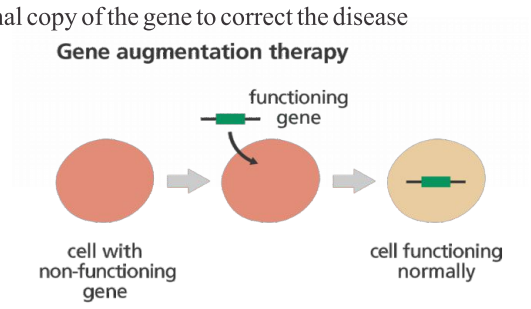
10 OCTOBER 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
10th Oct 1938	Leroy Hood		Leroy Hood is a prominent biologist and biotechnologist. Hood is known for pioneering the field of genomics, which involves the study of an organism's complete set of genes (genome).
12th Oct 1865	Arthur Harden		Arthur Harden, a British biochemist, who along with William Young led to the discovery of Glycolytic Pathway.
24th Oct 1632	Antoine Philips van Leeuwenhoek		Van Leeuwenhoek was the first to observe microscopic organisms, using simple single-lensed microscopes of his own design known as "Father of Microbiology".
28th Oct 1911	Ephraim Anderson		Best known for his work highlighting the human health dangers of drug resistant bacteria created by use of antibiotics.
28th Oct 1864	Dmitri Ivanovsky		Discovery of viruses, TMV (Tobacco mosaic virus).
30th Oct 1895	Gerhard Domagk		1939 Nobel Prize in Physiology or Medicine for the discovering the first commercially available sulphonamide drug prontosil.
30th Oct 1909	Homi J Bhabha		Father of the Indian Nuclear Program.

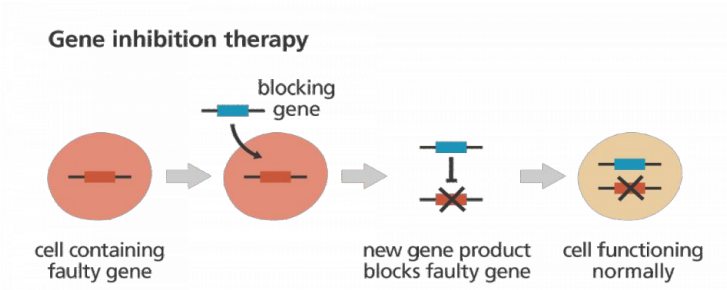
Death Anniversaries	Name of Scientists	Photographs	Contribution
5th Oct 2004	Maurice Wilkins		Maurice Wilkins was a British molecular biologist who played a critical role in elucidating the structure of DNA through X-ray.
7th Oct 2008	George Palade		George Emil Palade was a Romanian-American cell biologist. He was instrumental in the discovery and characterization.
23rd Oct 1986	Edward Doisy		Edward Doisy was an American biochemist best known for his isolation and identification of vitamin K, a vital nutrient essential for blood clotting.

GENE THERAPY

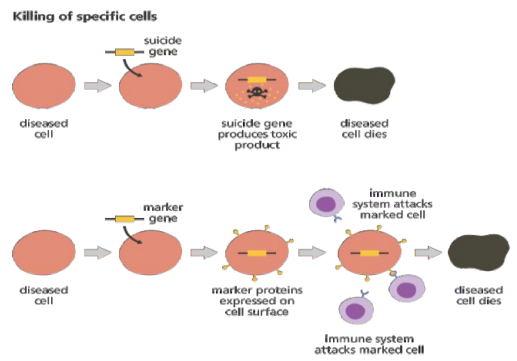
Gene therapy is when DNA is introduced into a patient to treat a genetic disease. The new DNA usually con tains a functioning gene to correct the effects of a disease causing mutation. Gene therapy uses sections of DNA (usually genes) to treat or prevent disease. The DNA is carefully selected to correct the effect of a mutated gene that is causing disease. The technique was first developed in 1972 but has, so far, had limited success in treating human diseases. Gene therapy may be a promising treatment option for some genetic dis eases, including muscular dystrophy and cystic fibrosis.. Two different types of gene therapy depending on which types of cells are treated: Somatic gene therapy: transfer of a section of DNA to any cell of the body that doesn't produce sperm or eggs. Effects of gene therapy will not be passed onto the patient's children. Germline gene therapy: transfer of a section of DNA to cells that produce eggs or sperm. Effects of gene therapy will be passed onto the patient's children and subsequent generations. Gene therapy techniques: There are several techniques for carrying out gene therapy. These include: Gene augmentation therapy This is used to treat diseases caused by a mutation that stops a gene from producing a functioning product, such as a protein. This therapy adds DNA containing a functional version of the lost gene back into the cell. The new gene produces a functioning product at sufficient levels to replace the protein that was originally missing. This is only successful if the effects of the disease are reversible or have not resulted in lasting damage to the body. For example, this can be used to treat loss of function disorders such as cystic fibrosis by introducing a functional copy of the gene to correct the disease



Gene inhibition therapy: Suitable for the treatment of infectious diseases, cancer and inherited disease caused by inappropriate gene activity. The aim is to introduce a gene whose product either: inhibits the expression of another gene interferes with the activity of the product of another gene. The basis of this therapy is to eliminate the activity of a gene that encourages the growth of disease-related cells. For example, cancer is sometimes the result of the over-activation of an oncogene (gene which stimulates cell growth). So, by eliminating the activity of that oncogene through gene inhibition therapy, it is possible to prevent further cell growth and stop the cancer in its tracks.

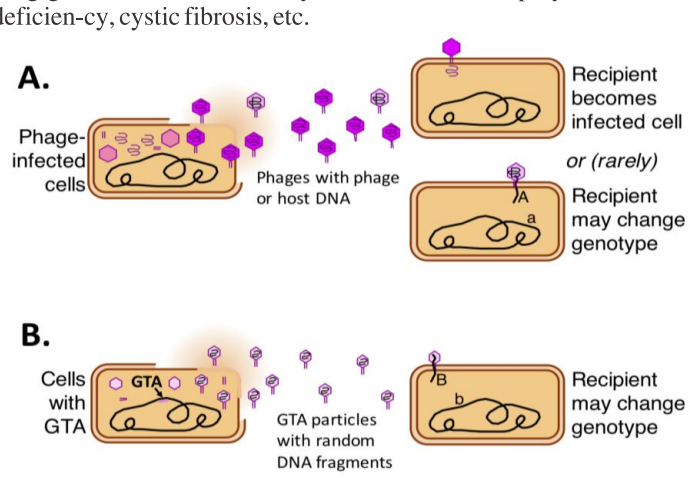


Killing of specific cells: Suitable for diseases such as cancer that can be treated by destroying certain groups of cells. The aim is to insert DNA into a diseased cell that causes that cell to die. This can be achieved in one of two ways: the inserted DNA contains a "suicide" gene that produces a highly toxic product which kills the diseased cell the inserted DNA causes expression of a protein that marks the cells so that the diseased cells are attacked by the body's natural immune system. It is essential with this method that the inserted DNA is targeted appropriately to avoid the death of cells that are functioning normally.



How is DNA transfer done. A section of DNA/gene containing instructions for making a useful protein is packaged within a vector, usually a virus, a bacterium and plasmid. The vector acts as a vehicle to carry the new DNA into the cells of a patient with a genetic disease. Once inside the cell of the patient, the DNA/gene is expressed by the cell's normal machinery leading to production of the therapeutic protein and treatment of the patient's disease

Application of Gene Therapy: It is used in the replacement of genes that cause medical ill-health. The method generally destroys the problem causing genes. It helps the body to fight against disease by adding genes to the human body This method is employed to treat diseases such as cancer, ADA deficien-cy, cystic fibrosis, etc.



COMPETITIVE EXAMS	ELIGIBILITY
ICMR – SRF: The ICMR SRF/ RA Fellowship is awarded to young scientists to enable them to carry out research in medicine or allied fields at the permanent institutes of the council, universities and medical colleges, other biomedical research institutes in India where laboratories and other facilities are readily available to carry out research.	M.Sc. (Life Sciences), MA (Social Sciences), Master in Social Work (MSW) degree holders with two years research experience.
IIT – JAM: IIT JAM Biotechnology is a national-level entrance exam for admission to M.Sc. and PhD programs in biotechnology offered by IITs, IISc, and other top-ranked institutes in India. A good score in the exam can help you secure a seat in a prestigious institute and pursue higher education in biotechnology.	Biotechnology candidates should have a Bachelor's degree in any branch of Science, Engineering or Technology, with a minimum of 55% aggregate marks [or 5.5 out of 10 Cumulative Grade Point Average (CGPA) or equivalent)].
NEST: The National Entrance Screening Test or NEST is a compulsory online/computer based test for admis-sion to the five year Integrated MSc programme in Biology, Chemistry, Mathematics, and Physics, at the Na-tional Institute of Science Education and Research (NISER), Bhubaneswar and University of Mumbai – Depart-ment of Atomic Energy Centre for Excellence in Basic Sciences (UM–DAE CEBS), Mumbai.	Candidates should have passed the class 12th examination or equivalent from any recognized Board in India in the year 2022 or 2023 or must be appearing in the same in 2024. Final-year applicants are also eligible for NEST 2024.

MICROBIOLOGISTS SOCIETY, INDIA

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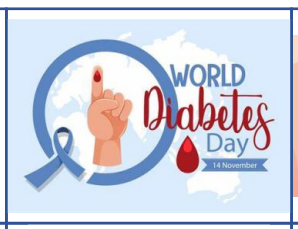
11 NOVEMBER 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
WORLD LUNG CANCER AWARENESS MONTH					1	2
3	4	5 NATIONAL TOOTH BRUSHING DAY	6	7 NATIONAL CANCER AWARENESS DAY	8 INTERNATIONAL RADIOLOGY DAY	9
10 NATIONAL AYURVEDA DAY WORLD IMMUNIZATION DAY	11	12 WORLD PNEUMONIA DAY	13	14 WORLD DIABETES DAY	15 WORLD COPD DAY	16
17 WORLD PREMATURITY DAY NATIONAL EPILEPSY DAY	18 WORLD AMR WEEK	19	20	21	22	23
24	25	26 GLOBAL IRON DEFICIENCY AWARENESS DAY	27	28	29	30

"UNITE TO HELP BIOTECHNOLOGY AND A SOUND WAY OF LIFE."



BHARAT BIOTECH, HYDERABAD

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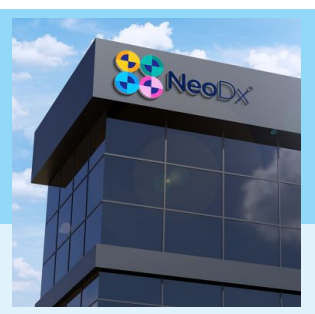

NEODX BIOTECH LABS PRIVATE LIMITED, HYDERABAD

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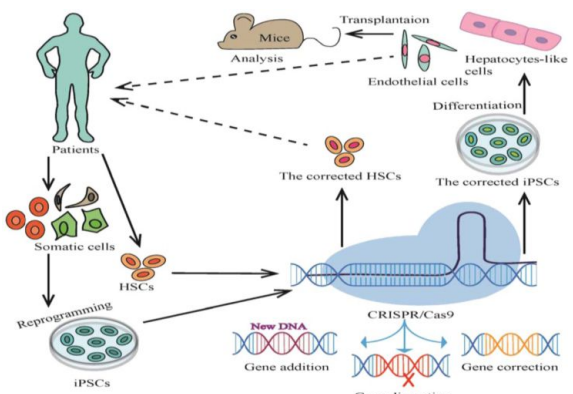
11 NOVEMBER 2024

Birth Anniversaries	Name Of Scientists	Photographs	Contribution
24th Nov 1864	Raymond Sabouraud		Development of Sabauraud agar with low pH and high concentration of sugar for isolation of fungi and introduced radiological treatment against ringworm of scalp.
30th Nov 1858	Jagadish Chandra Bose		Pioneer of Radio & microwave optics, made significant contribution to plant science and laid the foundation of experimental science in the India.

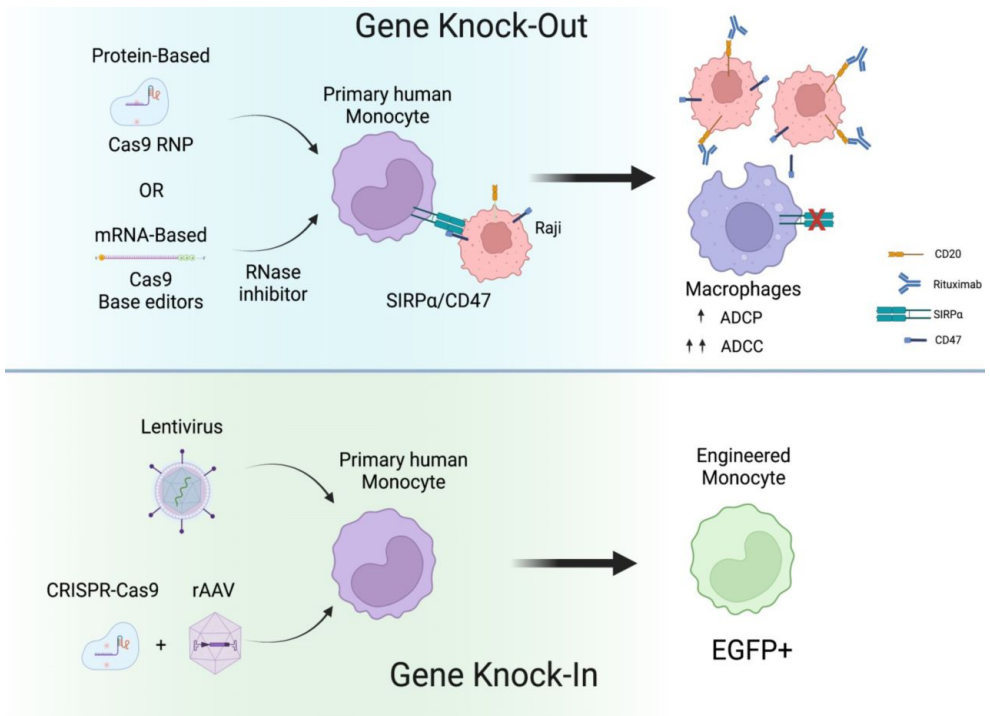
Death Anniversaries	Name of Scientists	Photographs	Contribution
14th Nov 1938	Hans Christian Gram		He developed a staining technique (1884) that classifies most bacteria into two large groups that are referred to as Gram-positive, and Gram-negative bacteria.

CRISPR

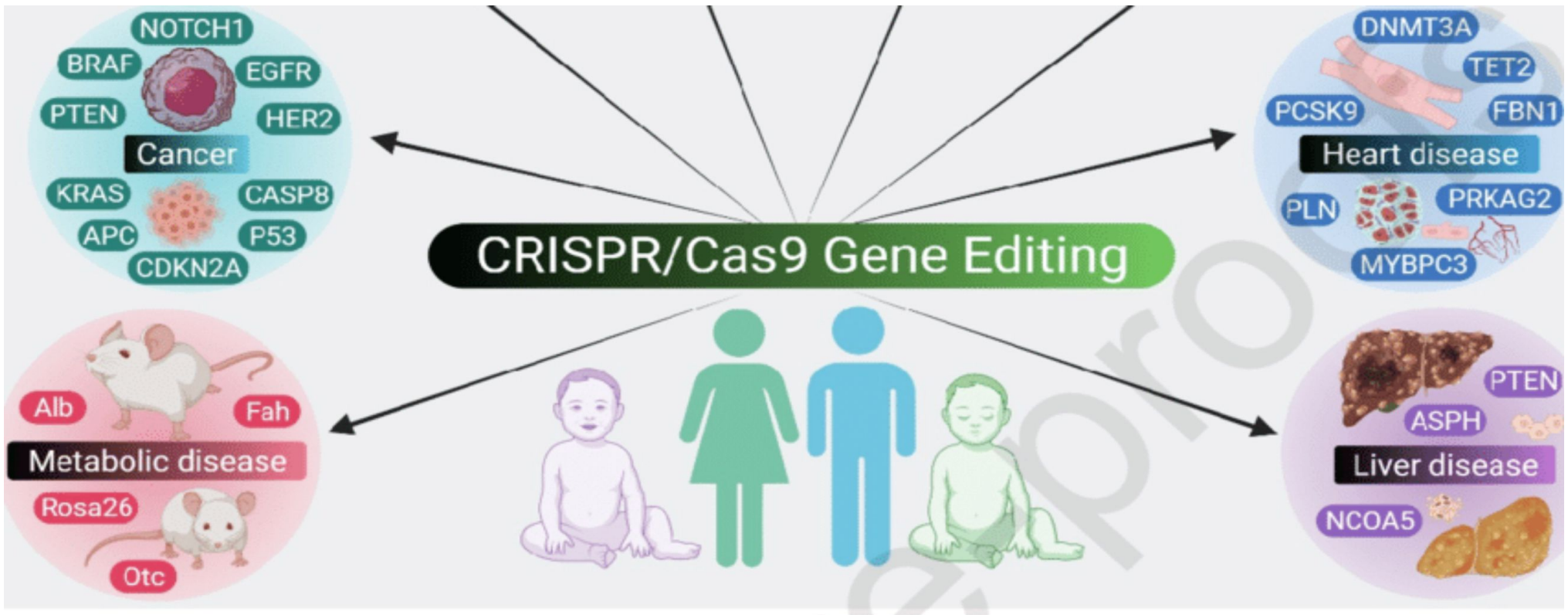
CRISPR (short for **"clustered regularly interspaced short palindromic repeats")** is a technology that research scientists use to selectively modify the DNA of living organisms. CRISPR was adapted for use in the laboratory from naturally occurring genome editing systems found in bacteria. **Here's why CRISPR is important in health:**1. Disease Treatment: CRISPR can be used to target and edit specific genes associated with genetic diseases. This offers potential treatments for conditions that were previously incurable or difficult to manage, such as certain types of muscular dystrophy and sickle cell disease. 2)Cancer Research: CRISPR is instrumental in cancer research by enabling the modification of genes involved in cancer development. This can lead to a better understanding of the disease and the development of targeted therapies. 3) Infectious Disease Control: CRISPR technology has been explored for creating genetically modified organisms, like mosquitoes, that are resistant to disease. This can help control the spread of diseases like malaria and Zika virus.4)Precision Medicine: CRISPR has the potential to personalize medicine by tailoring treatments to an individual's genetic makeup. This can lead to more effective and safer treatments.5) Studying Genetic Mechanisms : CRISPR allows researchers to precisely manipulate genes, enabling the study of gene functions and the discovery of new therapeutic targets. 6)Ethical Considerations: While CRISPR holds great promise, it also raises ethical questions regarding its use, such as in germline editing, where changes made to an individuals DNA can be passed down to future generations. Ethical discussions are crucial to ensure responsible and ethical use of this technology. In summary, CRISPR has revolutionized genetic research and offers numerous opportunities to advance healthcare, but its use also comes with ethical and regulatory considerations that need to be carefully addressed. **HISTORY** : While Doudna and Charpentier were the first to adapt CRISPR-Cas9 as a gene editing tool, the history goes back a little further than their 2012 publication. In 1993, Dr. Fransisco Mojica, a scientist at the University of Alicante in Spain, identified repetitive palindromic segment of DNA interspaced with other fragments of genetic material in bacterial genomes. Dr. Mojico gave these regions the name CRISPR, and proposed that they are a component of the bacterial immune system. In 2007, a team of scientists led by Dr. Philippe horvath experimentally demonstrated mojicas theory. since its adaptation by Dr. Doudna and Dr. Charpentier, this versatile gene editing technology has progressed rapidly. It has been adapted for many different purposes, including RNA editing, base and prime editing, live imaging, and diagnostics. It has been used to edit DNA in a variety of organisms, including humans. in 2019, the first crispr trials began, harvesting cells from patients with sickle cell disease (SCD) and editing them in vitro before infusing them back into the body .



CRISPR Methods And Techniques CRISPR gene knockout Gene knockouts are used in a range of research areas, including functional genomics, pathway analysis, drug discovery and screening, and disease modeling. Using multiple guide RNAs that target various regions of the gene ensures high efficiency gene knockout, a method that is gaining popularity. **CRISPR knock-in:** Gene knock-ins have been a key breakthrough in biotechnology, including the production of recombinant proteins, increasing the viability of immortalized cell lines, and precision disease modeling. Perhaps most importantly, CRISPR knock-in can be used in cell and gene therapies to correct genetic mutations that cause human disease.. compared with gene knockout, gene knock-ins are more challenging. This is because HDR is a less common repair pathway than NHEJ, only occurring at certain stages of the cell cycle. The low frequency of HDR typically results in low knock-in efficiencies. However, scientists have been creating methods to overcome this obstacle, including detailed experimental optimization, cell cycle synchronization, and treatments that either boost HDR or disa-ble NHEJ for knock-in experiment.



Important Applications of CRISPR Technology:
1. Cell and gene therapies . 2. Diagnostics. 3. Agriculture. 4. Bioenergy
The Future Of CRISPR: There can be no doubt that CRISPR-Cas9 has revolutionized the field of genome engineering. However, we're only just beginning to see the benefits and possibilities of this incredible technology - with a variety of successful preclinical studies and more clinical trials being approved, the dream of curing human disease by editing our DNA is now very real. There are also an increasing number of biotech startup companies focusing on CRISPR-Cas9 gene editing technology, and many researchers are continually finding new ways of applying this technology to solve real-world problems, including epigenome editing, new cell and gene therapies, infectious disease research, and for the conservation of endangered species.



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12 DECEMBER 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 WORLD AIDS DAY	2	3 INTERNATIONAL IDPD DAY	4	5	6	7
8	9	10	11 UNICEF FOUNDATION DAY	12 UNIVERSAL HEALTH COVERAGE DAY	13	14 NATIONAL ENERGY CONSERVATION DAY
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31 CONSTIPATION AWARNESS MONTH				

"BIOTECHNOLOGY IS VERSATILE"

ZYDUS CADILA,
AHMEDABAD, GUJARAT

https://g.co/kgs/DiVnGT

Department of Microbiology , HVHP Institute of Post Graduate Studies and Research,
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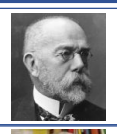
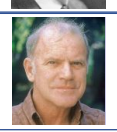
12 DECEMBER 2024

Birth Anniversaries	Name of Scientists	Photographs	Contribution
11th Dec 1843	Robert Koch		1905 Nobel Prize in Physiology or Medicine for work on tuberculosis; identified causative agents of tuberculosis, cholera and anthrax.
16th Dec 1928	Bruce Ames		Ames test for testing mutagenesis of compound.
27th Dec 1822	Louis Pasteur		Known as the Father of Modern Microbiology, Father of Fermentation, development of vaccines for chicken cholera, anthrax and rabies & developed the process of Pasteurization .
27th Dec 1920	Robert Harding Whittaker		He was the first to propose the five-kingdom taxonomic classifi-cation of the world's biota into the animalia, Plantae, Fungi, Protista and Monera in 1969 .
27th Dec 1860	David Hendricks Bergey		American bacteriologist, primary author of Bergey's manual of determinative bacteriology, an invaluable taxonomic reference work.
28th Dec 1944	Kary Mullis		Invention of polymerase chain reaction .

Death Anniversaries	Name of Scientists	Photographs	Contribution
1st Dec 1934	Fanny Hesse		Pioneered use of Agar-Agar as a solidifying agent in solid culture media
1st Dec 2007	Jun Almeida		Pioneer in virus imaging, identification, and diagnosis
12th Dec 1948	Marjory Stephenson		She wrote Bacterial Metabolism

IMMUNIZATION

IMMUNIZATION: Immunization is the process of giving a vaccine to a person to protect them against disease. Immunity (protection) by immunization is similar to the immunity a person would get from disease, but instead of getting the disease you get a vaccine. This is what makes vaccines such powerful medicine. Most vaccines are given by needle (injection) but some are given by mouth (orally) or sprayed into the nose (nasally). Immunizations are also called vaccinations, needles, shots or jabs. VACCINATION: The process of implementing the vaccine is called vaccination. A vaccine is a biological preparation that provides active acquired immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened (attenuated) or killed forms of the microbe, its toxins or one of its surface proteins. the agent stimulates the body's immune system to recognize the agent as a threat, destroy it and keep a record of it so that the immune system can more easily recognize and destroy any of these microorganisms that it later encounters. IMPORTANCE OF VACCINATION :A vaccine activates our immune system without making us sick. Many dangerous infectious diseases can be prevented in this simple and effective way. From birth, we are constantly exposed to many different viruses, bacteria and other microbes. Most are not harmful, many are beneficial but some can cause disease. The body's immune system helps protect us against infections. When we are exposed to infection, the immune system triggers a series of responses to neutralize the microbes and limit their harmful effects. Exposure to an infectious disease often gives lifelong protection (immunity) so we do not contract the same disease again. Our immune system “remembers” the microbe. 1. Effective protection from dangerous diseases and better health. 2. Safety and prevention. 3. Eradicating diseases and saving lives. 4. Available, accessible and affordable. 5. Lower medical bills and higher life expectancy. 6. Childhood vaccinations secure health and development. 7. Protects children and others.8. The benefit of herd immunity.9. Prevention of related diseases.10. Enhancing social and economic equity. HISTORY OF VACCINE:1400s to 1700s From at least the 15th century, people in different parts of the world have attempted to prevent illness by intentionally exposing healthy people to smallpox. in 1721, Lady Mary Wortley Montagu brought smallpox inoculation to Europe. In May 1796, English physician Edward Jenner expands on this discovery and inoculates 8-year-old James Phipps with matter collected from a cowpox sore on the hand of a milkmaid. In 1872, despite enduring a stroke and the death of 2 of his daughters to typhoid, Louis Pasteur creates the first laboratory-produced vaccine: the vaccine for fowl cholera in chickens. In 1885, Louis Pasteur successfully prevents rabies through post-exposure vaccination. In 1894, Dr Anna Wessels Williams isolates a strain of the diphtheria . In 1937 Max Theiler, Hugh Smith and Eugen Haagen develops the 17D vaccine against yellow fever. By 1945, the first influenza vaccine is approved for military use, followed in 1946 by an approval for civilian use. From 1952–1955, the first effective polio vaccine is developed by Jonas Salk and trials begin. In 1967, the World Health Organization announces the Intensified Smallpox Eradication Program. In 1969, four years after Dr Baruch Blumberg discovers the hepatitis B virus. FUTURE VACCINE PROCESS: Expanded Vaccine Coverage: India may continue to expand its vaccination coverage, ensuring that a larger percentage of its population is protected against a variety of diseases beyond COVID-19. Advanced Distribution Systems: Improved cold chain and logistics systems to efficiently distribute vaccines, especially to remote and underserved areas. Research and Development: Increased investment in research and development for vaccines against diseases that are prevalent in India, such as tuberculosis, malaria, and dengue. Digital Vaccine Certificates: Adoption of digital vaccine certificates or passports for easier verification of vaccination status and travel. Public-Private Partnerships: Collaborations between

VACCINATION SCHEDULE FOR PREGNANT WOMEN:

Vaccine	Due age	Max age	Dose	Diluent	Route	Site
For Pregnant Women						
TT-1	Early in pregnancy	Give as early as possible in pregnancy	0.5 ml	NO	Intra-muscular	Upper Arm
TT-2*	4 weeks after TT-1*		0.5 ml	NO	Intra-muscular	Upper Arm
TT- Booster	If received 2 TT doses in a pregnancy within the last 3 years*		0.5 ml	NO	Intra-muscular	Upper Arm

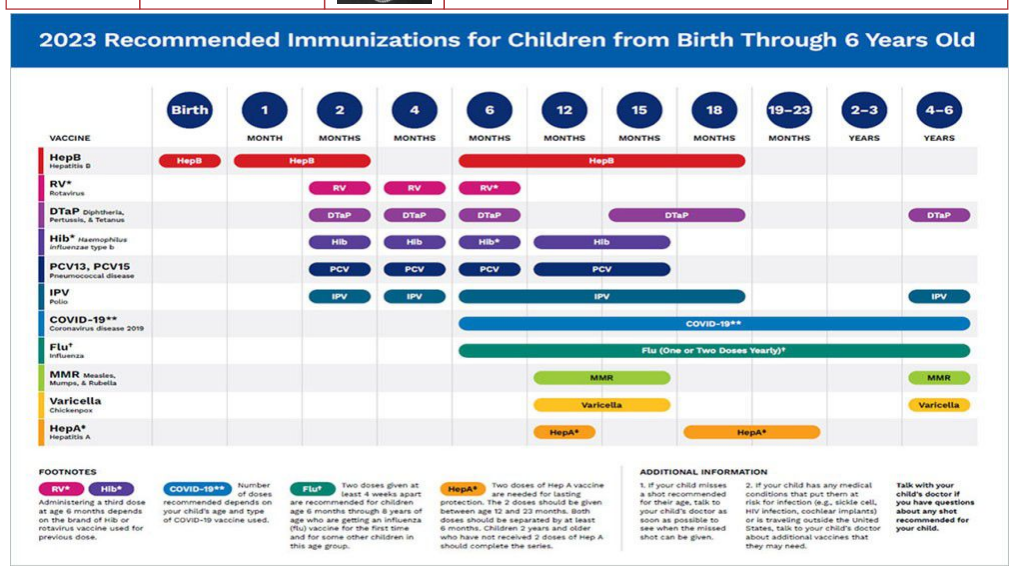


Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2023

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	2- or 3- dose primary series and booster (See Notes)			
Influenza inactivated (IIV4) or Influenza recombinant (RIV4) or Influenza live, attenuated (LAIV4)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			For healthcare personnel, see notes
Varicella (VAR)	2 doses (if born in 1980 or later)	2 doses		
Zoster recombinant (RZV)	2 doses for immunocompromising conditions (see notes)		2 doses	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PPSV23)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			See Notes
				See Notes
Hepatitis A (HepA)	2, 3, or 4 doses depending on vaccine			
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			

Antigen	Vaccine developer	Technology	Adjuvants	Clinical Stage
Full-length S-protein based vaccines				
Trimer	Novavax	Insect cells	Matrix M	Phase 3
S-protein	Sanofi Pasteur/GSK	Insect cells	2 different adjuvants	Phase 1-2
SCB-2019 Trimer	Clover Biopharmaceuticals Inc./GSK/Dynavax	CHO cells	Alum +CpG 1018 orAS03	Phase 1
S-2P (MVC-COV1901)	Medigen Vaccine Biologics Corporation/ NIAID/Dynavax	CHO cells	Alum+ CpG1018	Phase 1
Sclamp	University of Queensland/CSL/ Seqirus	CHO cells	MF59	Phase 1
Covax-19	Vaxine Pty Ltd/Medytox	Insect cells	AdvaxCpG55.2	Phase 1
RBD-based vaccines				
AdimrSC-2f	Adimmune	Baculovirus/Sf9	Alum	Phase 1
FINLAY-FR- 1/2	Instituto Finlay de Vacunas, Cuba			Phase 1
KBP-201	Kentucky Bioprocessing, Inc	Plants		Phase 1-2
RBD Dimer	Anhui Zhifei Longcom Biopharmaceutical/ Chinese Academy of Sciences	CHO Cells	Aluminum preparation	Phase 2
RBD	West China Hospital, Sichuan University P	Insect Cells	Alum	Phase 1
Multi-epitope vaccines				
Multitope Peptide-based Vaccine (MPV)	COVAXX	Peptides	CpG and alum (AdjuPhos®)	Phase 1
EpiVacCoron	Vektor Laboratories, Russia	Chemical synthesis	Alum	Phase 1
CoVac-1	University Hospital Tübingen	Peptides	Montanide ISA51	Phase 1

Table 1. Recombinant protein vaccine candidates in clinical trials for COVID-19