The Galen

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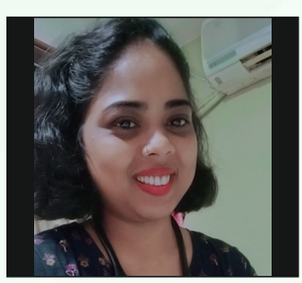

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Thanks Note

Corona Warriors

"Worrying doesn't make any difference but working does."

As we know that in 2019–2020 corona virus pandemic is upending life on a global level at that time as a healthcare professional, Pharmacists played a positive role during the pandemic, they worked in the hospital pharmacies and provided a pharmaceutical care to COVID-19 patients. Moreover, they also provide reliable information regarding prevention, detection and treatment to manage the corona virus infection. During this time community Pharmacist played very important role, they came in front line of treatment and reduced the burden on the healthcare system. They have played various roles in supporting the healthcare system by delivering medications to patients, performing consultations on minor alignments, clarifying misconception about COVID-19 treatments and contributing to COVID-19 screening. Hospital pharmacists have been part of the COVID-19 efforts and their roles include management of drug shortages, development of treatment protocols, participation of patient's rounds, interpretation of lab results for COVID-19, participant recruitments for clinical trials, exploration of new drugs and medication management advice.

We are thankful all those entire pharmacist (scientist) who worked day night and discovered the vaccine which break down the chain of corona virus inflation and finally save the whole world from this deadly disease. Pharmacists also played a major role in the implementation and distribution of the COVID-19 vaccine. At the same pharmacists gave ordered and administered the COVID-19 vaccine.

Pharmacists have not stopped working as frontline workers and they should be recognized as such because they put their own health, families, and most importantly their own lives at risk; the least we can do is appreciate their efforts and thank them for being our Nation's guiding light in the face of this adversity.

Let us be grateful to the Pharmacist who work hard to safe our Nation and entire World in this Pandemic

"Hats off to all Pharmacist"

Article 1:

Malaria & its Medicines (History and Development)

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Key words: Malaria, P. falciparum, P. vivax, antimalarial

Malaria remains one of the precarious (deadliest) infectious diseases worldwide and still a major health issue in many developing countries, tropical and subtropical parts of the world. It's important to recognize that, although some countries have been successful in stamping out malaria, we are still a very long way from malaria eradication (elimination of malaria in all parts of the world).This is a serious and sometimes life threatening disease which is caused by parasites (the genus Plasmodium which is transmitted by the bite of infected female Anopheles mosquitoes). There are 5 parasite species that cause malaria in humans, and two of these species P. falciparum and P. vivax have the greatest threat of malaria. Malaria is a preventable and treatable disease but it stills a huge problem because of drug resistance. In fact the word "malaria" actually comes from the Italian means "bad airs" .It was not derived until the 1880s and 1890s that Alphonse Laveran, Ronald Ross, Battista Grassi, and others were able to identify the malaria parasite and link the transmission of malaria to mosquitoes. Although the understanding of the mosquito cycle leads to a number of new approaches in vector control in the early 20th century. Early 20th century, traditional drugs were used to treat malaria; in the early 1600s Infusions of Cinchona bark provided the first effective cure for malaria and was used widely for centuries. Infusions of Cinchona bark were the only effective antimalarial treatment until its active component, quinine, was isolated in 1820. Attempts to synthesize quinine chemically were unsuccessful but new synthetic antimalarials based on structural elements of quinine were pioneered by German chemists in the early twentieth century.

In 1934, German scientist discovered a substitute for quinine, led to synthesis of Resochin (Chloroquine) and Sontochin (3-methyl-chloroquine).These compounds belonged to a new class of antimalarials , the four-amino quinolines. During the World war II- a pyrimidine derivative, Proguanil, also emerged from the antimalarial pipeline but resistance appeared quickly within one year in case of proguanil so, for increasing the efficacy and preventing it from resistance, Sulfones and sulfonamides were then combined with proguanil (pyrimethamine). In 1972, Artemisinin was isolated by Chinese scientists' from Artemisia annua also known as sweet wormwood.

Artemisinin and other aetemether-group drugs has been a very potent and effective antimalarial drug, especially when used in combination with other malaria medicines. However, in 2009, evidence of resistance to artemisinin based therapy (ACT) was reported. Resistance to antimalarials continues to be a serious problem and drove much of the drug discovery in the twentieth century.

Current antimalarial therapy recommends combinations of drugs over single-agent therapy to slow drug resistance. Though different measures are being used to restrain malaria, but no single prevention is adequate to deal with the problem of malaria. According to WHO, in 2020, there were an estimated 241 million new cases of malaria and 627 000 malaria-related deaths in 85 countries. Constituting new ideas and tools in different fields including vector control interventions, improved diagnostics and potent antimalarial medicines is essential to achieve global eradication targets. The Ministry of Health and Family welfare, Govt. of India in February 2016, launched the national framework for Malaria Elimination 2016-2030 and the National Strategic Plan for Malaria Elimination 2017-2022 in July 2017.India has a vision of a malaria free country. National Center for Vector Borne Diseases Control is the nodal centre for implementing the programmes for malaria elimination.

World Malaria day is celebrated every year on 25th September to raise the awareness about the disease malaria that how to control it and new innovation to eradicate it completely. The theme for World Malaria Day 2022 is “harness innovation to reduce the malaria disease burden and save lives” WHO (World health organization) is calling for investments and innovation that bring new vector control approaches, diagnostics, antimalarial medicines and other tools to speed the pace of progress against malaria because progress has slowed or stalled in recent years, particularly in high burden countries in sub-Saharan Africa.

Recent Innovation in the field of Malaria disease

In October 2021, World Health Organization recommended the broad use of the RTS, S malaria vaccine for young children living in areas with moderate and high malaria transmission. World Health Organization conducted a pilot programme in Ghana, Kenya and Malawi, Evidence and experience from the programme has shown that the vaccine is safe, feasible to deliver and protected from life threatening Malaria disease. Over one million African children protected by first malaria vaccine.

Article 2:

Thalidomide: The Tragedy of Birth Defect

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Keywords: Thalidomide, Glutamic acid, Teratogenicity, Chiral molecule,Antiangiogenic properties,Myeloma cells

Thalidomide, first launched in 1957 by a West German company, Grunenthal, was marketed as a sedative to a sleepless (a drug that is used for making people feel calm or to help them sleep) post-World War Europe. However currently it is used to treat a skin condition and various cancer diseases. Creating new substances first and then attempting to find a possible use for them was a common approach in the pharmaceutical industry at that time. Grünenthal registered a patent for Thalidomide in the same year. With today's knowledge of Thalidomide's side effects, it may be difficult to understand why the product was allowed to be sold at all. It is important to explain that knowledge about the safety of products and medical products was not as far advanced in the 1950s and 1960s as it is today. There were no guidelines in Germany for the development, production, and marketing of pharmaceuticals as we know them today. Procedures for authorizing and monitoring medicines in their current form were only established after the Thalidomide tragedy. In which all new drugs molecules (Investigational New drug) passed through preclinical stages undergo various stages of clinical trials. Clinical trials have been typically carried out into four phases (I, II, III and IV). In addition to this, recently phase 0 has been added.

Just after discovery of this medicine someone accidentally discovered that the drug also cures nausea. Soon the medicine began to be prescribed to pregnant women all over the world for morning sickness. The babies of these women were, tragically, born with congenital deformities, primarily shortened or completely absent limbs. The manufacturers, apparently, failed to detect harmful effects in their studies on rats and mice—high doses, the company claimed, did not kill. Thalidomide, a chiral molecule (in general is used to describe the object that is non-super posable on its mirror image), naturally occurs in two forms, (R)- thalidomide and (S)- thalidomide, which are enantiomers, or mirror image molecules, of each other. Marketed drug is a mixture of the two forms in equal amounts. Its ability to disrupt growth of the human embryo (teratogenicity: it is the ability of a drug to cause fetal

abnormalities or deformities) is caused by one of the forms. The (R)-form has remedial properties, while the (S)-form is a teratogen, an agent that can cause birth defects. The thalidomide tragedy marked a turning point in toxicity testing, as it prompted United States and international regulatory agencies to develop systematic toxicity testing protocols; the use of thalidomide as a tool in developmental biology led to important discoveries in the biochemical pathways of limb development.

TAWANA WILLIAMS types, eats and braids hair with her feet. She does not have a choice. She entered the world without arms. Williams, born in Wilson, USA, was one of the 12, 000 babies around the world who either died or were born with severe limb defects in the early 1960s— the period that went down in history as the years of thalidomide tragedy.

Thalidomide also has an orphan designation for the treatment for the following:

Graft versus host disease, Mycobacterium infection, severe recurrent aphthous stomatitis, Primary brain malignancies, HIV- associated wasting syndrome, Crohn disease, Kaposi sarcoma, Myelodysplastic syndrome, Hematopoietic stem cell transplantation, Hereditary hemorrhagic telangiectasia*(small, widened blood vessels on the skin.).

Administration-

Dosing of thalidomide is usually given via the oral route with various strengths up to 200 mg tablets for all known treatment indications.

Article 3:

A Brief History of Sulfanilamide Disaster

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Keywords: Sulfanilamide, Elixir, Diethylene Glycol, FDA

Sulfanilamide is a sulfonamide antibacterial drug. Chemically, it is an organic compound comprising of an aniline derivatives with a sulfonamide group. The sulfanilamide disaster of 1937 was one of the worst mass poisoning happenings of the twentieth century. In 1937, there were certain regulations on the development, marketing and release of drugs to the public. Unlike today's strict approval procedures, these drugs do not have to undergo animal testing or undergo toxicity or premarket studies. As a result, a number of diseases appeared most notably, elixir sulfanilamide patients exposed to toxins or ineffective drugs. In the case of elixir sulfanilamide, diethylene glycol (DEG) is the culprit toxin. DEG is a colorless, nearly fragrance-free liquid with a sweet taste usually used in antifreeze solutions and as a solvent in the synthesis of many products.

In this tragedy, company S.E. Massengill used diethylene glycol as a solvent in elixir sulfanilamide. At that time, sulfanilamide was used as an antibacterial drug for the treatment of streptococcal infections. Conversely, sulfanilamide was available only in tablet form. In view of the high demand for liquid formulations of the drug, S.E. Massengill decided to manufacture and distribute its own formulation. The chief pharmacist at S. E. Massengill was Harold Watkins. At that time, pharmaceutical regulations were inadequate and were passed in the Pure Food and Drug Act (1906). Conversely, toxicity studies were not mandatory. When trying to produce a sulfanilamide liquid formulation, Watkins decided to use diethylene glycol as a solvent and raspberry as a flavoring agent. The preparation was to be called Elixir Sulfanilamide (even though the preparation did not have alcohol and theoretically did not constitute an “elixir”).

Watkins was unaware that DEG is toxic to humans, although there are known cases of toxicity, and studies published a few years ago concluded that DEG is a highly nephrotoxic drug (later also found as a neurotoxic) that should be avoided in humans. However, in September 1937, the elixir sulfonamide was still distributed nationwide. By mid-October, there were growing reports of an increase in hospitalizations and deaths due to consumption. The American

Medical Association informed the Food and Drug Administration (FDA) of these stories and efforts were made to alleviate any potential or future damage. Drug recalls were instigated. In spite of these efforts, 105 patients died.

The sulfa disaster caused great public outrage. As a result, Congress passed the Food, Drug, and Cosmetic Act (1938), which required drug makers to conduct efficacy and safety studies, including animal testing. The outcomes of these studies must be surrender to as part of a New Drug Application, where the FDA determines if the medicine has been shown to be safe and effective in the treatment of a given condition before post marketing study of any new drug in clinical trial. This act requires drug makers to raise their standards to the next level to prevent the risk of any avoidable toxic reactions in the future. S. E. Massengill persistent to operate as a family-owned pharmaceutical company. In 1971, the company was assimilated by Beecham Group which itself fused into SmithKline Beecham in 1989 and, since 2000, merged into GlaxoSmithKline.

Article 4:

A Brief History of Vaccine

Author Name: Dr. Neeraj S. Thakur
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Keywords: Oral polio vaccine Variola virus, Vaccine, orthopoxvirus

Pathogens of viral origin produced a large variety of infectious diseases in livestock. It is essential to establish the best practices in animal care and an efficient way to stop and prevent infectious diseases that impacts animal husbandry. Vaccination's fundamental concept is to utilize particular antigens, either endogenous or exogenous to induce immunity against the antigens or cells. In light of how past emerging and reemerging infectious diseases and pandemics were handled, examining the vaccination methods and technological platforms utilized for the animals may provide some useful insights. Vaccine is a biological preparation that provides active acquired immunity to particular infectious diseases.

More lives have been saved by vaccines than by any other medical discoveries. Individuals have been exposed to healthy people to smallpox since the 15th century. This method is known as variolation (after the French term for smallpox, "la variole"), and it has been used to try to avoid sickness in many regions of the world. Benjamin Jesty achieved success in 1774 in testing his claim that exposure to the human-transmissible cowpox virus may shield a person against the smallpox. English physician Edward Jenner immunizes 8-year-old James Phipps with material taken from a cowpox sore on a milkmaid's hand in May 1796. Phipps experienced a local response and was ill for a few days, but he fully recovered. Jenner inoculates Phipps with material from human smallpox sore two months later. Phipps was in excellent condition and received the smallpox vaccine for the first time. The smallpox (it’s an acute contagious disease caused by the Variola virus*, a member of the orthopoxvirus* family) vaccine, the first vaccine ever made, was developed by British physician and scientist Edward Jenner (17 May 1749–26 January 1833) who helped to pioneer the idea of vaccinations. Variola vaccine, the name Jenner coined to describe cowpox (a skin disease caused by a virus belonging to the Orthopoxvirus genus.), is where the phrases vaccine and vaccination stem form.

Later on, the word "vaccine" is derived from the Latin word for cow, “vacca”. Despite suffering from a stroke and losing two of his children to typhoid in

1872, Louis Pasteur develops the first vaccine made in a lab—the vaccination for fowl cholera in chickens. Through post-exposure vaccination, Louis Pasteur effectively prevents rabies in 1885. The effectiveness of the pertussis (whooping cough) vaccine is demonstrated in 1939 by bacteriologists Pearl Kendrick and Grace Eldering. The research demonstrates that immunization lowers the risk of illness in youngsters from 15.1 per 100 to 2.3 per 100. The first influenza vaccine is authorized for use in the military by 1945, and it is authorized for civilian use in 1946. Jonas Salk created the first successful polio vaccine between 1952 and 1955. Salk tested the vaccine on himself and his family. By 1960, Albert Sabin's discovered second polio vaccine. The live-attenuated (using the virus in weakened form) vaccine developed by Sabin may be administered orally, as drops, or as a sugar cube. Czechoslovakia becomes the first country in the world to eliminate polio.

The jet injector*(it is a type of medical injecting syringe device used for a method of drug delivery) was used by the United States CDC staff* (Centers for Disease Control and Prevention) in the campaign in west and central Africa and later in Brazil. Far more effective was an invention by Ben Rubin of Wyeth Laboratories, smallpox programme- the bifurcated needle* (is a narrow steel rod, approximately 5 cm (2 in) long with two prongs at one end. It was designed to hold one dose of reconstituted freeze-dried smallpox vaccine between its prongs) dipped into a vial of reconstituted vaccine, it held a dose between its prongs. After this had been deposited on the skin 15 vertical pricks with the bifurcated needle through the droplet discovered a successful vaccination.

Genetic engineering, proteomics, and other advanced technologies have aided in implementing novel vaccine theories. Subunit vaccines, recombinant vaccines, DNA vaccines, and vectored vaccines are increasingly gaining scientific and public attention as the next generation of vaccines and are being seen as viable replacements to conventional vaccines.

Note: This information was collected from various available sources enclosed in the reference section.[1–8]

References:

1. A Brief History of Afrofuturism — Google Arts & Culture. https://artsandculture.google.com/story/a-brief-history-of-afrofuturism/mQWxEn3Q8NmCRg?hl=en. Accessed 9 Aug 2022

2. Anon. (2020) A brief history of vaccination. In: Immun. Advis. Cent. https://www.who.int/news-room/spotlight/history-of-vaccination/a-brief-history-of-vaccination. Accessed 9 Aug 2022

3. Edward Jenner — Google Arts & Culture. https://artsandculture.google.com/entity/edward-jenner/m02ljb?hl=en. Accessed 9 Aug 2022

4. Riedel S (2005) Edward Jenner and the History of Smallpox and Vaccination. Baylor Univ Med Cent Proc 18:21–25. https://doi.org/10.1080/08998280.2005.11928028

5. Edward Jenner's Birthday Archives - AMMI. https://ammi.ca/en/tag/edward-jenners-birthday/. Accessed 9 Aug 2022

6. Baxby D (1999) Edward Jenner's inquiry; a bicentenary analysis. Vaccine 17:301–307. https://doi.org/10.1016/S0264-410X(98)00207-2

7. John Hunter letter to Edward Jenner, 1791 December 10. http://dla.library.upenn.edu/dla/pacscl/detail.html?id=PACSCL_CPP_MSS416USUSPPCP. Accessed 9 Aug 2022

8. Fox R (2004) Oxford Dictionary of National Biography, online. Oxford University Press, Oxford

Article 5:

Brief History of Sir Alexander Fleming

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Keywords: Antibiotic, Penicillin, Alexander Fleming, Microorganism

Antibiotic played a vital role in human life from ancient time to till now and we can definitely say that without antibiotic it is very challenging to live in this earth. The term antibiotic was first time used in 1942 (Selman Waksman); it is any substance produce by a microorganism that inhibits the growth of other microorganisms. Discovery of antibiotic (penicillin) is one of the best examples of serendipity. Penicillin was discovered accidentally when Alexander Fleming inoculated several culture plates with S. aureus and kept the plates sidewise on one corner of the table before going to holiday. After coming from holiday he and co-worker examined the culture plates, and found one plate with an open lid and the culture contaminated with a blue-green mould. Interestingly in the contaminated plate the bacteria around the fungi did not grow, while in other bacteria grew generally, meaning that these fungi inhibit the growth of bacteria.

Alexander Fleming was born in Scotland on 6 August 1881 and died in London, England on 11 March 1955. He was a Scottish bacteriologist known for discovering penicillin. Fleming had brilliance for practical originality and innovative observation. His research on wound infections and lysozyme, an antibacterial enzyme found in tears and saliva, guarantees their place in the history of bacteriology. However, penicillin was invented in 1928 that laid the foundation for the antibiotic revolution that laid the foundation for his lasting reputation. In 1945, he was awarded the Nobel Prize in Physiology or Medicine along with Howard Walter Flory (An Australian pathologist) and Ernst Boris Chain (a German-born British biochemist), both of whom received isolated and purified penicillin.

In his family he was the seventh of eight children of a Scottish hill farmer. His country's education in south-west Scotland enhanced his ability to perceive and appreciate the natural world from an early age. He began his elementary education in Loudoun moor, and then moved to a large school in Dawel before entering Kilmarnock College in 1894.He moved to London in 1895to live with his elder brother Thomas and completed his basic schooling at Regent Street Polytechnic. Fleming worked as a delivery boy for some time after that he began his medical studies at St. Mary’s Hospital Medical School in

1901, funded by a scholarship and a support from his uncle. There he won the gold medal for the top medical student at the University of London in 1908. After completion of study initially, his goal was to become a surgeon, but he was offered a temporary position in the laboratory of the immunization department at St Mary's Hospital. Here he changed his goals and entered a new field of bacteriology.

Among 1909 and 1914 Fleming renowned an efficacious private practice as a venereologist (it is the branch of medicine related with venereal diseases).He married in 1915 with Sarah Marion McElroy (an Irish nurse). During World War I, Fleming had a commission in the Royal Army Medical Corps and worked as a bacteriologist learning wound contagions in a laboratory that Wright had set up in a military hospital housed in a casino in Boulogne, France. There, they confirmed that the use of strong antiseptic on wounds does more harm than good and supports keeping wounds moderately clean with a mild saline solution. Fleming returned to St. Mary's after the war and was promoted to assistant director of the Department of Immunization. Later in 1946, he became head of the department, which was renamed the Wright-Fleming Institute.

Antibiotics are among the most commonly recommended treatments in modern medicine. Today, over 100 diverse antibiotics are available to cure minor and severe infections. In last 100 years antibiotics have extremely transformed current medicine and prolonged the average human lifecycle by 23 years. The future of antibiotic discovery looking more bright as new technologies such as genome mining and editing are arrayedto discover new therapeutic compound with diverse bioactivities. In the current state of antibiotic progression, presently around 50 drugs are going through the clinical trials pipeline, including several new classes with novel modes of action that are in phase 3 clinical trials.

Novel Drug Approved by FDA for 2022

No.	Drug Name	Active Ingredient	FDA-approved use on approval date*
1	Rolvedon	Eflapegrastim	To decrease the incidence of infection in patients with non-myeloid malignancies receiving myelosuppressive anti-cancer drugs associated with clinically significant incidence of febrile neutropenia
2	Sotyktu	Deucravacitinib	To treat moderate-to-severe plaque psoriasis
3	Daxxify	Daxibotulinumtoixn A-lanm	To treat moderate-to-severe glabellar lines associated with corrugator and/or procerus muscle activity
4	Spevigo	spesolimab-sbzo	To treat generalized pustular psoriasis flares
5	Xenpozyme	Olipudase alfa	To treat Acid Sphingomyelinase Deficiency Press Release
6	Amvuttra	Vutrisiran	To treat polyneuropathy of hereditary transthyretin-mediated amyloidosis
7	Vtama	Tapinarof	To treat plaque psoriasis
8	Mounjaro	Tirzepatide	To improve blood sugar control in diabetes, in addition to diet and exercise Press Release
9	Voquezna	vonoprazan, amoxicillin, and clarithromycin	To treat *Helicobacter pylori* infection
10	Camzyos	Mavacamten	To treat certain classes of obstructive hypertrophic cardiomyopathy
11	Vivjoa	Oteseconazole	To reduce the incidence of recurrent vulvovaginal candidiasis (RVVC) in females with a history of RVVC who are not of reproductive potential
12	Pluvicto	lutetium (177Lu) vipivotidetetraxetan	To treat prostate-specific membrane antigen-positive metastatic castration-resistant prostate cancer following other therapies
13	Opdualag	nivolumab and relatlimab-rmbw	To treat unresectable or metastatic melanoma
14	Ztalmy	Ganaxolone	To treat seizures in cyclin-dependent kinase-like 5 deficiency disorder
15	Vonjo	Pacritinib	To treat intermediate or high-risk primary or secondary myelofibrosis in adults with low platelets
16	Pyrukynd	Mitapivat	To treat hemolytic anemia in pyruvate kinase deficiency
17	Enjaymo	sutimlimab-jome	To decrease the need for red blood cell transfusion due to hemolysis in cold agglutinin disease
18	Vabysmo	faricimab-svoa	To treat neovascular (wet) aged-related macular degeneration and diabetic macular edema
19	Kimmtrak	tebentafusp-tebn	To treat unresectable or metastatic uveal melanoma
20	Cibinqo	Abrocitinib	To treat refractory, moderate-to-severe atopic dermatitis
21	Quviviq	Daridorexant	To treat insomnia

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About Sagar Group and SIPTec

Sagar group came into existence in the year 1983 under the visionary leadership of Chairman Shri Sudhir Kumar Agrawal. Over the years, it has now transformed into one of the largest corporate house and business conglomerate of Central India. In its journey of over three decades, the group has successfully ventured in the field of education, real estate, production and manufacturing to employ 5000+ people and impact lives of more than two lakh people every day. **Sagar Group** has been felicitated with IBC24 Excellence Award 2017 for its contribution to Madhya Pradesh's Industrial Development and Incredible Societal Development. **Agrawal Builders** have established its presence as one of the leading Real Estate giants with over 39 years of rich experience in building state-of-art residential projects. **Sagar Manufacturers Pvt Ltd** has pledged to use the best fibers to produce superior quality yarns with the world-class production technology. In a short span of time the company has achieved an installed capacity of 2,00,000 spindles and exporting its products to over 20+ countries. **Sagar Nutriments Pvt Ltd** is **Sagar Group's** recent venture in food processing premium quality basmati rice.

Sagar Group has earned a lot of praise across the nation empowering youth of Madhya Pradesh with a bright career and life. The group provides world class school and technical education under **Sagar Group of Institutions** to 20000+ students with 2000+ dedicated faculties. The group imparts schooling through the chain of **Sagar Public Schools (SPS)** to nurture the young mind. Today, SPS is considered as the most preferred brand forholistic education and Indian Value System to its core featuring amongst the **Top 100 schools in India** with its campuses at **Saket Nagar, Gandhi Nagar, Rohit Nagar, Ratibad, Katara Extension and Dwarka Dham. Sagar Group of Institutions** are engaged in providing the best technical education in the field of engineering, pharmacy, and management.

Sagar Institute of Pharmacy and Technology (SIPTec) is the premier institution known for its high standards in teaching and research in pharmaceutical sciences. SIPTec was established in 2008. The Institute is also registered under CPCSEA. Today, within a short span of 14 years, the institute has gained a reputation of being one of the **top Pharmacy Colleges in MP** that provides total pharmaceutical education comprising B.Pharm. and M.Pharm. (Pharmaceutics& Pharmaceutical Chemistry).

Next Theme:
EMPLOYMENT OPPORTUNITY IN INDIA

Deadline for article submissions:
15 November 2022, 05:00 PM, Tuesday