



BANSAL COLLEGE OF PHARMACY BHOPAL NEWSLETTER

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Pharmacy : Present and Future



LATE SHRI K. C. BANSAL
(Jan. 1936 – Aug. 2007)

"Yesterday is but a dream, tomorrow but a vision. But today well lived, makes every yesterday a dream of happiness and every tomorrow a vision of hope."

Every year, Bansal Group of Institutes celebrates its Founder's Day on 3rd January to mark the birthday, renew the commitment and realize the vision of our founder Late Shri K.C.Bansal.



Prof. A K Pathak

Former Head of the Department,
Department of Pharmaceutical Sciences
Barkatullah University, Bhopal MP.

The Pharmacy Education was started in India in 1932 at Banaras Hindu Vishwa vidhyalaya, By Prof M.L. Schroff, who is known as Father of Pharmacy Education in India.

Prof ML Schroff was born 6th March 1902 at Darbhanga in Bihar. he has started Pharmaceutical Chemistry as the main subject in the B.Sc. and after two-year B.Sc course in Pharmaceutical Chemistry, Pharmacy, and Pharmacognosy. After that he has started three-year B.Pharm. course at BHU.

Today, India has gained immense importance and carved a niche for itself in the pharmaceutical domain. In fact, it has emerged as a big mart for the pharmaceutical industry. Formulations, bulk drugs, generics, Novel Drug Delivery Systems, New Chemical Entities, or Biotechnology, etc. Indian companies are dominating in the marketplace which was traditionally manned by MNC.

In economic terms, the pharmacy sector has experienced significant growth during the past two decades, and world wide pharma revenue totaled 1.42 trillion U.S. dollars in 2021 i.e. from 300 billion in 2001 to 1.42 trillion US dollars in 2021 is excellent growth. The pharmaceutical industry is responsible for the research, development, production, and distribution of medications. The sector continues to grow however, with growing time, the adaptations in the sector are relatively low which has to be looked into very seriously.

In 1930, in Calcutta the first pharmaceutical company called Bengal Chemicals and Pharmaceutical Works, which still is today as one of 5 government-owned drug manufacturers was started.

The multiple outbreaks of diseases and public health crisis which has affected millions across the globe and pharma has always shared huge responsibility with the healthcare fraternity and has worked tirelessly to curb the spread of the disease. These unprecedented times demand the unusual roles of pharmacists to overcome to the challenges and strategize accordingly.

Similarly in COVID 19 outbreak have led o the public healthcare crises and pharmacists had a vital role to play as members of the health care team by ensuring individuals identified as having the disease are isolated and by providing recommendations on how individuals can safely and effectively protect themselves to mitigate transmission, Overall, the role of pharmacists is crucial when discussing immunizations and related, effective strategies to maintaining safe, healthy lifestyles.

According to the Indian Economic Survey 2021, the domestic market is expected to grow 3x in the next decade. India's domestic pharmaceutical market stood at US\$ 42 billion in 2021 and is likely to reach US\$ 65 billion by 2024 and further expand to reach US\$ 120-130 billion by 2030. Low cost of production and R&D boosts efficiency of Indian pharma companies, leading to competitive exports. Indian drug & pharmaceutical exports stood at US\$ 24.60 billion in FUS\$ 24.44 billion in FY21. With pandemic, India has emerged as one of the major hub for production and supply of drugs. The opportunity which lies ahead in the pharmacy sector includes the following:

The education system also thus need to realign itself in accordance with the need and emergence of the sector, however, the present education system still is going with old traditional curriculums and focuses. The education system is not moving with the present and future needs of the Pharma sector.

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Er. Sunil Bansal
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Prof. Ankit Gour

BIOMARKERS: OPPORTUNITIES AND CHALLENGES FOR DRUG & DEVELOPMENT IN THE CURRENT REGULATORY LANDSCAPE

"Biomarkers are widely used at every stage of drug discovery and development. Utilisation of biomarkers has a potential to make drug discovery, development and approval processes more efficient. An overview of the current global regulatory landscape is presented in this article with particular emphasis on the validation and qualification of biomarkers, as well as legal framework for companion diagnostics. Furthermore, this article shows how the number of approved drugs with at least 1 biomarker used during development (biomarker acceptance) is affected by the recent advances in the biomarker regulations. More than half of analysed approvals were supported by biomarker data and there has been a slight increase in acceptance of biomarkers in recent years, even though the growth is not continuous. For certain pharmacotherapeutic groups, approvals with biomarkers are more common than without. Examples include immunosuppressants, immunostimulants, drugs used in diabetes, antithrombotic drugs, antineoplastic agents and antivirals.

A biomarker is a dynamic and informational biological substance (i.e., cellular, biochemical, molecular, genetic, protein, metabolite, specific post-translational modification or physiological or physical sign) that can be objectively measured and evaluated as an indicator of normal biological process, pathogenic processes and its progression or the pharmacologic responses to a therapeutic intervention. Generally, biomarkers are categorised as molecular, imaging (PET, MRI and CT) and psychometric biomarkers (e.g., loss of memory to predict Alzheimer's disease (AD)). Many different biomarkers can be discovered and developed in various stages of drug development. FDA pharmacogenomics guidance further defines possible, probable and known valid biomarker categories depending on available scientific information on the marker. For example, clinical end point biomarkers are defined as those with a characteristic or variable that reflects how a patient feels, functions or survives, whereas surrogate end point biomarkers are intended to substitute for a clinical end point (e.g., regulatory decisions). Therefore, the designation of a 'surrogate end point' requires registration with regulatory authorities. Relatively few biomarkers are surrogate endpoints (e.g., FDA has permitted the use of HIV 'viral' load as surrogacy for AIDS7. A surrogate endpoint is expected to predict clinical outcomes (benefit or harm, or lack of benefit) based on epidemiologic, therapeutic, pathophysiologic or other scientific evidence. Although earlier discussions on the use of biomarkers in drug development has emphasised the use of biomarkers as surrogate end points for effectiveness, most applications of new biomarkers may not involve surrogacy (e.g., prediction of drug safety)"



Ms. Anushree Jyotishi
Assistant Professor
Bansal College of Pharmacy
Bhopal

New Approved Drug in 2020 by FDA

S. No.	Drug Name	Active Ingredient	Approval Date	FDA-approved use on approval date*	Company Name	Dosage form; ROA	Dose
1.	Ayvakit	Avapritinib	09.01.2020	To treat adults with unresectable or metastatic gastrointestinal stromal tumor (GIST)	BLUEPRINT MEDICINES	TABLET; ORAL	100 mg
2.	Zeposia	ozanimod	25.03.2020	To treat relapsing forms of multiple sclerosis	CELGENE INTL	CAPSULE; ORAL	EQ 0.23MG BASE
3.	Isturisa	Osilodrostat	06.03.2020	To treat adults with Cushing's disease who either cannot undergo pituitary gland surgery or have undergone the surgery but still have the disease	RECORDATI RARE	TABLET; ORAL	EQ 1mg 5mg 10mg
4.	Nurtec ODT	Rimengepant sulphate	27.02.2020	To treat migraine	BIOHAVEN IRELAND	TABLET, ORALLY DISINTEGRATING; ORAL	Eq 75 mg base
5.	Retevmo	selpercatinib	08.05.2020	To treat lung and thyroid cancers	LOXO ONCOL ELI LILLY	CAPSULE; ORAL	40mg, 80mg

VISION & MISSION



VISION

We will provide an unparalleled experience to budding pharmacist as the most trusted college.

To improve the overall well-being of a budding pharmacist by providing the best education through hybrid learning, clinical practice and research.



MISSION

STUDENTS EVENTS



EDUCATIONAL VISIT TO INTERNATIONAL HERBAL FAIR (DECEMBER 21, 2022)

An educational visit was organized for B.Pharm 1st year students on 21st Dec 2022 to International Herbal Fair, at Lal Pared Ground, Bhopal.

The Herbal Fair was organized by MP State Minor Forest Produce (Trade & Development) Cooperative Federation Limited.

About 300 stalls were set up at the fair. Students visited various stalls and got knowledge about Herbal medicines, equipment, techniques used in the formulation of Herbal drugs and traditional uses of herbs. They also visited exhibitions arranged by various districts of MP by Forest Departments.

The visit was coordinated by Prof. Mamta Yadav, Prof. Anushree Jyotishi, Prof. Dr. Dhanraj Patidar and Prof. Ankit Gour (Assistant Professors, Bansal College of Pharmacy). Students had enjoyed a lot.

The annual fair started in 2001 and was organized in the last years. It is held every year to promote sale of herbal products and aims at socio-economic uplift of tribals, forest dwellers and others involved in the business. Free of cost diagnosis by authorized Ayurveda experts was available at the fair.

STUDENTS AWARDED IN NATIONAL CONFERENCE (NOVEMBER 13, 2022)

The students of Bansal College of Pharmacy, Bhopal (MP) were attended National Seminar 'Resinnovative-2' on innovation in the field of applied and Pharmaceutical sciences. It was organised under the joint aegis of Scan Research Laboratory, Innovare Academic Science at Madhya Pradesh Council of Science and Technology (MPCST). VC SP Vyas (Sagar), spoke on the present inventions and future possibilities and on relation between science and spirituality.

CS Verma (RD, AICTE) threw light on the new innovation and how it helped in generating employment. Dr. Satish Nayak, Principal, Bansal College of Pharmacy Awarded by Excellence Academics and Administration in the conference.

Scientific poster and oral presentation was also organized to know the recent development in pharmacy research for researchers and scientists working in the field of healthcare across the country. About 12 students presented their poster and got the prize and Certificate. Student who were presented poster are Ms. Vanshika Badkun, Mr. Vasu Mishra and Ms. Shruti Jain from B.Pharm Vth Semester and from B.Pharm IIIrd semester student were Mr. Suraj Gupta, Mr. Ujjawal Pandey, Mr. Vivek Dviwedi and Mr. Sachin Singh



EDUCATIONAL VISIT AT MODERN LABORATORIES, INDORE (NOVEMBER 11, 2022)

An Industrial visit was organized for B.Pharm VIIth Semester, students on 11th November 2022 to Modern laboratory Indore. Modern Laboratories WHO-GMP, and ISO 9001-2008 certified manufacturing plant is based in the central India part at INDORE, (M.P. state). With a remarkable 40 plus years of experience serving throughout India as well as in other countries, we are one of the most trusted Pharmaceutical manufacturing organizations in India. Emense support provided by Modern laboratory Director – Dr. Anil Kharia and Faculty Coordinator Dr. Kiriti Malviya.

Students visited premises and got knowledge about Manufacturing of formulations like parenteral, tablet, capsule, ophthalmics and GMPs. The visit was coordinated by Prof. Manish Sahu and Prof. Saurabh Singh and (Assistant Professors, Bansal College of Pharmacy).

EDUCATIONAL VISIT TO INDIRA GANDHI RASHTRIYA MANAV SANGRAHALAYA. (JULY 23, 2022)

An educational visit was organized for B.Pharm Vth Semester students on 23rd July 2022 to Indira Gandhi Rashtriya Manav Sangrahalaya. Indira Gandhi Rashtriya Manav Sangrahalaya (IGRMS) or National Museum of Humankind or Museum of Man is an anthropology museum located in Bhopal to present an integrated story of the Evolution of man and culture with special reference to India. This museum depicts the story of mankind in time and space. Students visited and got knowledge about Evolution of man and culture. The visit was coordinated by Prof. Mamta Yadav and Prof. Anil Prajapati (assistant professors, Bansal College of Pharmacy). Total No of Student Were 73



BLOOD DONATION CAMP (MAY 17, 2022)

On the occasion of World Hypertension Day, a blood donation camp was organized at Bansal College of Pharmacy in which a large number of students donated blood and made blood donation meaningful. Hypertension Day (Blood Pressure)

WEBINAR ON "IMPORTANCE OF PROFESSION READY TRAINING IN CLINICAL RESEARCH AND PHARMACOVIGILANCE" (NOVEMBER 20, 2021)

Bansal College of Pharmacy has organized a webinar on "Importance of Profession Ready Training in Clinical Research and Pharmacovigilance" on 20th Nov 2021. The expert lecture has delivered by Mr. Vishal Chaudhari Sir, Head of Operations, Clini India. The webinar was inaugurated by Dr. Sanjay Jain, Joint Secretary, Bansal Group of Institute. The welcome address was delivered by Dr. S. Nayak, Principal, Bansal College of Pharmacy. The webinar was coordinated by Prof. Supriya Sharma, Assistant Professor, Bansal College of Pharmacy.



The Program consisted lecture, interaction between speaker, students and faculties. The speaker, Mr. Vishal Chaudhari, has interacted with students and made them aware of how to develop skills sets for getting jobs in Clinical research, Importance of Pharmacovigilance and how to pursue a career in Pharmacovigilance. The students have exhibited enthusiasm in learning and upgrading their awareness. The purpose of webinar is to enrich knowledge about Clinical Research and Pharmacovigilance.



BANSAL COLLEGE OF PHARMACY ORGANIZED ONLINE NATIONAL SEMINAR ON A "FUTURE SCENARIO OF PHARMACEUTICAL INDUSTRY IN INDIA" (JUNE 6, 2020)

Bansal College of Pharmacy organized online National Seminar on a "Future Scenario of Pharmaceutical Industry in India. Moderator of Event Prof. Prof. Purnima Tripathi started the events by welcome of our Dignities. Dr. S Nayak Director of Bansal College of Pharmacy, Convener of the Seminar welcomed the guests and delegates. The Speaker of the event was Dr. Subhash Pandey Ex. Service President QA. Total No. of Participant were:88. Vote of Thank given By Prof. Rini Thomas.

NATIONAL WORKSHOP ON "HANDLING OF SOME ANALYTICAL INSTRUMENTS (JUNE 8, 2020)

Bansal College of Pharmacy organized 13th Shri K.C. Bansal Memorial National Workshop (virtual) on Handling of Some Analytical Instruments. Theme "Become The Master in operational HPLC" The programme was attended on live by participants including Faculty, Research Scholars, Industry Experts and Students. The Workshop began with a word of appreciation by the respected Principal Dr. S Nayak, Principal, Bansal College of Pharmacy, highlighted the importance of workshop. The programme was inaugurated by Virtual lighting the lamp in Presence of Chief Guest was Dr Sanjay Jain, Joint Secretary, BGI and Guest of Honor Prof. H.B khurasiya Director BIST, Bhopal. Convener of the event was Dr. Satish Nayak. A lucid speech about the purpose of the workshop was delivered by our Subject Expert Prof. Sushil Mahaske. In which, he mentioned that department labs are better equipped.



He also briefed about the new advancements and techniques in the instrumentation field, which has significantly changed the field of research. To become a good scientist, one has to unleash the lab instruments' potential and work on it. Working with the new equipments has to make a radical change so as to save time and money invested in research. Analysis and interpretation of the data derived from the instrument is the most important factor which has to be practised. He finally insisted about the focus of the workshop which is to provide both the theory and practical knowledge of analytical. Organizing Secretary was Prof. Sushil Mahaske. E-Certificate given to all Participant. Coordinator of event was Prof. Rini Thomas.



NATIONAL WEBINAR ON "NOVEL BIOTECHNOLOGICAL APPROACHES ON VACCINE DESIGN.(JULY 15, 2020)

Bansal College of Pharmacy Organized a National Webinar on "Novel Biotechnological Approaches on Vaccine Design. Moderator of Event Prof. Priyanka Singh started the events by the welcome of Dignities. Dr. S. Nayak, Director of Bansal College of Pharmacy, Convener of the Seminar welcomed the guests and delegates. The programme was inaugurated by Virtual lighting the lamp in Presence of the Chief Guest Dr. Sanjay Jain Sir Joint Secretary BGI and Guest of Honor Prof. H.B khurasiya Director BIST, Bhopal, Speaker and Chief Guest of the event was Dr. Umesh K. Jain, Convener, Dr. Satish Nayak, Director, Bansal College of Pharmacy. The coordinator of the webinar was Prof. Priyanka Singh. Total No. of Participait; was 165. E- Certificate is given to all participants.

FACULTY EVENTS



FACULTIES AWARDED IN INTERNATIONAL CONFERENCE AT BANGKOK, THAILAND (DECEMBER 9, 2022)

Faculty members of Bansal College of Pharmacy are not leaving any stone unturned to bring fame for the group, they have represented the group Internationally by participating and presenting the paper at International Conference on **Expanding Multidisciplinary Approaches for Healthcare and Well being** at Bangkok, Thailand held on 8-9 Dec 2022.

The Conference was inaugurated by **Dr. Yannakorn Topron** Chief Executive of the Bangsomboon Sub-district Administrative Organization, and Prime Minister, President

Ms. Rungnapa, President, Thai Industrial Pharmacist Association, **Dr. Pornsak**, Professor, Silpakorn University and Vice-Chairman TIPA. The conference was organized to expand the multidisciplinary approaches by bringing different professionals in one roof and share their research and information, many professionals from different streams and Industries from different countries joined the conference and shared their work. Our Faculties **Dr. Priyanka Singh**, **Prof. Payal Saiju**, **Prof. Mamta Yadav**, **Prof. Purnima Tripathi** from Bansal College of Pharmacy also participated and presented their papers. They were felicitated and awarded. **Dr. Priyanka Singh and Prof. Payal Saiju** is felicitated with **Innovative Researcher Award** for their contribution in research and received research grants from funding agencies, and submitted proposals for grants, and **Prof. Mamta Yadav** felicitated with **Health Care Women Ion** and **Prof. Purnima Tripathi** was felicitated with **Young Scientist Award**.



INDUSTRIAL VISIT OF BANSAL EXTRACTION AND EXPORTS PVT. LTD PLANT, MANDIDEEP (SEPTEMBER 3, 2022)

Bansal College of Pharmacy, Kokta Campus, Bhopal organized an industrial visit of **Bansal Extraction and Exports Pvt. Ltd. Plant, Mandideep** for the final year students of B.Pharm. Main aim of industrial visit is to provide an exposure to students about practical working environment. They also provide students a good opportunity to gain full awareness about practical knowledge.

Industrial Plant Assistant Manager **Mr. Raj Rai** addressed the students and provided valuable information regarding the plant. The students were exposed to a variety of products such as purification of oil, Extraction oil from soyabean seeds and chunks, Different colour variants of oils and identification of oil on the basis of colour, Conveyors, Steam engines, Faculty Member **Prof. Mamta Yadav**, **Prof. Anil Prajapati**, **Prof. Manish Sahu**, **Prof. Sourabh Singh** and Staff member **Mr. Bablesh** accompanied the students on this visit. We are grateful to **Shri Parth Bansal MD BGI** for organizing such visits where platform provided to the students to correlate their theory with practical application in the pharma manufacturing field. This industrial visit help students to better understand the concepts and processes covered during the course.



FACULTIES ATTENDED NATIONAL SEMINAR 'RESINNOVATIVE-2' (NOVEMBER 13, 2022)

The faculties of **Bansal College of Pharmacy**, Bhopal (MP) were attended National Seminar 'Resinnovative-2' on innovation in the field of applied and Pharmaceutical sciences. It was organised under the joint aegis of Scan Research Laboratory, Innovare Academic Science at Madhya Pradesh Council of Science and Technology (MPCST).

VC SP Vyas (Sagar), spoke on the present inventions and future possibilities and on relation between science and spirituality.

CS Verma (RD, AICTE) threw light on the new innovation and how it helped in generating employment. **Dr. Satish Nayak, Principal, Bansal College of Pharmacy** Awarded by Excellence Academics and Administration in the conference





MOU WITH SCAN RESEARCH LAB AND R B SCIENCE BHOPAL (JULY 16, 2022)

Bansal College of Pharmacy has signed **MoU** with Scan Research Lab and R B Science Bhopal, on collaborating Professional training, loaded with technical expertise insight to the Pharmacy students of Bansal College of Pharmacy, who will be the future pharmacists of the leading innovation in the industry. The program started with Saraswati Poojan followed by welcome of the guests by a bunch of flowers. **Dr. Sanjay Jain Jt. Sec.** BGI highlighted the importance of collaboration in the form of MOU. This Memorandum of Understanding (**MoU**) will help promote great academic objectives, make students industry-ready, and improve technical skills through training. The MoU will also support placements for the students of Bansal College of Pharmacy, Bhopal.

The MoU was signed in the presence of **Dr. Sanjay Jain** Joint Secretary BGI, **Dr. Satish Nayak** Director of Bansal College of Pharmacy, **Mr. Prabhat Jain**, (Director, Scan Research Laboratories), **Dr. Richa Mishra**, (Director, R B Science Laboratories), **Mr. Brijeshkumar Mishra** (CEO R B Science). All staff and a huge number of students were attended. The Program was coordinated by **Dr. Priyanka Singh**.

It is a day initiated by the League, itself a grouping of organizations of 85 national hypertension societies and leagues. The day was started to raise awareness about high blood pressure.

At Bansal College of Pharmacy, various programs were organized from time to time to increase the awareness of the students and the society. In the same series, a blood donation camp was organized on this day, in which a large number of students, teachers and staff donated their responsibility towards the society by donating blood. **Shri Parth Bansal, MD, BGI** congratulated all. On this occasion students, **NCC and NSS cadets** made all the arrangements.



EMINENT FACULTY AWARD WAS GIVEN BY INDIAN PHARMACEUTICAL ASSOCIATION (OCTOBER 2, 2021)

On the occasion of World Pharmacist Day Eminent Principal and Eminent Faculty award was given by Indian Pharmaceutical Association Principal of Bansal College of Pharmacy received Eminent Principal Award and Dr Priyanka Singh, Mr Shobhit Srivastava and Ms Mamta Yadav received the Eminent Associate Professor Award at Hotel Sheraton, Indore. Chairman, BGI, all staff members and Students have extended their congratulations for this.



NATIONAL CONFERENCE IN ASSOCIATION WITH SOCIETY FOR ETHNOPHARMACOLOGY (OCTOBER 14, 2022)

The students and faculties of Bansal College of Pharmacy, Bhopal (MP) were attended the AICTE Sponsored National Conference in Association with Society for Ethnopharmacology (SFE, Bhopal, Local Chapter) on "Biomarkers as Targeted Herbal Drug Discovery" ("High throughput screening methods based on molecular markers for standardization of new drug development process") organized by Truba Institute of Pharmacy, Bhopal on 14-15 Oct 2022. **Dr. S. Nayak, Prof. Smita Jain, Prof. Mamta Yadav and Prof. Rajkumari Lodhi** were actively participated in this program. Scientific poster and oral presentation was also organized to know the recent development in pharmacy research for researchers and scientists working in the field of healthcare across the country.

1. ALEMBIC GETS USFDA NOD FOR GENERIC PAIN-RELIEF MEDICATION

Alembic Pharmaceuticals on Thursday said it has received approval from the US health regulator to market Ketorolac Tromethamine Injection, used to treat moderate to severe pain, in the American market. The company has received final approval from the US Food & Drug Administration (USFDA) for its abbreviated new drug application (ANDA) for Ketorolac Tromethamine Injection In multiple strengths, the drug maker said in a statement.

2. DR REDDY'S LABORATORIES SEES GENERIC REVLIMID, OTHER LAUNCHES TO KEEP US BUSINESS FIRING

Dr. Reddy's Laboratories said it expects the generic version of the immune-modulatory drug Revlimid to make meaningful contributions for the next several quarters in the US market. The Hyderabad-based drug maker on Friday reported its highest ever revenues, largely driven by generic Revlimid launch during the second quarter of FY23, and partly due to favourable Movement of forex rates and rebound of Russian business

3. HPV VACCINE PRODUCTION DELAYED DUE TO COVID FOCUS, WILL START SUPPLY TO THE INDIAN GOVT. IN EARLY 2023: SII

Serum Institute of India (SII) had to defer HPV vaccine production by two years due to the focus on COVID-19 and will start supplying small quantities of the dose to the Indian government in early 2023, a top official has said. Exports will have to wait till 2024, its chief executive Adar Poonawalla told reporters here on Thursday evening, adding that the company has to build a scale of manufacturing to over 150 million for that.

4. GLENMARK PHARMA LAUNCHES DRUG FOR DIABETIC PATIENTS WITH COMORBIDITIES

Glenmark Pharma on Thursday said it has launched a fixed-dose combination for the treatment of diabetes for patients with comorbidities. The Mumbai-based drug maker said it has become the first company to launch Teneligliptin (20mg) + Dapagliflozin (5mg/10mg) fixed-dose combination for the treatment of adult patients with type 2 diabetes. Marketed under the brand name Zita D, it contains Teneligliptin (20mg) + Dapagliflozin (5 mg/10 mg), and must be taken once daily under prescription to improve glycemic condition.

5. US GOVERNMENT TO TEST PFIZER'S PAXLOVID FOR LONG COVID

The US National Institutes of Health's \$1 billion Recover Initiative has picked Pfizer's anti-viral drug Paxlovid as the first treatment it will study in patients with long COVID, organisers of the study said yesterday. The complex medical condition involves more than 200 symptoms ranging from exhaustion and cognitive impairment to pain, fever and heart palpitations that can last for months and even years following a COVID-19 infection.

6. MODERNA COVID VACCINE SALES FORECASTS FALL SHORT FOR 2022, 2023

Moderna cut its 2022 COVID-19 vaccine sales forecast, citing regulatory and production delays, and issued a 2023 outlook for the shots well below Wall Street estimates, and its shares fell as much as nine per cent before recovering. It expects \$4.5 billion to \$5.5 billion in sales from signed COVID vaccine contracts for the next year, while analysts' estimates were at \$9.5 billion.