ACTIVITIES UNDER INDO-FRENCH NODE

Indo-French Liver & Metabolic Disease Network (InFLiMeN)

विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

CEFIPRA

InFLiMeN

Indo-French Liver & Metabolic Disease Network

INSTITUTE OF LIVER & BILIARY SCIENCES

Workshops Report

Vision and Mission of InFliMeN

The Indo-French Node "Liver and Metabolic Disease Network" (InFLiMeN) represents a collaborative initiative between India and France, focusing on research and development in the field of liver and metabolic diseases. The joint research programme is being supported under the aegis of the Department of Science and Technology, Government of India, and the Ministry of Europe and Foreign Affairs, Government of France.

Promoting Indo-French Collaborative Research IFCPAR/CEFIPRA is a model for international collaborative research in advanced areas of science & technology. The primary objective is to enhance and strengthen bilateral scientific cooperation between India and France by providing research grants, organizing workshops, and facilitating networking opportunities for scientists from both countries.

- This network aims to foster scientific exchanges and enhance joint research prjects.
- Expertise of both countries to tackle critical health challenges associated with liver and metabolic disorders.
- InFLiMeN is dedicated to advancing the understanding, diagnosis, and treatment by integrating multidisciplinary approaches and cutting-edge technologies.
- Joint Indo-French Node is to develop a fertile ecosystem in both nations, enabling collaborative efforts to address key issues in translational sciences.
- This collaborative Node aspires to serve like a virtual university & promote development of new products & technologies to benefit people suffering from liver and metabolic diseases.

Inauguration of InFliMeN Node

Date: 4th July, 2024, Thursday

Venue: A.P.J. Abdul Kalam Auditorium, ILBS, New Delhi

Dr. Jitendra Singh Hon'ble Minister of Science & Technology and Earth Sciences, Govt. of India, Inaugurated Indo - French Node "Liver & Metabolic Disease Network (InFLiMeN)" On July 4, 2024 a collaborative consortium initiated by the Institute of Liver and Biliary Sciences (ILBS), India, and The National Institute of Health and Medical Research (INSERM), France. This Node is aspires to serve like a virtual university & promote development of new products & technologies to benefit people suffering from liver and metabolic diseases.

The node objectives and activities were presented by Dr Shiv Kumar Sarin, Director & Chancellor, Institute of Liver & Biliary Sciences, New Delhi and his team. From the French Side Dr Richard Moreau, Senior Scientist, Inserm Centre de Recherche sur l'Inflammation CRI Dr Christian Boitard Professor, Head of the Clinical Immunology & Diabetology Departments of Necker-Enfants Malades, Paris.

The initiative will be initially supported for three years from the Department of Science & Technology, Ministry of Science, Government of India, and the Ministry for Europe & Foreign Affairs, Government of France, through CEFIPRA.

OBJECTIVES AND AIMS

- To develop a collective vision and expertise in cutting-edge diagnostic tests and products for liver and metabolic diseases.
- To engage Indian and French investigators and start-ups in collaborative research.
- To develop innovative technologies.
- To initiate training and skill development.

Thematic areas:

- Metabolic diseases: Novel biomarkers and therapies
- Early diagnosis of infections in liver diseases
- New POC tests Improving intestinal barrier in liver diseases
- Fecal microbiota transplantation-protocols and products
- Interventions in liver diseases
- Liver cancer & cancer vaccines
- Liver-on-chip, humanized animals microfluidic devices, point-of-care tests.
- Animal models of hepatic and metabolic diseases

- Bio-artificial liver & liver regeneration
- Artificial Intelligence, Machine Learning and Computer Vision
- Clinical trials & product development

Planned Activities for the Year

The consortium has planned several key activities each year, including :

- Virtual meetings held four times per year (two from each country).
- Exchange programs involving 15-day exchange visits for clinicians, scientists, and students.
- Skill exchange and project and product development
- In-person meetings with stakeholders, alternating between India and France (two per year).

Workshop

on

“Diagnostic Pointofcare (PoC) tools; Microfluidics, Lateral Flow Assays and Cellfree DNA”

Organizing Committees

Chief Patrons

Prof. Shiv Kumar Sarin

(Chancellor & Director, ILBS)

Coordinators

Dr. Richard Moreu

Dr. Nirupama Trehanpati

Scientific Program

9:00 – 9:15	Registration	
9:15 - 9:20	Lamp Lighting	
9:20 - 9:25	Welcome Address:- Dr. S.K. Sarin Chancellor and Director, ILBS	
9:25 - 9:30	Address by Vice Chancellor:- Dr. Deepak Tempe	
9:30 - 10:00	Key note Speaker :- Dr. N.K. Ganguly Chairperson:-Dr. Shiv.K. Sarin, Dr. Anoop Saraya	
10:00 AM- 11:00 AM	**Session 1- Microfluidics**	**Chairperson** Dr. Nitin Seth Dr. Vijay Kumar Dr. Manoj Kumar Sharma **Moderators** Dr. Ekta Gupta Dr. Archana Rastogi Dr. Pratibha Kale
	Emerging Diagnostic Technologies for Viral Infections: Impedance Spectroscopy, RT-LAMP and Lateral Flow Assays	-Dr. Shantanu Bhattacharya, Director CSIR-Central Scientific Instruments Organisation (CSIO)
	Miniaturizing the culture vials: Future of in-vitro 3D models for Monitoring Diseases	-Dr. Neetu Singh (Microfluidics), Professor, IIT Delhi
11:00 - 11:15	Tea Break	
11:15 - 12:30	**Session 2- Cell Vaccine and Microfluidics**	**Chairperson** Dr. Meenu Bajpai Dr. Chhagan Bihari **Moderators** Dr. Sukriti Dr. Sherin Thomas Dr. Rajeev Khanna
	Boosting anti-cancer immunotherapy of a cell-free vaccine by "FORTY" fying immunity	-Dr Jayanta Bhattacharyya, IIT, Delhi

	Ultrasensitive detection of different analytes using Microfluidics coupled optical/electronic point-of-care devices.	-Dr. Jaydeep Bhattacharya, Assistant Professor, Jawaharlal Nehru University
12:30 - 1:30	**Round Table Panel Discussion**	**Panelist** Dr. Seema Alam Dr. Vikas Khilan Dr. Nirupama Trehanpati Dr. Rakhi Maiwall Dr. Vinod Arora Panelist
	Applications of LFA and Microfluidics in Clinics and Potential collaborations	
1:30 - 2:15	lunch	
	Session-3 (Cell free DNA)	**Chairperson** Dr. Gayatri Dr. Ankur Jindal **Moderators** Dr. Deepti Sharma Dr. Savneet Dr. Sanal MG Dr. Bikrant Bihari Lal
2:15 - 4:00	Tumor-Informed Circulating Cell Free Nucleic Acid-Based Biomarkers"	-Dr. Ritu Gupta, Professor Oncology, AIIMS, New Delhi
	Role of Circulating tumor DNA in Hapatocellular Carcinoma	-Dr. Jean Charles Nault Centre de -Recherche des Cordeliers Paris, France
	Cell-free DNA based diagnostics and Clinical applications Dr. Sagarika	-Haldar, Associate Professor, PGIMER, Chandigarh
4:00 PM- 5:00	Round Table Panel Discussion	**Panelist** Dr. Ashok Dr. Jaswinder Singh Dr. Anupam Dr. Satender Pal Dr. Anupama Prashar
	Applications of Cell free DNA in Clinics and potential collaborations	
5:00 - 5:30	Closing Ceremony followed by High Tea	

Program Overview

Date: 28th December, 2024, Saturday
Time: 09:00 AM 05:00 PM
Venue: A.P.J. Abdul Kalam Auditorium, ILBS, New Delhi
Registration: Registration for the workshop started sharp at 9:00 am

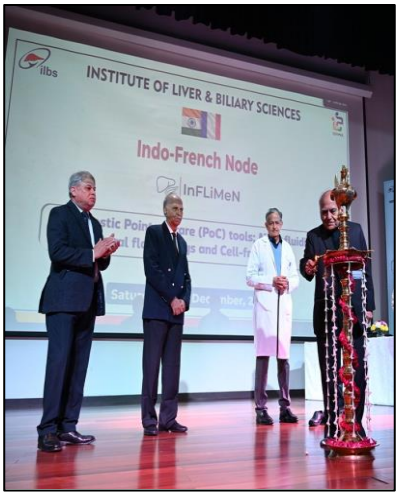
The goal of this workshop was discussion of existing methodologies and tools in Point Of Care (PoC) devices, microfluidics, lateral flow assays and cell free DNA. The Workshop included the following talks in three sessions and two panel discussions.

- Emerging Diagnostic Technologies for Viral Infections: Impedance Spectroscopy, RTLAMP and Lateral Flow Assays
- Miniaturizing the culture vials: Future of invitro 3D models for Monitoring Diseases
- Boosting anticancer immunotherapy of a cell free vaccine by "FORTIfying immunity
- Ultrasensitive detection of different analytes using Microfluidics coupled optical/electronic point of care devices.
- Tumor-Informed Circulating Cell Free Nucleic Acid-Based Biomarkers
- Role of Circulating tumor DNA in Hapatocellular Carcinoma
- Cell-free DNA based diagnostics and Clinical applications

Inauguration of Workshop

Inauguration of workshop was stated with lamp lighting and welcome address by Prof. S.K. Sarin (Chancellor and Director ILBS) and Dr. Deepak Tempe (Vice Chancellor, ILBS). The inauguration was graced in the presence of Dr. N.K Ganguly, Dr. Nirupama Trehanpati, Dr Gayatri Ramakrishna, Dr. Sujata Mohanty, Dr. Arun Kumar Rastogi, Dr. Sukriti and Dr. Shantanu.

Afterwards Prof. S.K. Sarin wished all participants a good and successful workshop.



Keynote Address: *Point Of Care Diagnostics*

Keynote Address was delivered by Dr. N.K. Ganguly (Former Director General ICMR). This session was chaired by Dr. Shiv.K. Sarin and Dr. Anoop Saraya.

Dr. N.K. Ganguly discussed the challenges associated with hepatocellular carcinoma (HCC), highlighting specific situations where tumour biopsy remains irreplaceable despite its limitations, particularly regarding tumour heterogeneity. He elaborated on liquid biopsy analytes, their distinct roles, applications, and limitations. He explained how circulating tumour cells (CTCs) present in various body fluids can be collected as initial samples and discussed their clinical applications, along with the roles of circulating tumour DNA (ctDNA) and exosomes in HCC. Additionally, he provided insights into commercial liquid biopsy platforms for HCC detection and treatment stratification, many of which are based on methylation markers. He highlighted the Liquid Biopsy Episcreen MethylLiver Test platform, designed for modulating gene methylation patterns in HCC. He also shared findings from his cross sectional cohort studies, demonstrating the Episcreen Liver Test's high performance, with 90% specificity in early stage HCC and 93% in latestage cases. Lastly, he explained his work on urine exosomal proteome analysis, identifying significantly deregulated proteins following renal transplantation.

Workshop Sessions 1: Microfluidics

Chairpersons: Dr. Nitin Seth, Dr. Vijay Kumar, Dr. Manoj Kumar Sharma

Moderators: Dr. Ekta Gupta, Dr. Archana Rastogi, Dr. Pratibha Kale

Speaker: Dr. Shantanu Bhattacharya, Director CSIR Central Scientific Instruments Organisation (CSIO)

Emerging Diagnostic Technologies for Viral Infections: Impedance Spectroscopy, RT-LAMP and Lateral Flow Assays

He discussed HCV detection schemes, detailing the use of electrochemical impedance spectroscopy. He explained that an increase in the concentration of bound DNA in a solution leads to a decrease in impedance, allowing for improved charge flow across the electrode. Additionally, he highlighted the development of a dengue detection pointofcare (PoC) device in his laboratory.

Speaker: Dr. Neetu Singh (Microfluidics), Professor, IIT Delhi

Miniaturizing the culture vials: Future of in-vitro 3D models for Monitoring Diseases

She discussed disease monitoring, organ engineering, and novel delivery vehicles. Her presentation covered invitro models, the extracellular matrix, the mechanical properties of human tissues, tissue mimicking, and realtime monitoring of the biochemical environment. She highlighted the use of 3D invitro liver disease platforms for in situ disease staging with fluorescent nanoprobes. Additionally, she showcased a platform for the rapid electrochemical detection of bacterial sepsis in cirrhotic patients.

Workshop Session 2: **Cell Vaccine and Microfluidics**

Chairpersons: Dr. Chhagan Bihari, Dr. Meenu Bajpai

Moderators: Dr. Sukriti, Dr. Dinesh Mani Tripathi, Dr. Sherin Thomas, Dr. Rajeev Khanna

Speaker: Dr Jayanta Bhattacharyya, IIT, Delhi

Boosting anti-cancer immunotherapy of a cell-free vaccine by "FORTY" fying immunity

He discussed the synthesis and characterization of DCderived extracellular vesicles (DeX) from mouse bone marrow progenitor cells. He described the physicochemical characterization of DeX using scanning electron microscopy, western blot analysis, and in vivo studies, explaining how αCD40/DeX can delay melanoma growth in mice.

Additionally, he presented findings showing that the combination of Ecadherin, fibronectin, and vimentin reduces metastatic markers in primary tumors.

Speaker: Dr. Jaydeep Bhattacharya, Assistant Professor, Jawaharlal Nehru

Ultrasensitive detection of different analytes using Microfluidics coupled optical/electronic

He discussed the fabrication of low cost point of care (PoC) devices and the development of affordable technological solutions for diagnostics and therapeutics. He emphasized the creation of innovative, timesaving, and cost effective technologies. He explained the principles of Raman spectroscopy and impedance spectroscopy, highlighting methods such as silver nanostructures based single molecule SERS and a gold nanoparticle based optical sensor for detecting advanced glycation endproducts (AGEs). Additionally, he showcased a microfluidic device designed for singlecell detection.

Round Table Panel Discussion

Applications of LFA and Microfluidics in Clinics and Potential collaborations

Panelist: Dr. Seema Alam, Dr. Vikas Khilan, Dr. Nirupama Trehanpati, Dr. Rakhi Maiwall, Dr. Vinod Arora

***Workshop Session 3* - Cell free DNA**

Chairperson: Dr. Gayatri, Dr. Ankur Jindal

Moderators: Dr. Deepti Sharma, Dr. Savneet, Dr. Sanal MG, Dr. Bikrant Bihari Lal

Speaker: Dr. Ritu Gupta, Professor Oncology, AIIMS, New Delhi

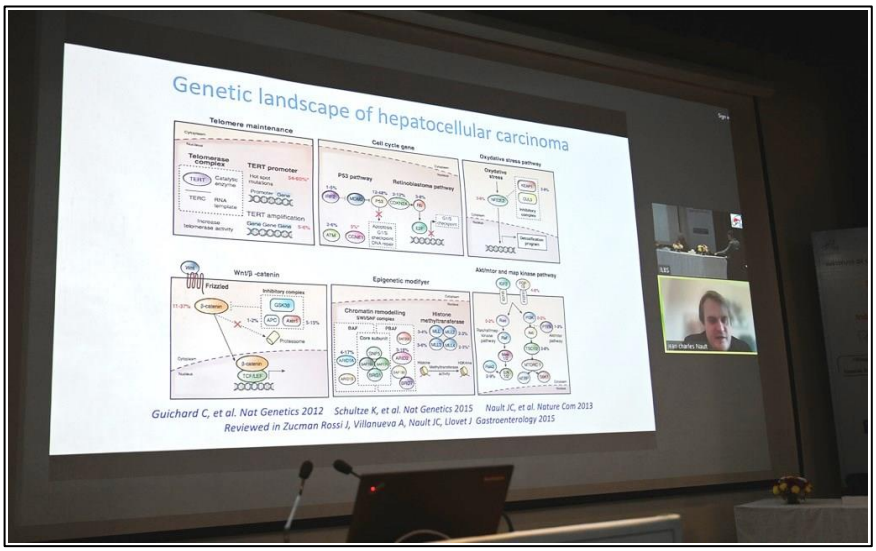
Tumor-Informed Circulating Cell Free Nucleic Acid-Based Biomarkers

She provided an overview of hematological malignancies, focusing on the clinical utility of plasmaderived cellfree DNA for molecular profiling in these conditions. She discussed the early detection of cancer using liquid biopsy methods and presented data from AIIMS on cellfree DNA levels in newly diagnosed multiple myeloma patients. She emphasized that liquid biopsy holds significant potential for assessing residual disease, guiding therapy selection, and monitoring disease progression in acute myeloid leukemia.

Speaker: Dr. Jean Charles Nault Centre de Recherche des Cordeliers Paris, France

Role of Circulating tumor DNA in Hapatocellular Carcinoma

He provided an explanation of hepatocellular carcinoma (HCC) and its genetic landscape, along with the molecular profiling of tumors based on their stage. He discussed circulating tumor DNA (ctDNA), emphasizing its specificity and sensitivity in detection. Additionally, he illustrated the presence of ctDNA in patients undergoing systemic treatments.



Round Table Panel Discussion

Topic: Applications of Cell free DNA in Clinics and potential collaborations

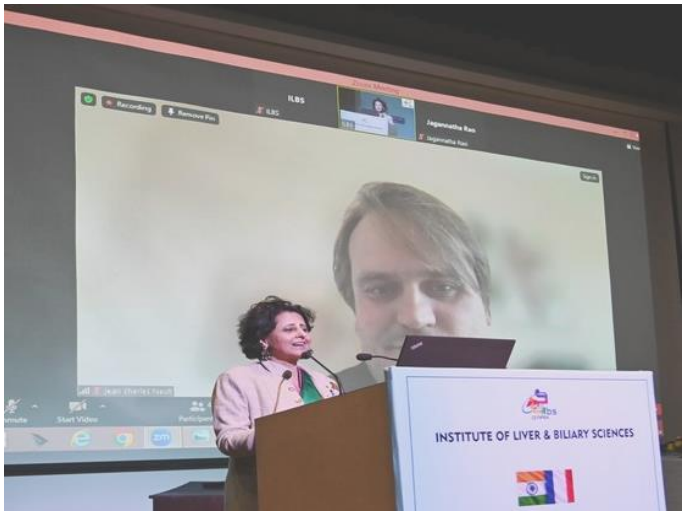
Panelist: Dr. Ashok, Dr. Jaswinder Singh, Dr. Anupam, Dr. Satender Pal, Dr. Anupama Prashar.

Participants

In this workshop 24 faculties, 54 students from different organizations attended the workshop along with speakers.

Closing Ceremony

Dr. Nirupama Trehanpati, Professor and Head Molecular and cellular medicine thanked Dr. Nault, all the delegates, Speakers, Faculties. She officially closed the workshop at 5:00 p.m. The workshop was supported by DST and CEFIPRA.



Workshop

on

“Brain Storming on “Organ on-chip”

A preclinical device for Diagnosis, Drug Discovery & Development

Organizing Committees

Chief Patrons

Prof. Shiv Kumar Sarin

(Chancellor & Director, ILBS)

Co-patron

Prof. U.S.N Murty

(Director, NIPER Guwahati)

Coordinators

Prof. Dr. V.G.M Naidu

Prof. Nirupama Trehanpati

Dr. Saurabh Kumar

Dr. Dinesh Mani Tripathi

Scientific Program

9:00 - 9:30	Registration and Breakfast	
9:30 - 10:00	Lamp lightening and Welcome address by Prof. USN Murty, Director, NIPER Guwahati	
9:20 - 09:25	Welcome Address:- Dr. S.K. Sarin Chancellor and Director, ILBS	
9:25 - 09:30	Address by Vice Chancellor:- Dr. Deepak Tempe	
9:30 - 10:00	Key note Speaker :- Dr. N.K. Ganguly Chairperson:-Dr. Shiv.K. Sarin, Dr. Anoop Saraya	
10:00 - 11:00	**Session 1** **Organ-On-Chip : Proof of Concept to Execution**	**Chairpersons** Prof. Nirupama Trehanpati Prof. V.G.M Naidu Prof. Subash Chandra Gupta
10:00 - 10:45	Microfluidic human physiomimetic liver model as a screening platform for drug induced liver injury	-Prof. Biman B. Mandal, Department of Biosciences and Bioengineering, IIT Guwahati
10:45 - 11:15	Gut on Chip 3D microphysiological disease modeling: from drug development to personalized therapy	-Dr. Subhadeep Roy, Department of Pharmacology & Toxicology, NIPER Kolkata
11:15 - 11:30	**Panel Discussion**	
11:30 - 11:45	Tea Break	
11:45 - 12:30	Keynote Lecture :- “Advanced in-vitro Models: Decoding Biological Mechanisms and Enhancing Therapeutic Screening.”	-Dr Shreyansh Jain Transgene, France
12:30 - 12:45	Address by Prof. Shiv K Sarin, Chancellor and Director, ILBS, New Delhi	
12:45 - 01:30	Keynote Lecture :- "Towards Mimicking Human Body Blood Vessels on a Bioengineered Chip".	-Prof. Suman Chakraborty IIT Kharagpur

1:30 - 2:30	LUNCH	
2:30 – 3:15	**Session-2 (Organoid on Chip)**	**Chairperson** Dr. Dinesh Mani Tripathi Dr. Sanjay Banerjee Dr. Radhakrishnand P
	Spheroid-on-a chip: an innovative technology for drug discovery and development"	-Dr. Emilie Crouchet, France
	Bile Duct on a Chip and its Applications	-Dr. Kapish Gupta IIT Guwahati
3:45 - 04:00	**Panel Discussion**	
	Session 3- (Emerging Technology on Pre-Clinical Devices)	**Chairperson** Dr. Sukriti Baweja Dr. S. Tamilvanan
4:00 - 04:30	Bio Sensors Integrated Devices	-Dr. Saurabh Kumar NIPER Guwahati
4:30 - 05:00	Sensing Devices for Healthcare Industries based on Nanobioengineering Technologies	-Dr. Pranjal Chandra, IIT BHU
5:00 - 5:20	**Panel Discussion and Potential Collaborations**	
5:20 - 5:40	**Closing Ceremony followed by High Tea**	

Program Overview

Date: 12th January, 2025, Sunday
Time: 9:00 AM 5:00 PM
Venue: Auditorium, NIPER Guwahati

The goal of this workshop was to learn the advancements and applications of Organ-on-Chip (OoC) technologies, with a focus on their role in drug discovery, disease modeling, and personalized medicine. The Workshop included the following topics in three sessions and two panel discussions.

1. Microfluidic human physiomimetic liver model as a screening platform for drug induced liver injury.
2. Gut on Chip 3D microphysiological disease modeling: from drug development to personalized therapy.
3. Advanced in-vitro Models: Decoding Biological Mechanisms and Enhancing Therapeutic Screening.
4. Towards Mimicking Human Body Blood Vessels on a Bioengineered Chip
5. Spheroid-on-a chip: an innovative technology for drug discovery and development
6. Bile Duct on a Chip and its Applications
7. Bio Sensors Integrated Devices
8. Sensing Devices for Healthcare Industries based on Nanobioengineering Technologies

Inauguration of Workshop

The Institute of Liver and Biliary Sciences (ILBS) in collaboration with NIPER Guwahati organized, oneday workshop on “Brainstorming session on "Organonchip: A Preclinical Device for Diagnosis, Drug Discovery & Development" on January 12, 2025. The event, held under the IndoFrench Node InFLiMeN at NIPER Guwahati, was graced by the presence of Prof. Shiv Kumar Sarin, Chancellor & Director of ILBS, and Prof. U.S.N. Murthy, Director, NIPER Guwahati. Over 80 registered participants attended the session, along with invited faculty members, departmental faculty, volunteers, and organizers.

Keynote Address

Keynote lecture was delivered by Prof. Suman Chakraborty IIT Kharagpur on "Towards Mimicking Human Body Blood Vessels on a Bioengineered Chip". International collaborator Dr Shreyansh Jain Transgene, from France delivered the keynote lecture “Advanced invitro Models: Decoding Biological Mechanisms and Enhancing Therapeutic Screening.

Workshop Session 1: Organ-On-Chip : Proof of Concept to Execution

Chairpersons: Prof. Nirupama Trehanpati, Prof. V.G.M Naidu, Prof. Subash Chandra Gupta

Speaker: Prof. Biman B. Mandal, Department of Biosciences and Bioengineering, IIT Guwahati

Microfluidic human physiomimetic liver model as a screening platform for drug induced liver injury

He discussed a microfluidic human physiomimetic liver model, designed to replicate the complex architecture and functionality of the human liver. This model serves as an advanced screening platform to assess drug-induced liver injury (DILI), which is one of the leading causes of drug failure in clinical trials. Prof. Mandal discussed the development of this innovative microfluidic model that integrates key physiological characteristics of the liver, such as cellular interactions, fluid dynamics, and metabolic functions. By mimicking the liver's real-world behavior, this model provides a more accurate and reliable testing environment compared to traditional cell culture systems or animal models.

Speaker: Dr. Subhadeep Roy, Department of Pharmacology & Toxicology, NIPER Kolkata

Gut on Chip 3D microphysiological disease modeling: from drug development to personalized therapy

He discussed the use of Gut-on-Chip technology, a 3D microphysiological model designed to mimic the human gut's structure and function. This model allows for disease modeling and drug testing, providing a platform that closely resembles the physiological environment of the human gut. He discussed how these systems can be used to study gastrointestinal diseases and evaluate the efficacy and toxicity of drugs in a more personalized manner.

Post session a panel discussion was organized and potential collaboration for research and joint funding were explored between Prof. Nirupama Trehanpati, Dr. Dinesh Mani Tripathi, Dr. Sukriti Baweja

Workshop Session 2: Organoid on Chip

Chairpersons: Dr. Dinesh Mani Tripathi, Dr. Sanjay Banerjee, Dr. Radhakrishnand P
Speaker: Dr. Emilie Crouchet, France
Spheroid-on-a chip: An innovative technology for drug discovery and development

She discussed the spheroid-on-a-Chip technology, a platform that combines the 3D cell culture model (spheroids) with microfluidic chip technology for drug discovery and development processes. This approach aims to replicate the complexity of human tissues more accurately than traditional 2D cell cultures or animal models, offering a more physiologically relevant environment for drug testing.

Speaker: Dr. Kapish Gupta IIT Guwahati

Bile Duct on a Chip and its Applications.

He discussed the development and potential applications of the Bile Duct on a Chip, a novel microfluidic model designed to replicate the structure and function of the human bile duct. This system simulates the bile duct's complex physiology, providing an in-vitro platform for studying various bile related diseases and conditions such as cholestasis, biliary fibrosis, and gallbladder diseases.

Possible Collaborative projects were discussed with DR. Gupta, Dr. Roy, Dr. Tripathi, Dr. Naidu and Dr. Saurabh.

Workshop Session 3: Emerging Technology on PreClinical Devices

Chairpersons: Dr. Sukriti Baweja, Dr. S. Tamilvanan

Speaker: Dr. Saurabh Kumar NIPER Guwahati

Bio Sensors Integrated Devices

He discussed about Biosensors Integrated Devices, a transformative technology at the intersection of biosensing, microelectronics, and biomedical engineering. These integrated devices combine the sensitivity of biosensors with the versatility of microfluidic platforms, creating a powerful tool for real-time monitoring and analysis of biological processes.

Speaker: Dr. Pranjal Chandra, IIT BHU

Sensing Devices for Healthcare Industries based on Nanobioengineering Technologies

He discussed on the emerging field of Sensing Devices for Healthcare Industries utilizing nanobioengineering technologies. This approach combines the precision of nanotechnology with the biological sensitivity of biosensors, leading to the development of highly efficient and advanced devices for medical diagnostics, monitoring, and therapeutic applications.

Possible collaboration to develop the point of care device was discussed with Pr. Nirupama,Prof. Biman, Prof. Naidu, Dr. Roy, Dr.Sukriti Baweja & Dr. Dinesh

Closing Ceremony

Dr. Nirupama Trehanpati, Professor and Head Molecular and cellular medicine thanked all the delegates, Speakers, Faculties. She officially closed the workshop at 5:40 p.m. followed by Hightea. The workshop was supported by DST and CEFIPRA.

Indo-French Seminar

on

“Novel Approaches in Inflammation, Vaccine Development and Therapeutics in Liver Cancer”

Organizing Committees

Chief Patrons

Prof. Shiv Kumar Sarin

(Chancellor & Director, ILBS)

Prof. Didier Samuel

(Director, Inserm)

Prof. Christian Boitard

(Secretary, National Academy of Medicine)

Patron

Prof. Jessica Zucman Rossi

(Director, CRC)

Prof. Richard Moreau

(Senior Scientist, Inserm)

Coordinators

Prof. Jean Charles Nault (Host)

Prof. Nirupama Trehanpati

Scientific Program

Day1: 28th January, 2025

09:45 – 10:20	Inauguration, Welcome Addresses and Launch of Abstract Book	-Pr Shiv Sarin (ILBS) -Pr Abhay Karandikar (DST Secretary, Govt. Of India) -Pr Jessica Zucman-rossi (Cordeliers Research Center)
	Expectations from Indo French Seminar	-Pr. Didier Samuel (INSERM) (video message) -Pr. Richard Moreau (INSERM) -Mr. Emmanuel Lebrun-Damiens (French Ambassad)
10:20 – 11:40	**Session 1: From chronic liver disease to cancer**	**(Chair: Chantal Desdouets, Tapas Kundu)**
(15 min of presentation + 5 min discussion)	CLIF consortium, description of an European network of research on acute on chronic liver disease	-Richard Moreau (Bichat, INSERM, Centre Recherche Inflammation)
(15 min of presentation + 5 min discussion)	MAIT cells in chronic liver disease	-Sophie Lotezrjtan (Bichat, INSERM, Centre Recherche Inflammation)
(15 min of presentation + 5 min discussion)	Senescence circuitry in end-stage liver disease and the genetics of hepatocellular carcinoma (HCC) in a non-cirrhotic background in indian study	-Gayatri Ramakrishna (ILBS)
(15 min of presentation + 5 min discussion)	Replication stress: A double-edged sword in liver disease.	-Chantal Desdouets (Cordeliers Research Center)
11:40 – 12:00	Tea/Coffee Break	
12:00 – 13:00	**Session 2: Role of microenvironment and oncogene/tumor suppressor in liver carcinogenesis**	**(Chair: Theo Hirsch, Amar Mukund and Jyoti Kodae)**
(15 min of presentation + 5 min discussion)	Proteomic in situ in hepatocellular carcinoma and cholangiocarcinoma	-Valérie Paradis (Beaujon, APHP)
(15 min of presentation +	Role of platelets in HCC	-Chhagan Bihari (ILBS)

5 min discussion)		
(15 min of presentation + 5 min discussion)	Status of immune environment after therapy in HCC patients: ILBS Pilot study data	-Nirupma Trehanpati (ILBS)
13:00 – 14:00	Group Picture following by Lunch	
14:00 – 15:30	**Session 3: Refining clinical management of patients with hepatocellular carcinoma**	**(Chair : Dominique Thabut, Vinod Arora)**
(15 min of presentation, discussion at the end with all the speakers)	Neoadjuvant treatment for HCC	-Pierre Nahon (Avicenne, APHP)
(15 min of presentation, discussion at the end with all the speakers)	First "Make in India" CAR-T cell therapy: from RnD to clinic to Market	-Rahul Purwar (IIT, Bombay)
(15 min of presentation, discussion at the end with all the speakers)	Hepatocellular carcinoma developed on alcohol related liver disease: epidemiology and clinical features	-Nathalie Ganne-Carrié (Avicenne, APHP)
(15 min of presentation, discussion at the end with all the speakers)0	Portal hypertension and liver carcinogenesis: from pathophysiology to implications in clinical practice	-Manon Allaire (Pitié-Salpêtrière, APHP)
Discussion among all the speakers (30 min)		
15:30 – 16:00	Tea/Coffee Break	
16:00 – 17:00	**Session 4: Role of immune system in liver carcinogenesis**	**(Chair: Sabrina Sidali, Nirupama Trehanpati)**
(15 min of presentation + 5 min discussion)	Deciphering the determinants of liver tumors mutated for beta-catenin signalling	-Angelique Gougelet (Cordeliers Research Center)
(15 min of presentation + 5 min discussion)	Dynamics of liver tumor immune microenvironment and challenges of immunotherapy for better patient	-Jyoti Anand Kode (ACTREC)

	management	
(15 min of presentation + 5 min discussion)	Real world data with immunotherapy in Indian population	-Dr Vinod Arora (ILBS)
17:00 – 17:30	**Session 5: Opportunities for collaboration**	**Panel discussion (30 min)**

Day2: 29th January, 2025

9:00 – 10:30	**Session 1: Genomic and artificial intelligence in primary liver cancer**	**(Chair: Jessica Zucman Rossi, Gayatri Ramakrishna and Dinesh Tripathy)**
(15 min of presentation + 5 min discussion)	Cell plasticity in hepatoblastoma and resistance to chemotherapy	-Theo Hirsch (Cordeliers Research Center)
(15 min of presentation + 5 min discussion)	EBB2 and KRAS alterations mediate response to EGFR inhibitors in early-stage gallbladder cancer	-Amit Dutt (Depart of Genetics,UDSC)
(15 min of presentation + 5 min discussion)	Artificial Intelligence for HCC	-Harsh Vardhan Tevethia (ILBS)
(15 min of presentation + 5 min discussion)	Opportunities and Pitfall of translation of AI in clinical practice	-Julien Calderaro (Mondor, APHP)
10h30 – 11h00	Tea/Coffee Break (Club Room)	
11:00 – 12:00	**Session 2: Preclinical models to study liver carcinogenesis**	**(Chair: Angelique Gougelet, ChhaganBihari and Lynda Thomas)**
(15 min of presentation + 5 min discussion)	2D and 3D preclinical models to identify new therapeutic targets in hepatocellular carcinoma and hepatoblastoma	-Sandra Rebouissou (Cordeliers Research Center)
(15 min of presentation + 5 min discussion)	Human physiomimetic liver on chip model as drug screening platform for HCC	-Dinesh Mani Tripathy (ILBS)

(15 min of presentation + 5 min discussion)	Bioengineering 3D liver cancer tissue models using tissue engineering approaches – challenges and future perspectives in scaffold development	-Lynda V Thomas (SCTIMST)
12:00 – 13:00	Lunch	
13:00 – 14:30	**Session 3: Innovation in management of patients with hepatocellular carcinoma from surgery to systemic treatments**	**(Chair: Pierre Nahon, Harsh Vardhan Tevethia)**
(15 min of presentation, discussion at the end with all the speakers)	The future of surgical Management of hepatocellular carcinoma	-Eric Vibert (Paul Brousse, APHP)
(15 min of presentation, discussion at the end with all the speakers)	Advanced HCC - can IR play a role in its management	-Amar Mukund (ILBS)
(15 min of presentation, discussion at the end with all the speakers)	Drugs targeting Chromatin Remodellers in HCC	-Tapas Kundu (JNCASR)
(15 min of presentation, discussion at the end with all the speakers)	Precision medicine in hepatocellular carcinoma: preliminary results of The French Medicine Genomic experience	-Jean-Charles Nault (Cordeliers Research Center)
Discussion among all the speakers (30 min)		
14:30 – 15:00	**Session 4: Opportunities for collaboration**	**Panel discussion (30 min)**
15:00 – 15:30	Closing Ceremony	(Cordeliers Research Center) - Pr Shiv Sarin (ILBS) - Pr Jessica Zucman-Rossi

Program Overview

Date: 28th & 29th Jan, 2025, Tuesday & Wednesday

Time: 9:00 AM 5:30 PM

Venue: Centre De recherche des Cordeliers, Paris, France

The goal of this seminar was to discuss and learn complex mechanisms underlying liver carcinogenesis, from chronic liver disease to cancer, and to advance understanding of how the liver's microenvironment and key molecular factors contribute to tumor formation and progression from both Indian and French perspectives, fostering international collaboration to address challenges in liver cancer research and treatment.

The two day long seminar included the following talks in five sessions on first day and four sessions on second day.

Day1 - 28th Jan 2025

1. CLIF consortium, description of an European network of research on acute on chronic liver disease
2. MAIT cells in chronic liver disease
3. Senescence circuitry in end-stage liver disease and the genetics of hepatocellular carcinoma (HCC) in a non-cirrhotic background in indian study
4. Replication stress: A double-edged sword in liver disease
5. Proteomic in situ in hepatocellular carcinoma and Cholangiocarcinoma
6. Proteomic in situ in hepatocellular carcinoma and cholangiocarcinoma
7. Role of platelets in HCC
8. Status of immune environment after therapy in HCC patients: ILBS Pilot study data
9. Neoadjuvant treatment for HCC
10. First “Make in India” CAR-T cell therapy: from RnD to clinic to Market
11. Hepatocellular carcinoma developed on alcohol related liver disease: epidemiology and clinical features
12. Portal hypertension and liver carcinogenesis: from pathophysiology to implications in clinical practice

13. Deciphering the determinants of liver tumors mutated for beta-catenin signalling
14. Dynamics of liver tumor immune microenvironment and challenges of immunotherapy for better patient management
15. Real world data with immunotherapy in Indian population
16. Cell plasticity in hepatoblastoma and resistance to chemotherapy

Day2 - 29th Jan 2025

1. Cell plasticity in hepatoblastoma and resistance to chemotherapy
2. EBB2 and KRAS alterations mediate response to EGFR inhibitors in early-stage gallbladder cancer
3. Artificial Intelligence for HCC
4. Opportunities and Pitfall of translation of AI in clinical practice
5. 2D and 3D preclinical models to identify new therapeutic targets in hepatocellular carcinoma and hepatoblastoma
6. Human physiomimetic liver on chip model as drug screening platform for HCC
7. Bioengineering 3D liver cancer tissue models using tissue engineering approaches – challenges and future perspectives in scaffold development
8. The future of surgical Management of hepatocellular carcinoma
9. Advanced HCC - can IR play a role in its management
10. Drugs targeting Chromatin Remodellers in HCC
11. Precision medicine in hepatocellular carcinoma: preliminary results of The French Medicine Genomic experience

Inauguration of Indo-French Seminar

The inauguration and welcome address of the Indo-French Seminar, delivered by Prof. Shiv Sarin (ILBS), Prof. Abhay Karandikar (DST Secretary, Govt. of India), and Prof. Jessica Zucman-Rossi (Cordeliers Research Center), highlighted the critical role of international collaboration in addressing complex medical challenges such as liver disease and its progression to cancer. The event also highlighted expectations from the IndoFrench Seminar, by Prof. Didier Samuel (INSERM) (via video), Prof. Richard Moreau (INSERM), and Mr. Emmanuel LebrunDamiens, the French Ambassador to India.

Workshop Session 1: From Chronic Liver Disease to Cancer

Chairpersons: Chantal Desdouets, Tapas Kundu

Speaker: Richard Moreau (Bichat, INSERM, Centre Recherche Inflammation)

CLIF consortium, description of an European network of research on acute on chronic liver disease

Prof. Richard Moreau introduced the CLIF Consortium, a European network dedicated to advancing research on acuteonchronic liver disease. His talk highlighted the significance of crossborder research initiatives to understand the complex mechanisms behind acute onchronic liver disease.

Speaker: Sophie Lotezrjtan, Bichat, INSERM, Centre Recherche Inflammation

MAIT cells in chronic liver disease

She discussed the role of MAIT cells in chronic liver disease. These immune cells have emerged as key players in the progression of liver diseases, and her research explores their potential as therapeutic targets. Senescence Circuitry in EndStage Liver Disease and the Genetics of Hepatocellular Carcinoma (HCC) in a NonCirrhotic Background: An Indian Study

Speaker: Dr. Gayatri Ramakrishna, ILBS

Senescence circuitry in end-stage liver disease and the genetics of hepatocellular carcinoma (HCC) in a non-cirrhotic background in indian study

She discussed about senescence circuitry in liver disease and the genetics of hepatocellular carcinoma (HCC), particularly in Indian patients with a noncirrhotic background.

Speaker: Chantal Desdouets, Cordeliers Research Center

Replication stress: A double-edged sword in liver disease

She discussed the complex role of replication stress in liver disease. How replication stress can contribute both to liver disease progression and the development of cancer, acting as a "doubleedged sword" in hepatocellular injury and malignancy.

Workshop Session 2: **Role of microenvironment and oncogene/ tumor suppressor in liver carcinogenesis**

Chairpersons: Theo Hirsch, Amar Mukund and Jyoti Kodae

Speaker: Valérie Paradis, Beaujon, APHP

Proteomic in situ in hepatocellular carcinoma and Cholangiocarcinoma

She discussed about the proteomics in situ, its application to hepatocellular carcinoma (HCC) and cholangiocarcinoma. Proteomic profiling of tumors can provide critical insights into the molecular landscape of these cancers. This approach is instrumental in identifying potential biomarkers for diagnosis and therapeutic targets.

Speaker: Chhagan Bihari, ILBS

Role of platelets in HCC

He discussed the role of platelets in hepatocellular carcinoma (HCC). Platelets are primarily known for their role in blood clotting, platelets play a significant part in tumor progression. Platelets contribute to the growth, metastasis, and resistance to therapy in liver cancer.

Speaker: Nirupma Trehanpati, ILBS

Status of immune environment after therapy in HCC patients: ILBS Pilot study data

She discussed the immune microenvironment in HCC is characterized by significant dysregulation, including increased activation and exhaustion of NKT, NK, and T cell subsets. The identification of specific immune markers, such as elevated LAG-3 expression and upregulation of PD1+ cytotoxic NK cells, may serve as valuable predictive indicators of treatment response to TACE and other therapies.

Workshop Session 3: **Refining clinical management of patients with hepatocellular carcinoma**

Speaker: Pierre Nahon, Avicenne, APHP

Neoadjuvant treatment for HCC

He discussed about neoadjuvant therapies for hepatocellular carcinoma (HCC). Neoadjuvant treatments, including chemotherapy and targeted therapies, are used before surgery to reduce tumor size and improve surgical outcomes.

Speaker: Rahul Purwar, IIT, Bombay

First "Make in India" CAR-T cell therapy: from RnD to clinic to Market

He discussed about the development of CART cell therapy in India, marking a significant achievement in the field of immunotherapy. He discussed the CART cell research from the lab into clinical practice and ultimately into the market.

Speaker: Nathalie Ganne-Carrié, Avicenne, APHP

Hepatocellular carcinoma developed on alcohol related liver disease: epidemiology and clinical features

She discussed about the HCC cases arising in the context of alcohol related liver disease (ALD).

Speaker: Manon Allaire, Pitié-Salpêtrière, APHP

Portal hypertension and liver carcinogenesis: from pathophysiology to implications in clinical practice

She discussed the complex relationship between portal hypertension and liver carcinogenesis, its role in the progression of liver disease to cancer. She explained portal hypertension, a common complication in cirrhotic liver disease, contributes to the development of HCC.

Workshop Session 4: **Role of immune system in liver carcinogenesis**

Chairpersons: Sabrina Sidali, Nirupama Trehanpati

Speaker: Angelique Gougelet, Cordeliers Research Center

Deciphering the determinants of liver tumors mutated for beta-catenin signalling

She discussed the role of betacatenin signaling in the development of liver tumors. Mutations in this pathway are common in hepatocellular carcinoma (HCC), and understanding how these mutations influence tumor progression is crucial for developing targeted therapies.

Speaker: Jyoti Anand Kode, ACTREC

Dynamics of liver tumor immune microenvironment and challenges of immunotherapy for better patient management

She discussed about the complexities of HCC treatment requires a multifaceted approach, combining advanced immunotherapies, localized radiotherapy, and the identification of key immune biomarkers to tailor individualized therapies. The integration of traditional Ayurvedic medicine alongside modern immunotherapy holds promise in enhancing treatment efficacy while minimizing toxicity. With ongoing advancements in immune

profiling and combination therapies, there is potential to significantly improve outcomes for HCC patients, particularly in regions with high disease burden.

Speaker: Dr Vinod Arora, ILBS

Real world data with immunotherapy in Indian population

Dr. Vinod discussed realworld data on the use of immunotherapy in the treatment of liver cancer in the Indian population

Workshop Session 5: Opportunities for collaboration

Panel discussion: The panel discussed about the possible collaborations between Indian and French research institutions.

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Date: 29h Jan, 2025, Wednesday

Time: 9:00 AM 5:30 PM

Venue: Centre De recherche des Cordeliers, Paris, France

Workshop Session 1: Genomic and artificial intelligence in primary liver cancer

Chairpersons: Jessica Zucman Rossi, Gayatri Ramakrishna and Dinesh Tripathy

Speaker: Theo Hirsch, Cordeliers Research Center

Cell plasticity in hepatoblastoma and resistance to chemotherapy

He discussed the cell plasticity in hepatoblastoma, a rare form of liver cancer that primarily. Tumor cells in hepatoblastoma exhibit remarkable plasticity, enabling them to adapt to changing environments, which contributes to chemotherapy resistance.

Speaker: Amit Dutt, Depart of Genetics,UDSC

EBB2 and KRAS alterations mediate response to EGFR inhibitors in early-stage gallbladder cancer

He discussed the role of EBB2 and KRAS gene alterations in early-stage gallbladder cancer. These genetic mutations can significantly affect the response to EGFR inhibitors, a class of drugs used in cancer treatment.

Speaker: Harsh Vardhan Tevethia, ILBS

Artificial Intelligence for HCC

He discusssed the role of artificial intelligence (AI) in hepatocellular carcinoma (HCC), AI algorithms are being developed to assist in early diagnosis, prognostication, and treatment planning for HCC. AI has the potential to analyze complex medical data, such as medical imaging, genetic information, and patient demographics, to improve clinical decision-making.

Speaker: Julien Calderaro, Mondor, APHP

Opportunities and Pitfall of translation of AI in clinical practice

He discussed the opportunities and pitfalls associated with translating AI into routine clinical practice. While AI offers exciting possibilities for improving liver cancer diagnosis and treatment, The challenges related to its implementation, including issues with data quality, the need for large-scale validation studies, and the risk of over-reliance on algorithms without proper human oversight.

Workshop Session 2: Preclinical models to study liver carcinogenesis

Chairpersons: Angelique Gougelet, ChhaganBihari and Lynda Thomas

Speaker: Sandra Rebouissou, Cordeliers Research Center

2D and 3D preclinical models to identify new therapeutic targets in hepatocellular carcinoma and hepatoblastom

She discussed about the development of 2D and 3D preclinical models for studying hepatocellular carcinoma (HCC) and hepatoblastoma. These models are critical for identifying novel therapeutic targets by mimicking the tumor microenvironment more accurately than traditional 2D cell cultures.

Speaker: Dinesh Mani Tripathy, ILBS

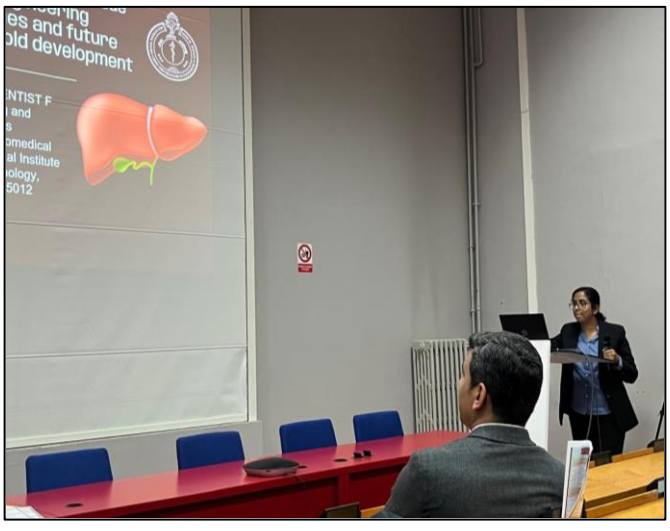
Human physiomimetic liver on chip model as drug screening platform for HCC

He discussed the physiomimetic liver-on-chip model, a tool designed to replicate the liver's functional properties for drug screening purposes. Utilization of this platform to evaluate the efficacy of potential treatments for hepatocellular carcinoma (HCC).

Speaker: Lynda V Thomas, SCTIMST

Bioengineering 3D liver cancer tissue models using tissue engineering approaches – challenges and future perspectives in scaffold development

She discussed about bioengineering 3D liver cancer tissue models using tissue engineering techniques, particularly focusing on the development of scaffolds. These scaffolds provide the necessary structural support for growing liver cancer cells in 3D, allowing for more accurate modeling of tumor behavior and testing of therapeutic interventions.



Workshop Session 3: Innovation in management of patients with hepatocellular carcinoma from surgery to systemic treatments

Chairpersons: Pierre Nahon, Harsh Vardhan Tevethia

Speaker: Eric Vibert, Paul Brousse, APHP

He discussed the various surgical options available, including liver resection and liver transplantation, and emphasized the need for individualized treatment plans based on tumor characteristics, liver function, and patient health.

Speaker: Amar Mukund, ILBS

Advanced HCC - can IR play a role in its management

He discussed the role of interventional radiology (IR) in the management of advanced hepatocellular carcinoma (HCC). He presented on various IR techniques, including transarterial chemoembolization (TACE) and radiofrequency ablation (RFA), as well as emerging approaches such as Y-90 radioembolization.

Speaker: Tapas Kundu, JNCASR

Drugs targeting Chromatin Remodellers in HCC

He discussed the chromatin remodelers as novel therapeutic targets in hepatocellular

carcinoma (HCC), the role of chromatin remodeling proteins in regulating gene expression and their involvement in cancer progression, including the development of HCC. Targeting these proteins to inhibit tumor growth and sensitize cancer cells to treatment. Discussed the potential of epigenetic-based therapies as an adjunct to conventional HCC treatments, which could help overcome drug resistance and improve therapeutic efficacy.

Speaker: Jean-Charles Nault, Cordeliers Research Center

Precision medicine in hepatocellular carcinoma: preliminary results of The French Medicine Genomic experience

He discussed about genomic profiling into the clinical management of HCC, precision medicine is transforming the treatment landscape for HCC patients. Prof. Nault explained how genetic mutations and molecular subtypes of HCC are being used to tailor personalized treatment regimens, improving outcomes and reducing unnecessary side effects.

Workshop Session 4: Opportunities for collaboration

Panel discussion: The panel discussed about the possible collaborations between Indian and French research institutions.