

A training session report on  
**Application of Molecular Tools in Animal  
Disease Diagnosis and Research**

Under STUTI program funded by DST



In association with  
**Indian Institute of Technology, Gandhinagar**  
(Project Management Unit)



Coordinated by

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**11<sup>th</sup> to 17<sup>th</sup> October 2022**

## Acknowledgement

I express sincere gratitude for the encouragement and support received from multiple sources during the execution of this training. First and foremost, I want to express my sincere appreciation to the Department of Science and Technology (DST) and IIT, Gandhinagar, PMU, DST-STUTI for entrusting me with the responsibility to conduct the program. The workshop was conducted on the '*Application of Molecular Tools in Animal Disease Diagnosis and Research*' on the instrument funded by the FIST program ([Sanction No.: SR/FST/LSI-522/2012](#)). I feel privileged to thank **Dr. B C Deka** (Hon'ble Vice Chancellor, Assam Agricultural University, Jorhat) for his unflattering support. My sincere thanks are due to **Dr. B N Saikia** (Dean, Faculty of Veterinary Science, Assam Agricultural University, Khanapara Campus, Guwahati) for his keen interest, constant encouragement, valuable guidance and support in organizing the training. I also extend my sincere thanks are also due to all statutory officers of AAU, Khanapara for the moral support and help. I am pleased to thank **Dr. N N Barman** (Head, Department of Veterinary Microbiology, CVSc, AAU, Khanapara) for his constant supporting attitude, constructive guidance in executing the program. Help and cooperation received from all the faculty members, students and employees of Department of Microbiology are duly acknowledged.

Dr. Durlav Prasad Bora  
Coordinator

## ***Summary***

The goal of this training session was to provide a general overview on the practical aspects of various molecular biology techniques used in Animal disease diagnosis and its developments in molecular biology tools along with the hands on practical knowledge using sophisticated instrumentation techniques among research scholars, faculty, young scientists and industry professionals through a week-long training workshop. The workshop was conducted in the Department of Veterinary Microbiology, College of Veterinary Science, AAU, Khanapara, Guwahati from 11<sup>th</sup> to 17<sup>th</sup> October, 2022 which comprised of lectures and hands on training sessions. This initiative is funded by Department of Science & Technology under the program STUTI (Synergistic Training Program Utilizing the Scientific and Technological Infrastructure). The focus of this workshop was to have a balance between theory and practical training on the equipment and schedule was designed in a way that if a theory session for a topic was organized in morning, the hands-on training session for the same topic was organized in afternoon/evening session. *'Emphasis was given on hands-on use of equipment for demonstration/characterization of sample by each participant for better understanding'*.

## Introduction

The Department of Veterinary Microbiology, College of Veterinary Science, Assam Agricultural University, Khanapara Campus, Guwahati, Assam commenced a week-long DST-FIST-supported training session on topic '*Application of Molecular Tools in Animal Disease and Research*' on its campus for participants from various backgrounds such as Post Graduate, B.Tech., Assistant Professors, Scientists, Post-Doc Fellows, Ph.D. Fellows and Industry persons were invited (**Annex-1**). A total of 31 candidates were selected for the training (**Annex-1 and 2**). The following workshop's activities took place from 11<sup>th</sup> to 17<sup>th</sup> October 2022 (**Annex 3**). This report provides a quick overview of both the lecture and technical sessions.

- Lecture Session

The training programme was commenced with an inaugural session chaired by **Dr. B N Saikia** (Dean, Faculty of Veterinary Science, AAU, Khanapara). **Dr. N.N. Barman** (Head, Department of Veterinary Microbiology) gave a detailed overview on the Endemic and emerging infectious diseases of livestock and poultry. This was followed by **Dr. G.K. Saikia** who gave a light on the importance of livestock disease diagnosis: Molecular approach its reliability and limitation over conventional diagnostic techniques. Further, in another lecture, **Dr. N.N. Barman** gave details on the principles of Microbiological specimen collection, preservation and transport for disease diagnosis. **Dr. D.P. Bora** showed the importance on the Molecular tools for Animal disease diagnosis and research. **Dr. R.K. Sharma** gave a lecture on the Diagnosis of Bacterial diseases: Bacterial demonstration and Molecular confirmation. **Dr. P Borah** (Professor & Head, Department of Animal Biotechnology) gave detailed lecture on application of bio-informatics in animal disease diagnosis and control. In an another lectures various faculties such as, **Dr. Borah** gave detailed discussion on various molecular biology tools like Polymerase chain reaction (PCR), Real time PCR, SDS-PAGE, Immunological diagnostic methods (by **Dr. S. Das**), Virus isolation methods-Cell culture (**Dr. P Deka**), Polymerase spiral reaction (**Dr. L M Buragohain**) etc., were discussed in detail by various experts as per attached schedule.

- Technical Session

The hands-on sessions in the entire training programme were designed to impart all the participants a true practical experience of available molecular and immunological techniques. On the day One, the participants were taken for lab visits of the institutes. From the day **Two to Six** hands on session was commenced with demonstration of collection of clinical specimens from animals and the precautions to be followed while collecting clinical materials from ailing animals. Then different practical sessions on molecular and immunological techniques like PCR, Realtime PCR, ELISA, Cell culture, PSR etc., were conducted where participants also took part and performed the tests. **Day seven** consist of a valedictory session where the participants given certificates and an overview on the aspects of science and technology.

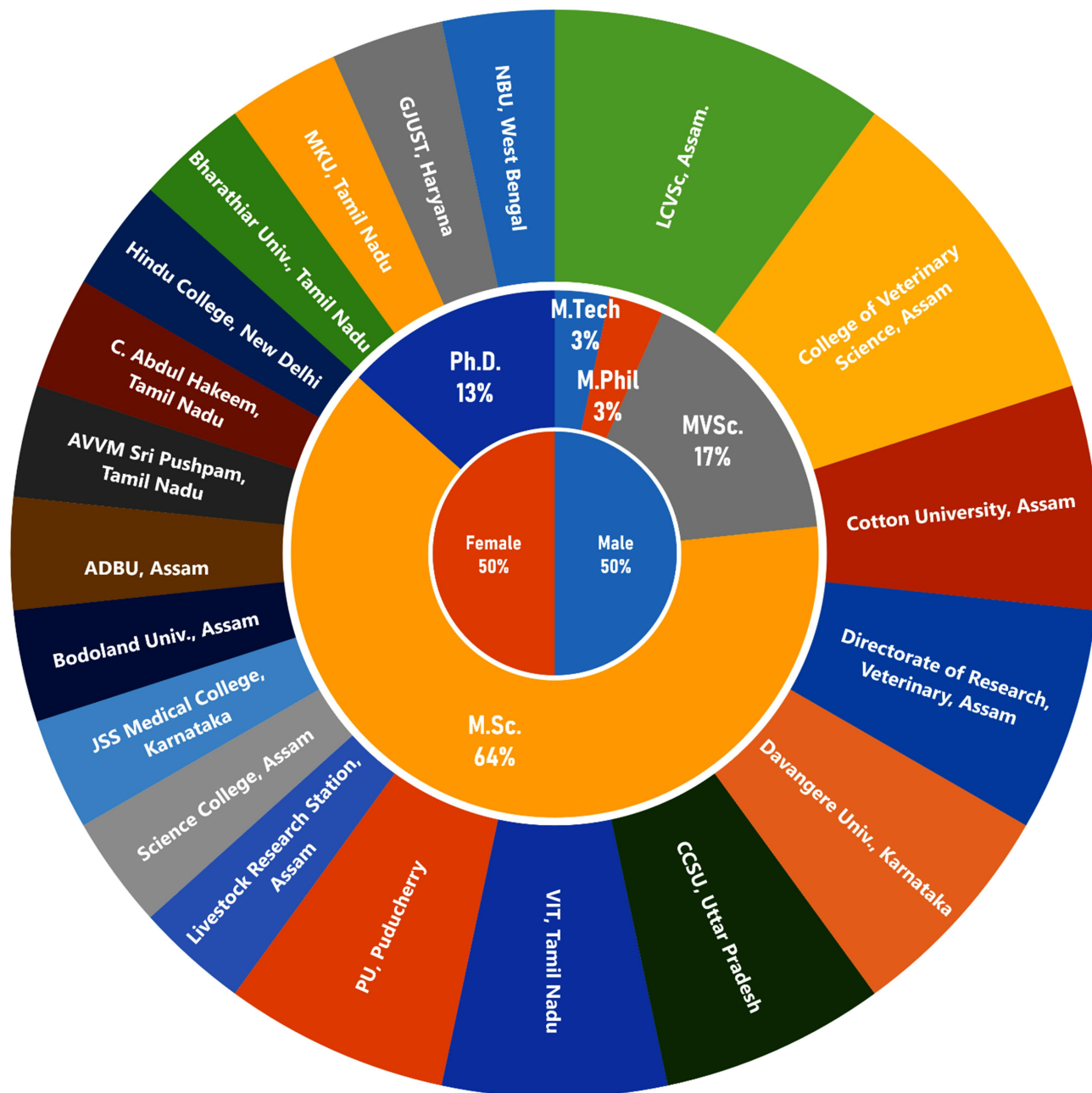
- Types of samples tested

During the hands-on session the participants were showed how to collect clinical specimens from animals with various precautions of infections which may arise during the operating techniques. Special care was taken during these sampling techniques.

## *Outcomes of the Workshop*

The STUTI workshop attracted participants from 16 different institutes throughout the country (**Figure 1**). About 31 participants enrolled and attended the training sessions on ‘*Application of Molecular Tools in Animal Disease Diagnosis and Research*’. The goal of this training event was to bring together participants from different disciplines and facilitate collaborative research through one health approach. Throughout the sessions, participants asked major questions regarding theoretical and practical aspects of molecular biological tools, and their application in research. Finally, the feedback from the participants was considered in the evaluation of the workshop (**Annex-4**). The majority of the participants were pleased with the training session and suggested that more workshops to be conducted in future.





**Figure 1.** Participants registered workshop from different institutes.

## Annexure 1: Brochure for the program

<p><b>About the STUTI Program of DST</b></p> <p>DEPARTMENT OF SCIENCE &amp; TECHNOLOGY (DST) has initiated the STUTI (Synergistic Training program Utilizing the Scientific &amp; Technological Infrastructure) program to impart training on instruments funded through FIST/ PURSE/ CURIE/ SAIF/ SATHI programs of DST. The STUTI program envisions hands-on-training and sensitization of the state-of-the-art equipment as well as towards sharing while ensuring transparent access to S&amp;T facilities.</p>		
<p><b>ABOUT THE INSTITUTE AND DEPARTMENT</b>  <b>College of Veterinary Science, AAU Khanapara:</b>          The College of Veterinary Science, Khanapara, Guwahati, the premier institute of its kind in the North Eastern Region of India, is a constituent college of Assam Agricultural University and has rendered yeoman services in promoting Veterinary education and developing human resources in the entire North Eastern Region and the country as a whole since its inception. The College is 5 km away from Dispur, the Capital of Assam, 12 km from the Garoohati Railway Station and 52 km from the Gauhati Air Port, Borjhar.</p> 	<p><b>Last Date of Registration:-</b>  <b>30<sup>th</sup> Sep. 2022</b>  <b>Intimation of Selection:-</b>  <b>6<sup>th</sup> Oct, 2022</b>  <b>Confirmation by participants:-</b>  <b>8<sup>th</sup> Oct, 2022</b></p>	<p>Department of Science and Technology (DST) funded  <b>7 days Training under STUTI (Synergistic Training program Utilizing the Scientific and Technological Infrastructure)</b></p> <p>ON</p> <p><b>Application of Molecular Tools in Animal Disease Diagnosis and Research</b></p>
<p>The Department of Microbiology, College of Veterinary Science, Assam Agricultural University came into existence from 8th January, 1975 after its bifurcation from erstwhile department of Pathology and Bacteriology in the erstwhile Assam Veterinary College. At present, the Department of Microbiology is a full-fledged leading Department of Assam Agricultural University. There is 13 teaching staff presently working in the Department. With university grant, XAR development grant and grant under different research projects, the Department procured many sophisticated instruments and established separate Bacteriology, Mycology, Immunology, Virology as well as Molecular Biology and Diagnostic laboratories. Now the Department is not only known in the North Eastern Region but also all over India as one of the well developed and advanced Department engaged in teaching and research on microbiology.</p>	<p><b>Contact:</b>  <b>Dr Durlav Prasad Bora, PhD</b>  <b>Asstt. Prof &amp; Coordinator</b>  <b>STUTI Training</b>  <b>Email: <a href="mailto:drdpbora@gmail.com">drdpbora@gmail.com</a></b>  <b><a href="mailto:durlav.bora@aaau.ac.in">durlav.bora@aaau.ac.in</a></b></p> <p><b>Course Content</b></p> <ul style="list-style-type: none"> <li>➤ Extraction of Nucleic Acids From clinical Samples</li> <li>➤ Quality Evaluation of Nucleic Acids by Nano Drop</li> <li>➤ Basics of PCR</li> <li>➤ Real time PCR</li> <li>➤ Application In Disease Diagnosis,</li> <li>➤ Analysis of Real time PCR Results,</li> <li>➤ Application of Molecular Biology tools in Animal Disease Diagnosis,</li> <li>➤ Application Bio-Informatics In Animal Research</li> </ul>	<p><b>11<sup>th</sup> October to 17<sup>th</sup> October, 2022</b></p> 
<p><b>Speakers:</b></p> <p><b>Dr D P Bora, PhD, Assistant Professor of Veterinary Microbiology, CVSc, AAU Khanapara</b>  <b>Dr N N Barman, PhD, Professor &amp; Head, Veterinary Microbiology</b>  <b>Dr P Borah, PhD, Professor &amp; Head, Animal Biotechnology</b>  <b>Dr P Deka Assistant Professor, Veterinary Microbiology</b>  <b>Dr A Ali, PhD, Assistant Professor, Veterinary Microbiology</b>  <b>Dr S M Gogoi, Assistant Professor, Veterinary Microbiology</b></p>		<p><b>Organized by</b></p> <p><b>Department of Veterinary Microbiology</b>  <b>College of Veterinary Science</b>  <b>Assam Agricultural University</b>  <b>Khanapara Campus, Guwahati</b></p>
<p><b>Link for Registration:-</b> <a href="https://forms.gle/bA7B4PUAuLTySZ1p9">https://forms.gle/bA7B4PUAuLTySZ1p9</a>  <b>Eligibility:</b> Post Graduate (Science) or BTech (Technology), Assistant Professors/Scientists/ Post-Doc Fellows/ PhD Fellows/ Industry persons who are actively involved in research and development (R&amp;D)/ Veterinary and Medical officers engaged in diagnostic labs</p>		<p><b>Acknowledgements</b></p> 



## Annexure 2: List of registered participants for the workshop

Sr. No.	Candidate Name	Gender	Educational Qualification	Email address	University/Institute
1	Saurav Kumar Mishra	Male	M.Sc. (Bioinformatics)	rs_sauravm@nbu.ac.in	University of North Bengal, West Bengal
2	Raksha Goswami	Female	M.Sc.(Biotechnology)	swamiraksha83@gmail.com	Pondicherry University, Kalapet, Puducherry
3	Mohini Gautam	Female	M.Sc. (Biotechnology)	mohinigautam129@gmail.com	
4	Nishtha Choudhary	Female	M. Sc. (Biotechnology)	nishtha.choudhary1709@gmail.com	Guru Jambheshwar University, Haryana
5	Saravana Kumaran P.	Male	M.Sc. (Biotechnology)	saravanakumaran106@gmail.com	Madurai Kamaraj University, Tamil Nadu
6	Raja Priya R.	Female	M.Sc.(Biotechnology and Bioinformation)	rajapriyar28@gmail.com	Vellore Institute of Technology, Tamil Nadu
7	Akshay Kisan Mundhe	Male	M.Sc. (Microbiology)	akshaykisanmundhe@gmail.com	
8	J. Subramaniam	Male	Ph.D. (Nanotechnology)	jayapalsubramaniam@gmail.com	Bharathiar University, Tamil Nadu
9	Soni Rani	Female	M.Sc. (Zoology)	sonidubey14@gmail.com	Hindu College, University of Delhi, New Delhi
10	V. Karthick	Male	M.Sc. (Zoology)	karthickshyam01@gmail.com	C. Abdul Hakeem College, Tamil Nadu
11	Amalraj S.	Male	M.Sc. (Botany)	s.amalraj101@gmail.com	A. V. Vandayar Memorial Sri Pushpam College (Autonomous), Tamil Nadu
12	Papiya Das	Female	M. Sc. (Zoology)	papiyadas20000@gmail.com	Assam Don Bosco University, Assam
13	Meghraj Barman	Male	M.Sc. (Zoology)	meghrajbarman2578@gmail.com	Bodoland University, Assam
14	Ruhi Tomar	Female	M.Phil (Zoology)	ruhitomar898@gmail.com	Chaudhary Charan Singh University, Uttar Pradesh
15	Shalu Lamba	Female	M. Sc. (Zoology)	shalulamba84@gmail.com	
16	Prasanna Kumar	Male	M.Sc. (Microbiology)	prasanna.kumarp03@gmail.com	JSS Medical College, Mysuru, Karnataka
17	Poorna Vivek V.	Male	M.Tech (Industrial Biotechnology)	poornavivek25@gmail.com	Davangere University, Karnataka
18	Santhosha B. C.	Male	M.Sc. (Biochemistry)	bcsantha@gmail.com	
19	Miniswring Borgoyary	Male	M.Sc. (Zoology)	bazziborg@gmail.com	Science College Kokrajhar, Assam
20	Mridusmrita Buragohain	Female	MVSc. (Veterinary Pathology)	mridusmrita.buragohain@aau.ac.in	College of Veterinary Science, Khanapara, Guwahati, Assam
21	Raju Deka	Male	MVSc. (Animal Reproduction and Gynaecology)	rajudeka110@gmail.com	
22	Kuntola Roy	Female	MVSc. (Veterinary Parasitology)	drkuntola79@gmail.com	
23	Dipankar Bharali	Male	Ph.D. (Animal Reproduction)	dipankar.bharali@aau.ac.in	Livestock Research Station, Mandira, Assam
24	Dhirashree Choudhury	Female	MVSc. (Veterinary Parasitology)	dhirashree.choudhury@gmail.com	LCVSc, Joyhing, North Lakhimpur, Assam.
25	Snigdha Hazarika	Female	MVSc. (Veterinary Pharmacology)	snigdha89@aau.ac.in	
26	Chandan kumar Gautam	Male	Ph.D. (Veterinary Anatomy)	drckgautam26@aau.ac.in	
27	Lucky Tamuli	Female	M.Sc. (Biotechnology)	ltamuli30@gmail.com	Directorate of Research, Veterinary, Assam
28	Mihir Sarma	Male	Ph.D. (Poultry Science)	mihir.sarma@aau.ac.in	
29	Deepshikha Goswami	Female	M.Sc. (Molecular Biology and Bioinformation)	goswamideeps09@gmail.com	Cotton university, Assam
30	Aditi Kalita	Female	M.Sc. (Molecular biology and Biotechnology)	aditi12.at@gmail.com	

### Annexure 3: Schedule date and activities during the workshop

Day / date	Sl no	Time	Topic of lecture/practical
Day 1 (11/10/2022)	1	8:30-9:30	Registration of participants
	2	9:30-11:00	Inaugural session
	3	11:00-12:00	Endemic and emerging infectious diseases of livestock and poultry: an overview (Theory)
	4	12:00-1:00	Importance of livestock disease diagnosis: Molecular approach, its reliability and limitation over conventional diagnostic techniques (Theory)
		1:00 – 2:00	LUNCH
	5	2:00-3:00	Principles of Microbiological specimen collection, preservation and transport for disease diagnosis (Theory/Practical)
		3:00-3:15	TEA BREAK
	6	3:15-5:15	Hands-on-demonstration on collection, preservation and transport of samples for detection of Microbial pathogens (Practical)
	7	10:00-11:00	Molecular tools for Animal disease diagnosis and research (Theory)
		11:00-11:15	TEA BREAK
Day 2 (12/10/2022)	8	11:15-1:00	Diagnosis of Bacterial diseases: Bacterial demonstration and Molecular confirmation
		1:00-2:00	LUNCH
	9	2:00-4:30	Principles of extraction of Nucleic acids by different methods, their quantification and trouble shooting (Theory/Practical)
	10	10:00-11:00	Application of bioinformatics in animal disease diagnosis and control (Theory)
	11:00-11:15	TEA BREAK	
Day 3 (13/10/2022)	11	11:30-12:30	Polymerase chain reaction: From invention to present application in disease diagnosis
		1:00-2:00	LUNCH
	12	2:00-5:00	Bioinformatics Practical
	13	10:00-11:00	Overview of Real time PCR and its application (Theory)
		11:00-11:15	TEA BREAK
Day 4 (14/10/2022)	14	11:15-12:15	Application of serological methods in disease diagnosis
	15	12:15-1:00	Isolation of animal and avian viruses in different host systems (Theory)
		1:00-2:00	LUNCH
	16	2:00-5:00	Hands-on training on detection and assay of antibody by different ELISA
Day 5 (15/10/2022)	17	10:00-11:00	Anti-microbial resistance: Molecular approach for confirmation and containment of MDR phenomenon (Theory)
		11:00-11:15	TEA BREAK
	18	11:15-12:15	PSR: A user friendly molecular tool for Disease Diagnosis
	19	12:15-1:00	Practical demonstration on PSR
		1:00-2:00	LUNCH
	20	2:00-3:15	Hands-on-practical on Real time PCR
		3:15-3:30	TEA BREAK
	3:30-5:00	Multiplex RT-PCR	
<b>16th Oct Field visit</b>	<b>Day 6</b>	<b>SUNDAY</b>	
Day 7 (17/10/2022)	22	10:00-11:00	One health approach for containment and control of zoonotic diseases (Theory)
		11:00-11:15	TEA BREAK
	23	11:15-1:00	Hands-on-training on Cell culture
		1:00-2:00	LUNCH
	24	2:00-3:00	Interactive session and Feedback from Participants
	25	3:00-4:30	Valedictory Session

## Annexure 4: Feedback summary

Sr. No	Content	% Rating
1	Overall grading of the program with reference to relevance of course, module/ content etc.	98% Rated on or above 8 points
2	Overall grading of the facilities provided by the institute, i.e., Hostel, Mess, Classrooms, Transport/infrastructure etc.	99% Rated on or above 8 points
3	Overall grading of the faculty members conducting the training	97% Rated on or above 8 points
4	How do you rate the overall training methodology	98% Rated on or above 8 points
5	How far the field visit is relevant and related to your research study	99% Rated on or above 8 points
6	Usefulness of this training in your current role	98% Rated on or above 8 points
7	Usefulness of this training in future work/job you may handle	98% Rated on or above 8 points
8	How far have you benefitted from interaction with the fellow participants of the training	97% Rated on or above 8 points
9	How far the course material supplied relevant and related to the training curriculum	95% Rated on or above 8 points
10	Overall grading of the process of training	96% Rated on or above 8 points
11	Your recommendation to your peers/ colleagues for the training Program	98% Rated on or above 8 points