

**SUMMER TEACHERS' WORKSHOP ON
RECOMBINANT PROTEINS: EXPRESSION, PURIFICATION,
CHARACTERIZATION**

**JULY 2-16, 2019
VENUE: UNIVERSITY OF DELHI SOUTH CAMPUS**

**COORDINATOR: Prof. V. K. CHAUDHARY
CONVENOR: Dr. AMITA GUPTA**

**WORKSHOP PARTNERS: WIPRO GE HEALTHCARE Pvt.
Ltd.**





Recombinant Proteins: Expression, Purification, Characterization

2 July - 16 July, 2019

University of Delhi South Campus



This course introduces applicants to the principles and practice of recombinant protein expression and purification. Proteins are major targets of pharmaceuticals, and are themselves increasingly used as therapeutics. However, both basic research and pharmaceutical industry depends on availability of purified proteins that are often difficult to isolate from native sources.

This course will comprise of a series of lecture and laboratory exercises, with an emphasis on practical techniques and hands-on experience of recombinant protein expression and purification. The course will cover a variety of expression systems, and address traditional and new methods in protein purification. The course participants will be guided in the planning of expression and purification projects, optimization of the various steps in the experimental procedures and trouble shooting. The participants will also be introduced to protein analysis and interaction studies on the BiaCore platform. Besides they will also learn about documentation, describing methods and results of protein preparation for scientific articles, Ethics in research, safety measures in rDNA research, Intellectual property rights, Manuscript and Grant writing and presentation skills.

At the end of the course the participant will be able to:

- Propose suitable strategies and methods for preparation of proteins.
- Use E. coli as host cells to do recombinant protein expression.
- Manipulate ÄKTA system for protein separation with various chromatography.
- Document methods and results of protein preparation for scientific articles.

No. of seats- 20 (First come first serve basis)

Eligibility- Teachers, Scientists, Post-doctoral researchers in Life Sciences

Venue: University of Delhi South Campus, New Delhi

Timing: 9:30 - 5:30 pm

Workshop Fee: There is a workshop fee of Rs. 2000 per person. This amount will be fully refunded and certificate will be issued to only those participants who successfully complete the full duration of the course.

How to Apply: Submit the registration form along with the fee at:

Dr. Amita Gupta, First floor Engineering department, University of Delhi South campus, New Delhi 110021 (Find more details on <http://ciidret.du.ac.in/>)

LAST DATE for Application: 25 JUNE 2019

Organised by: CIIDRET, University of Delhi South Campus

Partners: GE Healthcare

Contact: udscdnaseq@gmail.com; 011-24117542

COURSE SCHEDULE

DATE	BATCH 1	BATCH 2
2nd July (Tuesday)	Introduction to the workshop; Introduction of faculty & participants Lecture: Overview of Recombinant proteins, their importance and need; Literature based self-learning about recombinant protein expression	
	Preparation of reagents for protein expression	Preparation of reagents for protein expression; Inoculation for protein expression
3rd July (Wednesday)	Lecture: Expression of recombinant proteins in prokaryotic systems (E. coli), vector systems, fusion tags, Constitutive and inducible systems.	
	Demonstration of SDS PAGE; Inoculation for protein expression	Protein expression in E. coli using auto – induction; Demonstration of SDS PAGE
4th July (Thursday)	Protein expression in E. coli using IPTG induction and its localization; Inoculation for protein expression	Protein expression in E. coli using auto - induction and its localization
5th July (Friday)	Analysis of expressed protein by SDS polyacrylamide gel electrophoresis	Analysis of expressed protein by SDS polyacrylamide gel electrophoresis
	Protein expression in E. coli using auto – induction	Inoculation for protein expression
6th July (Saturday)	Protein expression in E. coli using auto - induction and its localization	Protein expression in E. coli using IPTG induction and its localization
8th July (Monday)	Lecture: Expression of recombinant proteins in eukaryotic systems	
	Analysis of expressed protein by electrophoresis	
	Compilation of results and Preparation for next experiment	
9th July (Tuesday)	Lecture: Introduction to protein purification and chromatography techniques Lecture: Protein purification by Gel Filtration chromatography	Lecture: Introduction to BiaCore basics
	Gel Filtration chromatography under Unicorn control program in ÄKTA system	BiaCore Reagent description, components, workflow Setting up a BiaCore run
10th July (Wednesday)	Lecture: Protein purification by Ion exchange chromatography	Lecture: Analysis and interaction studies using BiaCore- Kinetic and affinity measurements
	Protein purification by Ion exchange chromatography in ÄKTA system	Analysis of data generated from BiaCore run; Discussion and compilation of results
11th July (Thursday)	Lecture: Protein purification by Affinity Chromatography, Scale-up of positive candidates and resin cleaning and CIP	Lecture: Introduction to protein purification and chromatography techniques Lecture: Protein purification by Gel Filtration chromatography
	Protein purification by Affinity Chromatography in ÄKTA system; Cleaning and storage of columns	Gel Filtration chromatography under Unicorn control program in ÄKTA system
12th July (Friday)	Lecture: Introduction to BiaCore	Lecture: Protein purification by Ion exchange chromatography
	BiaCore Reagent description, components, workflow Setting up a BiaCore run	Protein purification by Ion exchange chromatography in ÄKTA system
13th July (Saturday)	Lecture: Analysis and interaction studies using BiaCore	Lecture: Protein purification by Affinity Chromatography, Scale-up, resin cleaning and CIP
	Analysis of data generated from BiaCore run; Discussion and compilation of results	Protein purification by Affinity Chromatography in ÄKTA system;
15th July (Monday)	Lecture: Ethics in research, safety measures in rDNA research, Intellectual property rights (IPR), Manuscript writing, Grant writing and Poster and presentation skills	
16th July (Tuesday)	Valedictory Function: Feedback by participants; Conclusion of the course and Distribution of certificates	

LIST OF PARTICIPANTS

S.No	Name	Affiliation	Batch
1	Neelima Mishra	National Institute of Malaria Research, New Delhi	1
2	Yasir Akhtar Khan	Department of Zoology, Aligarh Muslim University	2
3	Misha Ali	School of Biotechnology, JNU, New Delhi	1
4	Savita Bansal	Department of Biochemistry, Institute of Home Economics, University of Delhi	2
5	Shalini Sen	Department of Biochemistry, Sri Venkateswara College, University of Delhi	1
6	Renu Baweja	Department of Biochemistry, Shivaji College, University of Delhi	2
7	Shabnam Akhtar	School of Life Sciences, JNU, New Delhi	1
8	Ashok Kumar Patel	Department of Botany, Jai Narain Vyas University, Jodhpur	1
9	Tarun Kumar	Department of Biochemistry, University of Delhi	2
10	Manish Kumar Sachdeva	Department of Zoology, Shivaji College, University of Delhi	1
11	Sunita Singh	Department of Biochemistry, Shivaji College, University of Delhi	1
12	Neeraj Kumar	ICMR-National Institute of Pathology, New Delhi	2
13	S.A Raju Bagadi	ICMR-National Institute of Pathology, New Delhi	1
14	Harish	Department of Botany, Mohanlal Sukhadia University, Udaipur	2
15	Priya Kalra	Department of Biotechnology, AIIMS, New Delhi	1
16	Ashok Saini	Institute of Home Economics, University of Delhi	1
17	Romsha Kumar	AIIMS, New Delhi	2
18	Kriti Negi	AIIMS, New Delhi	2
19	Madhvendra Singh	UDSC, New Delhi	2

A hands-on training workshop for Teachers, Scientists and Post-doctoral Fellows was organized by Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET) at University of Delhi South Campus from 2 July – 16 July 2019.

The theme of the workshop was “**Recombinant Proteins: Expression, Purification, Characterization**”. The workshop had Industry leader GE Healthcare as the training partners.

The workshop included classroom lectures and hands on training modules.

The theory lectures were taken by CIIDRET members including Professor V. K. Chaudhary, Dr. Amita Gupta and Dr. Garima Khare. Various theoretical aspects covering bacterial expression vectors, cloning strategies, expression strategies, fusion tags were discussed by Prof. V. K. Chaudhary, Incharge CIIDRET. Dr. Garima Khare discussed about eukaryotic protein expression. The GE Healthcare faculty discussed the concepts of protein purification, strategies and upscale methods for protein production.

Ms. Anjali Sharma and Ms. Navneet Kaur were the instructors for the practical course on bacterial expression.

- The hands-on practical training was conducted in a manner that every participant performed every step of each experiment independently.
- For this, the 16 participants were divided into 2 batches with 2 instructors.
- The batches were swapped after completion of one module so that they could benefit from the methodologies of both the instructors and learn all the skills in a systematic manner.
- With GE Healthcare Fast Track team, one batch got training on Protein Purification while the other batch was trained on Characterization of molecules using SPR technology. After 3 days of intense training, the batches were swapped.
- The participants were trained for Bacterial Protein Expression by different methods, Protein purification by different chromatography techniques on AKTA system and characterization of proteins for binding affinity using SPR technology on Biacore system. They also practiced SDS-Polyacrylamide Gel Electrophoresis for proteins.
- All the participants were able to achieve the goals of the workshop.

A one-day Science Communications workshop along with Wellcome-DBT India Alliance was also included in the curriculum to enable participants to learn about ethical issues in research, writing grant proposals and writing manuscripts. Further, an interactive lecture was organized wherein Dr. Malathi Lakshmikumaran, renowned Scientist and Patent Attorney, discussed about novelty, invention and IPR.

**Lecture by Dr. Likhesh Sharma & Mr. Karan Sharma,
Application Specialists, GE Healthcare Life Sciences**



Lecture by Dr. Garima Khare, CIIDRET



Lectures on Science Communication by Wellcome-DBT India Alliance



Hands-on training in the workshop



Lecture on IPR by Dr. Malathi Lakshmikumaran



Valedictory Function

Interaction with Dr. Manju Sharma, Former Secretary, Department of Biotechnology, Govt. of India



Feedback from participants



Certificate Distribution



Group Photograph



WORKSHOP FEEDBACK BY PARTICIPANTS



Summer Workshop on
Recombinant proteins: Expression, Purification, Characterization, July 2-16, 2019
Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET)
UNIVERSITY OF DELHI SOUTH CAMPUS, NEW DELHI 110021

Participant Name, E-mail, Phone number: Dr. Romsha Kumar,
romsha15@gmail.com, 9958401117

Current designation, Organization: Scientist, AIIMS, New Delhi
Department of Biochemistry, AIIMS

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
2. The content is relevant to my work. 1 2 3 4 5
3. The workshop activities stimulated my learning. 1 2 3 4 5
4. The activities in this workshop gave me sufficient practice. 1 2 3 4 5
5. The level and pace of this workshop was appropriate. 1 2 3 4 5
6. The instructors were well prepared and helpful. 1 2 3 4 5
7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

First of all I would like to thank you for giving me an opportunity to attend this wonderful workshop. Lectures given by Dr. V.K. Chaudhary were amazing. He has given a deep insight of expression vectors and explained beautifully. Workshop is well designed and everything executed on time. Every minute detailed related to experiment were explained. First time I have learnt the concept of autoinduction and pET culture. The GE faculty was also very good. I have learnt about AKTA purification system, Basic concept of chromatography and different types of chromatography. We have also learnt the various ways of troubleshooting related to purification. We also learnt about the latest technology used for protein characterization and kinetics. Lectures delivered by Dr. Likesh was very good. We have learnt about Biacore and its application. "GREAT WORKSHOP"! THANKS!

12. Other topics on which you would like to attend a workshop:

1. Next Generation Sequencing (NGS) technology.
2. Microarray and sequencing.
3. Cloning & phage display.

Signature Romsha Date: _____

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: MANISH KUMAR SACHDEVA
msachdeva@gmail.com 9818 602572
Current designation, Organization: Assistant Professor, Dept. of Zoology
SHIVAJI COLLEGE
UNIVERSITY OF DELHI.

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
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8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

A number of techniques which we learned during the tenure of this workshop especially pertaining to Protein Expression, Purification and Characterization has taken me and my understanding in Protein Biochemistry beyond the level and limit which I've ever expected. This kind of hands-on training is very much required for a teacher training where one has to train their students in classroom practical sessions. Though in the college currently main focus is on teaching but definitely once research setup is provided ^{workshop} is going to be a major boon for conducting a protein based research. As in the present scenario no setup for the research work is there, neither all the exercises prescribed in our syllabi ~~there~~ therefore could not be applied in teaching assignments but ~~definitely~~ surely could be included in the DBT star college scheme experiments. A more hands on could be done in the protein purification aspect where sophisticated means of carrying out different types of chromatography are dealt with. I wish the CIIDRET organization for best of the very luck and Congratulate the trainers and faculties!

12. Other topics on which you would like to attend a workshop:

Genomics - DNA and RNA based experiments such as
Cloning - Sequencing - NGS, OLIGONUCLEOTIDE BIOSYNTHESIS,

Signature

msachdeva

Date:

11 July 2019.

Your feedback is sincerely appreciated. Thank you.



Summer Workshop on
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Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET)
UNIVERSITY OF DELHI SOUTH CAMPUS, NEW DELHI 110021

Participant Name, E-mail, Phone number: SHALINI SEN
ssen@svt.ac.in Mob: 9810677630

Current designation, Organization: ASSOCIATE PROFESSOR
Sri Venkateswara College, Delhi University

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 4 <u>5</u> |
| 2. The content is relevant to my work. | 1 2 3 <u>4</u> 5 |
| 3. The workshop activities stimulated my learning. | 1 2 3 4 <u>5</u> |
| 4. The activities in this workshop gave me sufficient practice. | 1 2 3 <u>4</u> 5 |
| 5. The level and pace of this workshop was appropriate. | 1 2 3 <u>4</u> 5 |
| 6. The instructors were well prepared and helpful. | 1 2 3 4 <u>5</u> |
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| 8. The workshop was a good way for me to learn this content. | 1 2 3 4 <u>5</u> |
| 9. Would you recommend this workshop to a colleague? | Yes / No |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | Yes / No |

11. Comments about the workshop:

I have yet to attend such an intensive and well-coordinated workshop, as this one. This includes
- Choice of areas of research - Freedom to ask questions
- Quality of speakers - Discipline and level of seriousness. Personally speaking, week one was very exciting as it dealt primarily with RDT. As I teach this paper, I was completely involved.

The best part of attending other lectures and associated practicals was, overcoming a fear - fear of what was unknown. So now I shall take at least some of my academic fears and venture into newer experiments. Can't thank the organizers enough!

12. Other topics on which you would like to attend a workshop:

(1) Animal cell culture (2) Plant tissue culture

Signature

Date:

12/7/19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr. ASHOK SAINI, dsainiashok22@gmail.com
Ph - 7827273335

Current designation, Organization: Assistant Professor (Adhoc), Department of Microbiology, Institute of Home Economics, Delhi University

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 <u>4</u> 5 |
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| 6. The instructors were well prepared and helpful. | 1 2 3 4 <u>5</u> |
| 7. I will be able to use what I learned in this workshop. | 1 2 3 <u>4</u> 5 |
| 8. The workshop was a good way for me to learn this content. | 1 2 3 4 <u>5</u> |
| 9. Would you recommend this workshop to a colleague? | Yes / No |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | Yes / No |

11. Comments about the workshop:

First of all, thanks for conducting such a type of unique workshop where we got ample amount of time to understand the topics covered as well as hands-on-training. For a teachers or researchers these kind of workshops should be conducted regularly so that they can think and understand the new things on which they didn't work or teach. It was very helpful for me to clear some basics as well as in terms of hands-on-training.

The workshop was very planned and delivers the quality of lectures. But in terms of location and space, I would like to authorities to allot a proper conference room and labs to conduct such a good workshops or events so that more and more faculties and students get benefitted.
Thanks.

12. Other topics on which you would like to attend a workshop:

I would like to attend workshops on Newer technologies and techniques coming up like NGS, Metagenomics, Nanotechnology, Bioinformatics, FACS etc.

Signature Ashok Date: 13/7/19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr. Savita Bansal, 9013342053
bonsalsavita-1916@yahoo.com

Current designation, Organization: Assistant Professor, Department of
Biochemistry, IHE, DU.

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
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8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

I am thankful to Prof. V.K. Chaudhary and Dr. Amita Gupta for
organizing this workshop, which is highly informative
from theoretical & practical point of view. Being a teacher
it is very important for us to have thorough knowledge
of things, which can't be completed without practical
exposure. This workshop provides me a opportunity to enhance
my knowledge, which will definitely improve my teaching
skills. Workshop is very well organized & CoE - Instructors
are very co-operative & cleared our all doubts. Lectures
given by Dr. V.K. Chaudhary are very informative & motivating
as well. This type of workshop should be continued in
future for the benefit of students, Teachers and people
working in research field as well.

12. Other topics on which you would like to attend a workshop:

① Cloning & Transformation Techniques. ② Techniques to study
structural biology of proteins ③ cell-Biology associated
techniques - TEM, SEM, FACS ④ Genomics & proteomics

Signature

Savita

Date:

13/7/19

Your feedback is sincerely appreciated. Thank you.



Summer Workshop on
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Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET)
UNIVERSITY OF DELHI SOUTH CAMPUS, NEW DELHI 110021

Participant Name, E-mail, Phone number: DR. HARISH
harish.botany1979@gmail.com 9414478466

Current designation, Organization: ASSISTANT PROFESSOR
Department of Botany, MLSU, Udaipur (Raj.)

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
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8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

The workshop was very well planned and implemented in professional way. Prof. Vijay K. Choudhary and Dr. Amita Gupta were very responsive and pro-active for any query we asked. We learned basics of protein expression (recombinant) in E. coli. We learned the aspect of inoculation of E. coli in MDAG media and induction of protein expression via Autoinduction and IPTG method. We did all the experiments by our hands each individually and we performed SDS-PAGE also. Later we learned about Surface plasma resonance using Biacore system of GE. That increases our knowledge about study of protein-interaction. After that we learned about size-exclusion, ion-exchange and affinity chromatography using AKTA system of GE. Our understanding from the day one to till today have improved a lot by this workshop.

12. Other topics on which you would like to attend a workshop:

Designing of Plasmid, synthesis ^{of plasmid} and transformation of E. coli with our desired plasmid, selection of recombinant and cloning. We lack in ~~these~~ knowledge about these basic & DNA techniques and future training on this will be very helpful.

Signature Harish Date: _____

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr. ASHOK KUMAR PATEL, ashpatel47@gmail.co
+91-9414573555

Current designation, Organization: ASSISTANT PROFESSOR, DEPARTMENT OF BOTANY,
JAI NARAIN VAS UNIVERSITY, JODHPUR - 342005 (RAJASTHAN)

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 4 <u>5</u> |
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| 9. Would you recommend this workshop to a colleague? | Yes / No |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | Yes / No |

11. Comments about the workshop:

In my opinion, the workshop has fulfilled its proposed objectives. The workshop was very planned both theoretically and practically / hands-on. As a student of Botany, I had only literature based knowledge of Recombinant DNA Technology but after participation in this workshop, now I became able to understand the science behind these techniques. Now, I can teach & transfer / translate the knowledge of operon system in a more better way to our students. The demonstration of equipments followed by practical exercises (like SPR on Biacore Platform) made that learning very meaningful. The experts from GE healthcare demonstrated / taught the techniques of chromatography very precisely & how to troubleshoot with the problems. Till now, the workshop gone very well, hopefully next two days (Mon-Tue) will also be very fruitful.

12. Other topics on which you would like to attend a workshop:

As I learned expression, purification & characterization part of RDT, it will be appreciable if you organize a training/workshop on "vector Designing, transformation techniques & cloning Methods".

Signature Ashok Patel

Date: 13/07/2019

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr Neeraj Kumar,
Email:- neerajkaiims@hotmail.com, Mob-9899887656

Current designation, Organization: Scientist-C, TCMR- National
Institute of Pathology, New Delhi

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
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7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

The program of the workshop is very well planned. The 15 day format is quite useful and practically more meaningful, as I had plenty of time to interact with the instructors as well as to do the hands on activities. For me the protein expression work was quite unfamiliar and this workshop introduced me with this field of the biology, further, the program of workshop is very basic, which was very easy to understand and grasp the knowledge obtained by this course, especially, the beginners like me. The teachers were excellent, the way they taught, was very simple and effective. The lectures of Prof. Vijay Choudhary were brilliant and very easy to understand. By attending this course, I have become quite confident that now I can also work on Protein expression & Purification.

12. Other topics on which you would like to attend a workshop:

Since, the workshop included protein expression and purification, the initial steps like vector modification, cloning, transfection and other steps should have been included. In future if another workshop on these aspects is planned, I would definitely attend that.

Signature Neeraj Kumar

Date: 13/07/19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr. TARUN KUMAR,
Email - tktarumbiotech@gmail.com, PH: 9810750967

Current designation, Organization: Assistant Professor (Adhoc), Shaheed Rajguru.
College of Applied Sciences for Women.

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

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9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

It was a very nice workshop organized by CIIDRET, UDSC.
I am thankful to Dr. Amrita Gupta and Prof. Vijay K.
Chaudhary for organising such a wonderful workshop.
In the workshop, we learned a lot about
expression and purification of proteins especially the
auto-induction which I did not know before. Apart
from this we were introduced about chromatography
for protein purification - Ion-exchange, Gel-filtration and
affinity chromatography. I never had any hands
on experience of all these techniques before but
after finishing this workshop, I am feeling confident
enough in handling all these techniques. This
will help me to upgrade my teaching and research skills.

12. Other topics on which you would like to attend a workshop:

- Gene cloning + Hands on training
+ Primer Designing + Both manually and by Software.
+ DNA sequencing.

Signature Tamr Date: 13/07/19

Your feedback is sincerely appreciated. Thank you.



Summer Workshop on
Recombinant proteins: Expression, Purification, Characterization, July 2-16, 2019
Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET)
UNIVERSITY OF DELHI SOUTH CAMPUS, NEW DELHI 110021

Participant Name, E-mail, Phone number: Misha Ali, misha11biochem@gmail.com
8057185248

Current designation, Organization: CSIR-RA, School of Biotechnology,
JNU, New Delhi

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
2. The content is relevant to my work. 1 2 3 4 5
3. The workshop activities stimulated my learning. 1 2 3 4 5
4. The activities in this workshop gave me sufficient practice. 1 2 3 4 5
5. The level and pace of this workshop was appropriate. 1 2 3 4 5
6. The instructors were well prepared and helpful. 1 2 3 4 5
7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes/ No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes/ No

11. Comments about the workshop:

The workshop was amazing. It is going to be very useful in my future research. The sessions were planned well and every session commenced and concluded on time as per schedule. The lectures were delivered with great enthusiasm & deep insight and the experiments were executed in a proper manner. The chance of hands-on training was given to each and every participant. Organizing team was very helpful, always ready to discuss our doubts. Lab members were technically sound and helped in our training by putting all their efforts. This was a very good attempt in the field of research to broaden the knowledge of scientists. Many more such attempts should be encouraged in future.

12. Other topics on which you would like to attend a workshop:

In future, I would like to have workshops on Next Generation sequencing, genetic engineering & cloning and statistical analysis

Signature Misha Ali

Date: 15-07-2019

Your feedback is sincerely appreciated. Thank you.



**Summer Workshop on
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Participant Name, E-mail, Phone number: Yasir Akhtar Khan
email: yasirkhanakhtar@gmail.com, 9897968417

Current designation, Organization: Assistant Professor, Section of Parasitology
Department of Zoology, Aligarh Muslim University, Aligarh.

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|-------------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 <u>4</u> <u>5</u> |
| 2. The content is relevant to my work. | 1 2 3 4 <u>5</u> |
| 3. The workshop activities stimulated my learning. | 1 2 3 4 <u>5</u> |
| 4. The activities in this workshop gave me sufficient practice. | 1 2 3 <u>4</u> 5 |
| 5. The level and pace of this workshop was appropriate. | 1 2 3 4 <u>5</u> |
| 6. The instructors were well prepared and helpful. | 1 2 3 4 <u>5</u> |
| 7. I will be able to use what I learned in this workshop. | 1 2 3 4 <u>5</u> |
| 8. The workshop was a good way for me to learn this content. | 1 2 3 4 <u>5</u> |
| 9. Would you recommend this workshop to a colleague? | <u>Yes</u> / No |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | <u>Yes</u> / No |

11. Comments about the workshop:

This workshop was an example of excellent teaching and hands on training program. A good teacher is he who teaches from the heart and Prof Vijay K. Chaudhary sir is synonymous to this. His years long research and academic experience reflect in his teaching. I am fortunate that I was taught by Prof. Vijay sir, during this workshop. This workshop was organized with utmost seniority. I am learned a lot about the gene expression, SPR and protein purification. I am grateful to Dr. Amita Gupta for short listing me for this program and I request her in advance for short listing me for the workshop on cloning in future. As a teacher, such workshops refresh our ideas and skills about the different technique and also gave the opportunity to interact with the researchers from different field. I wish that such workshop should be carried out on routine basis under such a wonderful organizers.

12. Other topics on which you would like to attend a workshop:

- ① Gene Cloning ^{and expression} in both ~~bacterial~~ ^{yeast} and mammalian system
② Micro Array

Signature Yasir Akhtar Khan Date: 13/07/2019

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: DR. SUNITA SINGH
sunitasingh@shivaji.du.ac.in ; 9811750581; 9811750815

Current designation, Organization: ASSISTANT PROFESSOR, DEPARTMENT OF BIOCHEMISTRY, SHIVAJI COLLEGE, UNIV. OF DELHI

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|-------------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 4 <u>5</u> |
| 2. The content is relevant to my work. | 1 2 3 4 <u>5</u> |
| 3. The workshop activities stimulated my learning. | 1 2 3 4 <u>5</u> |
| 4. The activities in this workshop gave me sufficient practice. | 1 2 3 <u>4</u> 5 |
| 5. The level and pace of this workshop was appropriate. | 1 2 3 4 <u>5</u> |
| 6. The instructors were well prepared and helpful. | 1 2 3 4 <u>5</u> |
| 7. I will be able to use what I learned in this workshop. | 1 2 3 4 <u>5</u> |
| 8. The workshop was a good way for me to learn this content. | 1 <u>2</u> 3 4 <u>5</u> |
| 9. Would you recommend this workshop to a colleague? | Yes / <u>No</u> |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | Yes / <u>No</u> |

11. Comments about the workshop: Genuinely one of the best workshops I have attended. I wish to thank Prof. V.K. Chaudhary, Dr. Amita Gupta and the very helpful and energetic technical team as organizing such an workshop involves enormous amts. of energy and time. The lectures delivered by Prof. Chaudhary & Dr. Garimha Khare and Hands-on-training sessions (Protein expression in E. coli using Auto & IPTG induction and its localization; Analysis of expressed proteins by SDS-PAGE, Introduction to protein purification and Chromatography techniques using AKTA system; Analysis and interaction studies using BiCORE) were excellent, enjoyable and was academically very advantageous to interact with such an exemplary academicians. I would like to congratulate the entire CIIDRET team for organizing the event & the excellent management of what has turned out to be a SUCCESSFUL & HIGHLY STIMULATING WORKSHOP. Thank you very much for giving me this OPPORTUNITY.
12. Other topics on which you would like to attend a workshop: The present workshop

was very insightful and provided an opportunity to exploit the new techniques and approaches towards making vital advances in biology. I request the CIIDRET team to organize the following workshops also in benefit of teaching faculty members. *

Signature Sunita Date: July 13, 2019

Your feedback is sincerely appreciated. Thank you.

- * ① PCR: Principle & designing of oligos for the gene of interest.
② Next generation sequencing (NGS) ③ Recombinant cloning & expression ④ Pathogenol: Biology & diagnosis.



**Summer Workshop on
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Participant Name, E-mail, Phone number: Dr. Shabnam Akhtar,
Shabnamakhtar015@gmail.com, 9654039419

Current designation, Organization: Post-Doctoral Research Fellow (DSKPDF)
in School of Life Sciences, Jawaharlal Nehru University (JNU), New Delhi

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
2. The content is relevant to my work. 1 2 3 4 5
3. The workshop activities stimulated my learning. 1 2 3 4 5
4. The activities in this workshop gave me sufficient practice. 1 2 3 4 5
5. The level and pace of this workshop was appropriate. 1 2 3 4 5
6. The instructors were well prepared and helpful. 1 2 3 4 5
7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

Before attending the Workshop, I only had the book knowledge about expression, purification, interaction for their characterization. But understanding the basics for choosing appropriate vectors, polymerase enzymes, media for bacterial growth and getting desired O.D., principle behind the instrument working, understanding the instruments like chromatograph, Biacore, choosing of suitable chromatographic technique, suitable column and chromatographic conditions etc we only learned here. By learning all these techniques and hands on training on all these techniques whether they are related to know protein solubility, after its expression, chromatography, desalting, affinity chromatography and SPR for learning protein interaction are also made me confident for working on them.

I am feeling that after attending the workshop I will be able to work on my protein efficiently and easily. I want to say thanks Chaudhary Sir and Amrita Mam for conducting such a useful and informative workshop for us. And in future, I look forward to attend those workshops if arranged here, relevant to my work.

12. Other topics on which you would like to attend a workshop:

Would like to know details and hands on NGS, Sanger's DNA Sequencing, CRISPR-Cas Technology

Signature Shabnam

Date: 13th July 19

Your feedback is sincerely appreciated. Thank you.



Summer Workshop on
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Participant Name, E-mail, Phone number: DR. PRIYA KALRA; aiims.priya@gmail.com
9891297565

Current designation, Organization: Senior Demonstrator, Dept. of Biotechnology,
AIIMS, New Delhi-110029

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

- | | |
|--|------------------|
| 1. The workshop location and facilities were suitable and appropriate | 1 2 3 4 <u>5</u> |
| 2. The content is relevant to my work. | 1 2 3 <u>4</u> 5 |
| 3. The workshop activities stimulated my learning. | 1 2 3 4 <u>5</u> |
| 4. The activities in this workshop gave me sufficient practice. | 1 2 3 4 <u>5</u> |
| 5. The level and pace of this workshop was appropriate. | 1 2 3 4 <u>5</u> |
| 6. The instructors were well prepared and helpful. | 1 2 3 4 <u>5</u> |
| 7. I will be able to use what I learned in this workshop. | 1 2 3 <u>4</u> 5 |
| 8. The workshop was a good way for me to learn this content. | 1 2 3 4 <u>5</u> |
| 9. Would you recommend this workshop to a colleague? | <u>Yes</u> / No |
| 10. I would like to participate in more hands-on workshops at CIIDRET. | <u>Yes</u> / No |

11. Comments about the workshop:

This is one of the most well organised, in-depth workshop providing hands-on-experience that I have attended or even heard of. I have previous experience with cloning, expression and protein purification, and however the level of in-depth details regarding the basics ~~was~~ definitely added to my previous knowledge. I can say with confidence that several new aspects that I take away from this workshop will be extremely helpful in teaching my students. In particular, the concept of enriched media to support higher OD cultures, autoinduction & His-tag concept was truly brilliant. Active involvement & efforts of the entire team of organizers is highly appreciated & am really thankful to you for providing this opportunity. I have no experience in Bioreactors & being naive at the topic, I took a while to catch-up with this. Above all, this place provided the opportunity to interact with several hardworking teachers & form a long-lasting network. Thank you!

12. Other topics on which you would like to attend a workshop:

I had struggled with variations of real time PCR in my research. Although I have attended workshops in relation to this, no where have we had a hands-on experience. Having a similarly in-depth-Real Time PCR workshop would be truly unique & strengthen/clarify the utility of this tool.

Signature Priya Date: 16/7/19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Kniti Negi, knitinegi17@gmail.com
9654326267.

Current designation, Organization: Research Fellow, Dept of Biotechnology
AIIMS, New Delhi

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
2. The content is relevant to my work. 1 2 3 4 5
3. The workshop activities stimulated my learning. 1 2 3 4 5
4. The activities in this workshop gave me sufficient practice. 1 2 3 4 5
5. The level and pace of this workshop was appropriate. 1 2 3 4 5
6. The instructors were well prepared and helpful. 1 2 3 4 5
7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes/ No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes/ No

11. Comments about the workshop:

Great Initiative, It was an amazing opportunity to sharpen my
skills on protein expression and purification. I got to
learn a lot about different chromatographic techniques, which
will be useful in my research project. We got to learn
how to optimize purification parameters. Classes by Prof. VKC
were extremely informative and study material will be very
helpful for future research career.
Hands-on training on Biacore was a completely
new research experience. Overall the workshop was totally
worth it. I'm looking forward to attend more workshops
at CIIDRET, and learn more from the faculty.

12. Other topics on which you would like to attend a workshop:

Cloning strategies, Antibody technology.

Signature Kniti Date: 12-07-19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: Dr. Neelima Mishra,
neelima1.nima@gmail.com, 9910223439

Current designation, Organization: Scientist 'F' (Deputy Director, Sr. Grade),
ICMR - National Institute of Malaria Research

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

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5. The level and pace of this workshop was appropriate. 1 2 3 4 5
6. The instructors were well prepared and helpful. 1 2 3 4 5
7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? ☒ Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. ☒ Yes / No

11. Comments about the workshop:

The workshop has provided hands on experience on the
topic with extensive knowledge through indepth presentations
by experts in the field. The guidance and support provided
by Prof. Vijay Choudhry and Prof Amita Gupta is a life time
experience and will be cherished forever.
The commitment of these teachers towards their duties and
work is a path to be followed by all of us in future.
The indepth knowledge gained through this workshop will
have path for future projects and I personally look forward
to seek their guidance and support.
More such workshops on regular basis by such committed
teachers should be organised by the University.

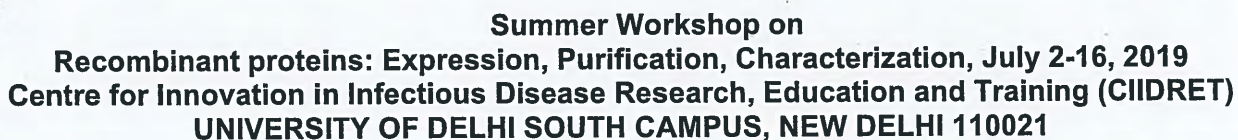
12. Other topics on which you would like to attend a workshop:

The hands on experience on the various instruments available
in the CIIDRET alongwith their applications.

Signature N Mishra

Date: 15th July 2019

Your feedback is sincerely appreciated. Thank you.



Current designation, Organization: Scientist - D1, National Institute of Pathology

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

11. Comments about the workshop:

12. Other topics on which you would like to attend a workshop:

Signature: [Signature] Date: 16/07/19

Your feedback is sincerely appreciated. Thank you.



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Participant Name, E-mail, Phone number: DR-RENU BAWEJA,
renubaweja11@yahoo.com , 9818192670

Current designation, Organization: ASSISTANT PROFESSOR, DEPARTMENT
OF BIOCHEMISTRY, SHIVAJI COLLEGE, UNIVERSITY OF DELHI

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale with 5 being the highest, most positive impression.

1. The workshop location and facilities were suitable and appropriate 1 2 3 4 5
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7. I will be able to use what I learned in this workshop. 1 2 3 4 5
8. The workshop was a good way for me to learn this content. 1 2 3 4 5
9. Would you recommend this workshop to a colleague? Yes / No
10. I would like to participate in more hands-on workshops at CIIDRET. Yes / No

11. Comments about the workshop:

The workshop was very well planned. It has given
excellent exposure to both theoretical and practical
aspects of the different topics related to the workshop.
The Professors and Instructors of particular subject were
very well prepared, efficient and highly
professional. They were always available to clear
the doubts. The best part of the workshop was
the duration and hands-on training of various
theoretical concepts taught during the workshop.
The written material provided during the workshop
is also comprehensive, latest and hence very
useful.

12. Other topics on which you would like to attend a workshop:

Cloning Strategies, Designing of Primers
Transformation, Handling and Maintenance of
Mammalian cell lines

Signature

Renu

Date:

13/07/19

Your feedback is sincerely appreciated. Thank you.