

Science Setu Webinars by NIPGR

“SIGNAL TRANSDUCTION IN PLANTS AND PROTEIN-PROTEIN INTERACTIONS”

Press- Note

Date: 13-05-2021, Thursday

Resource person: Dr. Alok K. Sinha, Scientist VII, NIPGR

The Department of Biotechnology, Government of India, has planned “Science Setu” as a virtual platform to connect research Institutes with undergraduate students. Under this, our college has been assigned to National Institute of Plant Genome Research (NIPGR), New Delhi. NIPGR is an autonomous institution aided by the Department of Biotechnology. Research at NIPGR focuses on functional, structural, evolutionary and applied genomics of plants, including crop plants. Through the Science Setu program, our students and faculty virtually connect with NIPGR, New Delhi and got to know about the multifarious kinds of plant based research. It is a unique opportunity for science students at undergraduate level to get an exposure to high-level research.

Dr. Pinky Agarwal, Scientist, NIPGR gave welcome note on this event. **Resource person: Dr. Alok K. Sinha, Scientist VII, NIPGR** started his lecture with brief introduction on signal transduction in plants by giving an outline of signals, receptors and reverse phosphorylation. He introduced general points of signals, types of signaling, amplification, role and classes of receptors, ligand binding, etc. He discussed about different types of receptors present in cell membrane and their role in signal transduction. He stressed on MAPKs i.e. Mitogen Activated Protein Kinases and explained the molecular mechanism governing submergence stress management. He discussed about his research article on “Interaction between two rice mitogen activated protein kinases and its possible role in plant defense.” He discussed specifically four methods to investigate protein-protein interactions and briefly explain them one by one. He beautifully explained the mechanism of protein-protein interaction through fishing with the yeast two- hybrid system. He inspired all the participants for research and told that there is still a lot to be explored, lots of new techniques to be established to understand signal transduction in biological system. In total 38 participants, including faculty of science and students attended the event. Dr. Amarjeet Singh, Scientist, NIPGR attended the questions of the participants and gave vote of thanks. It was an intellectual and exciting experience for all the participants.

Sarushi KMV college	Pinky Agarwal	 Alok Sinha	Abhish Jais George	Akint Kaur Gill	Amar Pal Singh
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Signal Transduction in Plants and Protein-Protein Interaction

Fifth Webinar: Science Setu 2021



Alok Krishna Sinha
alok@nipgr.ac.in
National Institute of Plant Genome Research, New Delhi, India



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Talk Outline

➤ **A brief introduction on signal transduction in plants:**
(i) Signals; (ii) Receptors; (ii) Reversible phosphorylation

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Plant Signaling Pathways

Binding of growth factor to receptor

TRANSDUCTION

NUCLEUS

DNA

Gene

mRNA

Chat

PABBATHI PREMA, M.sc plant biology and biotechnology, 2nd semester, University of Hyderabad, Telangana from shakthi Angayarkanni to everyone: 3:25 PM

shakthi Angayarkanni B. sc biotechnology... sem 02 Nandha arts and science college, Erode, Tamilnadu from Ritisha to everyone: 3:25 PM

Ritisha dhapola, Bsc(H)Microbiology, Ram Lal anand college, University of Delhi from gunprasaith to everyone: 3:25 PM

S.Gunprasath,nandhaarts and science College, Erode biotechnology 2nd semester from Sakshi Tyagi to all panellists: 3:25 PM

SAKSHI TYAGI, Bsc Bio, MEERUT COLLEGE MEERUT from Sarushi KMV college to host (Invisibly): 3:25 PM

sarushi department of botany KM.V. College Jalandhar from Saniya Patil to all panellists: 3:25 PM

Saniya patil BSc medical sem 4 207034 KMV Jalandhar from Nusrat khatoon 207021 to all panellists: 3:25 PM

Nusrat khatoon from Payal to all panellists: 3:25 PM

Payal BSc medical sem 4 207032 KMV college Jalandhar

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Q & A

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Sarushi KMV college Me Pinky Agarwal Alok Sinha Abhilash Jasi George Airt Kaur Gill Amar Pal Singh

Viewing Alok Sinha's applicat...

(i) Signals: General Points

- Single signal may start several cascades
- Signal may be tiny, response can be big
- Many signals received at the same time – more than one may activate / repress the same cascade
- “Crosstalk” can occur (one cascade influences another)
- Not all cells in organ sensitive to same signal (e.g. stomata more sensitive to ABA than other cells in the leaf)

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Chat

shakthi Angayarkanni
8. sc biotechnology.. sem 02
Nandha arts and science college, Erode, Tamilnadu
from Rishu to everyone: 3:25 PM
Rishu dhapola, Bsc(H)Microbiology, Ram Lal anand college, University of Delhi
from gurprakash to everyone: 3:25 PM
S.Gunuprasath,nandhaarts and science College, Erode biotechnology 2nd semester
from Sakshi Tyagi to all panetists: 3:25 PM
SAKSHI TYAGI , Bsc Bio , MEERUT COLLEGE MEERUT
from Sarushi KMV college to host (privately): 3:25 PM
sarushi department of botany K.M.V. College Jalandhar
from Saranya Pabai to all panetists: 3:25 PM
Sanjya patial
BSC medical sem 4
207034
KMV Jalandhar
from Nusrat Khatoun 207021 to all panetists: 3:25 PM
Nusrat khatoun
from Payal to all panetists: 3:25 PM
Payal
Bsc medical sem 4
207032
KMV college jalandhar
from Nusrat Khatoun 207021 to all panetists: 3:25 PM
Nusrat khatoun, 207021, med sem 4

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Q & A

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(ii) Receptors

RÉCEPTEURS À ACTIVITÉ TYROSINE KINASE

EGFR PDGFR INSR IGF-1 R NGFR FGFR

— Domaine catalytique
— Région riche en Cystéines
— Domaine Immunoglobuline-like
— Motif riche en Leucine

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Chat

NIM Luvette
from Kunal to all panetists: 3:29 PM
Kunal tanwar
from Kunal to all panetists: 3:29 PM
Kunal Tanwar
from Nitanshi Sharma to all panetists: 3:29 PM
Nitanshi Sharma
(Bsc med 4) 207026
KMV Jalandhar
from Kunal to all panetists: 3:30 PM
Kunal Tanwar Young professional-II NIPB
from Shwami to all panetists: 3:30 PM
Shwami thakur
207016
Bsc medical
from Kritika Bakur to all panetists: 3:30 PM
kritika thakur bac medical sem 4 KMV COLLEGE
JALANDHAR
from Rajat Singh to everyone: 3:31 PM
Rajat Singh
MEERUT COLLEGE, MEERUT (U.P.)
from Rajat Singh to all panetists: 3:31 PM
Rajat Singh
MEERUT COLLEGE, MEERUT
from sapna arts to all panetists: 3:31 PM
sapna
bac medical semester4
kmv collage jalandhar
from rashmi to all panetists: 3:32 PM
Rashmi Holker, PhD scholar, botany department, Meerut
College, Meerut

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Ligand Binding

- Agonist – binds to a receptor, activates it
- Antagonist – binds to a receptor, does not activate it, stops agonists binding
- Binding is similar to that of enzyme to substrate, so can calculate “Km” – here called Kd
- Kd is a measure of the affinity of a receptor for a ligand

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Kunal Tanwar Young professional-II NIPB
from Kunal to all panelists: 3:30 PM

Shivani thakur
207016
Bsc medical
from kritika thakur to all panelists: 3:30 PM

kritika thakur bsc medical sem 4 KMV COLLEGE JALANDHAR
from Rajat Singh to everyone: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT (U.P.)
from Rajat Singh to all panelists: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT
from sapna arto to all panelists: 3:31 PM

sapna
bsc medical semester4
kmv collage jalandhar
from rajsh to all panelists: 3:32 PM

Rashmi Holker, PhD scholar, botany department, Meerut College, Meerut
from shakthi Angayarkanni to all panelists: 3:33 PM

shakthi Angayarkanni
B. sc biotechnology
Nandha arts and science college, erode, Tamilnadu
from Priya Bhatia to all panelists: 3:34 PM

Priya Bhatia, B.Sc. (H) Microbiology, Ram Lal Anand College, University of Delhi

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Sarushi KMV college Me Alok Sinha Pinky Agarwal Abhilash Jassi George Anar Pal Singh Amarjeet Singh

A Typical MAPK cascade

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graph TD
    Stimuli --> SR[Sensor/Receptor]
    SR --> MK1[MAP kinase kinase kinase]
    MK1 --> MK2[MAP kinase kinase]
    MK2 --> MK3[MAP kinase]
    MK3 --> TF[Transcription factors]
    TF --> GR[Gene regulation and immune response]
  
```

- MAPK is the last component of phosphorelay system consisting of MAPKK and MAPKKK
- MAPK cascades are universal signal transduction modules in eukaryotes, including yeasts, animals and plants
- These phosphorelay cascade link extracellular stimuli to wide range of cellular responses

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Shivani thakur
207016
Bsc medical
from kritika thakur to all panelists: 3:30 PM

kritika thakur bsc medical sem 4 KMV COLLEGE JALANDHAR
from Rajat Singh to everyone: 3:31 PM

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Rashmi Holker, PhD scholar, botany department, Meerut College, Meerut
from shakthi Angayarkanni to all panelists: 3:33 PM

shakthi Angayarkanni
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Nandha arts and science college, erode, Tamilnadu
from Priya Bhatia to all panelists: 3:34 PM

Priya Bhatia, B.Sc. (H) Microbiology, Ram Lal Anand College, University of Delhi
from Deepak Tomar to everyone: 3:35 PM

DEEPAK TOMAR
MEERUT COLLEGE, MEERUT (U.P.)

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Binary High Accuracy Indica...
Photo, BOOM

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Methods to investigate protein-protein interactions

- **Fluorescence resonance energy transfer (FRET)**
- **Bimolecular fluorescence complementation (BiFC)**
- **Surface Plasmon Resonance (SPR)**
- **Yeast two-hybrid Assay**

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Shakthi Angayarkanni
from kritika thakur to all panelists: 3:30 PM

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JALANDHAR
from Rajat Singh to everyone: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT (U.P.)
from Rajat Singh to all panelists: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT
from sapna arto to all panelists: 3:31 PM

sapna
bac medical semester4
kmv collage jalandhar
from rashmi to all panelists: 3:32 PM

Rashmi Holker, PHD scholar, botany department, Meerut College, Meerut
from shakthi Angayarkanni to all panelists: 3:33 PM

shakthi Angayarkanni
B. sc biotechnology
Nandha arts and science college, erode, Tamilnadu
from Priya Bhatia to all panelists: 3:34 PM

Priya Bhatia, B.Sc. (H) Microbiology, Ram Lal Anand College, University of Delhi
from Deepak Tomar to everyone: 3:35 PM

DEEPAK TOMAR
MEERUT COLLEGE, MEERUT (U.P.)
from NIPDRI to everyone: 3:45 PM

from kamal kant to host (privately): 3:50 PM

KAMAL KANT, PhD, University of szeged, Biological research center, szeged, Hungary

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Protein-protein interaction

Protein-protein interactions refer to the association of **protein** molecules and the study of these associations from the perspective of **biochemistry, signal transduction and networks**.

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Shivani thakur
207016
Bac medical
from kritika thakur to all panelists: 3:30 PM

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JALANDHAR
from Rajat Singh to everyone: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT (U.P.)
from Rajat Singh to all panelists: 3:31 PM

Rajat Singh
MEERUT COLLEGE, MEERUT
from sapna arto to all panelists: 3:31 PM

sapna
bac medical semester4
kmv collage jalandhar
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Rashmi Holker, PHD scholar, botany department, Meerut College, Meerut
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shakthi Angayarkanni
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from Priya Bhatia to all panelists: 3:34 PM

Priya Bhatia, B.Sc. (H) Microbiology, Ram Lal Anand College, University of Delhi
from Deepak Tomar to everyone: 3:35 PM

DEEPAK TOMAR
MEERUT COLLEGE, MEERUT (U.P.)

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Cross talk between MAPK signaling pathway

Sinha et al. 2011 Plant Sig Behav

Anika Roy, Vijaygarh jyotish ray college, University of Calcutta
 from NPQR to all panelists: 3:43 PM
 from Punjab Singh Malik to host (privately): 3:20 PM
 Punjab Singh Malik, Meerut College, Meerut
 from NPQR to all panelists: 3:43 PM
 from Saumya Samridhi to host (privately): 3:18 PM
 Ram Lal Anand College, DU
 from NPQR to all panelists: 3:44 PM
 from Bhargavi s to host (privately): 3:17 PM
 SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
 from NPQR to all panelists: 3:44 PM
 from Sudeshna Saha to host (privately): 3:17 PM
 Ballygunge Science College, University of Calcutta
 from NPQR to all panelists: 3:45 PM
 from parth kapil to host (privately): 3:17 PM
 Parth Kapil, BSc (H) Microbiology, Ram Lal Anand college
 from NPQR to all panelists: 3:45 PM
 from Krishna Kodappully Das to host (privately): 3:08 PM
 Krishna K. Das, ISER Tinupali.
 from NPQR to all panelists: 3:45 PM
 from Shikha Vashisht to host (privately): 3:01 PM
 Good Afternoon to all...Ms.Shikha Vashisht, Assistant
 Prof.,Kanya Maha Vidyalaya, Jalandhar
 from Narendra Burman to all panelists: 3:57 PM
 Using surface plasmon resonance, can we study protein
 interaction with secondary messengers
 from NPQR to all panelists: 3:58 PM
 from Deepak Kumar to host (privately): 3:57 PM
 Deepak kumar from Meerut College Meerut

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Possible biological relevance of the OsMPK3- OsMPK20-4 interaction

A

B

Sheikh et al. BMC Plant Biology 2013, 13:121
http://www.biomedcentral.com/1471-2229/13/121

BMC Plant Biology

RESEARCH ARTICLE | **Open Access**

Interaction between two rice mitogen activated protein kinases and its possible role in plant defense

Arsheed H Sheikh, Badmi Raghuram, Siddhi K Jalmi, Dhammaprakash P Wankhede, Pallavi Singh and Alok K Sinha*

After Infection


BMC Plant Bio. 2013. Shiekh et al.

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(ii) MAPK :: Submergence tolerance



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Punjab Singh Malik, Meerut College, Meerut
from NPQR to all panelists: 3:13 PM

from Saumya Samridhi to host (privately): 3:18 PM

Ram Lal Anand College, DU
from NPQR to all panelists: 3:44 PM

from Bhargava s to host (privately): 3:17 PM

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
from NPQR to all panelists: 3:44 PM

from Sudeshna Saha to host (privately): 3:17 PM

Ballygunge Science College, University of Calcutta
from NPQR to all panelists: 3:45 PM

from parth kapil to host (privately): 3:17 PM

Parth Kapil ,BSc (H) Microbiology, Ram Lal Anand college
from NPQR to all panelists: 3:45 PM

from Krishna Kodappully Das to host (privately): 3:08 PM

Krishna K. Das, IISER Tirupati.
from NPQR to all panelists: 3:45 PM

from Shikha Vashisht to host (privately): 3:01 PM

Good Afternoon to all.. Ms.Shikha Vashisht, Assistant
Prof.,Kanya Maha Vidyalaya, Jalandhar
from Narendra Burman to all panelists: 3:57 PM

Using surface plasmon resonance, can we study protein
interaction with secondary messengers
from NPQR to all panelists: 3:58 PM

from Deepak Kumar to host (privately): 3:57 PM

Deepak kumar from Meerut College Meerut
from nagarathna to all panelists: 4:06 PM

very good information, tq u sir please send this ppt to
mail nagarathna75@gmail.com
from jasnoor kaur -207130 to all panelists: 4:11 PM

jasnoor kaur , kanya Maha vidalaya Jalandhar.

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August 27, 2012; 10 days of complete submergence



October 9, 2012; 40 days after water receding



November 1, 2012; 60 days after water receding



Swarna-Sub1

Neighbouring varieties badly damaged

Chat

Ram Lal Anand College, DU
from NPQR to all panelists: 3:44 PM

from Bhargava s to host (privately): 3:17 PM

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
from NPQR to all panelists: 3:44 PM

from Sudeshna Saha to host (privately): 3:17 PM

Ballygunge Science College, University of Calcutta
from NPQR to all panelists: 3:45 PM

from parth kapil to host (privately): 3:17 PM

Parth Kapil ,BSc (H) Microbiology, Ram Lal Anand college
from NPQR to all panelists: 3:45 PM

from Krishna Kodappully Das to host (privately): 3:08 PM

Krishna K. Das, IISER Tirupati.
from NPQR to all panelists: 3:45 PM

from Shikha Vashisht to host (privately): 3:01 PM

Good Afternoon to all.. Ms.Shikha Vashisht, Assistant
Prof.,Kanya Maha Vidyalaya, Jalandhar
from Narendra Burman to all panelists: 3:57 PM

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very good information, tq u sir please send this ppt to
mail nagarathna751@gmail.com
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jasnoor kaur , kanya Maha vidalaya Jalandhar.
from Nanda Gopal to all panelists: 4:11 PM

NandaGopal, Msc. Plant Biology and Biotechnology,
University of Hyderabad

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The model of submergence stress tolerance in rice

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graph TD
    Submergence --> Ethylene
    Ethylene --> Sub1A1
    Sub1A1 --> Ethylene
    Sub1A1 --> DWF1DWF4[DWF1/DWF4]
    DWF1DWF4 --> Brassinosteroids
    Brassinosteroids --> GA2Oxidase7[GA2 Oxidase 7]
    Brassinosteroids --> SLR1SLRL1[SLR1/SLRL1]
    GA2Oxidase7 --> Gibberellin
    SLR1SLRL1 --> GAResponses[GA Responses]
    Gibberellin --> ShootElongation[Shoot Elongation]
    GAResponses --> ShootElongation
  
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Ram Lal Anand College, DU
from NPQR to all panelists: 3:44 PM

from Bhargava s to host (privately): 3:17 PM

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from NPQR to all panelists: 3:44 PM

from Sudeshna Saha to host (privately): 3:17 PM

Ballygunge Science College, University of Calcutta
from NPQR to all panelists: 3:45 PM

from parth kapil to host (privately): 3:17 PM

Parth Kapil ,BSc (H) Microbiology, Ram Lal Anand college
from NPQR to all panelists: 3:45 PM

from Krishna Kodappully Das to host (privately): 3:08 PM

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from jasnour kaur -207130 to all panelists: 4:11 PM

jasnour kaur, kanya Maha vidalaya jalandhar:
from Nanda Gopal to all panelists: 4:11 PM

NandaGopal, Msc. Plant Biology and Biotechnology,
University of Hyderabad

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Sarushi KMV college | **Alok Sinha** | Pinky Agarwal | Amar Pal Singh | Anajet Singh | anamica

MAPK inhibitor pre-treatment showed alteration in the most tractable phenotype of SUB1A-mediated submergence tolerance

Genotype	Pre Submergence		Post Submergence	
	Mock Treated	PD98059 Treated	Mock Treated	PD98059 Treated
Swarna	~12 cm	~12 cm	~12 cm	~12 cm
Swarna Sub1	~12 cm	~12 cm	~18 cm	~15 cm

Plant Height (cm.)

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Ram Lal Anand College, DU
from NPQR to all panelists: 3:44 PM

from Bhargava s to host (privately): 3:17 PM

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
from NPQR to all panelists: 3:44 PM

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jasnour kaur, kanya Maha vidalaya jalandhar:
from Nanda Gopal to all panelists: 4:11 PM

NandaGopal, Msc. Plant Biology and Biotechnology,
University of Hyderabad

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from shereenarora to everyone: 3:21 PM
Shereen , Bsc Medical Kmv Jalandhar
from Palak attri to all panelists: 3:22 PM
palak med4 207033 kmv jalandhar
from samiksha to everyone: 3:22 PM
Samiksha
Bsc med sem 4
kmv Jalandhar
from Sakshi Tyagi to all panelists: 3:22 PM
SAKSHI TYAGI , MEERUT COLLEGE MEERUT

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Participants



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palak med4 207033 kmv jalandhar

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Samiksha

Bsc med sem 4

kmv Jalandhar

from Sakshi Tyagi to all panelists: 3:22 PM

SAKSHI TYAGI , MEERUT COLLEGE MEERUT

from Nisha to everyone: 3:22 PM

Nisha, Msc botany, KMV Jalandhar

from sejal to all panelists: 3:22 PM

KMV college Jalandhar

Sejal

207030

from riya to everyone: 3:23 PM

Riya kumar

MSc botany..sem 04

Meerut College, Meerut (UP)

from karthikarajutky to everyone: 3:23 PM

Karthika Raju, Master of Fisheries science (MFSC)sem 4 ,

KUFOS ,Kochi, Kerala

from Niharika Das to everyone: 3:23 PM

Niharika Das, Ramkrishna Mission Vivekananda Education

and Research Institute, M.Sc. Agricultural Biotechnology,

2nd sem

from isha dhiman to all panelists: 3:24 PM

Isha Dhiman

BSCMED4

207001

To: Host

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Q & A



Participants

Chat



ENG

15:24

13-05-2021



Chat

20/02/21

kmv jalandhar

from NIPGR to all panelists: 3:42 PM

from Sutirtha Das to host (privately): 3:25 PM

Sutirtha Das, MSc Biotechnology. Amity Institute of Biotechnology. Kolkata

from AR to all panelists: 3:42 PM

Ankita Roy, Vijaygarh jyotish ray college, University of Calcutta.

from NIPGR to all panelists: 3:43 PM

from Punjab Singh Malik to host (privately): 3:20 PM

Punjab Singh Malik, Meerut College, Meerut

from NIPGR to all panelists: 3:43 PM

from Saumya Samridhi to host (privately): 3:18 PM

Ram Lal Anand College, DU

from NIPGR to all panelists: 3:44 PM

from Bhargavi s to host (privately): 3:17 PM

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

from NIPGR to all panelists: 3:44 PM

from Sudeshna Saha to host (privately): 3:17 PM

Ballygunge Science College, University of Calcutta

from NIPGR to all panelists: 3:45 PM

from parth kapil to host (privately): 3:17 PM

Parth Kapil ,BSc (H) Microbiology, Ram Lal Anand college

from NIPGR to all panelists: 3:45 PM

from Krishna Kodappully Das to host (privately): 3:08 PM

Krishna K. Das, IISER Tirupati.

from NIPGR to all panelists: 3:45 PM

from Shikha Vashisht to host (privately): 3:01 PM

Good Afternoon to all...Ms.Shikha Vashisht, Assistant Prof.,Kanya Maha Vidyalaya, Jalandhar

To: Host

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Participants

Chat



Chat

Research center, szeged, hungary
 from NIPGR to everyone: 3:41 PM
 from Rakesh Gupta to host (privately): 3:27 PM
 Prof Rakesh Gupta, Principal Ram Lal Anand College
 University of Delhi
 from NIPGR to all panelists: 3:42 PM
 from Sarushi KMV college to host (privately): 3:25 PM
 sarushi department of botany K.M.V. College Jalandhar
 from Bharti Sharma to all panelists: 3:42 PM
 Bharti Sharma
 207023
 <mv.jalandhar
 from NIPGR to all panelists: 3:42 PM
 from Sutirtha Das to host (privately): 3:25 PM
 Sutirtha Das, MSc Biotechnology. Amity Institute of
 Biotechnology. Kolkata
 from AR to all panelists: 3:42 PM
 Ankita Roy, Vijaygarh jyotish ray college, University of
 Calcutta.
 from NIPGR to all panelists: 3:43 PM
 from Punjab Singh Malik to host (privately): 3:20 PM
 Punjab Singh Malik, Meerut College, Meerut
 from NIPGR to all panelists: 3:43 PM
 from Saumya Samridhi to host (privately): 3:18 PM
 Ram Lal Anand College, DU
 from NIPGR to all panelists: 3:44 PM
 from Bhargavi s to host (privately): 3:17 PM
 SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
 from NIPGR to all panelists: 3:44 PM
 from Sudeshna Saha to host (privately): 3:17 PM
 Ballygunege Science College, University of Calcutta

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Participants

Chat



ENG

15:44

13-05-2021



▼ **Chat** ✕

from shivani to all panelists: 3:30 PM
Shivani thakur
207016
Bsc medical
from kritika thakur to all panelists: 3:30 PM
kritika thakur bsc medical sem 4 KMV COLLEGE
JALANDHAR
from Rajat Singh to everyone: 3:31 PM
Rajat Singh
MEERUT COLLEGE, MEERUT (U.P.)
from Rajat Singh to all panelists: 3:31 PM
Rajat Singh
MEERUT COLLEGE, MEERUT
from sapna artu to all panelists: 3:31 PM
sapna
bsc medical semester4
kmv collage jalandhar
from rashmi to all panelists: 3:32 PM
Rashmi Holker, PhD scholar, botany department, Meerut
College, Meerut
from shakthi Angayarkanni to all panelists: 3:33 PM
shakthi Angayarkanni
B. sc biotechnology
Nandha arts and science college, erode, Tamilnadu
from Priya Bhatia to all panelists: 3:34 PM
Priya Bhatia, B.Sc. (H) Microbiology, Ram Lal Anand
College, University of Delhi
from Deepak Tomar to everyone: 3:35 PM
DEEPAK TOMAR
MEERUT COLLEGE,MEERUT (U.P.)

To: ▼

Enter chat message here



Participants



Chat

