

Peer-Peer Mentoring Program

Student Learning Center, Hansraj College

Month and Year: April, 2022

Department: Botany Department

Name of the Departmental Program Coordinator: Dr. Satyakam Guha

S. No	Name of the Mentor	Semester	Number of sessions	Date and Time (of each session)	Topics covered (in each session)	No. of Mentees attended (per each session)
1.	Nandini Killa	VI	2	April 9, 2022 4:30-5:00 p m.	Introduction, History, Naming and classification, Enzyme structure and binding, Mechanism of Action (Lock and key hypothesis and Induced fit hypothesis), Inhibition.	9
				April 10, 2022; 5:00-5:30 p.m.	Recap of the topics taught previously, Michaelis Menten equation, factors affecting enzyme activity, Control of	6

					Enzyme activity.	
2.	Josemon Biju	VI	2	May 7, 2022 4:15-5:00 p.m.	Discovery, physiochemical and biological characteristics; classification (Baltimore); General structure with special reference to viroids and prions.	6
				May 8, 2022 3:00-3:40 p.m.	Replication, DNA virus (T-phage), lytic and lysogenic cycle; RNA virus (TMV). Viral diseases.	6

Mentor 1: Nandini Killa

Course: B.Sc (H) Botony

Current Sem: VI

Email id: nandini.killa@gmail.com



April 9, 2022: Topics taught were Introduction, History, Naming and classification, Enzyme structure and binding, Mechanism of Action (Lock and key hypothesis and Induced fit hypothesis), Inhibition from the unit Enzymes.

Full Name	User Action	Timestamp
nandini	Joined	4/9/2022, 4:28:59 PM
anudeepti3187	Joined before	4/9/2022, 4:28:59 PM
anudeepti3187	Left	4/9/2022, 4:43:27 PM
anudeepti3187	Joined	4/9/2022, 4:45:29 PM
anudeepti3187	Left	4/9/2022, 4:49:45 PM
kabir3176	Joined before	4/9/2022, 4:28:59 PM
kabir3176	Left	4/9/2022, 4:47:14 PM
aanchal3138	Joined before	4/9/2022, 4:28:59 PM
ayushi3121	Joined before	4/9/2022, 4:28:59 PM
ayushi3121	Left	4/9/2022, 4:49:19 PM
josemon	Joined	4/9/2022, 4:29:03 PM
bhumika14664	Joined	4/9/2022, 4:38:46 PM
bhumika14664	Left	4/9/2022, 4:39:06 PM
aditi14716	Joined	4/9/2022, 4:43:24 PM
riya14682	Joined	4/9/2022, 4:43:35 PM
riya14682	Left	4/9/2022, 4:46:30 PM

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HISTORY

- **1878** - first used by the German physiologist **Wilhelm Kühne**.
- En (meaning 'within') and zyme (meaning 'yeast'),
- **1920s** - enzymes were crystallized
- **1980s** - **Ribozymes** (RNA molecules exhibit catalytic activity were discovered)
- **1980s** - Development of **Abzymes**

NAMING AND CLASSIFICATION

- Enzymes typically have common names (often called 'trivial names')
- All enzymes are described by a four-part **Enzyme Commission (EC) number**. For example, lactate dehydrogenase has the EC number 1.1.1.27
- The first part of the EC number refers to the reaction that the enzyme catalyses. The remaining digits have different meanings according to the nature of the reaction identified by the first digit.

TWO THEORIES

Lock and Key Hypothesis

Enzymes are very specific and it was suggested by **Fischer in 1890** that this was because the enzyme had a particular shape into which the substrate or substrates fit exactly.

Induced Fit Hypothesis

Daniel Koshland extended Fischer's ideas and presented the "induced-fit model" of substrate and enzyme binding, in which the enzyme molecule changes its shape slightly to accommodate the binding of the substrate.

April 10, 2022: Topics Michaelis-Menten equation, factors affecting enzyme activity from the unit Enzymes, were covered.

Full Name	User Action	Timestamp
nandini	Joined	4/10/2022, 4:57:38 PM
aanchal3138	Joined	4/10/2022, 4:59:08 PM
josemon	Joined	4/10/2022, 4:59:58 PM
anudeepti3187	Joined	4/10/2022, 5:01:29 PM
vaibhavi3105	Joined	4/10/2022, 5:01:31 PM
kabir3176	Joined	4/10/2022, 5:07:50 PM
kabir3176	Left	4/10/2022, 5:23:58 PM

Photographs:

Mentorship - Enzymes

08:07

LOCK AND KEY V/S INDUCED FIT MODEL

<p>INDUCED FIT MODEL</p> <p>A model for enzyme-substrate interaction in which the active site of the enzyme does not completely fit with the substrate</p> <p>Suggested by Daniel Koshland in 1958</p> <p>The active site of the enzyme does not completely fit with the substrate</p> <p>The active site of the enzyme has to undergo a conformational change in order to improve binding</p> <p>The active site of the enzyme contains two components</p>	<p>LOCK AND KEY MODEL</p> <p>A second model for enzyme-substrate interaction in which the active site of the enzyme completely fits with the substrate</p> <p>Suggested by Emil Fischer in 1894</p> <p>The active site of the enzyme precisely fits with the substrate</p> <p>Describes the specificity of the active site of the enzyme to a particular substrate</p> <p>The active site of the enzyme contains a single entity</p>	<p>There is a separate catalytic group in the enzyme</p> <p>The active site of the enzyme is not static</p> <p>A transition state develops before the reactants undergo changes</p> <p>Catalytic group weakens the substrate bonds either by the nucleophilic or electrophilic attack</p> <p>Describes the mechanism of nonaction over competitive inhibitors</p>	<p>There is no separate catalytic group in the enzyme</p> <p>The active site of the enzyme is static</p> <p>No transition state</p> <p>No weakening of the substrate bonds</p> <p>Describes the specificity of the active site of the enzyme to a particular substrate</p> <p>Visit www.PEDIAA.com</p>
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Mentorship - Enzymes

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COMPETITIVE AND NON-COMPETITIVE INHIBITION

NORMAL REACTION

COMPETITIVE INHIBITOR

NONCOMPETITIVE INHIBITOR

08:22

Mentorship - Enzymes

19:26

CONCENTRATION OF SUBSTRATE

• Increase in the substrate concentration gradually increases the velocity of enzyme reaction within the limited range of substrate levels.

19:26

Mentor 2: Josemon Biju

Course: B.Sc (H) Botony

Current Sem: VI

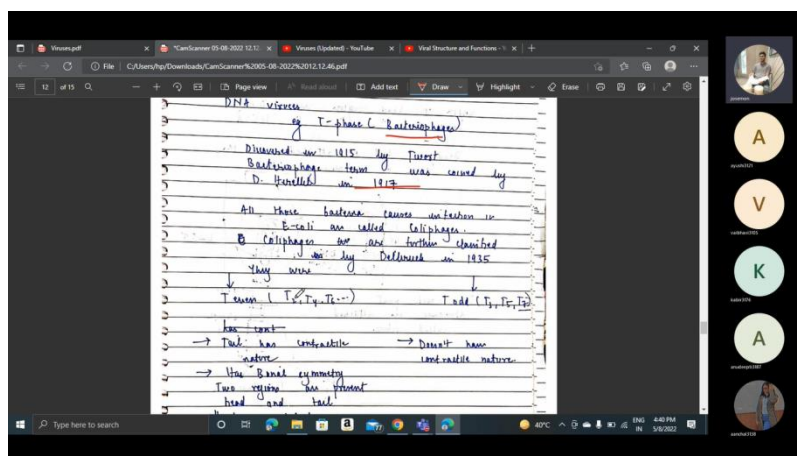
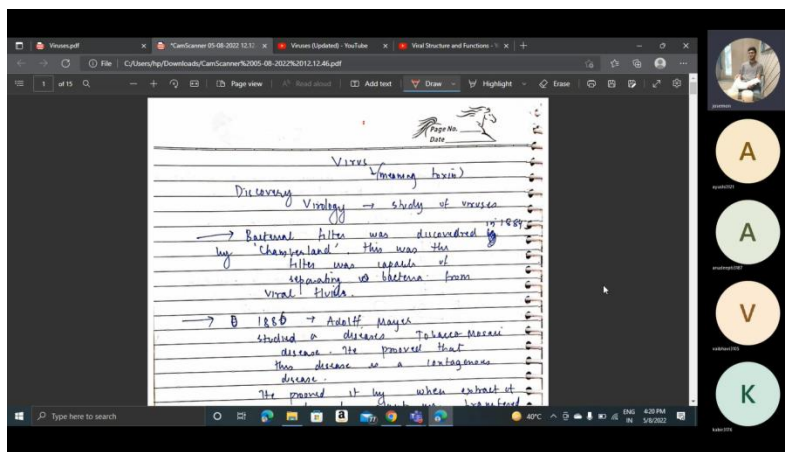
Email id: josephbiju150@gmail.com



May 7, 2022: Topics covered were Discovery, physiochemical and biological characteristics; classification (Baltimore); General structure with special reference to viroids and prions from the unit Viruses.

Full Name	User Action	Timestamp
josemon	Joined	5/7/2022, 3:00:50 PM
anudeepti3187	Joined	5/7/2022, 3:03:03 PM
ayushi3121	Joined	5/7/2022, 3:08:14 PM
kabir3176	Joined	5/7/2022, 3:11:18 PM
vaibhavi3105	Joined	5/7/2022, 3:11:59 PM
aanchal3138	Joined	5/7/2022, 3:12:03 PM

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Windows taskbar: Virus.pdf, CamScanner 05-08-2022 12:17, Viruses (Updated) - YouTube, Viral Structure and Functions - 1

File: C:\Users\pjp\Downloads\Viruses.pdf

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Origin

There are three theories to explain the origin of viruses:

- Regressive evolution**
 The first hypothesis is the theory of "regressive evolution", which proposes that viruses descend from free-living and more complex parasites. According to this theory viruses were dependent on host cell machinery through evolution but retained the ability to auto replicate. Viruses are degenerate life-forms which have lost many functions that other organisms possess & have only retained the genetic information essential to their parasitic way of life.
- Cellular origins**
 The second hypothesis is the theory of "cell origin", which assumes that viruses originate from cell DNA and/or messenger RNA, which acquired the ability to auto-replicate, create extracellular virions, exist and function independently.
- Independent entities**
 The theory of "independent" or "parallel" evolution of viruses and other organisms, which assumes that viruses appeared at the same time as the most primitive organisms.

Morphology

Institute of Lifelong Learning, University of Delhi

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Windows taskbar: Virus.pdf, CamScanner 05-08-2022 12:17, Viruses (Updated) - YouTube, Viral Structure and Functions - 1

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Handwritten notes:

In case of ~~ribosome~~ viriod RNA molecule does not code for any protein.

gDNA cause Potato spindle tuber disease

① Bacterial disease of citrus

② Viruicide: Has infectious RNA molecule which also codes for coat protein.

can not cause infection in the presence of other virus called helpers virus.

Viruicide	Viruicide
① RNA molecule causes both infection and codes for protein	① Only cause infection
② Causes infection	② Causes infection

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Handwritten notes:

BSE - BSE in cattle
 Bovine spongiform Encephalopathy

Virus: classification

David Baltimore → discovered enzyme called Reverse transcription enzyme

Classification

- Process involved is synthesizing its genetic material
- In what way the virus synthesises its RNA.

7 group according to this system of classification

Group 1: Genetic material is DNA and it is double stranded.

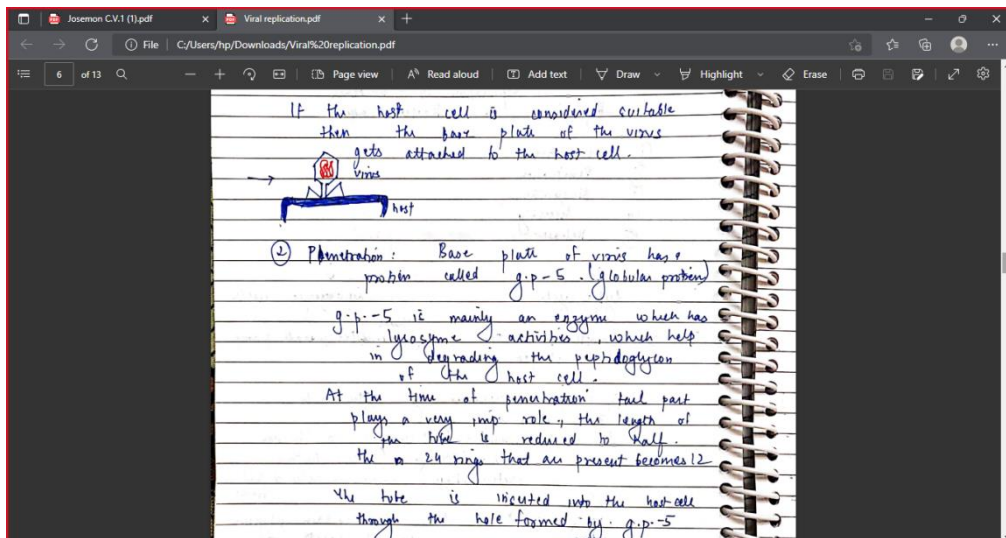
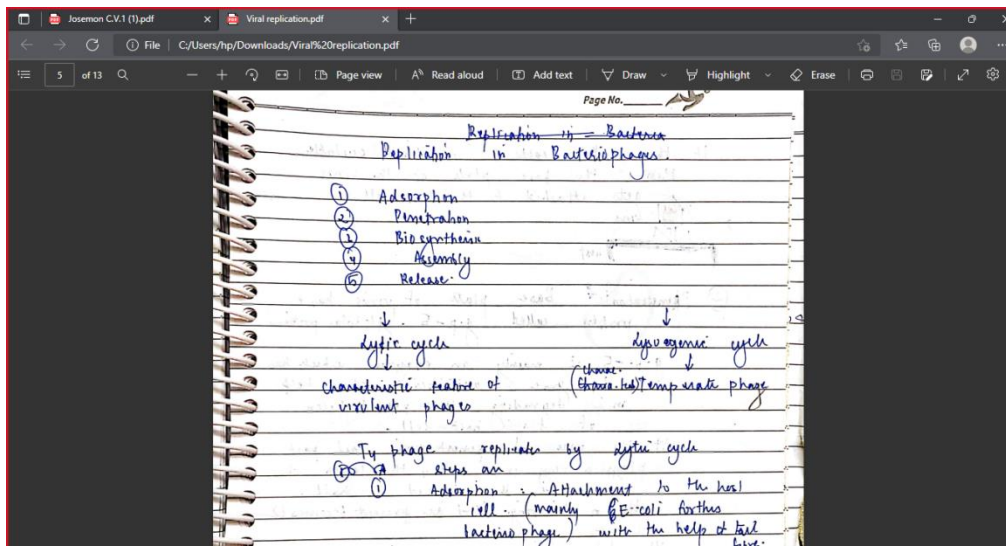
① Double stranded DNA → D.S. DNA

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May 8, 2022: Topics covered were Replication, DNA virus (T-phage), lytic and lysogenic cycle; RNA virus (TMV) and Viral diseases.

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josemon	Joined	5/8/2022, 4:15:56 PM
ayushi3121	Joined	5/8/2022, 4:16:18 PM
vaibhavi3105	Joined	5/8/2022, 4:16:34 PM
anudeepti3187	Joined	5/8/2022, 4:17:21 PM
anudeepti3187	Left	5/8/2022, 4:27:37 PM
anudeepti3187	Joined	5/8/2022, 4:27:38 PM
kabir3176	Joined	5/8/2022, 4:19:02 PM
aanchal3138	Joined	5/8/2022, 4:20:18 PM

Photograph:



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③ **Biosynthesis: very rapid process**

Early stage

When RNA polymerase enzyme gets attached to the viral DNA, it leads to the undirected transcription and early leads to the formation of coding m-RNA.

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④ **Assembly stage:**

Different parts are assembled in a particular sequence.

If taken by 2 side by side manner:

- ① Head region assembled
- ② Tail

simultaneously assembly of head region takes place

Assembly of tail, it always starts with the 'base plate' and then the 'sheath region' is assembled, then the 'tail fibres'.

simultaneously assembly of head region takes place

Head - head is formed and side by side genetic material is loaded from the start to be assembled as 'tail fibres'.

⑤ **Release:** Release protein mainly occurs through lysis process in bacteria.

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of DNA-repressor and lead to the synthesis of another system called λ -phage. λ -phage promotes the synthesis of late m-RNA. Further processes occur.

Economic Importance of Virus

- ① Harmful effects
- ② Beneficial effects

Harmful effects

- ① Causes disease \rightarrow cannot complete their life cycle without host cell. Effects all type of living organism.
- ② Not always to cure these diseases

Plant Diseases: Tobacco Mosaic Disease caused by TMV

\rightarrow small white spots appear at the surface, yellowish in colour, changed in mosaic patterns. It spreads to different parts, metabolism disturbed and the plant becomes diseased.