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 ASSIT. PROF OF. BIOCHEMISTRY

EVEN SEMESTR - APR - 2022.

DAY	1	2	3	4	5
DAY 1			I MSC		III BSc
DAY 2		II Lab BSc		I MSC	
DAY 3			BHM EVS		I MSC
DAY 4	BHM EVS			III BSc	
DAY 5	I MSC	II BSc			III BSc
DAY 6		III BSc		I MSC	III BSc

Date: 29/3/22  
Day: 15  
H. 11

## External Structures

### Flagella :-

Some bacteria have flagella

They are long

Flagella vary both in number and distribution

Bacteria which have a single flagellum

located at one end, are called monotrichous

### Fimbriae or pili :-

Some bacteria have short, fine, hair like appendages that are thinner than flagella.

They are called fimbriae

pili :- Hair like structures which are longer than fimbriae

They are also called conjugation pili or sex pili

### Cell membrane :-

Cell membrane is thin living membrane

It primarily consists of phospholipids and proteins

### Cytoplasm :-

The cytoplasm is the semifluid substance inside the cell membrane

Full  
29/3/22

11/4/22

Dns - v - 11

## Myxobacteria

The myxobacteria (slime bacteria) are group of bacteria that predominantly live in the soil and feed on insoluble organic substances.

The myxobacteria have large genomes relative to other bacteria.

more recently, secondary metabolites was discovered, these compounds secreted the major yellow pigment.

myxobacteria are Gram - negative single celled bacteria.

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Prepared

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# Enzyme Technology

21/02/2022

Day 02: IT

## Classification of Enzymes.

Enzymes are biocatalysts. Enzymes are catalysts for biochemical reactions in living cells. Enzymes help to speed up reactions of digestion and metabolism.

The naming of enzyme is called nomenclature of enzymes.

1. Nomenclature based on Substrate
2. Nomenclature based on Reaction.
3. Based on substrate and Reaction.
4. Based on synthesis
5. Based on Discoverer.
6. Based on Enzyme Commission (EC)
  1. Oxidoreductases
  2. Transferases.
  3. Hydrolases.
  4. Lyases.
  5. Isomerases.
  6. Ligases.

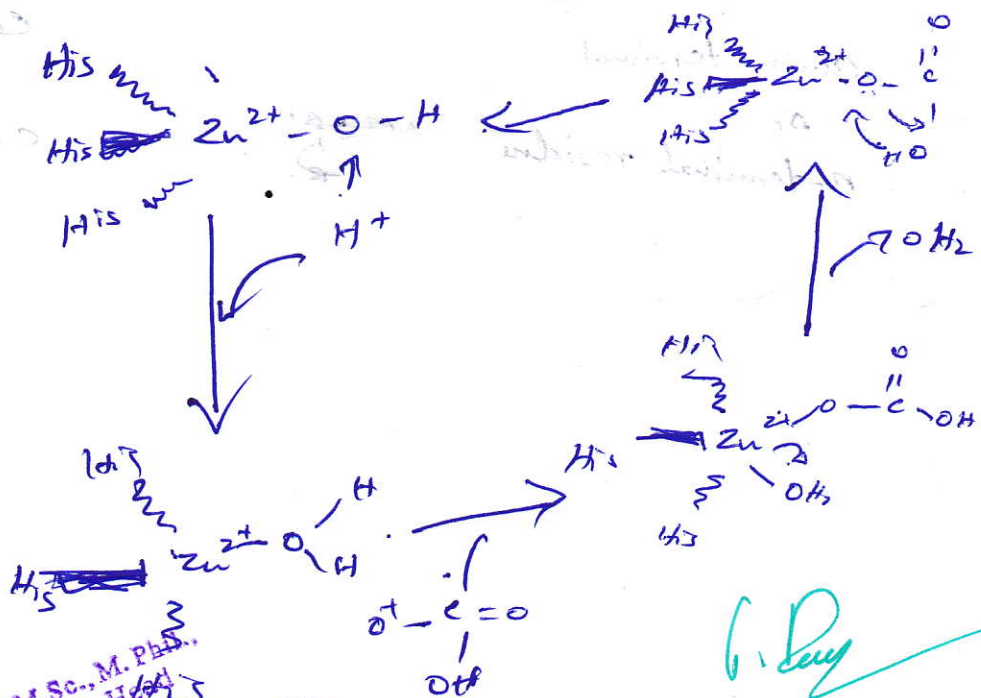
7. Based on E.C Number

04/04/22  
 po: II

Carbonic anhydrase.

It is a family of enzymes that catalyse the interconversion between carbon dioxide and water and the dissociated ions of carbonic acid.

The active site of most carbonic acid anhydrase contains a zinc ion.



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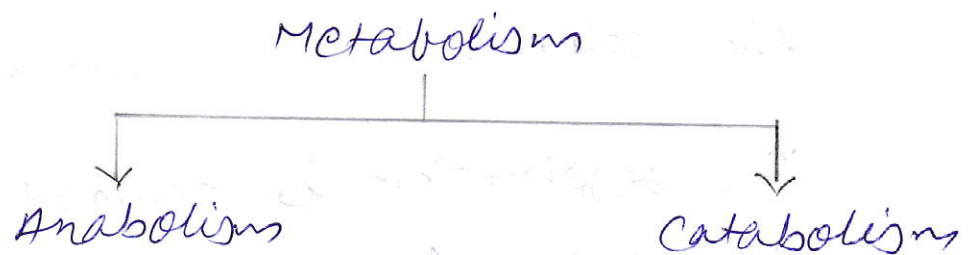
D.O HY	1	2	3	4	5
<u>I</u>	<u>ii</u> M.Sc			<u>i</u> M.Sc	
<u>ii</u>		<u>i</u> M.Sc			<u>ii</u> M.Sc
<u>iii</u>	<u>ii</u> M.Sc			<u>i</u> M.Sc	
<u>iv</u>		<u>ii</u> M.Sc			<u>i</u> M.Sc
<u>v</u>		<u>ii</u> M.Sc		<u>i</u> M.Sc	
<u>vi</u>	<u>i</u> M.Sc			<u>ii</u> M.Sc	

21/2/22

18/18

## INTRODUCTION:

Metabolism deals with the numerous biochemical reactions that take place within the system of a living organism.



Anabolism involves the building up of a macromolecules by the joining of micromolecules. This involves energy.

Catabolism involves the breaking down of the macromolecules into smaller subunits.

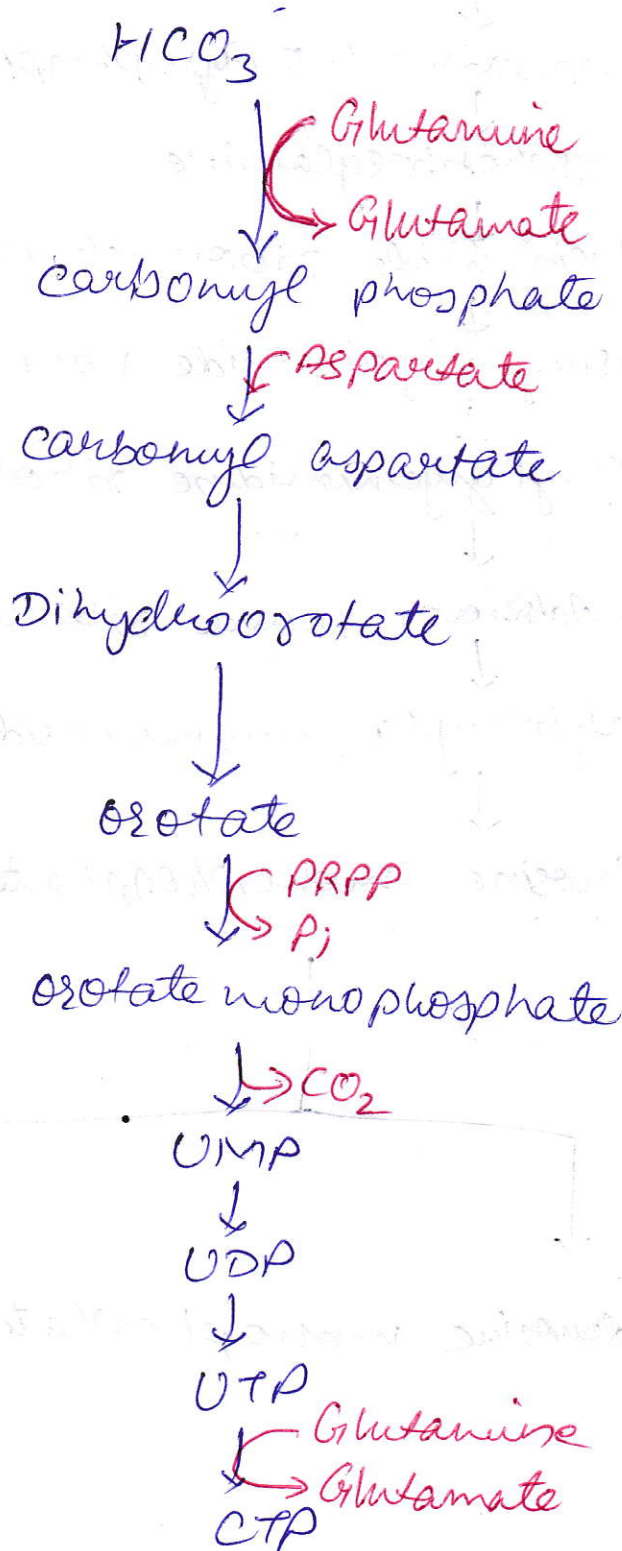
This involves the release of energy.

Catabolism is always integrated with that of the anabolic reaction.

2/5/22

EM

# PYRIMIDINE NUCLEOTIDE BIOSYNTHESIS



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D \ H	1	2	3	4	5
D11		III B.Sc		II B.Sc	
D2		III B.Sc			III B.Sc
D3		II B.Sc		III B.Sc	
D4	II B.Sc	II B.Sc			III B.Sc
D5	III B.Sc		II B.Sc		II B.Sc
D6		← Major Lab →			
			II B.Sc		

Date: 23.02.22

Day order: III

Anticoagulants:

The blood from a person's vein to a test tube and prevented from clotting. For this the tube containing anticoagulant. **Serum** = Plasma - Fibrinogen (Coagulant factor)

Examples for anticoagulants are: Heparin, EDTA, Sodium citrate, Sodium Fluoride & Potassium oxalate etc.

Hemolysis:

\* Clinical investigations are interfered by the cellular constituents from the RBC lysis.

\* To avoid this should use dry syringes, needles and containers; to allow slow blood flow into syringe.

Preservation of Blood Specimens:

\* After blood collection, plasma (or) serum should be separated within 2 hrs.

\* Immediate analysis of plasma (or) serum after blood collection.

\* Samples stored at 4°C until analyzed.

\* For enzyme analysis, samples preserved at 20°C.

Choice of blood specimen:

\* Whole blood - for the estimation of Hb, pH, glucose.

\* Plasma - for the parameters of fibrinogen, glucose, bicarbonate, Chloride, ascorbic acid etc.

\* Serum - estimated for proteins, creatinine, bilirubin, cholesterol, uric acid, electro

Date: 18.04.22

Day: Tu

## Ketoacidosis

- accumulation of abnormal amount of ketone bodies in tissues and body fluids. is -

Ketonaemia - rise of ketone bodies in blood above normal level.

Ketonuria - the blood level of ketone bodies rises above the renal threshold value.

Cause:

\* Starvation

\* Diabetes mellitus

\* High fat feeding

\* After severe exercise in the post-absorptive state

\* Injection of anterior pituitary extracts.

Both acetoacetate &  $\beta$ -hydroxybutyrate are increased their concentration in blood would cause acidosis.

Diabetic ketoacidosis is dangerous may result in coma and even death.

The hormone glucagon stimulates ketogenesis

whereas insulin inhibits.

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# Fundamentals of Biology - III (U4R1BCAC6)

## Unit I

### Biodiversity

Taxonomic Systems: Introduction to taxa - species concept - methods of taxonomy - Phenetic Methods - Identification keys - Cytotaxonomy - Chemotaxonomy - Phylogenetic taxonomy - Nonmendelian methods. Animal Groups: Methods of Grouping Animals - Major Phyla - characters with Examples - Protista - Porifera - Coelenterata - Platyhelminthes - Nematodes - Annelida - Arthropoda - Mollusca - Echinodermata - Chordata.

## Unit II

### Genetics

Concept of Heredity and Variation - Mendel's Law of Inheritance - Chromosomal Basis, Incomplete Dominance, Epistasis, Chromosomal Structure and Types - Genes and Genomes - Linkage and Crossing over, Gene

Date: 14/5/20

Hour: IV

Day order: II

# Fouling and fouling organisms.

Fouling organisms secrete and accumulate the waste substance. A fouling organism is an animal (or) plant species that exists in water and attaches to the surface of a material immersed in the water.

Examples: - <sup>Micro fouling organisms</sup>  
1) Diatoms  
2) Bacteria  
3) Protozoa

## Animal fouling organisms

- 1) Oysters
- 2) Clams
- 3) Tube worms
- 4) Mussels
- 5) Hydroids.

## Plant fouling organisms

- 1) Ectocarpus (Brown Algae)
- 2) Green Algae
- 3) Red Algae



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 Asst Professor  
 Dept of Biochemis  
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 T. J. college of Arts  
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Time Table.

D/H	1	2	3	4	5
D <sub>1</sub>				III BSc	I MSc
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D <sub>3</sub>	III BSc		I MSc		III BSc
D <sub>4</sub>	III BSc				
D <sub>5</sub>		I MSc		III BSc	
D <sub>6</sub>		I MSc			

Date :- 21/2/2022

Day Index :- 1

Hrs :- 5

## Plant cell.

Plant cell may be defined as an organised unimuclear mass of Protoplasm, bounded by a cell wall existing singly / in groups & containing structure of various sorts.

Different b/w plant & animal cell :-

Plants

Animals

1) Cell wall present

Absent.

2) vacuoles "

"

3) chloroplasts

"

4) Centriosomes & centrioles

"

Absent

## Ultrastructure Of Plant Cell :-

Plant cell is usually spherical or polyhedral, box-like shape & a diameter of about 0.01 mm to 0.1 mm.

It consists of three parts,

\* cell wall

\* cytoplasm

\* nucleus

Date :- 19/4/22

Day Order :- 5

Herb :- 2, 4, 5

## Dormancy

Dormancy phase is represented by resting spores and in higher groups seed stage is the important dormant phase.

In certain perennial plant, specialised resting organs such as winter resting buds of trees, tubers, rhizomes, bulb, corms etc.

In general, the term is applied for any phase in the life cycle of plant, in which active growth is temporarily suspended.

Different types,  
→ Imposed dormancy. when dormancy occurs due to unfavourable environmental conditions.

→ Innate dormancy. is due to conditions in the dormant organ itself.

\* Pre-dormancy

\* Mid-dormancy

\* Post-dormancy



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Time Table.

D	H	1	2	3	4	5
D <sub>1</sub>			III BSc		III BSc	
D <sub>2</sub>	II PG		III BSc	II PG		III BSc
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D <sub>4</sub>	II PG		II PG			
D <sub>5</sub>			III BSc			III BSc
D <sub>6</sub>	II PG		III BSc	III BSc		

# MOLECULAR BIOLOGY

(P<sub>3</sub>R<sub>1</sub>BCCC13)

UNIT :- I

DNA REPLICATION :-

Types of replication, evidence for semi conservative replication - Messelson & Stahl experiment. Replications in circular chromosomes - Cairns model, rolling circle model. Replication in Prokaryotes and in inhibitors of replication, replication bubble, bidirectional replication, replicon, action of SSB, Primase, DNA gyrase, topoisomerase, DNA Polymerase I, II, III, lagging & leading strand synthesis. Okazaki fragments, replication in RNA viruses, plasmid replication, reverse transcriptase, retroviruses, eukaryotic replication (overview and method) inhibitors of replication.

UNIT :- II

Transcription :-

Transcription - definition, coding strand, template strand, sense strand and anti-sense strand, Promoter

Date :- 25/8/2021  
Day :- 1  
Hrs :- 2

## Structure of t-RNA

Transfer ribonucleic acid (tRNA) is a type of RNA molecule that helps decode a messenger RNA (mRNA) sequence into a protein. tRNAs function at specific sites in the ribosome during translation, which is a process that synthesizes a protein from an mRNA molecule.

The tRNA molecule has a distinct three-lobed structure with three hairpin loops that form the shape of a three-leafed clover.

One of these hairpin loops contains a sequence called the anticodon, which can recognize and decode an mRNA codon.

Each tRNA has its corresponding amino acid attached to its end.

When a tRNA recognizes & binds to its corresponding amino acid attached to its end.



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Assistant professor

Department of Biochemistry

Course: Human Physiology  
(USRIBCC11)

Semester: Odd (November)

Year: 2021

# HUMAN PHYSIOLOGY (USRIBCCII)

## Unit I

### Digestive System

Parts of the digestive system - Secretion, Properties, composition and functions of Saliva, gastric juice, Pancreatic juice, Bile and succus entericus. Digestion and absorption of carbohydrates, lipids and proteins.

## Unit II

### Respiratory system

Respiration - Types, structure and functions of respiratory tract. Pulmonary circulation, Mechanism of Respiration, exchange and transport of respiratory gases, regulation of respiration, Disturbances in respiration

## Unit III

### Circulatory System

Structure and functions of heart, properties of the cardiac muscles. Divisions of circulation. Cardiac cycle, Electrocardiogram (ECG) Cardiac output, Measurement of Blood Pressure, Coronary circulation.

## Unit IV

### Excretory system

Structure and functions of kidney, structure of Nephron, mechanism of urine formation

Date: 23-10-2021

Page No: II

Hours: I

## Excretory products.

Animals and human beings etc excrete a wide variety of excretory products. They are

1) Ammonia 2) Urea 3) Uric acid

4) Trimethylamine oxide 5) Creatinine

Based on the excretory products, they are

(i) Ammonotelic (ii) Ureotelic

(iii) Uricotelic

Excrete ammonia etc called Ammonotelic.

The process of excretion of ammonia is

called ammonotelism. Eg. Aquatic animals.

Ureotelic

The animals excreting urea is called

Ureotelic. The process of excretion of urea

is called ureotelism. Eg. Tadpole (Mammals)

Uricotelic

Excreting Uric acid etc called Uricotelic

The process of excretion of uric acid

is called Uricotelism.

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ASSISTANT PROFESSOR

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Molecular Endocrinology

Nov-2021

# MOLECULAR ENDOCRINOLOGY

## P3RBCC11 - III SEMESTER.

### UNIT - I PITUITARY HORMONE

Hormones - Classification, biosynthesis, Circulation, modification and degradation, Hormone receptors Structure and regulation. Mechanism of hormone action. Hypothalamic releasing factors. Anterior pituitary hormone: biological actions. regulation and disorders of growth hormones. ACTH and prolactin. posterior. hormone biological actions and regulation of Vasopressin. Diabetes insipidus and SIADH secretion, Oxytocin. Hypopituitarism.

### UNIT - II THYROID AND PARATHYROID HORMONE

Thyroid hormones - synthesis, Secretion, regulation transport, metabolic fate and biological actions. Antithyroid agents. Thyroid functions test. Hyper and hypothyroidism. Hormonal regulation of calcium and phosphate metabolism. Secretion and biological actions of parathyroid hormone, Calcitonin and Calcitriol - mechanism of action, regulation and role. Hypocalcaemia and hypocalcaemia, rickets and Osteomalacia.

### UNIT III ADRENAL HORMONE

Adrenal cortical hormones - Synthesis regulation of transport, metabolism and biological effects of glucocorticoids and mineralocorticoids. Cushing's syndrome, Conn's syndrome and primary adrenal hyperplasia.

24/9/21  
VI-I

receptor kinases

signal transductions

Receptor tyrosine kinases (RTKs) are membrane receptors that attach phosphates to tyrosines.

A receptor tyrosine kinase can trigger multiple signal transduction pathways at once.

Abnormal functioning of RTKs is associated with many types of cancers.

In particular, the binding of a signaling molecule with RTK activates tyrosine kinase to turn on a series of enzymatic reactions that carry the signal to the nucleus, where it alters path

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	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
D <sub>1</sub>	I <sub>MSC</sub>		I <sub>MSC</sub>	I <sub>MSC</sub> (MB)	
D <sub>2</sub>	•	I <sub>MSC</sub>		I <sub>MSC</sub>	MB
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D <sub>5</sub>		I <sub>MSC</sub>			
D <sub>6</sub>		I <sub>MSC</sub>			I <sub>MSC</sub>

20/10/2021

DS-1

Hr: 3

# Microbiology

ICT

## Unit I

Classification of Microorganism.

Taxonomy - organizing, classifying and naming living things.

- Formal system originated by

Carl von Linné (1707 - 1778)

- Identifying and classifying organisms according to specific criteria.

- Each organism placed into a classification system.

Domains :-

Eubacteria - true bacteria, peptidoglycan

Archaea :-

Odd bacteria that live in extreme environments, high salt, heat etc..

Eukarya :-

have a nucleus & organelles

Naming Microorganisms :-

- Binomial nomenclature.

- Gives each microbe 2 names.

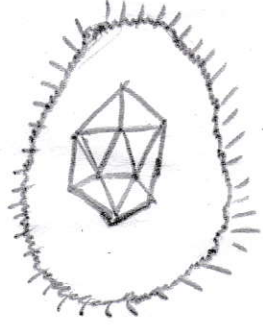
① Genus ② Species.

2/12/20  
10:1  
11:1

Chicken pox:-

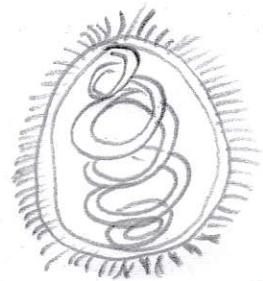
It is a viral disease. It is a communicable disease caused by Herpes virus. Varicella. It is characterised by a pleomorphic eruption of the skin and mucous membranes.

It is caused by a virus Varicella. It is a DNA virus. The virus is present in the oropharyngeal secretion, lesions of the skin and mucous membranes and blood of infected persons.



Influenza:-

An acute viral infection of the respiratory tract with inflammation of nasal mucosa, pharynx and conjunctiva.



deficiency

a RNA

deficiency

is a

by luc

which

ed from fluids like breast milk,

tease

protein

41

protein coat

RNA

lipid layer envelope

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Unit-I - Enzymes

Nomenclature, classification, chemical nature and units of enzyme activity. Structure, properties and function of coenzymes - NAD, FAD, CoA. Metallo enzymes and metal activated enzymes. Isoenzymes of lactate dehydrogenase. Multienzyme complex - pyruvate dehydrogenase complex and fatty acid synthase complex enzyme. Nonprotein enzymes - Ribozymes and Labzymes.

Unit-II - Mechanism of Enzyme action

Active site, models of enzyme - substrate complex formation - Lock and key model, induced fit model and substrate strain model. Mechanism of enzyme catalysis: Acid-Base catalysis covalent catalysis, substrate strain and Entropy effect. Enzyme specificity - group specificity and optical specificity. Mechanism of action of chymotrypsin and lysozyme.

Unit-III - Enzyme kinetics

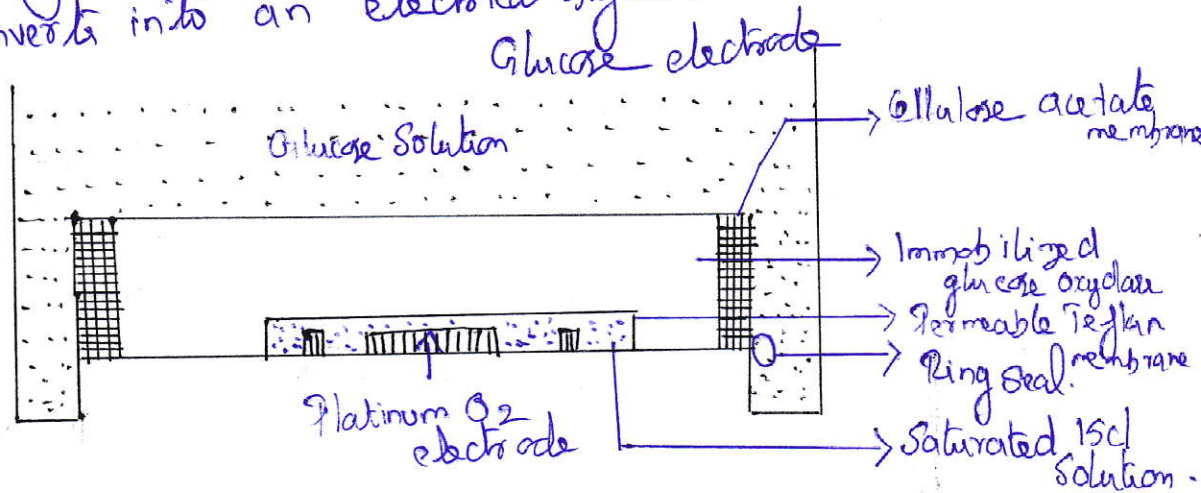
Theories of enzyme kinetics - Derivation and significance of Michaelis-Menton equation. Transformation of M-M equation - Line weaver-Burke plot, The Eadie-Hofstee plot and the Hanes-Woolf plot. Factors influencing enzyme activity. Enzyme inhibition - types of inhibition - competitive, Noncompetitive, Uncompetitive, Feedback and Allosteric inhibition.

Unit-IV - Characterization of Enzymes

Identification of sources of enzymes, methods of isolation of enzymes. Use of hydrolytic enzymes, homogenization by homogenizer, use of hypotonic solutions, ultrasonic vibrations. Methods of purification - methods depending on size or mass, methods depending upon charge, methods based on changes in solubility and methods based on specific binding sites. Criteria of purity of enzymes. Preservation of purified enzymes.

## Biosensor

- an analytical device having an immobilized layer of biological material that analyze the biological signal and converts into an electrical signal.



- Product passes through the membrane to the transducer.

- Signal processing equipment converts the amplified signals into a display most commonly the electric signal which can be read out and recorded.

## Biochips

- self shaping property of proteins helps in biochip designing.

- Semiconducting organic molecule is inserted into a protein framework.

- respond to natural nerve impulses implanted into the artificial limbs

- so used as heart beat regulator

- electrical signals produced by biochips

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Odd- Semester - Lesson Plan

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	1	2	3	4	5
01		<u>II M.Sc</u>		<u>II M.Sc</u>	
02		<u>II M.Sc</u>		<u>II M.Sc</u>	
03	<u>II M.Sc</u>			<u>II M.Sc</u>	<u>II M.Sc</u>
04		<u>II M.Sc</u>		<u>II M.Sc</u>	
05					
06		<u>II M.Sc</u>	<u>II M.Sc</u>		

UNIT - I:LYMPHOID SYSTEM, ANTIGENS AND ANTIBODY

Lymphoid System - central and Peripheral lymphoid organs and cells involved in immune system. Antigen, haptens, adjuvants, antigenicity, antigenic determinants and epitopes. Immunoglobulins basic structure, classification, functions, allotypes and idiotypes. Theories of antibody formation - side chain and clonal selection theory. Antibody diversity - mechanisms contributing to diversity. Somatic recombination, rearrangement and generation of antibody diversity.

UNIT - II:IMMUNITY AND COMPLEMENT SYSTEM:

Types of immunity - innate and acquired immunity. antitoxin, anti bacterial and antiviral immunity. Immune response - Primary and secondary - humoral and cell mediated immunity. Antigen recognition - T cell and B cell receptor complexes, antigen processing and presentation. Interaction of T and B cells, cytokines. Immunological memory, cytotoxicity - immunotolerance, immunosuppression. Complement system - nomenclature, components, activation of complement. Complement receptors and alternate pathway.

UNIT - III:VACCINES AND IMMUNOLOGICAL TECHNIQUES:

Vaccines - killed, attenuated, toxoid, recombinant vaccines, subunit vaccines, DNA vaccines, synthetic peptide vaccines, anti-idiotypic vaccines. Immunization practices - immunoprophylaxis and immunotherapy. Immunological techniques - Production of polyclonal and monoclonal antibodies. Immunoprecipitation, RIA, ELISA, fluorescent immunoassay, avidin-biotin mediated assay, immunohistochemistry, immunoelectrophoresis, immunoblotting. Complement fixation test.

UNIT - IV:GENETIC BASIS OF IMMUNOLOGY:

MHC complex - gene organization - HLA genes - Class I & II

Date: 22.10.21

Day: 11

## Secondary immune deficiencies:

- arise not from genetic (or) developmental causes but from environmental exposures.
- occur at any time of life, depending upon the exposures.

environmental factors are:

Stress, malnutrition, reduced levels of iron, zinc, selenium and vitamins A, B<sub>6</sub>, C & E, radiation, cytotoxic drugs, corticosteroids, injection with viruses, bacteria & parasites & HIV destroys CD4+ T cells leads to AIDS.

## Diagnosis & Investigations:

### T Cell Test:

- response to intradermal test with an antigen
- eg: Positive tuberculin test
- proliferative response of T<sub>H</sub> cell to mitogens or allogenic lymphocytes.

### B cell Test:

- antibodies against common bacterial antigens (or)
- antibodies against bacterial toxins.

## Treatment:

- replacement of an immunodeficient patient's bone marrow from a marrow from a normal donor may provide a permanent restoration.

- passive administration of Ig, cytokines (or)

*[Signature]*  
22/10/21

*[Signature]*

Date: 24.09.2021.

Page: IV

CLASS: I - BIO

SUBJECT: BIOMOLECULES

CODE: UIR1BCCG1

DAY: 1:

- ⇒ First of all introducing myself to students.
- ⇒ Then introduce the students.
- ⇒ Taking a presentation on our college campus and its environment.
- ⇒ What is Biochemistry and its explaining it, why study or know Biochemistry.
- ⇒ Giving an explanation about the faculty of the department.
- ⇒ Explaining what are the subjects are in the first year.
- ⇒ Explaining about what else can be studied after completing the three year degree.
- ⇒ And after course completing this Biochemistry it is related to giving a brief description related to a job.

Signature of the HoD

Date: 30.12.21 Day order: DS Hr: III

## Ribosomal RNA

- present in ribosome.
- Insoluble DNA.
- It have 65% to 70% of mass of ribosomes.
- ribosomes is responsible for synthesis of protein.

## Function of RNA

- mRNA → carries message & signals
- tRNA → carries the A.A to codon during translation.
- rRNA → part of ribosomes. RNA + ptn.
- siRNA → control the gene expression.
- snRNA → edit the mRNA.

*JK*  
30/12/21

Mrs. S. KANITHA, M.Sc., M.Phil.  
Assistant Professor & Head  
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*C. Par*  
Dr. J. PARASURAMAN, M.A., M.B.A., M.C.A.,  
M.Phil., B.Ed., Ph.D.

PRINCIPAL  
J.J. College of Arts and Science  
(Autonomous)

Ms. S. KANITHA, HEAD  
DEPARTMENT OF BIOCHEMISTRY  
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(AUTONOMOUS)  
PUDUCOTTAI

INTERMEDIARY METABOLISM  
USRIBOCCIO

JUNE 2021

1/7/21

12/18

## INTRODUCTION:

### METABOLISM

#### ANABOLISM

→ Building up of macromolecules

→ Energy is utilised

#### CATABOLISM

→ Breaking down of macromolecules into smaller subunits

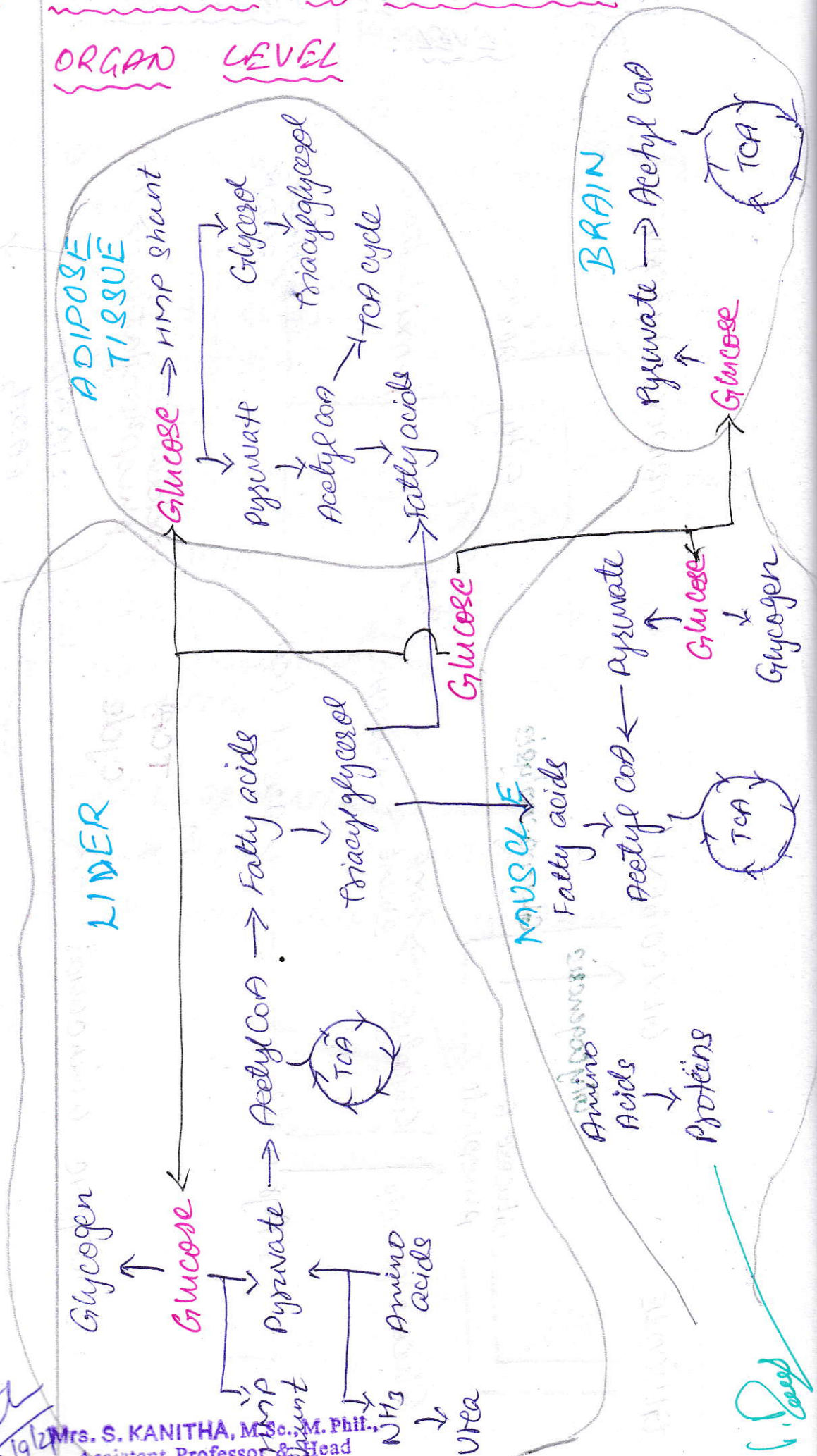
→ Energy is released

- Involves all the reactions taking place within a living system
- Few reactions requires energy
- Few reactions results in production of energy
- Deals with the study of all the high energy molecules.
- Pathways that involve the transfer of energy between molecules

16/9/21  
 11 AM

INTEGRATION OF METABOLISM -

ORGAN LEVEL



*Handwritten signature and date:*  
 16/9/21

Mrs. S. KANITHA, M.Sc., M. Phil.,  
 Assistant Professor & Head

*Handwritten signature:*  
 V. Deep

