



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kentingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

Cell Biology

Undergraduate Program in Biology Education

Module Handbook

Module Name:	Cell Biology (Biologi Sel)																		
Module Level:	Undergraduate Program																		
Code, if applicable:	02013142002																		
Sub-title, if applicable:	-																		
Courses, if applicable:	-																		
Semester(s) in which the module is taught	1 st																		
Module coordinator(s)	Dr. Slamet Santosa, M.Si.																		
Lecturer(s)	Dr. Slamet Santosa, M.Si.																		
Language	Bahasa Indonesia (Indonesian Language)																		
Course Classification	Compulsory Course / Elective Studies																		
Teaching format/class hours per week during semester	<p>Direct instruction/face to face/blended learning: 26.7 hours / Week: lecture, discussion</p> <p>Structured Activity: 32 hours / Week (discussion of material from books, articles and journals, analysis of journal articles)</p> <p>Self-study Activity: 32 hours / Week (Journal analysis related to learning topics)</p>																		
Workload	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Type</th> <th>CSU</th> <th>Face to Face</th> <th>Structured Activities</th> <th>Self-study</th> </tr> </thead> <tbody> <tr> <td>T</td> <td>2</td> <td>26.7h (0.88 ECTS)</td> <td>32h (1.06 ECTS)</td> <td>32h (1.06 ECTS)</td> </tr> <tr> <td>Total</td> <td></td> <td>90.7 h (3 ECTS)</td> <td></td> <td></td> </tr> </tbody> </table>				Type	CSU	Face to Face	Structured Activities	Self-study	T	2	26.7h (0.88 ECTS)	32h (1.06 ECTS)	32h (1.06 ECTS)	Total		90.7 h (3 ECTS)		
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Total		90.7 h (3 ECTS)																	
Credit Points:	2 CSU (3 ECTS)																		
Requirements:	Biology Sel																		
Learning goals/competencies:	PLO 2 They are able to apply the basic advance knowledge in biology to solve the problem in biology.																		



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	<p>PLO 4 They are able to demonstrate the research methodology in biology, its teaching and learning, and publish the results of the research.</p> <p>PLO 7 They are able to solve problems and present the idea argumentatively.</p> <p>CLO 1 Mastering basic biological knowledge and branches of biology to solve biological problems.</p> <p>CLO 2 Have knowledge related to biological research methodology and its learning, can apply and publish the results.</p> <p>CLO 3 Have knowledge of technology, information/data and be able to apply it in solving problems in their area of expertise.</p> <p>CLO 4 Have the ability to solve problems within the scope of work, and present the results in an argumentative manner</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>CLO/ PLO</th> <th>P L O 1</th> <th>P L O 2</th> <th>P L O 3</th> <th>P L O 4</th> <th>P L O 5</th> <th>P L O 6</th> <th>P L O 7</th> <th>P L O 8</th> <th>P L O 9</th> <th>P L O 10</th> </tr> </thead> <tbody> <tr> <td>CLO1</td> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO2</td> <td></td> <td></td> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>*</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO4</td> <td></td> <td>*</td> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	CLO/ PLO	P L O 1	P L O 2	P L O 3	P L O 4	P L O 5	P L O 6	P L O 7	P L O 8	P L O 9	P L O 10	CLO1		*									CLO2				*							CLO3							*				CLO4		*		*						
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Content	<p>Biology Sel is a compulsory subject for the study program which includes the following studies:</p> <ol style="list-style-type: none"> 1. Protoplasm, 2. Cell wall, 3. Cell membrane, 4. Endoplasmic reticulum and Golgi bodies, 5. Lysosomes and Microbodies, 6. Mitochondria, 7. Chloroplasts, 8. Nucleus, 9. Cell cycle/cell division and cytoskeleton, 10. Membrane transport mechanism, 11. Cell receptors (antigen antibodies), 12. Nucleic acids, 																																																							



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	13. Ribosomes, 14. Protein synthesis.												
Attribute Soft skill	1. Able to think conceptually, analitically, and logically 2. Have good communication skills												
Study/exam achievements:	<p>Students are required to attend the face-to-face lecture minimum 75% to be able to take the Mid and Final exam. It is considered to complete the course and pass if students obtain at least 60% of maximum final score. The final score (FS) is calculated based on the following ratio:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Aspect</th> <th style="text-align: center;">(%)</th> </tr> </thead> <tbody> <tr> <td>Report of Case analysis</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Participation and Project</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Mid-Term Test</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Final Exam</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Final Score</td> <td style="text-align: center;">100</td> </tr> </tbody> </table>	Aspect	(%)	Report of Case analysis	30	Participation and Project	30	Mid-Term Test	20	Final Exam	20	Final Score	100
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Forms of Media	Laptop, internet, PPT, LCD, SPADA												
Literature:	<ol style="list-style-type: none"> 1. Albert, Johnson, Lewis, Reff, Roberts, and Walter, 2008. Molecular Biology of the Cell. Gerland Science. 2. Siregar, A. 1990. Biologi Sel. ITB Bandung. 3. Cells Second Edition, Philadelphia : Saunders College.Publishing 4. De Robertis, E.D.P. at.al. 1987. Cell and Molecular Biology. Eight Edition. Philadelphia: Lea and Febiger. 5. Issoegianti, S.M.R. 1994. Biologi Sel. Departemen Pendidikan dan Kebudayaan. Direktorat Jenderal Pendidikan Tinggi. 6. Sheeler, P. and Bianchi, D.E. 1983. Cell Biology. John Wiley & Sons. Inc. New York. 7. Santosa, S., Sajidan, Purwanto, E., dan Suranto. 2018. Molecular Characterization of Plant Growth Promoting Rhizobacteria Using 16S rRNA Sequences in the organic rice field of Sukorejo Village, Central Java, Indonesia. Jurnal Biodiversitas. UNS Surakarta 8. Thorpe, N.O. 1984. Cell Biology. John Wiley & Sons. Inc. New York. 												



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	<p>9. Walker J.H. 2006. Cell and molecular biology concepts and experiments (3rd ed.). Karp, G.; John Wiley & Sons, Inc., New York.</p> <p>10. Diana, F.M. 2009. Fungsi dan Metabolisme Protein dalam Tubuh Manusia. Jurnal Kesehatan Masyarakat Andalas. Universitas Andalas</p> <p>11. Siregar F.A dan Makmur, T. 2020. Metabolisme Lipid dalam tubuh. Jurnal Inovasi Kesehatan masyarakat. USU.</p> <p>12. Reece, J., Urry, L., & Campbell, N. 2016. Campbell Biology Eleventh Edition. Hoboken: Pearson Higher Education</p> <p>13. Supu, I. 2015. Mekanisme Transport Ion melalui Karakterisasi Sifat Listrik pada Membran Jeruk Lemon. Jurnal Dinamika. 6. Uncok Palopo.</p> <p>14. Al Qori'ah, Surono S, dan Sutrisno S. 2016. Sintesis protein mikroba dan aktivitas selulolitik akibat penambahan level zeolit sumber nitrogen slow release pada glukosa murni secara in vitro. Jurnal Ilmu-Ilmu Peternakan. 26. Universitas Brawijaya.</p>
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Assessment

Presentation Assessment Rubric

Dimension	Weight (%)	Score	WxS	Comments
Report of Case analysis	30			
Participation and Project	30			
Mid-Term Test	20			
Final Exam	20			
Final Score	100			

DIMENSION	Scale				
	Very Good ≥85	Good 71-84	Sufficient 60-70	Deficient 40-59	Very Deficient <40
Organization	Well organized by presenting facts that are supported by examples that have been analyzed according to the concept	well organized and present convincing facts to support conclusions.	The presentation has focus and presents some evidence to support the conclusion	Sufficiently focused, but insufficient evidence to be used in drawing conclusions	There is no clear organization. Facts are not used to support statements.
Content	Content can inspire listeners to develop their minds.	Contents are accurate and complete.	Content is generally accurate, but incomplete.	The content is less accurate, because there	The content is inaccurate or too general. Listeners



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		Listeners get new insights about the topic.	Listeners can learn some implied facts, but they don't add new insight into the topic	is no factual data, it does not add to the listener's understanding	don't learn anything or are sometimes misled.
Presentatio n Style	Speak with passion, transmit enthusiasm and enthusiasm to listeners	The speaker is calm and uses proper intonation, speaks without relying on notes, and interacts intensively with the listener. The speaker always makes eye contact with the listener.	In general the speaker is calm, but with a flat tone and quite often relies on notes. Sometimes eye contact with the listener is ignored.	Based on the notes, no ideas are developed outside the notes, the sound is monotonous	The speaker is anxious and uncomfortable, and reads notes rather than speaking. Listeners are often ignored. There is no eye contact because the speaker is looking more at the whiteboard or screen.

Rubric for Review Article

No	Assessment Aspect	Article 1		Article 2		Article 3	
		High 6-10	Low 1-5	High 6-10	Low 1-5	High 6-10	Low 1-5
1.	Articles come from the indexed journals in the last 3 years.						
2.	Articles related to the theme of learning chemistry						
3.	The number of articles at least discusses learning chemistry						
4.	Accuracy in summarizing the important parts of the abstract of the article						
5.	Accuracy of summarizing important thought concepts in the article						
6.	Accuracy of summarizing the methodology used in the article						
7.	The accuracy of summarizing the research results in the article						
8.	The accuracy of summarizing the discussion of research results in the article						
9.	The accuracy of summarizing the conclusions of the research results in the article						
10.	The accuracy of commenting on selected journal articles						



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Total score for each article summary			
Average score obtained			

FINAL EXAM

Subject : Biology Sel

Program / Smt: Biology/1

Date/time : Monday / 21 December 2020

Time : 100 minutes

Lecturer : Dr. Slamet Santosa

Type of exam : *Open books*

Please answer all the following questions briefly but clearly!

1. Why steroids, prostaglandins, proteins and nucleic acids?
2. How do membrane lipids move? Is it possible to damage cell membranes?
3. Why can cell membranes act as both antigens and receptors?
4. Why do lysosomes play a role in the process of secretion, antidote and means of fertilization?
5. What is the mechanism of aerobic glucose oxidation?
6. How are C3 and C4 plants different, including their cycles?
7. What are the cyclic and non-cyclic light reactions and electron transport?
8. What is the difference between Spermatogenesis and Oogenesis?

N o	Soal	Jawaban	Rubrik
1	Why steroids, prostaglandins, proteins and nucleic acids?	<ul style="list-style-type: none">• Steroids are a group of lipids that are unsaponifiable or cannot be hydrolyzed into their constituent components in an alkaline reaction medium. Steroids are soluble in nonpolar solvents. Compounds included in steroids are bile salts, cholesterol, vitamin D, cortisone, testosterone, and progesterone. Cholesterol is the main component of gallstones and easily settles in the blood vessels, especially in the arteries. Bile salts are produced and stored in the gallbladder. Cortisone is a hormone and works with insulin to regulate the use of glucose, how much is burned and how much is stored.	0. No answer 1. Explain 1 topic. 2. Explaining topics 3. Explain the whole topic



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		<ul style="list-style-type: none">• Prostaglandins can function as hormones, regulating smooth muscle activity, blood flow, and secretion of various substances. In addition, it can be used for the manufacture of drugs as birth stimulants, elevating or lowering blood pressure, reducing gastric acid secretion, curing shortness of breath, treating asthma, preventing blood clots in heart disease.• As a transport protein, for example, hemoglobin functions as a carrier of oxygen from the lungs to the body's tissues. Storage proteins such as myoglobin function as oxygen stores in muscles, and some transport proteins in membranes. Proteins are structural tissues such as components of teeth, bones, skin, tendons, hair, and nails. As a catalyst such as enzymes that catalyze biochemical reactions. driving proteins. Information disseminator protein. Protein as genetic information. <p>The function of nucleic acids is to control biosynthetic activity in cells, and to carry genetic information. In addition there are also nucleotides that play a role in energy conversion when cells carry out oxidation such as adenosine diphosphate (ADP) and adenosine triphosphate (ATP).</p>	
2	How do membrane lipids move? Is it possible to damage cell membranes?	Membrane lipids are capable of movement, and they have much more movement than membrane proteins. Lipids can move laterally within 1-2 seconds. Lipids can also perform a transverse movement or so-called flip-flop motion, where the cell surface layer moves toward the cytosol or vice versa for 10-20 seconds. Lipids associated with membrane proteins that are difficult to move are called boundary lipids. Movement of lipids and proteins can cause membrane instability or membrane fluidity. The degree of membrane instability depends on the degree of saturation of the fatty acids. Saturated fatty acids will give a rigid and different properties with unsaturated fatty acids will give a more liquid structure. In addition, membrane fluidity is also affected by	0. No answer 1. Explain 1 topic. 2. Explaining topics 3. Explain the whole topic 0.



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		temperature, where cells living at low temperatures have higher unsaturated fatty acids than cells living at high temperatures. If the position does not return it can experience cell damage.	
3	Why can cell membranes act as both antigens and receptors?	<p>The cell surface contains a combination of carbohydrate and protein called glycocalyx which is also a cell surface antigen. The composition of the membrane is very complex for each cell type, therefore the type of antigen also varies. The nature of the cell is antigenic, so when the cell is injected into the body of another species, the recipient of the cell will make antibodies that will interact with the foreign cell. Some examples in studying surface antigens are ABO blood group antigens, MN blood group antigens, and tissue cell antigens.</p> <p>The cell surface contains many side chains, where these side chains become active in carrying out biological functions when there is a stimulus. Not all cells have a complex receptor as in lymphocytes, therefore there are many variations of cells with the type of receptor.</p> <p>The plasma membrane has proteins that can function as receptors. Receptors are to receive or recognize such as antigens, substances to be cytosol, hormones, neurotransmitters, bacteria.</p> <p>T lymphocytes occur in the thymus tissue of primary and secondary lymphoid tissues such as lymph nodes and spleen. T lymphocytes are sensitive to viral and parasitic fungal antigens. T lymphocytes are activated by antigens that can participate in immunity (immunity). Whereas B lymphocytes differentiate with the bursa of Fabricius in birds (similar to vertebrates). These lymphocytes are also derived from primary and secondary lymphoid tissue, and are sensitive to bacteria, fungi and toxins. B lymphocytes are activated by antigens and participate in the process of antibody formation.</p>	<p>0. No answer</p> <ol style="list-style-type: none">1. Explain 1 topic.2. Explaining topics3. Explain the whole topic <p>0.</p>



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		The plasma membrane is also a kind of protein that can recognize neighboring cells, so that cells can live in harmony in their communities. In contrast to cancer cells, because cancer cells are not able to recognize between their own tissue and neighboring cells or do not live in harmony.	
4	Why do lysosomes play a role in the process of secretion, antidote and means of fertilization?	<p>1. The role of lysosomes in secretion Lysosomes function as secretory vesicles in various glands, both exocrine and endocrine. Lysosomal enzymes work inside the cell to help prepare material that can function outside the cell. For example, to help prepare for the activation of thyroid hormones. The thyroid hormones, namely tyrosine and tri iodotyrosine, have covalent bonds with proteins (in the follicles of the thyroid gland). With the stimulation of the pituitary hormone TSH (Thyrotropin Stimulating Hormone) without binding to protein (thyroglobulin), the hormone appears in the blood. The mechanism is that TSH stimulates pinocytosis on the epithelial surface facing the lumen of the follicle. Pinocytosis grains containing hormones combine with lysosomes, then the protein is released by the presence of lysosomal enzymes, finally hormones are released by cells into the blood.</p> <p>In plants, functions such as pitcher plants (<i>Nepenthes</i>) secrete hydrolytic enzymes to attack insects. Fungi can secrete hydrolytic enzymes to break down macromolecules that are outside the cell so that the molecules can be inserted into the cell.</p> <p>2. Lysosomes as defense and antidote In addition to the function of lysosomes digesting foreign objects or toxins that are phagocytosed, lysosomes also clean debris from cells that are dead or damaged by foreign objects or toxins and digest and offer foreign objects that are toxic.</p> <p>3. Lysosomes as a means of fertilization The acrosome in spermatozoa is also a lysosome and functions to digest parts of the plasma membrane,</p>	<p>0. No answer 1. Explain 1 topic. 2. Explaining topics 3. Explain the whole topic 0.</p>



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		perivitelline membrane, zona pellucida of the egg so that it is easy to enter and carry out fertilization.	
5	What is the mechanism of aerobic glucose oxidation?	<p>Charcoal Hydrate Oxidation Pathways</p> <p>a. Glycolysis or the Embden-Meyerhoff pathway</p> <p>Glycolysis is the process of breaking down glucose into a compound of 3 carbon atoms, namely 2 moles of pyruvic acid. Each step in the process of glycolysis requires a specific enzyme. Glycolysis takes place in the cytoplasm and is aerobic, and glycolysis can take place either in the protoplasm in the presence or absence of oxygen. Glycolysis is a series of biochemical reactions that have stages, namely the first/preparation in which glucose is converted to glyceraldehyde-3-phosphate. The second conversion of glyceraldehyde-3-phosphate into two molecules of pyruvic acid.</p> <p>The EM (glycolysis) pathway can be inhibited by certain compounds so that it can interfere with the course of glycolysis, namely iodoacetate by inhibiting the activity of the glyceraldehyde-3P dehydrogenase enzyme and fluoride inhibiting the enolase enzyme.</p> <p>The energy produced in glycolysis is as follows: $-2 \text{ ATP} + 4 \text{ ATP} + 2 \text{ NADH} (6 \text{ ATP}) = 8 \text{ ATP}$. After 2 molecules of pyruvic acid are formed in the cytosol, if there is O_2, aerobic respiration will be carried out, namely entering the Krebs cycle which takes place in the mitochondrial membrane.</p> <p>The reactions in the glycolysis process or the EMP pathway can be broken down into 10 reactions, including:</p> <p>1. The hexokinase-catalyzed 1st reaction is irreversible under intracellular conditions. Hexokinases in the liver are called glucokinase and act only on glucose and not on other hexoses. This glucokinase is very useful for storing excess blood sugar in the liver in the form of glycogen. In people with diabetes mellitus, there is a deficiency of the glucokinase enzyme.</p>	<p>0. Tidak menjawab</p> <p>1. Menjelaskan 1 topik.</p> <p>2. Menjelaskan 2 topik</p> <p>3. Menjelaskan seluruh topik</p>



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		<p>2. The second reaction is catalyzed by the enzyme phosphoglucosomerase, which converts the aldolase form to the ketose form. This enzyme requires Mg^{++} ions and is specific for this reaction.</p> <p>3. The 3rd reaction is a phosphorylation reaction Information no. 1, 2 and 3 is written the mechanism or cycle.</p>	
6	How are C3 and C4 plants different, including their cycles?	<p>C-3 plants are plants in which the mesophyll cells contain chloroplasts and the bundle sheath cells do not contain chloroplasts. C-3 plants fix CO_2 by the enzyme RUDP (Ribulose diphosphate Carboxylase) to produce carbon compounds with 3 atoms (3 carbon atoms). Then CO_2 will be processed through the Calvin cycle produced starch and sugar (Figure 50). C-3 plants for example are spinach, kale, acacia, Poaceae, Gymnosperms, Pteridophyta and Bryophyta. C-4 plants have chloroplasts in mesophyll cells and bundle sheath cells. Chloroplasts in mesophyll do not have RUDP or RUBP enzymes, therapy has phosphonol pyruvate (PEP) enzymes that can fix CO_2. CO_2 fixation by PEP will produce organic acids with 4 carbon atoms. The organic acid is transferred to the bundle sheath containing the RUDP enzyme and the CO_2 is removed, then the process goes through the Calvin cycle to produce sugar (Figure 51). Examples of plants are corn, rice, sugar cane, wheat, glagah, weeds, and others.</p> <p>C-4 plants contain malic acid and aspartic acid in the mesophyll cells, while phosphoglyceric acid (APG), sucrose and starch are produced in the parenchyma sheath. Phosphoenol pyruvate (PEP) carboxylase is present in mesophyll cells and RUBP is only present in the parenchymal sheath. CO_2 in the form of malate and aspartate enters the mesophyll cells, so that in mesophyll cells PEP carboxylase increases and RUBP decreases.</p>	<p>0. No answer</p> <p>1. Explain 1 topic.</p> <p>2. Explaining topics</p> <p>3. Explain the whole topic</p> <p>0.</p>



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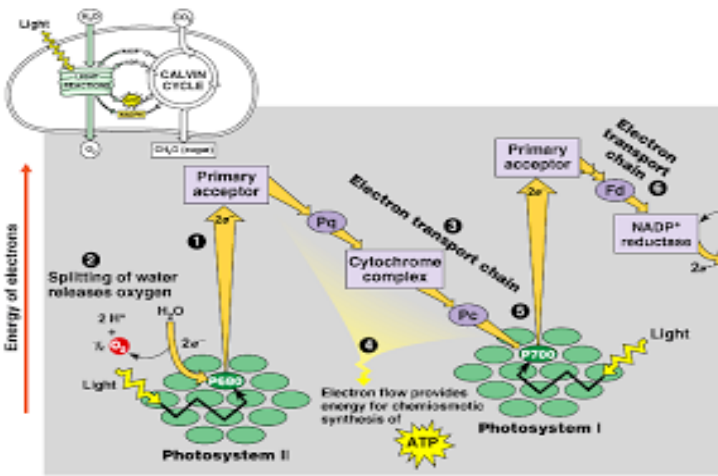
		<h3>Calvin Benson Cycle</h3> <p style="text-align: center;">Daur Calvin Modifikasi (C-4)</p>	
7	<p>What are the cyclic and non-cyclic light reactions</p>	<p>Light is absorbed by chlorophyll and other pigments present in the thylakoid membrane. Light energy stimulates molecules to induce and transfer energy to chlorophyll P68 or chlorophyll P700 molecules. In the</p>	<p>0. No answer 1. Explain 1 topic.</p>



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<p>and electron transport?</p>	<p>presence of light, two water molecules will break down, namely: $2\text{H}_2\text{O} \rightarrow 4\text{e}^- + 4\text{H}^+ + \text{O}_2$</p>  <p>Schematic of electron flow in the light reactions of photosynthesis.</p> <p>The electrons that occur from the splitting of water will reduce the plastokunin contained in the membrane. Then the electrons are passed to cytochrome b6 to cytochrome. The presence of proteins that enter the locules causes the activation of the ATP-synthase enzyme to form ATP. The electrons are passed on and accepted by chlorophyll P700 (PS I) and undergoes activation and goes to ferredoxin. In ferredoxin, NADP+ is converted to NADPH (non-cyclic electron transport). The ATP and NADPH formed are carried to the stroma for use in the dark reaction after CO₂ fixation by RUDP/PEP to form the final product sugar/starch.</p> <p>Photosynthesis I absorbs light at 700 nm (P700). Light hits PS I, excited chlorophyll, transfers electrons to electron acceptors (ferredoxin) associated with NADP not being able to absorb low electrons, so it is passed on to cytochrome b6, plastoquinone, cytochrome, plastoquinone and PS I with only ATP (cyclic electron transport) being produced.</p>	<p>2. Explaining topics 3. Explain the whole topic</p>
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UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

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8	What is the difference between Spermatogenesis and Oogenesis?	<p>SPERMATOGENESIS</p> <p>Spermatogenesis is the formation of spermatozoa in the seminiferous tubules in the testes. Cells that undergo meiosis are spermatocytes resulting from the differentiation of spermatogonia. In meiosis I the primary spermatocyte (2n) produces two secondary spermatocytes (n). In meiosis II, each secondary spermatocyte produces spermatids, which then undergo metamorphosis into spermatozoa. Therefore 1 spermatogonia/primary spermatocyte (n) produces 4 spermatozoa (n).</p> <p>OGENESIS</p> <p>Oogenesis is the formation of an egg cell (ovum). In oogenesis, nuclear division occurs and is followed by unequal cytokinesis, so that a diploid cell produces a large egg cell and 3 plains (small ones). Oogenesis occurs in the ovary which starts from the division of the oogenium so that it is more abundant. Each oogenium differentiates into a primary oocyte. DNA replicates and the primary oocyte enters prophase I until a tetrad is formed. Meiosis I chromosomes separate and during cytokinesis the two halves are not the same. One nucleus with cytoplasm is expelled and forms the primary plain. Meanwhile, other plainocytes get much more cytoplasmic parts to become secondary oocytes. Meiosis II secondary oocyte forms two daughter cells that are not equal in size, namely one secondary (small) and an ovum (large).</p>	0. No answer 1. Explain 1 topic. 2. Explaining topics 3. Explain the whole topic
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