

Student Project Works

Q&A#1

Course Evaluation:

- **Class participation and attendance (10%)**
- **Final exam (20%)**
- **Student project work and presentation (70%)**

Project Work Overview

•Goals of the Project Work

The goal of the project work for the students is to apply the knowledge and skills they have gained during the course to investigate and analyze a specific topic related to molecular and cellular physiology.

The project work is designed to enhance the students' critical thinking, problem-solving, and communication skills, as well as their ability to work independently and collaboratively.

The ultimate goal is to produce a high-quality research project that demonstrates a thorough understanding of the chosen topic and showcases the students' ability to apply their knowledge to real-world situations.

Project Work Overview

Guidelines and Deadlines #1

Group Work: The project work must be completed in small groups of 3-4 students.

Research Project: The project work consists of preparing a research project proposal in the field of molecular and cellular physiology, with a focus on neuroscience. The project proposal should include a clear hypothesis, detailed methodology, expected results, and potential implications of the research.

PPT Presentation: The research project proposal must be presented in a PPT format, with a minimum of 20 and a maximum of 30 slides. The presentation should be clear, concise, and well-organized.

Project Work Overview

Guidelines and Deadlines #2

Intermediate Deadlines: There will be intermediate deadlines every two weeks to ensure that the project is progressing as planned. These deadlines will include short presentations by each group, which will serve as an opportunity for feedback and discussion.

Literature Review: The project proposal should be based on a thorough literature review of the relevant scientific literature. Students are expected to use primary research articles, reviews, and other relevant sources to support their proposal.

Plagiarism: Plagiarism will not be tolerated. Students must properly cite all sources used in their proposal and presentation.

Project Work Overview

Guidelines and Deadlines #3

Grading: The project work will be graded based on the quality of the proposal, the clarity of the presentation, the level of engagement and participation in the intermediate deadlines, and the ability to answer questions and defend the proposal during the final presentation.

Deadline: The final deadline for the project work is May 20, 2023. No late submissions will be accepted without prior approval from the instructor. Submit the PowerPoint presentation as well as a written summary of the research proposal (maximum 2 pages, double-spaced) to the instructor by the assigned deadline.

Project Work Overview

Project Work Final Deadline

January 10th, 2024

Intermediate Deadlines

Every 2 weeks

Project Work Organization

Guidelines and Instructions #1

This project work will include the following sections:

Introduction:

In this section, you will introduce the topic of your project and provide some background information on why this topic is important. You should also clearly state the aims and objectives of your project, including the research questions that you will be addressing.

Background:

In this section, you will provide a detailed review of the relevant literature that is related to your project. You should summarize the key findings of previous studies that have investigated similar research questions and explain how your project will build upon this previous work.

Project Work Organization

Guidelines and Instructions #2

Aims:

In this section, you will clearly state the overall aims and objectives of your project. This should be a concise statement that outlines the main research questions that you will be addressing.

Methodology:

In this section, you will describe the methods and procedures that you will use to conduct your research. You should provide enough detail so that another researcher could replicate your study. This section should also include any ethical considerations or safety measures that you will need to take.

Expected Results:

In this section, you will describe what you expect to find as a result of your research. This should be based on your understanding of the literature and your hypothesis.

Project Work Organization

Guidelines and Instructions #3

Conclusions:

In this section, you will summarize the key findings of your research and draw conclusions based on your results. You should clearly state how your findings relate to your research aims and objectives. Additionally, you should suggest potential areas for future research.

Impact:

In this section, you will describe the potential impact of your research. This could include practical applications, contributions to the field, the broader scientific community, or society more generally.

Equality Plan:

In this section, you will describe any measures that you will take to ensure that your research is conducted in an inclusive and equitable manner. This might include considerations related to gender, ethnicity, or socioeconomic status.

Project Work Organization

Guidelines and Instructions #4

Timeline:

In this section, you will provide a detailed timeline for your project, including key milestones and deadlines. This will help you to stay on track and ensure that you are able to complete your project within the given timeframe.

The project work will be evaluated based on its quality, originality, and relevance to the course objectives. You are encouraged to be creative, innovative, and collaborative in your approach, and to seek feedback from your instructor or supervisor throughout the project work.

We look forward to seeing the results of your hard work, and to sharing your insights and discoveries with the rest of the class.

Project Work Guidelines

Tips and tricks #1

- Choose a research question related to the topics covered in the course and develop a research proposal to investigate it.
- Use scientific literature and other relevant sources to gather information about the chosen research question.
- Present the research question, background information, and research proposal in a PowerPoint presentation.
- The presentation should be approximately 20–30 minutes long.
- Include an introduction, literature review, methodology, and expected results in the presentation.

Project Work Guidelines

Tips and tricks #2

- Use clear and concise language to convey your ideas effectively.
- Use relevant diagrams, figures, and tables to enhance the clarity of the presentation.
- Provide citations for all sources used in the presentation.
- Be prepared to answer questions and engage in discussion with your peers and the instructor during and after the presentation.
- Submit the PowerPoint presentation as well as a written summary of the research proposal (maximum 2 pages, double-spaced) to the instructor by the assigned deadline.

Project Work Guidelines

Possible Topics #1

Investigating the pathophysiology of Alzheimer's disease: The students can investigate the molecular mechanisms underlying the development of Alzheimer's disease. They can explore the role of amyloid-beta and tau proteins, neuroinflammation, oxidative stress, and mitochondrial dysfunction in the pathophysiology of the disease.

Investigating the role of the microbiome-gut-brain axis in neurological disorders: The students can investigate the communication between the gut microbiome and the brain, and how this communication is disrupted in neurological disorders such as autism, depression, and anxiety. They can explore the mechanisms involved in this communication, including the production of neurotransmitters and inflammatory molecules.

Investigating the molecular mechanisms of pain: The students can investigate the molecular mechanisms underlying pain, including the roles of ion channels, receptors, and signaling pathways. They can explore the different types of pain, including acute and chronic pain, and how pain can be modulated by drugs and other interventions.

Project Work Guidelines

Possible Topics #2

Investigating the role of glia in neurological disorders: The students can investigate the role of glia cells in neurological disorders such as multiple sclerosis, Alzheimer's disease, and Parkinson's disease. They can explore the functions of different types of glia cells, and how these cells can contribute to disease pathology.

Investigating the molecular mechanisms of neurodegeneration: The students can investigate the molecular mechanisms underlying neurodegeneration, including the roles of protein misfolding, autophagy, and mitochondrial dysfunction. They can explore the different types of neurodegenerative diseases, including Parkinson's disease, Huntington's disease, and amyotrophic lateral sclerosis.

Investigating the role of genetics in neurological disorders: The students can investigate the genetic basis of neurological disorders, including the roles of single gene mutations and genetic risk factors. They can explore how genetics interacts with environmental factors to contribute to disease pathology and how this knowledge can be used to develop personalized treatments.

Project Work Guidelines

Possible Topics #3

Investigating the effects of environmental toxins on brain function: The students can investigate the effects of environmental toxins, such as lead, mercury, and pesticides, on brain function. They can explore the mechanisms involved in toxin-induced neurotoxicity and how this knowledge can be used to develop strategies for preventing or treating toxin exposure.

Investigating the role of specific ion channels or receptors in synaptic plasticity: Students can choose a specific ion channel or receptor, such as NMDA or AMPA receptors, and investigate their role in short-term and long-term synaptic plasticity using electrophysiological techniques.

Exploring the role of astrocytes in neuronal function: Students can investigate the role of astrocytes in regulating neuronal activity, synaptic transmission, and plasticity using techniques such as calcium imaging and optogenetics.

Project Work Guidelines

Possible Topics #4

Investigating the effects of microbiota on brain function: Students can investigate the effects of gut microbiota on brain function, behavior, and cognition using techniques such as fecal transplants, microbiota depletion, and behavioral tests.

Investigating the role of glial cells in neurodegenerative diseases: Students can investigate the role of glial cells, such as microglia or astrocytes, in neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, or multiple sclerosis, using techniques such as histology and immunohistochemistry.

Investigating the role of neuropeptides in regulating behavior and physiology: Students can investigate the role of neuropeptides such as oxytocin, vasopressin, or corticotropin-releasing hormone in regulating behavior and physiology, using techniques such as receptor mapping and behavioral tests.

Project Work Guidelines

Possible Topics #5

Investigating the effects of environmental factors on neuronal function: Students can investigate the effects of environmental factors such as stress, exercise, or nutrition on neuronal function and plasticity, using techniques such as electrophysiology and molecular biology.

Investigating the molecular mechanisms of synaptic transmission: Students can investigate the molecular mechanisms of synaptic transmission, such as vesicle release and neurotransmitter uptake, using techniques such as electron microscopy and biochemical assays.

Investigating the role of microRNAs in regulating neuronal gene expression: Students can investigate the role of microRNAs in regulating gene expression in neurons and glial cells, using techniques such as RNA sequencing and bioinformatics analysis.

Project Work Guidelines

Possible Topics #6

Investigating the molecular basis of sensory perception: Students can investigate the molecular mechanisms underlying sensory perception, such as photoreceptor signaling in vision or olfactory receptor signaling in smell, using techniques such as molecular biology and electrophysiology.

Investigating the effects of drugs of abuse on neuronal function: Students can investigate the effects of drugs of abuse such as cocaine, methamphetamine, or opioids on neuronal function and plasticity, using techniques such as electrophysiology and behavioral tests.