

**AL-FARABI KAZAKH NATIONAL UNIVERSITY**  
**Faculty of Medicine and Healthcare**  
**Higher School of Medicine**  
**Department of Fundamental Medicine**  
The schedule of implementation of the ISW in the discipline

**«Mechanisms of Defense and Disease»**  
**(10 credits)**

**Spring semester, 2021-2022 academic year**

<b>№</b>	<b>Tasks For ISW *</b>	<b>Implementation form of ISW</b>	<b>Deadline of ISW** (study week)</b>	<b>Scores</b>
1	Write an essay on the arguments surrounding the ethical dilemma in medical genetics.	Structured Controversy Essay on Ethical Dilemma (by groups of 4-5 students)	14	4
2	Make a Mind map "Classification of hereditary diseases"	Mind Map of hereditary diseases (by groups of 2-3 students)	14	4
3	Topic “Features of hepatitis A, B, C”. Treatment approaches to COVID 19 complications.	Case-based discussion, conference	14	4
4	Topic “Pharmacology Nowadays”. Contemporary Medical Treatment approaches to actual diseases.	Publication analysis, discussion, conference	15	4

For the implementation of the ISW, both the educational literature and sources recommended in the course are used, as well as independently found. ISW is delivered strictly on schedule. In case of good circumstances (if there is documentary evidence), the ISW can be accepted out of schedule.

**Recommendations for IWS of Medical genetics**

**Form 1 - Structured Controversy Essay on Ethical Dilemma (by groups of 4-5 students)**

**Assignment:** Write an essay on the arguments surrounding the ethical dilemma in medical genetics.

Choose a topic from the list of dilemmas given by the department OR find a new one by yourself (see the list and assessment criteria below). In order that you gain an understanding of both sides of the issue, and acquire experience in identifying assertions and evidence, please **structure the essay in the following manner**.

1. **TITLE** (Dilemma):
2. **AUTHOR** (Your name, group #):
3. **INTRODUCTION** (Several sentences briefly introducing the controversy/dilemma):

4. **PRO-SIDE OF THE ARGUMENT** (Here you should lay out minimum 2 of the major **assertions**<sup>1</sup> and **evidence**<sup>2</sup> that would be used in **arguing in favor** of the proposition stated in the title):
5. **CON-SIDE OF THE ARGUMENT** (Here, you should write minimum 2 major assertions and offer supporting evidence **against the proposition in the title**, using references where appropriate):
6. **POSSIBLE COMPROMISES** (Here, try to find any compromise statements or positions that both sides of the argument might agree to include):
7. **PERSONAL OPINION** (Write your personal views on the proposition):
8. **REFERENCES CITED** (Write out complete references to papers that you have cited)

### EXAMPLE

#### A short version of a student paper

1. **TITLE:** DNA EVIDENCE SHOULD BE USED IN FORENSIC MEDICINE
2. **AUTOR:**.....
3. **INTRODUCTION:** Technology concerning DNA fingerprinting has been developed for use in forensics. However, some believe this technology is unreliable and may in fact cause a false positive reaction, thus causing the imprisonment of an innocent person. The admission of DNA evidence into court has been extremely controversial, as was seen in the O.J. Simpson case.
4. **PRO:** Yes, DNA fingerprinting should be used in forensic medicine.  
**Assertion 1:** DNA-based identification is more reliable than other forms of identification, such as blood groups and enzymes.  
**Evidence 1:** "If enough tissue or semen is available, forensics laboratories can perform tests to determine the blood or tissue type. However, such tests have limitations...there are many people in the population with the same blood type or tissue type...this approach can only exclude a suspect...DNA testing, on the other hand, can theoretically identify the guilty individual with certainty because the DNA base sequence of every individual is unique" (Campbell et al., 1994). "DNA-based identification has been so widely embraced by the judicial system because...a suspect can for all practical purposes be positively identified" (McElfresh et al., 1993). "Another problem with traditional forensic methods is that, during the weeks or months [of the investigation], evidence may have to wait before being examined by a forensic scientist and proteins can become degraded or denatured so their antigenic properties are lost. For examination in forensic samples, DNA is more suitable than protein because DNA remains intact in the environments where such evidence generally is found. Indeed, small fragments of human DNA have been isolated and cloned from the tissue of a 2,400-year-old Egyptian mummy. Although the length of these DNA fragments was too small for RFLP analysis, this work does illustrate the impressive stability of the DNA molecule" (Moody, 1989).
5. **CON:** No, DNA fingerprinting should not be used in forensic medicine.  
**Assertion 1:** There are inherent errors in the techniques used to determine a DNA fingerprint.  
**Evidence 1:** Possible sources of error include band shift, DNA degradation, partial restriction digestion, and inconsistencies in the electrophoretic gel. "Forensic samples are different in origin,

<sup>1</sup> **A note on assertions:** Those that are short are often more easily defended than longer, more complex assertions. Good assertions are falsifiable in principle; i.e., they can be tested and we will know if they are wrong.

<sup>2</sup> **A note on evidence:** Be sure that the evidence that you use speaks directly to the assertion you make and meets the conditions of a good argument: the evidence must be adequate, relevant, and succinct. Finally, when you refer to data in the literature, proper citations should be appended to the paper. **CON-SIDE OF THE ARGUMENT:** Here, you should write four major assertions and offer supporting evidence against the proposition in the title, using references where appropriate. **POSSIBLE COMPROMISES:** Here, try to find any compromise statements or positions that both sides of the argument might agree to include.

storage, and collection from the standards. Such differences between the samples may be reflected in mobility differences between the DNA bands. It is just as probable that a band shift could move away from a match as into one, and there is no way to predict which will happen" (McElfresh et al. 1993). In the RFLP method, restriction enzymes break the DNA strands at specific sites, resulting in variable fragment lengths between individuals. However, "heat, humidity, bacterial contamination, and UV light damage DNA by causing random breakage of the helix" (McElfresh et al., 1993). This will result in random fragment lengths that may cause errors in the DNA fingerprint produced. Slight inconsistencies in the electrophoretic gel can skew the positions of the DNA fragments. "Occasionally, restriction bands do not separate completely, or they end up at slightly different positions in different gels" (Campbell et al., 1994). In addition to the inherent errors in the techniques, there is always the possibility of human error. "The largest source of error lies in poor laboratory practices" (Roberts, 1992). "The lab error is the most likely place to get a false incrimination of an innocent person or a guilty person going free" (Nowak, 1994).

**6. POSSIBLE COMPROMISE:** Statistical analysis shows that the probability of a false positive match varies from one in 400,000 to one in 4,000,000 people. Although at first this number seems sufficient enough to convict the suspect, when considering that 4,000,000 people can be found within a small geographical region in densely populated areas, this ratio becomes unconvincing. Therefore, DNA evidence can never prove with certainty the guilt of a suspect. In light of this, DNA evidence should be used only to corroborate other evidence to implicate a suspect or, conversely, to exonerate that person. Further, regulations should be passed and enforced establishing universal techniques and standards in processing DNA. This would include private and FBI labs.

**7. PERSONAL OPINION:** We believe that DNA fingerprinting is a very useful tool in the field of criminal justice. It has been shown to be very powerful and exact in determining the identification and guilt or innocence of a suspect. Like any method, however, DNA fingerprinting is subject to error, and these possible fallacies must be regulated and insured against to warrant the validity of DNA testing. We feel that research should be conducted to define the frequency of a particular DNA fingerprint occurring in the population in order to reach consensus in the scientific community, that DNA tests should be standardized to avoid the scrutiny that follows due to variations in methods and results, and DNA labs should be regulated, either by the federal government or some other body, to insure the exactness and validity of results.

#### **8. REFERENCES**

1. Ayala, F. and J.B. Black. 1993. Science and the courts. American Scientist May/June 1993: 233.
2. Black, E. 1990. Black's Law Dictionary. New York, NY: MacMillan Pub. Co.
3. Campbell, N.A., L.G. Mitchell, and J.B. Reece. 1994. Biology: Concepts and Corrections. Redwood City, CA: Benjamin/Cummings Pub. Co.

#### **LIST OF POSSIBLE DILEMMAS**

1. Pregnancy with fetuses with genetic disorder suggested to be terminated
2. Patient with genetic disease have a right not to inform other family members about his diagnosis
3. Use of prenatal diagnosis for "less serious" conditions should be restricted
4. Patients with Down syndrome need to have an opportunity to marry and have children

#### **Assessment criteria**

1	Topic is formulated by students and relevant to assignment	not chosen from the list of dilemmas	Yes =10 NO= 0
2	Essay is written exact according to the instruction	include all required elements	Yes=5 points NO= 0

3	Pro- and Con- Assertions formulated correctly (with evidence)	1 point for every correct assertion with evidence, but maximum 10 points	1...10 points
4	Compromise statements or positions is stated	5 points if so + 5 points if evidence is provided	Yes=5 or 10 points No = 0
5	Personal opinion is accompanied with examples or references		Yes=10 points NO= 0
6	References are contemporary and scientific	not earlier than 2010	Yes=5 points NO= 0

## Form 2 - Mind Map of hereditary diseases (by groups of 2-3 students)

**Assignment:** Make a Mind map "Classification of hereditary diseases".

Mind map (associative map or connection diagrams) is a method of structuring concepts, knowledge using graphical notation in the form of a diagram. Mind maps can store and structure a huge amount of information. They display the hierarchy and relationships between individual topics and give you the opportunity to see the big picture. This makes Mind maps an ideal tool for summarizing texts.

Rule of drawing up a map:

1. The larger the paper, the better. The minimum is A4. Place horizontally.
2. Mind Mapping softwares can be used.
3. In the center is the image of the entire problem / task / area of knowledge.
4. From the center, there are main branches with signatures - they mean the main sections of the map.
5. The main branches further branch out into thinner branches.
6. All branches are signed with keywords that make you remember a particular concept.
7. It is desirable to use block letters.
8. It is advisable to use a variety of visual designs - shape, color, volume, font, arrows, icons, pictures, etc.
9. The map should reflect your style of drawing maps.

How to draw?

1. A4 sheet or better A3. Or you may use software.
2. Use assorted pencils, pens, markers and crayons.
3. Start from the center of the sheet by drawing a specific drawing that characterizes your task, or just a square (rectangle, circle, and so on).
4. Use different shapes, colors, images to draw attention to the central image.
5. Draw bold lines (branches) from the central image on which you write the main subideas, etc.

### Assessment criteria

1. Number of concepts, vision of relationships, use of connecting lines, hierarchical structure, use of examples, validity.
2. Comparison of the map made by the teacher and the student.
3. The number of points scored - one point is given for each concept and correct relationship, more points can be given for the hierarchical structure and the use of connecting lines.
4. The main map - for genetically determined diseases, for other types of classification of diseases by 5 points.

30-37 – 100%

20-29 - 75%  
 15-19 – 50%  
 less than 15 – 0%

**Recommendations for IWS of Microbiology  
 Form 1 Compilation of the Case**

To complete the IWS in Microbiology, students need to compose a case using the textbooks recommended in the course as well as sources found on their own. The IWS is submitted strictly according to the schedule and is presented at the group conference in the form of an oral report. In case of valid circumstances (in the presence of documentary evidence), the IWS may be adopted outside the schedule.

**Case registration rules**

The case should consist of 4 parts which include

**Part 1** - The initial condition of the patient and the symptoms of the disease and the results of the initial examination

**Part 2** - Test results

**Part 3** - Diagnosis of specialists

**Part 4** - The result of treatment

**Assessment criteria**

1. The performance is characterized by the correct construction of sentences, preparedness, reasoning, etc.
2. Drawing attention to a certain range of issues that require in-depth discussion.
3. Possession of the categorical apparatus, the desire to give definitions, to identify the content of concepts.
4. Demonstration of the ability to think logically, if the points of view expressed earlier sum up and lead to logical conclusions.
5. Offering alternatives that were previously neglected.
6. Proposal of a specific action plan or a plan for implementing the solution.
7. Identification of essential elements that should be taken into account in the analysis of the case.
8. Significant participation in the processing of quantitative data, calculations.

**Evaluation paper:**

most of the problems in the case were formulated and analyzed;	Yes-4 No-0
carried out the maximum possible number of calculations;	Yes-4 No-0
own conclusions were made based on the information about the case, which differ from the conclusions of other students;	Yes-4 No-0
adequate analytical methods for information processing have been demonstrated;	Yes-4 No-0

the drafted documents meet the requirements in terms of meaning and content;	Yes-4 No-0
the arguments given as a result of the analysis are in accordance with the previously identified problems, the conclusions drawn, the assessments and the analytical methods used.	Yes-4 No-0

### Recommendations for IWS of Pharmacology

#### Form 1 Structured essay-reasoning (groups of 4-5 students)

**Assignment:** Write an essay about arguments related to the prevention and treatment of current diseases.

Select a topic from the list provided by the department. To help you understand both sides of the issue and gain experience in identifying claims and evidence, please **structure your essay as follows**.

1. **TITLE** (Dilemma):
2. **AUTHOR** (Your name, group #):
3. **INTRODUCTION** (Several sentences briefly introducing the controversy/dilemma):
4. **PRO-SIDE OF THE ARGUMENT** (Here you should lay out minimum 2 of the major **assertions**<sup>3</sup> and **evidence**<sup>4</sup> that would be used in **arguing in favor** of the proposition stated in the title):
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#### LIST OF POSSIBLE TOPICS

1. The need for vaccination against coronavirus infection.
2. Is it necessary to prescribe aspirin to patients with chronic ischemic heart disease?
3. Is the use of hepatoprotectors in the treatment of hepatitis justified?
4. Chondroprotectors - effective or not?

#### Assessment criteria

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<sup>4</sup> **A note on evidence:** Be sure that the evidence that you use speaks directly to the assertion you make and meets the conditions of a good argument: the evidence must be adequate, relevant, and succinct. Finally, when you refer to data in the literature, proper citations should be appended to the paper. **CON-SIDE OF THE ARGUMENT:** Here, you should write four major assertions and offer supporting evidence against the proposition in the title, using references where appropriate. **POSSIBLE COMPROMISES:** Here, try to find any compromise statements or positions that both sides of the argument might agree to include.

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