# CONTROL AND MEASURING MEANS

Name and cipher of the EP: 6B10115 «Medicine»

Discipline code: MI 2225

**Discipline:** Microbiology and Immunology

Amount of study hours/credits: 150 hours (5 credits)

Course and semester of study: 2, IV

## **QUESTIONS OF THE MID-TERM № 1**

- 1. What is immunological memory? What is its significance?
- 2. What role do T-helper cells play in the immune response?
- 3. Give examples of antigen-presenting cells (APCs) and describe their main function.
- 4. In which reactions is immunoglobulin E involved?
- 5. Why are MHC molecules important in transplantation?
- 6. Describe the role of cytokines in the immune response.
- 7. Why is *Pseudomonas aeruginosa* considered an antibiotic-resistant pathogen?
- 8. Name the main microbiological methods used for purulent-septic infections.
- 9. Describe the mechanism of action of the *Clostridium tetani* toxin.
- 10. Name 1–2 methods for cultivating pathogens under anaerobic conditions.
- 11. What role does *Pseudomonas aeruginosa* play in respiratory tract infections?
- 12. What additional factors are required for the growth of *Haemophilus influenzae*?
- 13. What media are used for diagnosing Shigella and Salmonella pathogens?
- 14. Why does diarrhea in cholera resemble "rice water"?
- 15. Under what conditions do enteropathogenic strains of Escherichia coli become dangerous?

## **Table Assignments for Midterm Control No. 1**

1. Comparison of Immunity Types

Criteria	Innate Immunity	Acquired Immunity
Response time	17 ch vs. 80 111.	J CH, VS. 60, 114, 13
Antigen specificity	1,17 ch, vs. 60,11	E. T. SKI, VS. 601.11/F.
Presence of memory cells	M. 11 84, 39. 600	11. 17 SKI V3. 600 11.
Main participating cells	2 17 1 5 EXT. US. 8	20 11 2 Km 25. 60
Examples	80, 771, 17 541, 23.	60, 11, 1 styl 3. 80,

2. Comparison of Immunoglobulins

Properties / Indicators	IgG	IgA	IgM	IgE
Structure	000114	1 3. KU,	S. 500 14	2 2
Serum concentration	y. 600.11	1 2. M.	3.000	Kr 20,
Functions	V3. 500	14, 2, 7	71, 3: 09	p. Kr
Placental transfer	J. 3. 30	o Kr	My Si	90. Kr
Importance in diseases	171, 3.	90, Kr	2, 1/4,	0 90. A

3. Comparison of Hypersensitivity Types (I–IV)

Criterion	Type I (IgE)	Type II (IgG/IgM)	Type III (immune complexes)	Type IV (cell- mediated)
Immune mechanism	3.600911.K	J skungige	griff sight	SUNTIFE ST SKILL
Reaction time	3.000	K 2, M.	Vic Un. Kr 24 Wa	3: 10. KT 24
Mediators / cells	74, 35, 36	10. Kr 2, W	3:0 90. KT 36.14	10 Sep 40. 15
Examples of diseases	SKULIS .	Egn Mikk 1 2, 2	Was segn Mike Se	Klub Segnynik

4. Difference Between Antigen and Antibody

Characteristic	Antigen	Antibody
Chemical composition	17 2 KU 30. 6	D. It Sky
Function	1. KT 2/1 Wg.	60 171. 17 3 3/11.
Role in the immune system	90. KJ 24 M.	J. 60 901. KT 24

OŃTÚSTIK QAZAQSTAN  MEDISINA  AKADEMIASY  «Оңтүстік Қазақстан медицина академиясы» АҚ  ОЙОЗТІК QAZAQSTAN  MEDICAL  ACADEMY  ACADEMY  AO «Южно-Казахстанская медицина	ская академия»
Department of microbiology, allergology and immunology	50-11-
Control and measuring means	3 p. from 16
Molecule type	40. 50 M. KT
Site of synthesis	1140 50 11. K

5. Comparison of Immune Response Phases

Phase name	Description / What happens?	Participating cells	Timing
Induction	2,11. 1 St. 3. 60 11/4 1	KU. 3: 990 / H	3, 174, 3;
Activation	60,114,1 4, 43, 60,114	2. Ku. 3. 90, Kr	2, 14
Effector	3. 60 "14" 1" 3 H. 33. 60 "14	1 2, My 3:0 30.1 A	1 5 10
Regression	V3. 600 11/4 1 2 VALL 33. 890	K 2, KU, J. 90.	Kr 55

**6.** Comparison of Immunocompetent Cells

Cell Type	Function	Type of Immunity	Features
T-helper cells (CD4+)	390, Kr 2	Kur J. On Kr St	Un 3:60 Yr.
Cytotoxic T cells	90. K	2, My 3:0 40. KT 2	11/40 3 50 41
B lymphocytes	3:0 90. K	21/4/10 3:00 YO. KI	Sp. Wo So
Macrophages	1, 3:0 90.1	- 20 Mg 3 60 M. M	SK. Wo
Natural Killer (NK) cells	1410 3:00 90.	The second	KT 2/2 Wa

7. Comparison of Immune System Organs

Organ Name	Location	Function	Central / Peripheral?
Thymus	10. 90. Kr	26 / Wo 3 60 Y	7. 1 2/2 WO. 60 M. 15
Spleen	3:00 YOU. KI	St. Wo So	47. 15 3K, Wo. 60, 471.
Lymph nodes	100 500 40.1	J 24 100	S. M. T. Ch. Wo. 60 M.
Red bone marrow	1400 300 411.	KJ 24, Wo	6, 47. 15 ch Va. 60,7

8. Immune Response Cells and Their Mediators

Cell Type	Involved Mediators	Function	<b>Example Situation</b>
T-helper cells (CD4+)	1. KT 24 WO. 60 M.	1 St 1	10. 60 111. 11 CK
Cytotoxic T cells	40. KT SK Was 60 40.	it at	V3. 60 111-11 CK
B cells	5 47. 15 de 20, 60	W. 1/1 C	K 3. 60 11 1
Macrophages	S 47. 15 86 40. S	311.7.1	ch, vs. 60, 114, 1

9. Comparison of Cytokines

<b>Cytokine Name</b>	Produced by Which Cells?	Function	Type of Immune Response
IL-1	1 7 ch 20, 60 111.	CHI NO	· 60, 11, 1 3 th, 23. 9
IL-2	17. 15 ch vs. 60 11/2	11 64	V3. 60, 11/4 1 2 My V3.
IFN-γ	3 471,15 EK, WS. 60".	1. T. K	1, 59. 600 11 1 2 KLL V
TNF-α	60 Mil 15 8/1 48. 60	111.11	Th. 33. 60, 114 1 2 th.

10. Comparison of Types of Immunization

Property	Active Immunization	Passive Immunization
Source of antibodies	60,111, 17 3K1, V3. 600	11/4 1 2. M. 3. 30 /h
Duration of protection	3. 60 "14" 1" 3 KII. VS. 6	20 1/K 1 2 KU, 35 30
Example	Vs. 60, 114, 1 8 41, Vs.	Son it is the single

11. Table on Purulent-Septic Infections

Pathogen	Morphology	Cultural Properties	Toxins	Type of Disease
S. aureus	600111411	KII. VS. SON IK I	, KU, S.	90. Kr 22, M
S. pyogenes	13. 600 11.K. 1	3 KII 33. SON 1/4	S. Mis	8. 30. Kr 20.
P. aeruginosa	13. 00. 14.	1 3. AU. 33: 390 14	2 2 1/1	J. 5 90. KT 6

OŃTÚSTIK QAZAQSTAN	2985	SOUTH KAZAKHSTAN	Kr Shilling
MEDISINA	SKMA	MEDICAL	1. 17 ch vio
AKADEMIASY	13h, 1	ACADEMY	(1, T. 1, 14)
«Оңтүстік Қазақстан медицина академиясы» АҚ		АО «Южно-Казахстанская медицинск	ая академия»
Department of microbiology, a	llergolog	y and immunology	50-11-
Control and measur	ing mean	So Co Co	7.4 n. from 16.

12. Table on Sexually Transmitted Infections (STIs)

Pathogen	Morphology	Diagnostic Method	<b>Transmission Routes</b>	Features
Treponema pallidum	St. Va. Sp.	M. 17 et 20.	60,111,11 chi	9. 500.11
Neisseria gonorrhoeae	ck, was	11. 11 ch V	3. 600 11 16 1 3 KM	Vg. 600
Chlamydia trachomatis	1 ch 20.	60 111-11 CKI	Vs. 60, 11, 17 3	(1) 29. 0

### 13. Table on Anaerobic Infections

Pathogen	Morphology	Toxin	Name of Disease	Prevention
Clostridium tetani	SO 111-11 SK	Vg. 60	With I settle voi.	300 Km 2, 1
C. perfringens	60,111,611	K1, VS.	500 11 1 2 FLL 3	· 000 / K
C. botulinum	13. 60,11.	JA1, VS	, 500 / KU.	3. 300 Th

14. Comparative Table: Pseudomonas vs Haemophilus

Property	P. aeruginosa	H. influenzae
Morphology	13. KU. 3.	390. The 21 Miles 2'62
Cultural properties	Tu. 19. CON 1/4 2 2 1/2/10	1:0 90. Kr 20, Kur 3
Pathogenic factors	12, 3: 90 / 12, NU	3:0 90. Kr 26 Mg
Types of infections	2. Tu. 3. 90 K 2.	111 3:0 90. KT 24. C
Antibiotic resistance	1 3. M. J. GO. H. 1 3	11/11/2 Sp. 11. 21

## 15. Table on Intestinal Infections

Pathogen	Morphology	Type of Disease	Diagnostic Method	Prevention
Escherichia coli	1. 41. 3.	300 /K 2 2, My	3:090. Kr 26	140 300 90.
Shigella spp.	11 3 KM 03	600 // 1 2, Y	W. 3.0 90. Kr 3	111000
Salmonella spp.	Mit of Skill	19. 600 11. 1 3	Ku. 19. 890 1 K	S. Kull

## Case-Based Questions for Midterm Control №1

**1. Patient:** A 5-year-old child was brought to the clinic after developing a fever and rash in kindergarten. Upon examination, a diagnosis of measles was made. The parents reported that the child had not received any vaccinations.

### **Ouestions:**

- 1. Which type of immunity—innate or acquired—was involved in the development of the disease? Explain.
- 2. What type of immunity is formed after vaccination, and which immunocompetent cells are involved?
- **2. Patient:** A 67-year-old man was hospitalized with pneumonia. Immunological testing revealed a decrease in nonspecific defense factors (phagocytosis, interferon levels).

## **Questions:**

- 1. Which humoral and cellular immune factors decline with age?
- 2. How can the weakening of nonspecific immunity contribute to the development of pneumonia?
- **3. Patient:** A 45-year-old woman undergoing cancer treatment is receiving immunomodulators. Blood analysis showed an increase in T-lymphocytes and natural killer (NK) cells, as well as high levels of interleukin-2.

## **Questions:**

- 1. Which phases of the immune response are activated in this case and which cells are involved?
- 2. What is the role of interleukins in interactions between immune cells?

MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ	SCUTH KAZAKHSTAN  MEDICAL  ACADEMY  AO «Южно-Казахстанская	я медицинская академия»
Department of microbiology, all	ergology and immunology	50-11-
Control and measuring		5 p. from 16

**4. Patient:** A 9-month-old infant frequently develops bacterial infections following a recent viral respiratory illness. Immunological testing revealed weak antibody production, low B-lymphocyte count, and decreased IgG levels.

## **Questions:**

- 1. Which phases of the immune response are impaired, and what is the role of antigen-presenting cells in this case?
- 2. Which immunoglobulin is deficient and what is its role in infection protection?
- **5. Patient:** A 25-year-old man experienced kidney transplant rejection. Cytotoxic T-lymphocyte activity and interleukin-2 levels were elevated.

## **Questions:**

- 1. Which T-lymphocyte function is activated and what is the role of antigen-presenting cells?
- 2. Which phases of the immune response are involved and what is the role of immunological memory?
- **6. Patient:** A 6-year-old child developed itching, skin redness, and difficulty breathing shortly after eating nuts. Emergency treatment was required. Elevated IgE levels were detected.

### **Ouestions:**

- 1. Which type of hypersensitivity does this reaction represent and what mechanisms are involved?
- 2. Which cells and mediators are responsible for the clinical manifestations of allergy?
- **7. Patient:** A 32-year-old woman developed fever and pain in the transplant area 10 days after a kidney transplant. Anti-donor antibodies were found in her serum (precipitation reaction).

### **Ouestions:**

- 1. What type of hypersensitivity is involved and which serological method was used?
- 2. What is the principle of the precipitation or agglutination reaction and how is the result interpreted?
- **8. Patient:** A 25-year-old man developed a purulent wound, swelling, and fever after a hand injury. *Staphylococcus aureus* was isolated from the pus. Hemolysis was observed on blood agar, and the coagulase test was positive.

## **Questions:**

- 1. Describe the morphological, cultural, and biochemical characteristics of *S. aureus*.
- 2. What microbiological methods were used, and which antibiotics are typically applied?
- **9. Patient:** A 28-year-old man reported pain during urination and purulent discharge. Smear showed Gramnegative cocci (*Neisseria gonorrhoeae*), and PCR detected *Chlamydia trachomatis* DNA.

## **Questions:**

- 1. What are the differences in morphology and diagnostics between *N. gonorrhoeae* and *C. trachomatis*?
- 2. What diagnostic methods are used for these STIs, and what are the modern treatment approaches?
- 10. Patient: A 4-year-old child presented with fever, cough, and shortness of breath. X-ray confirmed pneumonia. Sputum showed Gram-positive lancet-shaped diplococci (*Streptococcus pneumoniae*),  $\alpha$ -hemolysis, and optochin sensitivity.

### **Ouestions:**

- 1. Describe the morphology, cultural, and biochemical properties of *S. pneumoniae*.
- 2. What diagnostic methods and specific prevention measures are used?
- **11. Patient:** A 35-year-old man developed swelling, pain, foul odor, and gas bubbles at the wound site four days after an injury with rebar. Gram-positive rods and gas bubbles were observed in the smear. *Clostridium perfringens* was isolated.

## **Questions:**

1. Describe the morphology, cultural properties, and toxins of *C. perfringens*.

OŃTÚSTIK QAZAQSTAN  MEDISINA  AKADEMIASY  «Оңтүстік Қазақстан медицина академиясы» АҚ	SOUTH KAZAKHSTAN  MEDICAL  ACADEMY  AO «Южно-Казахстанская медицинская академия»
Department of microbiology, allergology	y and immunology 50-11-
Control and measuring means	6 p. from 16

- 2. What microbiological methods and prevention strategies are used?
- **12. Patient:** A 2-year-old child presented with trismus, difficulty swallowing, and rigidity. History revealed an untreated iron-related wound. Suspected *Clostridium tetani*.

## **Ouestions:**

- 1. Describe the biological characteristics of *C. tetani* and the action of tetanospasmin.
- 2. Name the microbiological diagnostic methods and specific preventive measures for tetanus.
- **13. Patient:** A 60-year-old experienced worsening symptoms after bronchitis. Sputum contained *Pseudomonas aeruginosa* and *Haemophilus influenzae*. Antibiotic susceptibility testing was performed. **Ouestions:** 
  - 1. Compare the morphology, biochemical features, and pathogenic factors of *P. aeruginosa* and *H. influenzae*.
  - 2. What diagnostic methods are used, and what are the features of antibiotic resistance?
- **14. Patient:** A 7-year-old child with fever, abdominal pain, and frequent bloody diarrhea. He had eaten at the school cafeteria. *Shigella sonnei* was detected in stool.

### **Ouestions:**

- 1. Describe the morphology, biochemical characteristics, and pathogenesis of Shigella.
- 2. What diagnostic and prevention methods are used in shigellosis?
- **15. Patient:** A 30-year-old man developed watery diarrhea, vomiting, and dehydration after a business trip. Stool resembled "rice water." Possibly waterborne. Suspected *Vibrio cholerae*.

## **Questions:**

- 1. Describe the morphology and pathogenesis of *V. cholerae*.
- 2. What diagnostic methods are used and how is specific prevention carried out?

## **QUESTIONS OF THE MID-TERM № 2**

- 1. Describe the natural reservoir and transmission routes of brucellosis.
- 2. Why is *Bacillus anthracis* dangerous due to its ability to form spores?
- 3. What are the main methods used in the microbiological diagnosis of tuberculosis?
- 4. What clinical symptoms are caused by the toxin produced by the diphtheria pathogen?
- 5. Why is rubella virus dangerous during pregnancy?
- 6. Where in the body does the varicella-zoster virus persist in a latent form?
- 7. Explain the mechanisms of antigenic drift and shift in the influenza virus.
- 8. What is unique about the replication of coronavirus infection?
- 9. In which cells does herpes simplex virus establish latency?
- 10. Who is at particular risk from cytomegalovirus infection and why?
- 11. Name the transmission routes and the most common diseases caused by enteroviruses.
- 12. In which age group are rotavirus infections most common and what are their clinical manifestations?
- 13. Compare the transmission routes of hepatitis A and hepatitis B viruses.
- 14. Why does the hepatitis C virus have a high risk of progressing to a chronic form?
- 15. Describe how the rabies virus reaches the central nervous system.

<b>Indicator</b>	Plague	<b>Brucellosis</b>
Name of pathogen	60, 771,1	1 9/1, WS
Morphology	10. 60 411.	is at
Gram staining Company of the Company	VO. 60 71	1.1.1
Spore/capsule formation	K. Vs. 60	111.11
Motility	94, 20.	2011111
Transmission routes	1 1 44, 20	602111.
Natural reservoir	W SKI	19. 60, 11
Clinical forms	1.7 1	VS. 600
Diagnostic methods		K. Vg. OC
	6011111	K. Vs. S.
	601111	1 7/1/3
Diagnostic methods  Specific prevention/vaccination  2. Comparison of Anthrax and Tula	remia	1 skugigi
Specific prevention/vaccination	nremia Anthrax	Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula Indicator		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula  Indicator  Name of pathogen		Tularemia
2. Comparison of Anthrax and Tula Indicator Name of pathogen Morphology		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula Indicator  Name of pathogen Morphology Spore/capsule formation		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula Indicator  Name of pathogen Morphology Spore/capsule formation Oxygen relationship		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula Indicator  Name of pathogen Morphology Spore/capsule formation Oxygen relationship Transmission routes		Tularemia
Specific prevention/vaccination  2. Comparison of Anthrax and Tula Indicator  Name of pathogen Morphology Spore/capsule formation Oxygen relationship Transmission routes Natural reservoir		Tularemia

Indicator	Anthrax	Tularemia
Name of pathogen	7, 3. 60,	1 1 2 1
Morphology	-KII. 53:	300 K
Spore/capsule formation	3. My 3.	SON KI
Oxygen relationship	1 2. M.	S. 300 / F
Transmission routes	1 3, 12	3.000
Natural reservoir	14, 2,	M. 3: 091
Main clinical forms	go H	3, 174, 3.6
Diagnostic methods	90, K	5, 11,
Specific prevention/vaccination	10 90. K	Sille

Natural reservoir	60,717.	1 24	10, 60, 11, 1	Tr. Vg. 60 12
Clinical forms	19. 60 111.	11 24	. vs. oo. 1	2. Thursing ago, The
Diagnostic methods	V3. 60,7	1.5.1	K1, V3. 60, 1/4	1 2 Kur 3. 890 Kr
Specific prevention/vacc	ination		1/1, Vg. 07, 11	1 2 Ku, 39 6 90
1200 SO 11: KI	SKI, Wa.	60 Mit	7 3KI Wa. 60	171.K1 2, EKU, USI, SQL
2. Comparison of Anthra Indicator		Anthrax	Tularemia	10,411, KT 2K1, Wg. 6
Name of pathogen	X 55 X	Antinaa	That china	"60, 411. KT 24, Wa.
Morphology	19. Kt 20.	The Sign	190, KJ 3, W	10 56 411. 15 34, W
Spore/capsule formation	200 / K	3. 111	1. 100 Kr 34	Ma Jier 41. 15 24.
Oxygen relationship	SON KI	1 25 Mil	15 90. Kg 2	6 41. KJ 3
Transmission routes	20.	5 1	40 Jin 90. Kr	26, 40, 56, 411. KT
Natural reservoir	73:000	W 5	The 50 90, K	P. St. Wo Sier Mr. K
Main clinical forms	W/1 3:00	D. Kr	3. My Jin 9/1.	Kr 24 Wo ser Mr.
Diagnostic methods	s. My Sig	90, Kr	2 /1/10 Jis 3/10	7. 15 24 Wo Ser 41,
	rination	10.1	4 2 1/4 3 C	41. KJ 24. Wo Son
3. Comparison of Natura	al-Foci Zoono			Hemorrhagic Fever with
Specific prevention/vacc  3. Comparison of Natura  Indicator	E J S. KU	eous	d Parasitic Infections Crimean-Congo Hemorrhagic Fever	Hemorrhagic Fever with Renal Syndrome
3. Comparison of Natura Indicator  Type of pathogen	al-Foci Zoono Cutane	eous	Crimean-Congo	
3. Comparison of Natura Indicator	al-Foci Zoono Cutane	eous	Crimean-Congo	
3. Comparison of Natura Indicator  Type of pathogen Nature of pathogen	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome Transmission routes Natural reservoir Vector	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome Transmission routes Natural reservoir	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome Transmission routes Natural reservoir Vector Incubation period Diagnostic methods	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome Transmission routes Natural reservoir Vector Incubation period	al-Foci Zoono Cutane	eous	Crimean-Congo	
Type of pathogen Nature of pathogen (virus/parasite) Morphology and genome Transmission routes Natural reservoir Vector Incubation period Diagnostic methods Specific prevention	al-Foci Zoono Cutane	eous	Crimean-Congo	

4. Comparative Characteristics of Pathogenic Fungi

Indicator	Candida spp.	Aspergillus spp.	Trichophyton spp.	Microsporum spp.
Morphology	W 54 0	0. 60, 771.1	SK1. VS. 60,	1. 1. of 1. 03
Type of hyphae	M. KI SK.	W. 60, 471.	12 ck, wa. 6	Will Style
Spore formation features	10.11 3	-, W.S. 60 111	L'17 CA, VS.	600 11 1 3 K

#### SOUTH KAZAKHSTAN **MEDISINA** MEDICAL **AKADEMIASY ACADEMY** АО «Южно-Казахстанская медицинская академия» «Оңтүстік Қазақстан медицина академиясы» АҚ Department of microbiology, allergology and immunology Control and measuring means 8 p. from 16 Diseases caused Main localization Source of infection Transmission routes Diagnostic methods Treatment methods Specific prevention (if any)

5. Comparative Characteristics of Pathogenic Protozoa

Indicator	Entamoeba histolytica	Giardia lamblia	Trichomonas vaginalis	Leishmania spp.	Toxoplasma gondii
Morphology	cking. 60,	111.11.1	K1, VS. 50, 11,	13. KU.	9:0 GD / Kr
Life cycle stages	T CH, Wg. 6	0,114,1	CK1, VS. 00	14 2 M	3. 30.
Disease	17 ck, vg.	60,114	1. 44, 29. 60	2.7	1, 3:090.
Main symptoms	1. 12 ct 2	9. 600 11	1. 1. 1/1. 13.	300 Kr 2	174, 3: 0G
Source of infection	edu.K. 1 ski	Mg. Sold	7.KT 2 SKULLIS	Siego gnift	S. Skulgie
Transmission routes	3.80.41.14	SKILLIS.	500911-KT 2. 24.	My J. Egg.	KT S. SKU
Diagnostic methods	Kusis soldnik	KT 2 SKU	19: Seggnik KT	2, 2KULO S.	90. KT 24
Preventive measures	s. Kulusis Eg	Mikits	Kulais Eggin	TI SKING	9. 697.11.K

6. Comparison of Tuberculosis and Meningococcal Infection

Indicator	Tuber	rculosis	Meningococcal I	nfection
Name of pathogen	24 16	40.1	1 2/2 Wa 6	YU.
Morphology of pathogen	Shirth	70.	KJ 24 Wa	Co YU
Cultural properties	Kr 22 W	, C /	1. KT 24 V.	D. 60.
Transmission routes	, KT 24	Wa So	111, KT 84,	VO. 6
Source of infection	10. 17 3	F. 100	60 111, 11 34	7,00
Pathogenesis	10, KI	St. Wo	6, 11, 11	St. W
Main clinical manifestations	S. 10. 1	SK	UO 60 411. 11	Ski
Diagnostic methods	0.00 1/11.	KI SH	War So Mi	1 0
Specific prevention (vaccination)	Way So YA	1. 1	2/ VO. 60, 11)	S. M.
7. Comparison of Diphtheria an			1 sking e	gn. K
7. Comparison of Diphtheria an Indicator	d Whooping C Diphtheria		ing Cough	GONTA GONTA
7. Comparison of Diphtheria an			ing Cough	giednika gniika
7. Comparison of Diphtheria an Indicator			ing Cough	g.edn.kg
7. Comparison of Diphtheria an Indicator Name of pathogen			ing Cough	iugiegn giegnika
7. Comparison of Diphtheria an Indicator Name of pathogen Morphology of pathogen Toxin production Transmission routes			ing Cough	ing.equ g.equ.kq
7. Comparison of Diphtheria an Indicator Name of pathogen Morphology of pathogen Toxin production Transmission routes Source of infection			ing Cough	skusiegn giegnika
7. Comparison of Diphtheria an Indicator Name of pathogen Morphology of pathogen Toxin production Transmission routes Source of infection Pathogenesis features			ing Cough	a.edu.ki a.edu.ki a.edu.ki
7. Comparison of Diphtheria an Indicator Name of pathogen Morphology of pathogen Toxin production Transmission routes Source of infection			ing Cough	du. Klasku kusedu ka kusedu ka ka kusedu ka ka ka ka ka ka ka ka ka ka ka ka ka
Name of pathogen Morphology of pathogen Toxin production Transmission routes Source of infection Pathogenesis features Main clinical manifestations Diagnostic methods			ing Cough	aledu.kl skinale skinale
V. Comparison of Diphtheria an Indicator  Name of pathogen  Morphology of pathogen  Toxin production  Transmission routes  Source of infection  Pathogenesis features  Main clinical manifestations			ing Cough	du.i.kl a.edu.kl skna.edu skna.edu skna.edu skna.edu

5 Indicator	Diphtheria	<b>Whooping Cough</b>
Name of pathogen	J 34 00	), 60 Mil. 11
Morphology of pathogen	I SH	VS. 60, 7/1/2/17
Toxin production	W. 17 CH	1. Va. 60, 11/4
Transmission routes	111.111	ch, vs. 60,111
Source of infection	60,111,10	941 Vg. 600
Pathogenesis features	J. 60,717'L	1 4 20. 6
Main clinical manifestations	Vg. 60,111	1 X X
Diagnostic methods	7, 29, 800	11. 12. 24. 20
Charifia provention (vessina)	ch, vg. 0	20 11 1 3 VIII.
Specific prevention (vaccine)		

OŇTÚSTIK QAZAQSTAN <b>MEDISINA</b> <b>AKADEMIASY</b> «Оңтүстік Қазақстан медицина академиясы» АҚ	SKMA -1979 -	SOUTH KAZAKHSTAN  MEDICAL  ACADEMY  AO «Южно-Казахстанская медицинска	ая академия»
Department of microbiology, al	lergology	and immunology	50-11-
Control and measuri	ng means	C 111. 11 CF. VO.	9 p. from 16

8. Comparison of Influenza and Parainfluenza Viruses

Indicator	Influenza Virus	Parainfluenza Virus
Pathogen name (family)	4. Wa. 60 11,	1, 17 gt, Wg.
Genetic material	St. Va. 60	11.11 ch vs.
Morphology	r ex wa	11. 11. ch. x
Antigenic structure	15 ch. vs.	60,771,671, 941,
Replication characteristics	J. 12 ch 2	9. 60,777,67
Transmission routes	111. 11. CK.	V3. 60, 11. 1.
Incubation period	50 111-111	T, Vg. 600" F.
Clinical manifestations	60,111,611	Th. 3. 60, 11.
Complications	19. 600 111 1.	×41, vg. 500"
Diagnostic methods	V3. 80, 114	17 7/1, 29. 00
Specific prevention	K1, VS. 600"	1. 1. 5K, VS.

9. Comparison of Adenovirus and Coronavirus Infections

Indicator	Adenovirus	Coronavirus
Virus family	1 × KU 3.	600 Fr 1 2
Genetic material	1 3 KU 3	1. 300 /K
Morphology	1 2. KU.	3. 30 K
Site of replication	21. 14. 2. 17	11,000
Antigenic structure	SON KINS	My Singly
Transmission routes	3. 300 Kr	S. Mir Jin
Source of infection	3. 30 K	2 21 1/10
Incubation period	2,000	K 25 W
Main clinical manifestations	11, 3: 90	Kr 25 W
Diagnostic methods	3, 11, 3,0	10. Kr 26
Specific prevention	2 2 11	90. Kr 2

10. Comparison of Human Herpesviruses

Indicator	HSV-1	HSV-2	CMV
Full virus name	90. K	26 Wo	2.00 11
Morphology	S. 40. K	Shirt	o So
Site of replication	3:00 401.	KI 54.	Way 6
Site of latency	10 3.60 40	V C	L'Wo
Tropism (target cells/tissues)	10000	10. KJ	SK. W
Diseases caused	Ma S	Yn. K	SK
Transmission routes	St. Wo	So Mi	V 6
Diagnostic methods	J 54 10	S. S. 71	1. 1
Specific prevention	KL 54	Vo. Sp.	XVI. 1

11. Comparison of Rickettsioses and Borrelioses

Indicator	<b>Epidemic Typhus</b>	<b>Tick-Borne Typhus</b>	Q Fever	Lyme Disease
Name of pathogen	W.O. 60, 417.	r chi wa. 60	1.1.	ch, vs. oc
Taxonomic group	5 F. Wa. 60, 111.	11 ch vs. 6		CALL VS.
Morphology	SK. Vs. Go.	1. 1 ch 3.	60011	1. 1. 1/1. 13
Vector	1 ch. Vs. 60	111111 11 11 11	000	if I s. Mu.
Natural reservoir	17 ch 20.	60 111 1 3 KM	VS. 50,	1 3 1
Transmission routes	11.11 ch 00	600 11 1 3 X	73.	On 14 2
Incubation period	111: 11 CK, 4	S. 60 114 1	1/11. VS:	600 1 K

«Оңтүстік Қазақстан медицина а	MEDISINA AKADEMIASY кадемиясы» АҚ	SOUTH KAZAKHSTAN MEDICAL ACADEMY AO «Южно-Казахо	Kwars en 9	ская академия»
Department of	f microbiology, allerg	gology and immunology	51,111	50-11-
To the Silving Co	ontrol and measuring	means	I St. No	10 p. from 16
Main clinical manifestations	6 47. KJ	St. Wo. 60 M.	The street	10. 60 111.
Diagnostic methods	J. 60 411. KJ	St. Wo. Sp. >	W. 11 SK	VS. 60771/4
Specific prevention	00 00 1111	1 4 00 01		M. 3. 000 . A

2. Comparison of Rabies and Indicator	Rabies	Tick-Borne Encephalitis
1 Skill Malcator	ixabics	rick-borne Encephantis
Pathogen name	In sky	Vs. 697714 1 2, 5
Viral taxonomy	M. Kr 3	E. Mo. J. Eggn. KT
Genetic material	60 11.16	SKILLISIS SQUILLE
Morphology	13. SO COLUM	Ky 2 skywy sieggi
Source of infection	11/10.250	90. KT 3. SKU. Wg. S.
Transmission routes	St Klucas	edo 11/2 Skyria
Natural reservoir	A SHIM	18. 3.60 911; KJ 3KI
Incubation period	11. 12 3	KW 43: 690 11/K
Pathogenesis features	901.KI	SKING SIGO 911. K
Clinical manifestations	y. Egg/11'k	KI SKIMBI EDVI
Diagnostic methods	Wo Sier G	7. KT 36 KWO. 360
Specific prevention	SK, Wa.	50, Mig 2, 2KUUS.
Seasonality	12 SKM	13.6 90, 151 3 34 Th
Endemic regions in Kazakhsta	an 1 sk	Wa. 50 M. 1 2

13. Comparison of Measles, Rubella, Chickenpox, and Mumps

Indicator	Measles	Rubella	Chickenpox	Mumps
Pathogen name	1/11 VS	. 600.1	K 1 2, KU,	3.
Virus family	1 3 1/1/	3. OD	1 2, 18	1100
Genetic material	1 3 1	1, 29.	70 Kr 2,	16/11/2
Morphology	1 2	15/1, 29.	90. Kr	2, 14,
Site of replication	V. 14	2, 1/1/1	J. 900, Kr	35/1/
Transmission routes	900 Kr	1 2, 1/1	3.0	H 55
Incubation period		15	410 3:00	The s
Main symptoms	3.000	H 2	14/10	10. K
Complications	1,00	D. Kr	21/1/10	90, K
Diagnostic methods	1411	90. K	Shille	10, 70.
Specific prevention	5, 17(1)	0.70.	Kr 26"W	2:00 1

14. Comparison of Enteroviruses and Rotaviruses

Indicator	<b>Enteroviruses (Polioviruses)</b>	Rotaviruses	
Pathogen name	, AT SE WO SE YOU.	KJ 54.10	
Virus family	40. Kr 26. 400 60 41	J. KJ St	
Genetic material	10. KT 26 Way 60	Y17. KT	
Morphology	Sec 411. KT SKI Was	S. 111. KT	

«Оңтүстік Қазақстан медиі		SKMA -1979- AC	UTH KAZAKHSTAN EDICAL EADEMY ) «Южно-Казахста	нская медицинск	ая академия»
Departi	ment of microbiology, a	ıllergology ar	d immunology	5, 100	50-11-
90 K 21 W	Control and measur	ring means	60 YN. K	St. No	11 p. from 16
Site of replication	10 50 YO. K	SK. W	G Yn.	1 3 m	0. 60 111.
Source of infection	1400 Sep 411.	W St	Lia. So M	The off	Wg. 60,111.K
Transmission routes	1, Wa 60 41	1 6	H. Vo. 60.	W. 11. CX	7, 49. 60,11
Incubation period	Ch. Wa. Co.	111. 11	ch 20, 6	D	TAI, 49. 500

15. Comparison of Viral Hepatitis Types

Clinical manifestations

Complications
Diagnostic methods
Specific prevention

Indicator	<b>Hepatitis A</b>	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Genetic material	J. 60, 111. L.	1 24 0	y. 60, "/'	1. 4	3. 00
Virus morphology	VIS. 60, 111;	The state of	Vg. 600	1 3. K	1, 35. SQD
Transmission routes	7 3. 800	1.4.1.3	1, 3, 60,	1,4,1,2,	M. 3: 8
Source of infection	K1, Vg. 60	111K	K11. V3.	900 /K	3, 17(1, 3);
Incubation period	KI, VS.	000	2. KII. VS:	SQL K	2 2 1/1/1
Disease course characteristic	3/1 2/ 13	1. 600 1 F	1 3. 1/11.	S. 600. 14	2 2 1/4
Risk of chronicity	1. 1. KI	V3. 60. "	K 1 3. 1/2	, 3.0 000	K 2
Diagnostic methods	11. 1	1, 3. 30	1 2	TU. 3.000	D. Kr 2
Specific prevention	0 114 3	KU, 35.	90 / K	, My Ji	90. Kr

### Case-Based Tasks for Midterm Control No. 2

**1. Patient:** A 45-year-old man engaged in livestock farming in a rural area presents with fever, chills, muscle pain, and shortness of breath. Examination reveals lymphadenopathy and harsh breath sounds. He recently slaughtered sheep.

### **Questions:**

- 1. Which zoonotic infection is characterized by such clinical features?
- 2. What microbiological methods are used to diagnose this disease?
- **2. Patient:** A 35-year-old woman with diabetes complains of white coating in the mouth, burning, and pain when swallowing. Microscopy reveals pseudomycelium and round cells.

### **Ouestions:**

- 1. What is the suspected pathogen and its morphology?
- 2. What are the features of laboratory diagnosis and treatment of this mycosis?
- **3. Patient:** A 6-year-old boy presents with fever, neck stiffness, vomiting, and altered consciousness. Purulent CSF shows Gram-negative diplococci.

## **Questions:**

- 1. What disease is suspected and what are the morphological features of the pathogen?
- 2. What are the diagnostic methods and specific prevention for this disease?
- **4. Patient:** A 24-year-old man presents with itchy lesions on hairy areas, with peripheral redness and central scaling. Microscopy shows branched hyphae and microconidia.

## **Questions:**

- 1. What type of mycosis and likely pathogen? What is its life cycle?
- 2. What laboratory diagnostics and preventive measures are used?

MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ	JTH KAZAKHSTAN DICAL ADEMY «Южно-Казахстанская медицинская академия»		
Department of microbiology, allergology and immunology 50-11-			
Control and measuring means	12 p. from 16		

**5. Patient:** A 22-year-old male student reports burning and itching on the lips followed by vesicular rash. He had exam-related stress a month ago.

### **Questions:**

- 1. Which herpes virus is suspected and in which cells does it remain latent?
- 2. What laboratory methods are used to diagnose this infection?
- **6. Patient:** A 38-year-old man developed a ring-shaped erythema, weakness, fever, and later joint pain and neurological symptoms 10 days after visiting a forested area.

## **Questions:**

- 1. What is the possible pathogen, its morphology, and vector?
- 2. Diagnosis and prevention of Lyme disease?
- **7. Patient:** A 27-year-old man has a fever up to 39°C, muscle aches, headache, and dry cough. There is a seasonal influenza outbreak.

### **Ouestions:**

- 1. What are the types of influenza virus and what cultures are used to grow them?
- 2. What rapid diagnostic methods are used and how are results interpreted?
- **8. Patient:** A 2-year-old boy has hoarseness, "barking" cough, inspiratory dyspnea, and moderate intoxication.

## **Questions:**

- 1. What virus is likely and where is biomaterial collected from?
- 2. What laboratory methods are used and how is the material prepared?
- **9. Patient:** A 50-year-old woman complains of dry cough, weakness, loss of smell, and low-grade fever. She was in contact with a sick person.

#### **Ouestions:**

- 1. What laboratory methods are used to detect COVID-19 and what material is studied?
- 2. What vaccines are used for specific prevention?
- **10. Patient:** A 10-year-old boy was bitten by a wild dog. Three days later: weakness, headache, photophobia, painful swallowing, neck muscle spasms. The wound was untreated.

## **Questions:**

- 1. What is the suspected diagnosis and pathogenesis?
- 2. What preventive measures should have been taken?
- **11. Patient:** A 5-year-old boy presents with fever, catarrhal symptoms, Koplik spots on the mucosa, followed by a rash. A measles case was registered at his kindergarten.

### **Ouestions:**

- 1. What is the morphology and antigenic structure of the measles virus?
- 2. What diagnostic and prevention methods are used?
- **12. Patient:** A 32-year-old man with prolonged diarrhea, candidiasis, weight loss, and frequent pneumonias.  $CD4 < 200/\mu L$ .

### **Ouestions:**

- 1. What stage of HIV infection is this and what are the clinical features?
- 2. What are the diagnostic methods and treatment principles?
- **13. Patient:** A 38-year-old woman was diagnosed with cervical dysplasia. PCR detected HPV types 16 and 18. She was not vaccinated.

## **Questions:**

1. How does the virus contribute to oncogenesis and which oncogenic proteins are involved?

- 2. What are the prevention and early detection strategies?
- **14. Patient:** A 4-year-old boy presents with fever, loss of appetite, oral blisters, and red spots on hands and feet. Similar cases were noted in the kindergarten.

### **Ouestions:**

- 1. What enterovirus is suspected, its morphology and transmission routes?
- 2. Diagnosis and prevention of the infection?
- **15. Patient:** A 34-year-old man complains of jaundice, weakness, nausea, and loss of appetite. Lab results: elevated bilirubin, ALT/AST. History of dental and injection procedures.

## **Questions:**

- 1. What is the structure of hepatitis B virus and its transmission routes?
- 2. Diagnostic methods and prevention?

## List of Practical Skills in the Discipline

- 1. Proper collection of diagnostic material from the oral mucosa (tongue, gums, tonsils, etc.) using a sterile swab or spatula.
- 2. Collection of purulent or mucous discharge from anterior and posterior nasal cavity using a sterile cotton swab.
- 3. Collection of material from damaged skin areas (pus, scales, exudate) using sterile instruments.
- 4. Collection of material using the "cough plate" method.
- 5. Streak inoculation of diagnostic material onto solid nutrient medium.
- 6. Loop inoculation into liquid nutrient medium.
- 7. Inoculation onto media designed for anaerobic conditions.
- 8. Air sampling using the sedimentation method for microbiological analysis.
- 9. Subculturing onto slant meat-peptone agar to isolate pure cultures.
- 10. Preparing smears from agar culture of bacteria.
- 11. Staining smears with aqueous solutions of fuchsin and methylene blue.
- 12. Gram staining of smears.
- 13. Microscopy of stained smears using the immersion system.
- 14. Identification of Staphylococcus morphology in Gram-stained smears.
- 15. Identification of *Enterobacteriaceae* morphology in Gram-stained smears.
- 16. Determination of catalase enzyme activity.
- 17. Determination of antibiotic susceptibility using disk diffusion method.
- 18. Inoculation of viral material into chick embryos.

Complied by:	Senior Lecturer, Polatbekova Sh.T.
Head of the department:	doctor of medical sciences, prof. Seytkhanova B.T.
Protocol № 119 Date « 26 »	2025 y. Salar and Market St. (1)
skug geodiniki ski	way se garry to skrius seagary to skrius seg
SKI, War Sear Mr. KT 2,	Skyrus. Egg. M.K. 7 Skyrus. Egg. M.K. 7 Skyrus.
KI 2 SK. Way Sec 917. KT	1 2k Kusy sign gar. KT 2 skr. Kusy sign gar. KT 2 skr. K
11. KT 2 KI, Wy. 3 600 11	14 7 2. 24 W. S. 690 M. 1 2. 34 W. S. 690 M. 14 1 24
Egn 1/1/KI 2 ex Mua 3 es	gnith 2 skruig ser gnith 2 skrug. seg gnight

OŃTÚSTIK QAZAQSTAN
MEDISINA
AKADEMIASY
«Оңтүстік Қазақстан медицина академиясы» АҚ
Department of microbiology, allergology and immunology
Control and measuring means

SOUTH KAZAKHSTAN
MEDICAL
ACADEMY
AO «Южно-Казахстанская медицинская академия»

50-1114 p. from 16

OŇTÚSTIK QAZAQSTAN  MEDISINA  AKADEMIASY  «Оңтүстік Қазақстан медицина академиясы» АҚ  Онтустік Қазақстан медицина академиясы» АҚ	нская медицинская академия»
Department of microbiology, allergology and immunology	50-11-
Control and measuring means	15 p. from 16
90" 1K 1 2" KUL 3" 6 90" 1K 2 24 KUC 3" 6 90" 1	KT 2K, (Wa 3'60, 41). KT
ia edilu. Klasikina edilu. Klasikina edilu. Klasikina edilu. Klasikina edilu. Klasikina edilu. Klasikina edilu.	. Kr 35 Wo sec 47. A
ig. eggnikry z skulgeggnikry z skulgegnikry z skulgegnikry z skulgeg	71. KT 24, Wa 50, 41.
Ku, 18. 690 1/4 2, Ku, 28. 90. 11 22 140 3.0	Mr. Kr. St. Wo Ser 40
3, 44, 35, 600 1/4 2, 44, 35, 90, 14, 20, 14, 30, 14,	in 90. Kr 26. Wo see
	us eggnirkt i skurus.
11/4 1 2/4 My 3 60 90 1/4 14 24/ My 3 60 90 1/4 14 3 34	sking e edn'k X skug
Jageduliki ki a skina eduliki ki skina e	K1 SKUS edn'y SGN'Y KY SKUS E
890 " Fr. 1 2, Fr. 1 3, 690 " Fr. 1 2, Fr. 3 : 6, 90 . Fr	22 My 5:05 41. 15 3
	KY SKINO SECONINIKI
13. 600 1/4 1 3. 44, 3. 690 1/4 2 20 My	
	dirkry s. skuras skuas egrikuas a egrikry skuas egrikuas kuas egrikry
skina. edu ki ki sa skina. edu ki ki ski	, 90. K) 26, Wa 360 41
2. The var of the sitting are you the service	J'es 911. KT SK Was Ser
1 2 7 4 35 90 1/h 2 2 1/4 35 90, 1/h 2 24 1/4	s Jee 4n. Kr Sk. Wo
2, 1 2, 70, 13 . Op. 1/h 2, 70, 2 . Op. 1/h 22/	We sign An. 15 2k Wa
11/4 1 2, 1/4, 13, 600 1/4 2, 1/4, 3, 1/4, 3, 90, 1/4, 2	L'Mo Jes M. KJ SKIN
1, 1, 1, 2, 10, 13, 60, 15, 1 2, 10, 10, 3; 90, 15, 1	24 My 3:00 41. KT 2K
600, 14, 1 2, 40, 23, 690, 14, 2, 40, 3, 6, 90, 14	2 2 Wy Jeg 47. 15
" 00" 'FU 2" FULL "S" 00" 'FU 2" " " " " " " " " " " " " " " " " " "	Kr 2 SK Myc Jes 40. Kr
2. 800 11 1 2 5ky 28. 690 11 1 2 164 28. 690	, Kr 2 2 My Jieg 911. K
", " " " " " " " " " " " " " " " " " "	yn. Kr 25 Kur Jies Yn.
The way con 11 th 1 2 the way con 11 th 2 the said	3 90, Kr 2 26 Kly 3:00 91
3 th, 33. 600 11 1 2 th, 35. 600 11 2 th	3:0 90. Kr 2 24 My 3:00
V 24, V3. 60, WY, V 256, V3. 60, WY, V 2, FU,	103. Office of the service of
L' (7 , 44, 24, 60, "1:4" (7 , 44), 28, 60, "1:4" (2, 7)	THE STATE OF THE STATE OF THE
17. L' L' 34, V3. 60, 11. L' 1 2 9/L, V3. 600 11. L' 1 2	" the single
3,471.47 , 5/41, 43. 602,1714, 17 3,5/41, 43. 600,1714,	12, KU, 35, 690, Kr 1 2,
60, 11. L. T. 3k, Ws. 60, 11. L. T. 3k, Vs. 60, 11.	1. 2. AU. 23. 690 1. K. 1
), 60,471. (1 , 341, 48, 60, 171. L' 1 , 341, 48, 60, 1.	1, 1 2, KU, 3, 69, 1, K
40. 60 47. 17 34, 40. 60 "11/2" 1 341, 40. 60,	11/1/2 AU 13. 600 1/1
7, 49, 60, 47, 47, 48, 48, 60, 17, 4, 1 3 941, 48, 6	500,114, 1 2, 44, 23, 590
36 War 60 M. L. V. 36, War 60 M. L. V. S. 561, Va.	600 11 2 KU, 35 60
. 3/2, 42, 60, 47. L'V , 3/2, 43, 60, 17. L'V , 3/41, 3	13. CON 11/4 1 3. 4/11 23.
17 24 War 60 Mile 17 24, War 60 Mile 17 250	, vs. 600 11 1 2 12 10 vs
· 1 3 2 43. 60 11. 1 3 4, 43. 60 11. 1 3.	KII. VS. 500 11/K 1 2, KILL
19. 17 35 Us. 60, 19. 17. 18. Us. 60, 11. 15. 15.	K1, 18, 600, 11, 1 2, 10
, 40., 17 , 26, 40. 60, 47.4. 15 , 44, 49. 60, "15"	1 2 ch 3. og 1. k 1 2.
	11 SK1, VS. 60, 11/4 1
o " 60 47. 17 . 34. 49. 60 47. 47. 541. 49. 600"	1.4.17 5 KL. VS. Ogg. 1.K.
40, 60 411, 15 3k, 48, 60 411, 1, 5 5k, 48, 60	"11. 1 2 cky, 28. og, "1
5, 40, 60, 411. 17, 34, 48, 60, 111, 17, 341, 48.	80, 11 x 1 2 x x 25 ogg
34, Wo. 60 Mr. V . 34, Wo. 60 Mr. V . 341, VO.	· 60, 114, 1 2, 1/4, 18, 9, 9,
× 24, 40, 60, 11, 11, 11, 15, 19, 00, 11, 1 3, 17, 1	19. 60, 11 1 2, My 15.

2 S. Mys Jin Mr. Kr	MEDISINA AKADEMIASY JEMURSCH'S AK	SOUTH KAZAKHSTAN  MEDICAL  ACADEMY  AO «Южно-Казахстанская медицинск	ая академия»
Department of r	nicrobiology, allergology	y and immunology	50-11-
	trol and measuring means	2 6 90 15 2k 100	16 p. from 16
ia edulu iki si skrima. Si skrima	690 1.Kr 1. 2.	Thurs 3's 90. 1/1 22 My	J. 60 917. KJ
kus equisticaniki si skur	a.eorgi.kr.kr. s.e	, the significant services	We Siegon, K
1. K. J. Skulgiedniky skrulgiedniky skrugiedniky skrugiedniky skrugiedniky skrulgiedniky skrulgiedniky skrulgi	Ja. 600111/K	KY Skug en ging ein Ky sk	KUL Sie SON.
14. W. 60 M. K. 15 8	71, Vg. 600" 1'K	1 2 cku 23. og	2, Kuis Sie gli
		1.K. 1 2 CKU, 48. 601 1.K	1. 5, 41, 20.
	ina. a.edu.k. skna.edu.k. skna.edu.k. skna.edu.k. du.k. skna.edu.k.		1. 2. Thuy 3.
			11/4 1 3 CKU.
		Kugisquikit zekusis	Soull'And S. Skill
40. M. 2. "U. 0			60,411,411,25
	11. 11 ch		9. 60 M. K. 17
2			Wg. 60, 17. 16
1, 35 -40, Kr 2, 14	, VO. M	S' =	L. Wo. Sp. 111.
kna edukha edukh si skna sedukh si skna edukh si skna edukh si skna edukh si skna sa edukh si skna sa edukh si	kua seguna edi. Kua sekua edi. Kua sekua edi. Kua sekua edi.	1 2K Wa 3 60 411. KT	2/ Wa. 60 41
J.K. K. Skina edil.K. S. S. S. Skina edil.K. S. S. S. Skina edil.K. S. S. S. Skina edil.K.	Killo Jieg 9/11.	edu. Kl. skrna. edu. kl. kl. skrna. edu. kl. kl. skrna. edu. kl. kl. skrna. edu. kl. kl. kl. kl. kl. kl. kl. kl	SK, War Go
1. 2. Kur 3. 690 1. Kr	Service Jie of	7. Kr 26, W. 3'60, 417.	KJ SK Way
1. 3. 4. vs. ogg 1. K	1 S. Miles S. C.	390. Kr 2 SK Kuc Jee 91	1. KJ 2K, Wa
11. 17 2 KU VS. 601"	12 KU103	5 90. Kr 2 24 Rue 3.60	gn. Kr 2k. W
"11.K" 12 SKII V9. 601	" 1. 2. KU	3. 90 Th 2 2 Kly 3.	2 911. KT 26
60 471. L. V. S. KII. V.S.	500"1"K" 1" 2" K	" S. Say The J. S. Kills	3.00 gm. Kr
. 60 M. K. 17 3 4/1 Wg.	601111/12 S.	KU, US. 690" 1.K. J. S. KU	Sic Sprike
Va. 60, 40: 15 15 24, 2	13. 600 111.K.17	CKII, VS. 601 11/4 1 2.	KU, VS. 690, 14
"Wo. 60 471. 15 3K	Wg. 60, 11. K	1 341 no. 60 111. K. 1.	, Kil, VS. 60p."
24, Way 60, Mr. 17	7, Wg. 60, M.	17 ch, 23. 600"11'K	1 ckil, 43. 60
SKING SEC 411. KT	SK, Way 60 4	7. 1 2/2 WS. 60 17:	11 3/4 10.
Kr 26, 140, 5:60, 401. A	1 24, Way 60	41. 15 3K Wg. 60 41	7. KT 341 Wg.
The service sign.	KJ SKINO	60 M. 1 2 W. W. 60	W. D SKIN
10. The service sie of	7. KT 26 1400	J. 60 411. KT 3K, W.O.	SC, 471. 17 2/2
690 1K 1 S. KU10 3.6	SAN, KIN SERV	us see 90. Kt 24. Wo	3.60 M. KT
, 60, 14, 12, 44, 03,	0 90. Kr 2 24	Kur Jie gn. Kr Zk. K	10 500 M. K
3. 600 11 1 2 cky	13. 000 1.Kr. 1	2, Kulg 3:0, 90. Kr 22	KU0 3:60 911. A
1, 48. 60 11 F. 15 SKI	13. 6gg///K	1. 2. thur 3.6 gg. 1/h	Status Jies 911.
3K, US. 60, 111, 15	K1, Vg. 60,"1"	1. 2. Ku. 3. 690 1.Kr	2 Sight of
SK, Wg. GOMILIA	CKI, US. SON	11.K. 1 2. CKU, V3. 690.11.K	1 S. Miles
7 2/ Wa. 60 Mile	1 ski no. ec	17. 17. 5 CAU. VS. 590"	1. 4. 1. 2. KU. 3
1 2 3K War 60 411.	17 ch, 20.	60 111. L. 15 8/1, US. 60	Mr. J. S. Ku.
111. KJ 24 Way 60 4	1.15 th W.	" 60 411. KIT 841, Wg.	600 11 14 17 2. CA
411. KJ 2K, Way 60	10. KJ SK.	43. 60 Mig 1 3/1, 43	· 600 111 / 1 3
in an KI stillion	6, 41. KT 34	L. S.	US. 60, 111.11
3: 9n. Kr 24, Wo	3.60 M., M	34 Was 60 Mil T 34	Wg. 60, 111.K
W. J'r. 90. KJ 24. 1	Un Jien 411., KT	36, Wo. 50, 47. 17	SK, WS. 50, 117;
Kur 3's 9n. Kr 2k	The yearly.	tr 22, 40, 50, 41, 17	34, Wg. 600
2, My 3:0, 90, Kr	2 1/40 JE 1/1/	KJ 24, WO SO MI,	J 54 20, 61