

2018-2019

COURSE NAME GENERAL MICROBIOLOGY

UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
Heinzelova 55
Tel. 01/2390 111
Division:
Department / Clinic:
Department of Microbiology and Infectious Diseases with Clinic
Email: pinter@vef.hr
Register no.:
File no.:
Zagreb, 16.1.2019.



79324	REPUBLIKA HRVATSKA	
Veterinarski fakultet u Zagrebu		
Primljeno:	17.01.2019	
Klasifikacijska oznaka	Org. jed.	
602-04/19-23/15	251-61-32;251-61-08;	
Uredžbeni broj	Prilozi	Vrijednost
251-61-08-19-03	0	-

COURSE SYLLABUS

Course name: GENERAL MICROBIOLOGY

Academic year 2018-19

Course leader: Prof Ljiljana Pinter, DVM

Teachers: Prof Ljiljana Pinter, DVM, Prof Nevenka Rudan, DVM

Associate teachers:

First day of classes: 15.4.2019.

Last day of classes: 5.6.2019.

Timetable for LECTURES academic year 2018-2019

LECTURES				
Date	Methodological unit	Teacher	Location / time	Literature
15.4.2019.	Introductory lecture - Microbiology development and its importance in veterinary medicine (the scope of microbiology, microscope, development of microbiology, Pasteur, Koch) Bacterial morphology (shape, size, structure, mobility). Bacterial spores (shape, size, structure). (2 hours lectures)	Prof Ljiljana Pinter, DVM	Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 10-12h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
29.4.2019.	Structure of bacterial cell (differences in cell wall structures, gram +, gram -) (2 hours lectures)	Prof Ljiljana Pinter, DVM	Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 13-15h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
6.5.2019.	Antibiotics and mechanisms of their effects (antimicrobials in veterinary medicine) (2 hours lectures)	Prof Nevenka Rudan, DVM	Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 10-12h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
13.5.2019.	Virology development (definition, shape, size, study methods)	Prof Nevenka Rudan, DVM	Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.

	<p>Basic properties of viruses. Physical properties and chemical composition of viruses. antigenic properties. Viral replication. Viral cultivation. Effects of viral infection of cell. (2 hours lectures)</p>			<p>Songer, J. Glenn, K. W. Post (2005): <i>Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease.</i> Elsevier Saunders</p>
17.5.2019.	<p>Bacteriophages and phagotyping. Viral genetics. Viral interference. Tumours. (2 hours lectures)</p>	<p>Prof Nevenka Rudan, DVM</p>	<p>Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 9-11h</p>	<p>Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): <i>Clinical Veterinary Microbiology.</i> M. Wolfe. London.</p> <p>Songer, J. Glenn, K. W. Post (2005): <i>Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease.</i> Elsevier Saunders</p>
28.5.2019.	<p>11,12 Morphology, physiology and reproduction of yeast and moulds (shape, size, structure, spores). (2 hours lectures)</p>	<p>Prof Ljiljana Pinter, DVM</p>	<p>Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 8-10h</p>	<p>Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): <i>Clinical Veterinary Microbiology.</i> M. Wolfe. London.</p> <p>Songer, J. Glenn, K. W. Post (2005): <i>Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease.</i> Elsevier Saunders</p>

Timetable for SEMINARS academic year 2018-2019

SEMINARS					
Date	Methodological unit	Teacher	Group	Location / time	Literature
18.4.2019.	1,2 Bacterial physiology (growth temperature, humidity, oxygen, pH) Bacterial toxins (2 hours seminar)	Prof Ljiljana Pinter, DVM		Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 8-10h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
9.5.2019.	3,4 Bacterial genetics (mutation, transduction, transformation, conjugation) (2 hours seminar)	Prof Ljiljana Pinter, DVM		Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 14-16h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
14.5.2019.	5,6 Bacterial resistance (development and	Prof Nevenka Rudan, DVM		Practical hall, Department of	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe.

	transfer) (2 hours seminar)			Microbiology and Infectious Diseases with Clinic / 8-10h	London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
20.5.2019.	7,8 Effects of physical and chemical factors on viruses. Antiviral chemotherapy (2 hours seminar)	Prof Nevenka Rudan, DVM		Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 13-15h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
27.5.2019.	9,10 Prions and viroids; Viral diseases diagnostics (laboratory diagnostics) (2 hours seminar)	Prof Nevenka Rudan, DVM		Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
4.6.2019.	11,12 Dermatophytes (isolation and identification) (2 hours seminar)	Prof Ljiljana Pinter, DVM		Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 16-18h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders

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Timetable for PRACTICALS academic year 2018-2019

PRACTICALS						
Date	Methodological unit	Teacher	Type of practical	Group	Location / time	Literature
16.4.2019.	1,2 Introduction + laboratory equipement and microscope – (2	Prof Ljilijana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 13-15h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.

	hours practical)					Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
29.4.2019.	3,4 Material and handling procedures for microbiological and serological examination – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic /15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
30.4.2019.	5,6 Sterilisation and liophylisation – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 10-12h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
3.5.2019.	7,8 Bacteriological media and culture procedures - (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 9-11h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders

7.5.2019.	9,10 Microscopic slides - native – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
15.5.2019.	11,12 Staining techniques I. chapter - Gram stain – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
16.5.2019.	13,14 Staining techniques II. Chapter – Giemsa stain and Ziehl-Neelsen – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 10-12h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
21.5.2019.	15,16 Bacterial physiology methods – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.

						Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
22.5.2019.	17,18 Testing for the drug susceptibility of microbes – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 8-10h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
23.5.2019.	19,20 Culture techniques and identification of fungus – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 15-17h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
24.5.2019.	21,22 Identification of dermatophytes – (2 hours practical)	Prof Ljiljana Pinter, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 10-12h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders

29.5.2019.	23,24 Viral cultivation I. chapter – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 8-10h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
30.5.2019.	25,26 Viral cultivation II. chapter – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 14-16h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
3.6.2019.	27,28 Practical work in virology laboratory - trypsinisation; CPE – (2 hours practical)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 16-18h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
5.6.2019.	29,30 Practical work in virology laboratory - PCR; electrophoresis in gel – (2 hours)	Prof Nevenka Rudan, DVM			Practical hall, Department of Microbiology and Infectious Diseases with Clinic / 16-18h	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.

	practical)					Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders

STUDENT OBLIGATIONS

Lecture attendance	Total of 15 lecture hours will hold out. Student must assemble at least 3 points (8 hours of lectures) and can gather at the most of 6 points (16 hours of lectures).
Seminars attendance	Total of 15 hours of seminars will hold out. Student must assemble at least 3 points (7 hours of seminars) and can gather at the most of 6 points (14 hours of seminars).
Practicals attendance	Total of 30 hours of laboratory practice will hold out. Student must assemble at least 8 points (20 hours of exercises) and can gather at the most of 12 points (30 hours of exercises).
Active participation in seminars and practicals	Student must assemble at least 5 points for active participation in exercises, which involve two correct answers on the verbal putting questions. The most of 10 points

	involve four correct answers on the verbal putting questions.
Final exam	For approaching to final exam, student must assemble at least 36 points from these segments of teaching: lecture attendance, practical attendance, active participation in practicals and continuous knowledge-checking. Final exam is in written form and consists of 40 questions. Student must assemble at least 24 points from final exam and at the most of 40 points. 18/3/19, 23/4/19, 20/5/19, 13/6/19, 27/6/19, 11/7/19, 4/9/19, 18/9/19
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. Article 45: a student can justifiably be absent from up to 50 % of the lectures; 30% of the seminars and 30 % of the exercises.

GRADING AND EVALUATING STUDENT WORK

2018-2019

COURSE NAME GENERAL MICROBIOLOGY

Continuous knowledge-checking (mid-terms)	1. Preliminary exam will be hold at. 21.5.2019 2. Preliminary exam will be hold at 5.6.2019. (reexams two times)
Final exams (dates)	After successful continuous (mid-terms) knowledge-checking (min 20 points) 18/3/19, 23/4/19, 20/5/19, 13/6/19, 27/6/19, 11/7/19, 4/9/19, 18/9/19
Form of final exam	written

LITERATURE

Obligatory literature	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders
Optional literature	1.Hajsig, D., F. Delaš (2016): Priručnik za vježbe iz opće mikrobiologije. Sveučilišni priručnik, Hrvatsko mikrobiološko društvo, Zagreb. 2.Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija.Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo 3.Topolnik, E., T. Naglič, D. Hajsig (1980): Opća mikrobiologija i imunologija. Veterinarski fakultet Zagreb, Zagreb. 4.Materijali s predavanja 5.Mrežne stranice Zavoda za mikrobiologiju i zarazne bolesti s klinikom Veterinarskog fakulteta Sveučilišta u Zagrebu. 6.Kalenić. S., E. Mlinarić-Missoni (1995): Medicinska bakteriologija i mikologija. Zagreb. 7.Presečki, V. et al. (2002): Virologija, Medicinska naklada, Zagreb. 8.Brudnjak, Z. (1987): Medicinska virologija. Jugoslavenska medicinska naklada. Zagreb

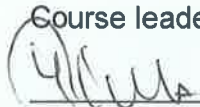
OBJECTIVES AND LEARNING OUTCOMES

Course objectives	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General pathology and pathological morphology, Pharmacology and clinical courses such as infectious diseases and microbial intoxication of animals. Procedures of sterilization, of sampling and sending different materials for further microbiological and immunological tests, simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice will be offered throughout practical work to students attending the course. Lessons and practices in microbiology offer basic knowledge on morphology, physiology, specific qualities of cultivation and identification, antigen properties, tenacity, relation to antimicrobial substances,
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GRADING SCHEME

<i>Points</i>	<i>Grade</i>
Up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

Course leader:



Head of Department/Clinic:



Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES,
SEMINARS and PRACTICALS**

Type of activity	Minimum number of points	Maximum number of points
Lectures attendance	3	6
Seminar attendance	4	6
Practicals attendance	4	6
Active participation in seminars and practicals	5	10
Continuous knowledge checking (mid-terms)	20	32
Final exam	24	40
TOTAL	60	100

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES and
SEMINARS**

Type of activity	Minimum number of points	Maximum number of points
Lecture attendance	3	6
Practicals attendance	8	12
Active participation in practicals	5	10
Continuous knowledge checking (mid-terms)	20	32
Final exam	24	40
TOTAL	60	100

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH SEMINARS and
EXERCISES**

Type of activity	Minimum number of points	Maximum number of points
Seminar / practicals attendance	11	18
Active participation in seminars and practicals	5	10
Continuous knowledge checking (mid-terms)	20	32
Final exam	24	40
TOTAL	60	100

Lectures 12 hours

1.2 **Introductory lecture** - Microbiology development and its importance in veterinary medicine (the scope of microbiology, microscope, development of microbiology, Pasteur, Koch)

Bacterial morphology (shape, size, structure, mobility, spores).

Bacterial spores (shape, size, structure).

3.4 **Structure of bacterial cell** (differences in cell wall structures, gram +, gram -)

5.6 **Antibiotics and mechanisms of their effects** (antimicrobials in veterinary medicine)

7.8 **Virology development** (definition, shape, size, study methods)
Basic properties of viruses. Physical properties and chemical composition of viruses. antigenic properties. Viral replication. Viral cultivation. Effects of viral infection of cell.

9.10 **Bacteriophages and phagotyping**.

**Viral genetics. Viral interference.
Tumours.**

11,12 **Morphology, physiology and reproduction of yeast and moulds (shape, size, structure, spores).**

Seminars 12 hours

1,2 **Bacterial physiology** (growth temperature, humidity, oxygen, pH)

Bacterial toxins

3,4 Bacterial genetics (mutation, transduction, transformation, conjugation)

5,6 Bacterial resistance (development and transfer)

7,8 **Effects of physical and chemical factors on viruses. Antiviral chemotherapy**

9,10 **Prions and viroids; Viral diseases diagnostics (laboratory diagnostics)**

11,12 **Dermatophytes** (isolation and identification)

Practical work 30 hours

1,2 **Introduction + laboratory equipment and microscope – chapter 1** (Described in literature)

3,4 **Material and handling procedures for microbiological and serological examination – chapter 10** (Described in literature)

5,6 **Sterilisation and liophylisation – chapter 11 and 12** (Described in literature)

7,8 **Bacteriological media and culture procedures – chapter 4** (Described in literature)

9,10 **Microscopic slides - native – chapter 2** (Described in literature)

11,12 **Staining techniques I. chapter - Gram stain – chapter 3** (Described in literature)

13,14 **Staining techniques II. Chapter – Giemsa stain and Ziehl-Neelsen – chapter 3** (Described in literature)

15,16 **Bacterial physiology methods – chapter 5** (Described in literature)

17,18 **Testing for the drug susceptibility of microbes – chapter 6** (Described in literature)

19,20 **Culture techniques and identification of fungus – chapter 7** (Described in literature)

21,22 **Identification of dermatophytes – chapter 7** (Described in literature)

23,24 **Viral cultivation I. chapter – chapter 8** (Described in literature)

25,26 **Viral cultivation II. chapter – chapter 8** (Described in literature))

27,28 **Practical work in virology laboratory - tripsinisation; GPE – chapter 1** (Described in literature)

29,30 **Practical work in virology laboratory - PCR; electrophoresis in gel – chapter 1** (Described in literature))