

SCBM 453 Pharmacology II
Credit 3(3-0-6)
Academic Year 2564 (2021)

Course description

วทขพ ๔๕๓ เกษัตริย์วิทยา ๒

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SCBM 453 Pharmacology 2

3 (3-0-6)

หลักการและกลไกของการเกิดความผิดปกติ ระบบผิวหนัง ระบบต่อมไร้ท่อ ระบบสืบพันธุ์ โรคติดเชื้อ และมะเร็ง กลไกและเป้าหมายการออกฤทธิ์ของยา ข้อบ่งใช้ การเลือกใช้ยา และอาการไม่พึงประสงค์จากการใช้ยาออกฤทธิ์ต่อระบบผิวหนัง ยารักษาความผิดปกติของระบบต่อมไร้ท่อ ระบบสืบพันธุ์ ฮอร์โมนส์และยาคุมกำเนิด ยาปฏิชีวนะ ยารักษามะเร็ง หลักการทางพิษวิทยา

Principles and mechanisms of dysfunction and diseases of integumentary, endocrine and reproductive systems, infectious diseases and cancer; site of action, mechanism of action, indications, rationale for drug selection and adverse reactions of drugs acting on each system: drugs acting on the skin, drugs for endocrine disorders and drugs for reproductive dysfunction, hormones and contraceptives, antibiotics, cancer chemotherapy, principles of toxicology.

Course objectives

At the end of this course, the students will be able to

1. Describe the etiology and basic mechanisms underlying common dysfunctions and diseases of skin, immune, endocrine, and reproductive systems, as well as infectious diseases, cancer, and human toxicology.
2. List and describe the targets and mechanisms of action, clinical indications and adverse effects of drugs acting on skin, immune, endocrine, and reproductive systems, as well as antimicrobial agents, anticancer agents, and human toxicology.
3. Apply and integrate knowledge of disease etiology and pharmacology for prospective research.

Course coordinator

Pimtip Sanvarinda, M.D., Ph.D.

PM

Instructors

1. Assoc. Prof. Darawan Pinthong, Ph.D. DP
2. Assoc. Prof. Noppawan Phumala Morales, Ph.D. NM
3. Assoc. Prof. Ruedee Hemstapat, Ph.D. RH
4. Asst. Prof. Pimtip Sanvarinda, M.D., Ph.D. PM
5. Asst. Prof. Porntipa Korprasertthaworn, Ph.D. PK
6. Dr. Sutharinee Likitnukul, D.V.M., Ph.D. SL
7. Dr. Somchai Yanarajana, Ph.D., M.D. SY

References

1. Goodman and Gilman's Pharmacological Basis of Therapeutics (12th ed-2012) Editors: Hardman J.G, Limberd L.E. and Gilman A.G.McGraw Hill
2. Basic and Clinical Pharmacology (13th ed-2015) Editor: Katzung B & Trevor AJ. McGraw Hill
3. Pharmacology (7th ed-2012) Editors: Rang H.P.; Dale M.M.; Ritter J.M. and Moore P.K. Churchill Livingstone

Additional materials might be distributed to students prior to classes/conferences.

Evaluation

1. Written examination (70%): multiple choice question
2. Performance (class participation) evaluation (30%)
3. Rubric score for class and conference participation

	Inadequate (1 point)	Need Improvement (2 points)	Satisfactory (3 points)
Punctuality	Arrive later than 15 min	Arrive late, before 15 min	Arrive on time or not later than 5 min
Listening	Lack of interest. Disrespect of the peers and instructors	Sometimes display lack of interest	Actively and respectfully listening to the peers and instructors
Frequency of Participation	Not participate	Participate 1-2 times	Participate more than 3 times

Rubric score for conference presentation (total = 10 points for each conference)

	Inadequate (1 point)	Need development (3 points)	Satisfactory (5 points)
Content	unreliable reference, incorrect information	provide reference, information not completed	reliable reference, all the important points are addressed and discussed
Presentation skills	difficult to follow, not making eye contact	information is presented in sequence, make some eye contacts	speak clearly and make eye contacts with audiences

Score and grade

The contents of lectures are accounted for 70% (written examination), and student's learning performance in the class is 30%. The final grade will be ranked from F to A, basically based on standard criterion and the group scores.

Grading will be done using percent points

Grade

A	$\geq 80\%$
B+	$\geq 75\%, < 80\%$
B	$\geq 70\%, < 75\%$
C+	$\geq 65\%, < 70\%$
C	$\geq 60\%, < 65\%$
D+	$\geq 55\%, < 60\%$
D	$\geq 50\%, < 55\%$
F	below 50%

Schedule

SCBM 453 Pharmacology II

Credit 3 (3-0-6) Academic Year 2564 (2021)

Date: 28 October 2021 – 14 December 2021

Time: Tuesday 09.00-16.00, Thursday 9.00 – 12.00 **Room:** TBA (online)

Examination: TBA, **Room:** TBA (online)

Week	Date	Time	Topics	Lecturer
1	Thu 28 Oct	9.00-12.00	Lecture 1: Drugs affecting hypothalamus and pituitary gland	NM
			Lecture 2: Thyroid & antithyroid drugs	NM
			Lecture 3: Drugs affecting bone mineral homeostasis	PK
2	Tue 2 Nov	9.00-12.00	Lecture 4-5: Drugs affecting adrenal gland	DP
		13.00-15.00	Conference 1: Endocrine disorder (2h)	NM
	Thu 4 Nov	9.00-12.00	Lecture 6-8: Drugs affecting reproductive system	DP
3	Tue 9 Nov	9.00-11.00	Lecture 9-10: Drugs use for treatment of diabetes mellitus	SL
		11:00-12:00	Formative evaluation & Quiz: Endocrine Pharmacology	DP, NM, PK, SL
		13.00 – 15.00	Lecture 11-12: Antibacterial drugs	SL
	Thu 11 Nov	9.00-11.00	Examination I (Lecture 1-8)	NM, DP, PK, SL, PM, TA
4	Tue 16 Nov	9.00-10.00	Lecture 13: Antifungal drugs	SL
		10.00-12.00	Lecture 14-15: Antiviral drugs I & II	SL
		13.00-15.00	Lecture 16-17: Antiparasitic drugs	SL
	Thu 18 Nov	9.00-11.00	Lecture 18-19: Pharmacokinetic/pharmacodynamic approach to antimicrobial therapy	SL
		11.00-12.00	Lecture 20: Antiseptics	PM
5	Tue 23 Nov	9.00-10.00	Formative evaluation & Quiz: Antimicrobials agents	SL, PM, TA
		10:00-12:00	Lecture 21-22: Cancer chemotherapy	PM
		13.00-15.00	Conference 2: Novel anticancer agents	PM
	Thu 25 Nov	9.00-11.00	Examination II (Lecture 9-19)	PM, TA
6	Tue 30 Nov	9.00-11.00	Lecture 23-24: Immunopharmacology	DP
		13.00-15.00	Lecture 25-26: Human toxicology I & II	PK
	Thu 2 Dec	9.00-11.00	Lecture 27-28: Dermatologic Pharmacology	SY
7	Tue 7 Dec	9.00-11.00	Conference 3: Herbal/alternative medicines	RH
		11:00-12:00	Formative evaluation & Quiz: Chemo-Immuno-Toxicology	PM, DP, PK, SY, TA
8	Tue 14 Dec	9.00-11.00	Examination III (Lecture 20-28)	PM, DP, PK, SY, TA

Lecture 1: Drugs affecting hypothalamus and pituitary gland

Lecturer: Noppawan Phumala Morales, Department of Pharmacology, Faculty of Science

Date/Time: 28 October 2021, 9.00-10.00

Learning Objectives: Students should be able to:

1. Explain the regulation of hormones releasing from hypothalamus and pituitary
2. Describe the mechanisms of action, indication, contraindication and adverse effects of hypothalamic and pituitary hormones
3. Describe the clinical use of hypothalamic and pituitary hormones

Content Outline:

1. Regulation of hypothalamic and anterior pituitary hormones
2. Clinical use of hypothalamic hormones and their analogs
3. Pharmacology of growth hormone and growth hormone antagonists
 - Somatotropin
 - Mecermin
 - Somatostatin and its analogs
 - Pegvisomant

Learning Organization:

1. Lecture 40 minutes.
2. Question and answers 10 minutes.

Learning Materials: PowerPoint lecture presentation

Reference:

1. Long RK, Cakmak H. Hypothalamic and pituitary hormones. In: Katzung BG, Trevor AJ, editors. Basic & Clinical Pharmacology, 13th Ed.: New York: McGraw-Hill; 2015, p 643-662.

Student Assessment: MCQ

Lecture 2: Thyroid and antithyroid drugs

Lecturer: Noppawan Phumala Morales, Department of Pharmacology, Faculty of Science

Date/Time: 28 October 2021, 10:00-11:00

Learning Objectives: Students should be able to

1. Describe the functions and regulation and synthesis of thyroid hormones
2. Describe the mechanisms of action, contraindication and adverse effects of thyroid hormones
3. Explain the mechanisms of action of antithyroid drugs
4. Describe the clinical use of thyroid and antithyroid drugs

Content Outline:

1. Function and regulation of thyroid hormones
2. Diagnosis of thyroid function
3. Pharmacology of thyroid hormones
4. Drugs used in hypothyroidism
5. Pharmacology and drugs used in hyperthyroidism
 - Thionamide
 - Iodides
 - Radioactive iodine

Learning Organization:

1. Lecture 40 minutes.
2. Question and answers 10 minutes.

Learning Materials: PowerPoint lecture presentation

Reference:

1. Dong BJ, Greenspan FS. Thyroid and antithyroid drugs In: Katzung BG, Trevor AJ, editors. Basic & Clinical Pharmacology, 13th Ed.: New York: McGraw-Hill; 2015, p 663-677.

Student Assessment: MCQ

Lecture 3: Drugs affecting bone and mineral homeostasis

Lecturer: Porntipa Korprasertthworn, Department of Pharmacology, Faculty of Science

Date/Time: 28 October 2021; 11.00-12.00

Learning Objectives: Student should be able to

1. Describe the regulatory mechanisms of bone homeostasis
2. Explain pharmacology of drugs used in the treatment of osteoporosis and calcium disorders

Content Outline

1. Regulation of bone and calcium homeostasis
2. Classification of drugs affecting bone and calcium homeostasis
3. Pharmacology of drugs used in the treatment of osteoporosis and calcium disorders

Learning Organization

1. Studying the learning materials provided in advance
2. Lecture 50 min
3. Questions and answers 10 min

Learning Materials Provided

Slides from PowerPoint lecture presentation

References

1. Bringhurst F, Demay MB, Krane SM, Kronenberg HM. Bone and Mineral Metabolism in Health and Disease. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 19e New York, NY: McGraw-Hill; 2014.
2. Bikle DD. Agents That Affect Bone Mineral Homeostasis. In: Katzung BG, Trevor AJ. eds. Basic & Clinical Pharmacology, 13e New York, NY: McGraw-Hill; 2015.
3. Friedman PA. Agents Affecting Mineral Ion Homeostasis and Bone Turnover. In: Brunton LL, Chabner BA, Knollmann BC. eds. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e New York, NY: McGraw-Hill; 2017.

Student Assessment: MCQ

Lecture 4-5: Drugs affecting adrenal gland

Lecturer: Darawan Pinthong, Department of Pharmacology, Faculty of Science

Date/Time: 2 November 2021, 9.00 – 12.00

Learning Objectives: Students should be able to

1. Describe the functions, regulation and biosynthesis of adrenocorticosteroids
2. Describe the mechanisms of action, pharmacological effects, adverse effects of glucocorticoids
3. Describe the therapeutic uses glucocorticoids and antagonists
4. Describe the pharmacological activity of mineralocorticoids
5. Describe the therapeutic uses mineralocorticoids and antagonists

Content Outlines:

1. Functions, regulation and biosynthesis of adrenocorticosteroids
2. Mechanisms of action, pharmacological effects, adverse effects of glucocorticoids
3. Treatment of disturbed adrenal function
 - Adrenocortical insufficiency
 - Cushing's syndrome
4. Pharmacological activity of mineralocorticoids
5. Antagonists of adrenocortical agents
 - Aminoglutethimide
 - Ketoconazole
 - Metyrapone
 - Spironolactone

Learning Organization:

1. Lecture 80 minutes.
2. Question and answers 20 minutes.

Learning Materials: PowerPoint lecture presentation

Reference:

1. Chrousos GP. Adrenocorticosteroids and adrenocortical antagonist In: Katzung BG, Trevor AJ, editors. Basic & Clinical Pharmacology, 13th Ed.: New York: McGraw-Hill; 2015, p 680-695.

Student Assessment: MCQ

Conference 1: Endocrine disorder

Coordinator: Noppawan Phumala Morales, Department of Pharmacology, Faculty of Science

Date/time: 2 November 2021, 13.00 – 15.00

Learning Objectives: Students should be able to:

1. Describe the causes and pathophysiology of endocrine disorders
2. Explain the methodology for diagnosis of endocrine disorders
3. Explain rational drug used and management for endocrine disorders

Learning Organization:

1. Students study the provide material (case report) in advance
2. Each student selects 1 topic and prepares a presentation with PowerPoint
3. Question and discussion in class

Learning Materials: Case reports

1. Tuhan H, et al. Recovery of central fever after GH therapy in a patient with GH deficiency secondary to posttraumatic brain injury. *J Clin Res Pediatr Endocrinol* 2015;7:77-79. Doi10.4274/jcrpe.1639
2. Kumar MM. Severe iodine deficiency from dietary restriction and subsequent iodine excess from sea weed snack overuse in an adolescent disordered eating. *Int J Eat Disord* 2018;1-4. doi:10.1002/eat.22940
3. Franke V, et al. Exogenous Cushing's syndrome due to a Chinese herbalist's prescription of ointment containing dexamethasone. *BMJ Case Rep* 2017;1-3. doi:10.1136/bcr-2016-218721

Student Assessment: Presentation, discussion according to Rubric criteria

Lecture 6-8: Drugs affecting the reproductive system

Lecturer: Darawan Pinthong, Department of Pharmacology, Faculty of Science

Date/Time: 4 November 2021, 9.00-12.00

Learning Objectives: Students should be able to

1. Describe the functions, regulation and biosynthesis of gonadal hormones
2. Describe the mechanisms of action, pharmacological and physiological effects, adverse effects and clinical uses of estrogens and progesterone
3. Explain mechanism of action and clinical uses of estrogen and progesterone inhibitors
4. Describe pharmacological effects of ovulation-inducing agents
5. Describe the mechanisms of action, pharmacological and physiological effects, adverse effects and clinical uses of androgens and anabolic steroids
6. Describe pharmacological effects and clinical uses of androgen suppression and antiandrogens

Content Outlines:

1. Biosynthesis and metabolism of estrogens and progesterone
2. Mechanisms of action, pharmacological and physiological effects, adverse effects of estrogens and progesterone
3. Clinical use of estrogens and progesterone/hormonal contraception
4. Mechanism of action and clinical uses of estrogen and progesterone inhibitors
5. Ovulation-inducing agents
6. Androgens and androgen inhibitors

Learning Organization:

1. Lecture 150 minutes.
2. Question and answers 30 minutes.

Learning Materials: PowerPoint lecture presentation

Reference:

1. Chrousos GP. The gonadal hormones and inhibitors In: Katzung BG, Trevor AJ, editors. Basic & Clinical Pharmacology, 13th Ed.: New York: McGraw-Hill; 2015, p 696-722.

Student Assessment: MCQ

Lecture 9-10: Drugs use for treatment of diabetes mellitus

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/Time: 9 November 2021, 9.00 – 11.00

Learning Objectives: Students should be able to:

1. Explain the hormonal regulation of blood glucose.
2. Describe the mechanisms of action and indication of insulin.
3. Classify the major classes of hypoglycemic agents.
4. Describe the mechanisms of action, indication and adverse effects of antidiabetic medications.

Content Outline:

1. Hormonal regulation of blood glucose level
2. Forms of Diabetes mellitus (DM): type I & II
3. Pharmacology and clinical uses of insulin and antidiabetic medications
 - Insulin
 - Amylin analog
 - Incretin mimetics
 - Sulfonylureas
 - Biguanides
 - Acarbose
 - Others

Learning Organization:

1. Lecture 50 minutes.
2. Question and answers 10 minutes.

Learning Materials: PowerPoint lecture presentation

Reference:

1. Powers AC and D'Alessio. Endocrine pancreas and pharmacotherapy of diabetes mellitus and hypoglycemia. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1237-73.
2. Nolte Kennedy MS and Masharani U. Pancreatic hormones and antidiabetic drugs. In: Katzung BG, editor. Basic & clinical pharmacology. 14th ed. New York: McGraw-Hill; 2018. p. 747-71.

Student Assessment: MCQ

Lecture 11-12: Antibacterial drugs

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/Time: 9 November 2021, 13.00 – 15.00

Learning Objectives: Students should be able to:

1. Classify and describe the mechanism of drugs affecting bacterial cell wall synthesis.
2. Classify and describe the mechanism of drugs affecting bacterial protein synthesis.
3. Classify and describe the mechanism of drugs affecting bacterial nucleic acid synthesis.
4. Classify and describe the mechanism of antimycobacterial drugs.
5. Describe the common adverse effects of antibacterial drugs.
6. Discuss the clinical use/selection of antibacterial drugs.

Content Outline:

1. Overview and classification of antibacterial drug
2. Drugs affecting bacterial cell wall synthesis
 - Penicillins
 - Cephalosporins
 - Vancomycin
3. Drugs affecting bacterial protein synthesis
 - Tetracyclines
 - Macrolides
 - Aminoglycosides
4. Drugs affecting bacterial nucleic acid synthesis
 - Sulfonamides
 - Fluoroquinolones
5. Antimycobacterial drugs
 - First-line drugs: isoniazid, rifampin, pyrazinamide, ethambutol
 - Second-line drugs

Learning Organization:

1. Lecture 100 minutes
2. Question and answers 20 minutes

Learning Materials: PowerPoint lecture presentation

Reference:

1. Deck DH, Winston LG. Beta-lactam & other cell wall- & membrane-active antibiotics. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 769-87.

2. Deck DH, Winston LG. Tetracyclines, macrolides, clindamycin, chloramphenicol, streptogramins & oxazolidinones. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 788-98.
3. Deck DH, Winston LG. Aminoglycosides & spectinomycin. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 799-806.
4. Deck DH, Winston LG. Sulfonamides, trimethoprim & quinolones. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 807-14.
5. Deck DH, Winston LG. Antimycobacterial drugs. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 815-824.
6. Gumbo T. General principles of antimicrobial therapy. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1365-82.
7. Petri WA. Sulfonamides, trimethoprim-sulfamethoxazole, quinolones, and agents for urinary tract infections. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1463-76.
8. Petri WA. Penicillins, cephalosporins, and other β -lactam antibiotics. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1477-504.
9. MacDougall C and Chambers HF. Aminoglycosides. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1505-520.
10. MacDougall C and Chambers HF. Protein synthesis inhibitors and miscellaneous antibacterial agents. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1521-48.

Student Assessment: MCQ

Lecture 13: Antifungal drugs

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/Time: 16 November 2021, 09:00-10:00

Learning Objectives: Students should be able to:

1. Describe the target and mechanism of action of antifungal drugs
2. Describe the clinical uses of antifungal drugs
3. Explain the common adverse effects and drug interaction of antifungal drugs

Content Outline:

1. The characteristic of fungal cell
2. Classification of antifungal drugs
 - Polyenes
 - Azoles
 - Terbinafine
 - Echinocandins
 - Flucytosine
 - Griseofulvin
3. Mechanism of action and clinical uses of antifungal drugs
4. Common adverse effects and drug interaction of antifungal drugs

Learning Organization:

1. Lecture 50 minutes
2. Question and answers 10 minutes

Learning Materials: PowerPoint lecture presentation

Reference:

1. Sheppard D, Lampiris HW. Antifungal agents. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 825-834.
2. Bennett JE. Antifungal agents. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1571-92.

Student Assessment: MCQ

Lecture 14-15: Antiviral drugs I & II

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/Time: 16 November 2021, 10.00-12:00

Learning Objectives: Students should be able to:

1. Describe the mechanism of action of antiherpetic, antiretroviral, antihepatitis and antiinfluenza drugs
2. Explain the common adverse effects and drug interaction of antiviral drugs

Content Outline:

1. Overview of common viral infection with available treatment
2. Antiherpetic drugs
 - Acyclovir
3. Antiretroviral drugs
 - Nucleoside reverse transcriptase
 - Non-nucleoside reverse transcriptase
 - Protease inhibitors
 - Integrase inhibitors
 - Entry inhibitors
4. Antihepatitis drugs
 - Interferon-alfa
 - Nucleoside/nucleotide analogs: lamivudine, tenofovir, adefovir, ribavirin
 - Protease inhibitors
5. Antiinfluenza drugs
6. Uncoating inhibitors: amantadine and rimantadine
7. Neurominidase inhibitors: oseltamivir and zanamivir

Learning Organization:

1. Lecture 100 minutes
2. Question and answers 20 minutes

Learning Materials: PowerPoint lecture presentation

Reference:

1. Safrin S. Antiviral agents. In: Katzung BG, Trevor AJ, editors. Basic & clinical pharmacology. 13th ed. Singapore: McGraw-Hill; 2015. p. 835-864.
2. Acosta EP, Flexner C. Antiviral agents (nonretroviral). In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1593-622.

3. Flexner C. Antiretroviral agents and treatment of HIV infection. In: Brunton LL, Chabner BA, Knollman BC, editors. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill; 2011. p. 1623-664.

Student Assessment: MCQ

Lecture 16-17: Antiparasitic drugs

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/time: 16 November 2021, 13.00 - 15.00

Learning Objectives: After completion of this lecture, the students should be able to:

1. Describe the mechanism of actions, general therapeutic uses, common adverse effects of antiprotozoal, antimalarial and antihelminthic drugs

Content Outline:

2. Mechanisms of actions of antiprotozoa drugs
3. General therapeutic uses and common adverse reactions of antiprotozoa drugs
4. Mechanisms of actions of antimalarial drugs
5. General therapeutic uses and common adverse reactions of antimalarial drugs
6. Mechanisms of actions of antihelminthic drugs
7. General therapeutic uses and common adverse reactions of antihelminthic drugs

Learning Organization:

1. Studying the learning materials provided in advanced
2. Lecture part 1 - 50 min
3. Break 10 min
4. Lecture part 2 – 50 min
5. Questions and answers 10 min

Learning Materials Provided:

1. Slides from PowerPoint lecture presentation

References:

1. Goodman and Gilman's Pharmacological Basis of Therapeutics. 12th ed, Editors: Hardman J.G, Limberd L.E. and Gilman A.G., McGraw Hill, 2011.
2. Katzung Basic and Clinical Pharmacology. 14th ed. Lange Medical Books/the McGraw-Hill Companies, Inc., 2018.

Student Assessment: MCQ

Lecture 18-19: Pharmacokinetic/pharmacodynamic approach to antimicrobial therapy

Lecturer: Sutharinee Likitnukul, Department of Pharmacology, Faculty of Science

Date/time: 18 November 2021, 9.00 – 11.00

Learning Objectives:

Students should be able to

1. Discuss the importance of pharmacokinetics and pharmacodynamics in antibiotic treatment
2. Classify antibiotics to concentration-dependent or time-dependent killing

Content Outline:

1. Pharmacokinetic parameters
 - Minimum effective concentration
 - Minimum toxic concentration
 - Area under the curve
2. Pharmacodynamic parameters
 - Minimal inhibitory concentration
 - Post antibacterial effect
3. Classification of antibiotics based on pharmacokinetic and pharmacodynamic properties
 - Concentration-dependent killing
 - i. Prolonged persistence effects
 - ii. Moderate persistence effects
 - Time-dependent killing
4. Combination therapy
 - Additive effect
 - Synergistic effect / supraadditive effect
 - Isobologram

Learning Organization:

1. Studying the learning materials provided in advance
2. Lecture 100 min
3. Questions and answers 20 min

References:

1. Hooper DC, Shenoy ES, Varughese CA. Treatment and prophylaxis of bacterial infections. In: Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J, editors. Harrison's principles of internal medicine. 19th ed. New York: McGraw-Hill; 2011. p. 934-935.
2. http://rxkinetics.com/antibiotic_pk_pd.html

Student Assessment: MCQ

Lecture 20: Antiseptics

Lecturer: Pimtip Sanvarinda, Department of Pharmacology, Faculty of Science

Date/time: 18 November 2021, 11.00 – 12.00

Learning Objectives: the students should be able to:

1. Describe definition and classification of sterilants, disinfectants, and antiseptics
2. Describe mechanisms of microbial killing/inhibition by sterilants, disinfectants, and antiseptics
3. Describe important pharmacological properties, spectrums, and adverse effects of sterilants, disinfectants, and antiseptics

Content Outline:

1. Definition and classification of sterilants, disinfectants, and antiseptics
2. Antimicrobial mechanisms and spectrums of sterilants, disinfectants, and antiseptics
 - alcohols
 - chlorhexidine
 - phenol
 - aldehydes
 - oxidizing agents
 - heavy metals
 - surfactants

Learning Organization:

1. Lecture 50 min
2. Questions and answers 10 min

Learning Materials Provided:

1. Slides from PowerPoint lecture presentation

References:

1. Katzung Basic and Clinical Pharmacology. 12th ed. Lange Medical Books/the McGraw-Hill Companies, Inc., 2012.

Student Assessment: MCQ

Lecture 21-22: Cancer Chemotherapy

Lecturer: Pimtip Sanvarinda, Department of Pharmacology, Faculty of Science

Date/time: 23 November 2021, 10.00-12.00

Learning Objectives: Students should be able to

1. Describe the principle of anticancer chemotherapy
2. Describe the mechanisms of action of chemotherapeutic drugs
3. Describe the anticancer mechanisms of hormonal and targeted agents
4. Give example of side effects of chemotherapeutic drugs and targeted agents

Content Outline:

1. Principle of chemotherapy
 - Kinetic of tumor growth
 - Drug combination
 - Log-kill hypothesis
 - Drug resistance
2. Chemotherapeutic agents
 - Alkylating agents
 - Antimetabolites
 - Antimicrotubules
 - Topoisomerase inhibitors
 - Miscellaneous
3. Miscellaneous: Hormonal agents in Cancer Therapy
 - Breast cancer
 - Prostate cancer

Learning Organization:

1. Lectures 100 min
2. Q&A 20 min

References:

1. Tripathi, KD. Essentials of Medical Pharmacology. 7th ed. New Delhi: Jaypee Brothers, 2013.
2. Katzung, Bertram G, Susan B. Masters, and Anthony J. Trevor. Basic & Clinical Pharmacology. New York: McGraw-Hill Medical, 2012.

Student Assessment: MCQ

Conference 2: Novel Anticancer Agents

Coordinator: Pimtip Sanvarinda, Department of Pharmacology, Faculty of Science

Date/time: 23 November 2021, 13.00-15.00

Learning Objectives: After completion of the conference, students should be able to

1. Describe the principle of targeted therapy
2. Discuss the side effects of targeted therapy
3. Discuss the resistant mechanism of targeted therapy

Instruction:

1. Students are grouped into 5 groups each group selects the following topics for presentation.
2. Each group is responsible for class presentation and discussion of the following topics (using information from provided reference and additional information)
 - a. Mechanism of mutational activation
 - b. Principle of targeted cancer therapy
 - c. Mechanism of action and resistant mechanism of trastuzumab
 - d. Mechanism of action and resistant mechanism of gefitinib
 - e. Mechanism of action and resistant mechanism of imatinib

Learning Organization:

1. Class presentation 15-20 minutes per group
2. Discussion

References:

1. Tsai CJ, Nussinov R. The molecular basis of targeting protein kinases in cancer therapeutics. *Semin Cancer Biol.* 2013;23(4):235-42.
2. Baker SJ, Reddy EP. Targeted inhibition of kinases in cancer therapy. *Mt Sinai J Med.* 2010;77(6):573-86.

Lecture 23-24: Immunopharmacology

Lecturer: Darawan Pinthong, Department of Pharmacology, Faculty of Science

Date/Time: 30 November 2021, 09:00-12:00

Learning Objectives: Students should be able to

1. Describe the immune response, including the role of B and T lymphocytes.
2. Name a major use for immunosuppressants.
3. Name the three major classes of immunomodulators (biologic response modifiers) and list some uses of each.
4. Identify major drug classifications that affect the immune system and give example of their representative drugs,
5. Explain mechanisms of action for each major drug classification.

Content Outline:

1. immune response, the role of B and T lymphocytes
2. a major use for immunosuppressants
3. immunomodulators (biologic response modifiers)
4. major drug classifications that affect the immune system
5. mechanisms of action for each major drug classification

Learning Organization:

- | | |
|--------------------------|---------|
| 1. Lecture | 120 min |
| 2. Questions and answers | 30 min |

Reference:

1. Katzung Basic and Clinical Pharmacology. 13th ed. Lange Medical Books/the McGraw-Hill Companies, Inc., 2015.

Student Assessment: MCQ

Lecture 25-26: Human toxicology

Lecturer: Pornnipa Korprasertthaworn, Department of Pharmacology, Faculty of Science

Date/Time: 30 November 2021, 13:00-15:00

Learning Objectives:

Student should be able to

1. Understand the principles of toxicology: dose-effect relationship, types of toxicant
2. Understand clinical toxic syndromes
3. Explain how to manage the acutely poisoned patients

Content Outlines:

1. Classification of toxic agents
2. Types of toxicity: acute and chronic
3. Clinical toxic syndromes
4. Antidotes

Learning Organization

1. Studying the learning materials provided in advance
2. Lecture 100 min
3. Questions and answers 10 min

Learning Materials Provided:

Slides from PowerPoint lecture presentation

References:

1. Katzung BG, Trevor AJ. eds. Basic & Clinical Pharmacology, 13e New York, NY: McGraw-Hill; 2015.
2. Brunton LL, Chabner BA, Knollmann BC. eds. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e New York, NY: McGraw-Hill; 2017.
3. Klaassen CD, ed. Casarett and Doull's Toxicology: The Basic Science of Poisons, 8e NY: McGraw-Hill; 2013.

Student Assessment: MCQ

Lecture 27-28: Dermatologic Pharmacology

Lecturer: Somchai Yanarajana, Department Pharmacology, Faculty of Science

Date/Time: 2 December 2021, 9.00-11.00

Objectives

1. Describe the structure and function of skin.
2. Describe the principles of the interactions of drugs with the skin.

Content outline

1. Functions of the skin.
2. The various bases and vehicles used in dermatological preparations.
3. Common topical medications.

Learning organization

- | | |
|--------------------------|---------|
| 1. Lecture | 100 min |
| 2. Questions and answers | 20 min |

References:

1. Katzung BG, Trevor AJ. eds. Basic & Clinical Pharmacology, 13e New York, NY: McGraw-Hill; 2015.
2. Brunton LL, Chabner BA, Knollmann BC. eds. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e New York, NY: McGraw-Hill; 2017.
3. Klaassen CD, ed. Casarett and Doull's Toxicology: The Basic Science of Poisons, 8e NY: McGraw-Hill; 2013.

Student Assessment: MCQ

Conference 3: Herbal/alternative medicines

Coordinator: Ruedee Hemstapat, Department of Pharmacology, Faculty of Science

Date/time: 7 December 2021, 9.00-11.00

Learning Objective:

1. Discuss the herbal/alternative medicines that are currently used in Thailand and their therapeutic application.

Content Outline

3. Students are grouped into 5-6 groups. Each group selects herbal medicines from the following lists for presentation. Each group is responsible for finding the herbal/alternative medicines of interest and presents two herbal medicines of their choice in the class.

Instructions: Each group is responsible for selecting two of the following herbal/alternative medicines of interest that are currently used in Thailand as suggested below or finding on your own.

Lists of herbal medicines

1. Ginkgo biloba
2. Ginseng
3. Garlic
4. Ginger
5. Boesenbergia pandurata
6. Hibiscus sabdariffa
7. *Andrographis paniculata*
8. *Curcuma longa* L.
9. *Orthosiphon aristatus*
10. Senna

Report covering the following aspects should be submitted to ruedee.hem@mahidol.ac.th by 20 December 2019.

- Characteristics
- Active ingredients
- Therapeutic applications
- Side effects