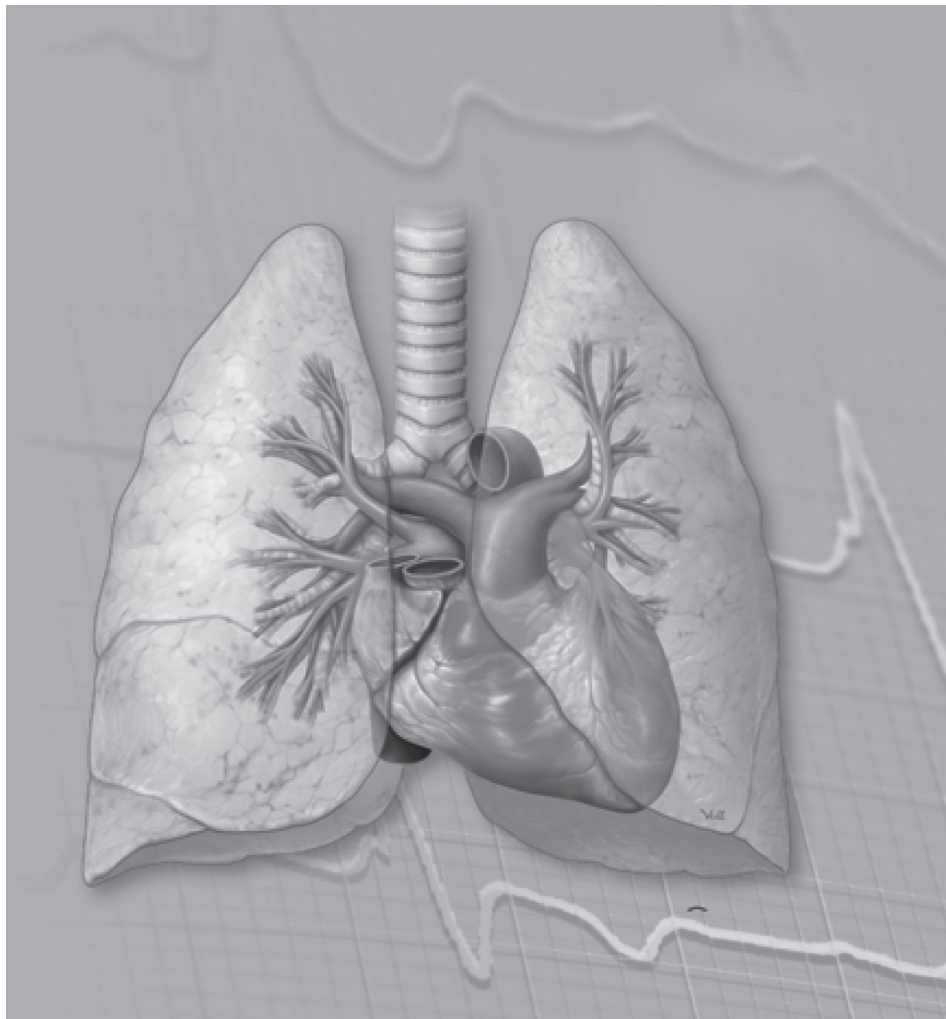


Principles of Medical Physiology

Second Edition

Sabyasachi Sircar

Free Competency Mapping Booklet



 Thieme

Acknowledgment

We are thankful to **Dr. Reshu Gupta**, Associate Professor, Department of Physiology, RUHS College of Medical Sciences, Jaipur, for preparing this “*Competency Mapping Booklet with Principles of Medical Physiology.*” Her contribution is sincerely appreciated and gratefully acknowledged.

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Topic: General Physiology			
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PY1.2	Describe and discuss the principles of homeostasis	Principles of control systems in physiology	24–27
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PY1.4	Describe apoptosis – programmed cell death	Apoptosis	47–48
PY1.5	Describe and discuss transport mechanisms across cell membranes	Membrane transport	38–43
PY1.6	Describe the fluid compartments of the body, its ionic composition and measurement	Body fluids	132
PY1.7	Describe the concept of pH and Buffer systems in the body	Buffers Renal regulation of acid–base balance	22 402–407
PY1.8	Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue	Resting membrane potential Membrane excitation and Action potential Electrophysiology of ion channels	69–75 76–80 81–85
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PY2.2	Discuss the origin, forms, variations and functions of plasma proteins	Plasma proteins	134–135
PY2.3	Describe and discuss the synthesis and functions of haemoglobin and explain its breakdown. Describe variants of haemoglobin	Haemoglobin	142–149
PY2.4	Describe RBC formation (erythropoiesis and its regulation) and its functions	Red blood cells Erythropoiesis	136–139 201–202
PY2.5	Describe different types of anaemias and jaundice	Anemias Hyperbilirubinemia	139–141 146–149
PY2.6	Describe WBC formation (granulopoiesis) and its regulation	Granulocytes Agranulocytes and lymphoid organs Leucopoiesis	176–180 182–186 202
PY2.7	Describe the formation of platelets, functions and variations.	Blood platelets	163–164
PY2.8	Describe the physiological basis of hemostasis and anticoagulants. Describe bleeding and clotting disorders (Hemophilia, purpura)	Hemostasis Hemostasis balance	164–169 170–175
PY2.9	Describe different blood groups and discuss the clinical importance of blood grouping, blood banking and transfusion	Blood grouping and transfusion	158–162
PY2.10	Define and classify different types of immunity. Describe the development of immunity and its regulation	Immunity, tolerance and hypersensitivity Immune mechanisms	187–192 193–199
Topic: Nerve and Muscle Physiology			
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss nerve growth factor and other growth factors/cytokines	Neuron Nerve growth	54–57 63–64
PY3.3	Describe the degeneration and regeneration in peripheral nerves	Degeneration and regeneration of nerve	63–66
PY3.4	Describe the structure of neuro–muscular junction and transmission of impulses	Neuromuscular transmission	93–94
PY3.5	Discuss the action of neuro–muscular blocking agents	Drugs affecting neuro–muscular transmission	94–96
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Competency number	Competencies	Title in book	Page number in book
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PY3.9	Describe the molecular basis of muscle contraction in skeletal and in smooth muscles	Mechanisms of striated muscle contraction	97–100
PY3.10	Describe the mode of muscle contraction (isometric and isotonic)	Single muscle twitch – Isotonic and isometric Isometric and isotonic contractions	101–102 108–109
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Topic: Gastrointestinal Physiology			
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PY4.3	Describe GIT movements, regulation and functions. Describe defecation reflex. Explain role of dietary fibre.	Mechanical events: Mouth and esophagus Stomach Small intestine Colon	437–439 442–443 454 458
PY4.4	Describe the physiology of digestion and absorption of nutrients	Events in mouth and esophagus Events in the stomach Events in the small intestine Events in the colon Events in small duodenum	437–461
PY4.5	Describe the source of GIT hormones, their regulation and functions	Gastrointestinal hormones	462–465
PY4.7	Describe and discuss the structure and functions of liver	Liver	501–502
PY4.8	Describe and discuss pancreatic exocrine function tests and liver function tests	Pancreatic function tests Liver function tests	452–453 502
PY4.9	Discuss the physiology aspects of: peptic ulcer, gastro–oesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	Gastrointestinal disorders	466–471
Topic: Cardiovascular Physiology (CVS)			
PY5.1	Describe the functional anatomy of heart including chambers, sounds; and Pacemaker tissue and conducting system.	Heart sounds Conductive system of heart	228–229 205–206
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	Cardiac muscle	127–131
PY5.3	Discuss the events occurring during the cardiac cycle	Cardiac cycle	224–230
PY5.4	Describe generation, conduction of cardiac impulse	Action potential in automatic cardiac fibre	128
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Competency number	Competencies	Title in book	Page number in book
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PY5.10	Describe and discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation	Capillary circulation and lymphatic circulation Coronary circulation Cerebral circulation Pulmonary and pleural circulation Cutaneous muscle and splanchnic circulation Circulatory pathways in the fetus	262–266 291–294 295–301 303–306 307–312 245–247
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PY6.4	Describe and discuss the physiology of high altitude and deep sea diving	High and low pressure breathing	364–367
PY6.5	Describe and discuss the principles of artificial respiration, oxygen therapy, acclimatization and decompression sickness	Acclimatization Decompression sickness Oxygen treatment Assisted ventilation	366 365 361 330–331
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis asphyxia; drowning, periodic breathing	Dyspnea Hypoxia Cyanosis Asphyxia Respiratory dysrhythmias	328 360–361 361 361 355–356
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PY7.3	Describe the mechanism of urine formation involving processes of filtration, tubular reabsorption and secretion; concentration and diluting mechanism	Tubular transport Renal regulation of urine volume and osmolarity	384–385 392–395
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Competency number	Competencies	Title in book	Page number in book
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PY8.1	Describe the physiology of bone and calcium metabolism	Bone tissue	525–528
PY8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus	Hypothalamic and pituitary hormones Thyroid hormones Calcitropic hormones Adrenocortical hormones Adrenomedullary hormones Pancreatic hormones	510–515 517–524 528–532 534–542 544–546 547–553
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PY9.1	Describe and discuss sex determination; sex differentiation and their abnormalities and outline psychiatry and practical implication of sex determination.	Sexual determination of the fetus	580–584
PY9.2	Describe and discuss puberty: onset, progression, stages; early and delayed puberty and outline adolescent clinical and psychological association	Puberty	560–561
PY9.3	Describe male reproductive system: functions of testis and control of spermatogenesis and factors modifying it and outline its association with psychiatric illness	Male gametogenesis	561–564
PY9.4	Describe female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle – hormonal, uterine and ovarian changes	Female gametogenesis Menstrual cycle	564–565 566–569
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PY9.8	Describe and discuss the physiology of pregnancy, parturition and lactation and outline the psychology and psychiatry–disorders associated with it	Pregnancy Parturition and lactation	585–588 591–594
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PY10.3	Describe and discuss somatic sensations and sensory tracts	Sensory Perception Sensory Pathways	672–675 666–672
PY10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium and vestibular apparatus	Regulation of muscle length and tone Brainstem tracts and their nuclei Motor planning programming and execution Vestibular mechanisms	677–684 609–612 685–697 794–798
PY10.5	Describe and discuss structure and functions of reticular activating system, autonomic nervous system (ANS)	Reticular formation Autonomic nervous system	613–614 642–647
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PY10.9	Describe and discuss the physiological basis of memory, learning and speech	Memory and learning Language and speech	731–738 740–742
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Competency number	Competencies	Title in book	Page number in book
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Topic: Integrated Physiology			
PY11.1	Describe and discuss mechanism of temperature regulation	Regulation of body temperature	720–726
PY11.2	Describe and discuss adaptation to altered temperature (heat and cold)	Body heating mechanisms Body cooling mechanisms	722 722–723
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PY11.4	Describe and discuss cardio-respiratory and metabolic adjustments during exercise; physical training effects	Blood pressure in exercise Factors affecting pulmonary circulation: Exercise Muscle circulation Sympathetic affects in exercise Effect of exercise on gas exchange Oxygen dissociation curve: Effect of exercise Exercise induced hyperventilation RQ in exercise	281 305 308–309 278–279 346 349 360 495
PY11.5	Describe and discuss physiological consequences of sedentary lifestyle	Dietary planning	482
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