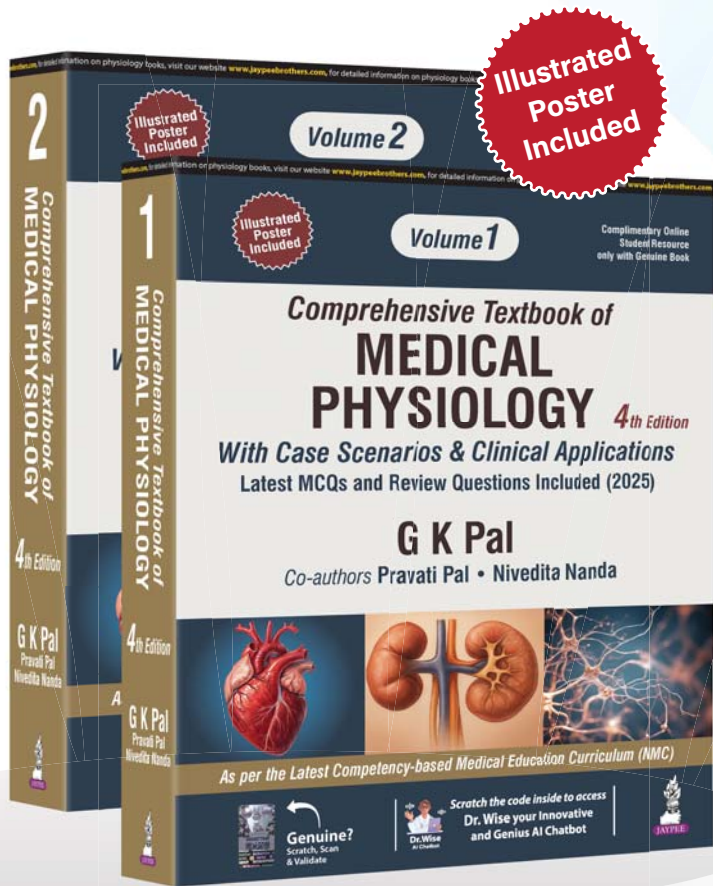




JAYPEE



Comprehensive Textbook of MEDICAL PHYSIOLOGY

With Case Scenarios & Clinical Applications

Latest MCQs and Reviews Questions Included (2025)

As per the Latest Competency-based Medical Education Curriculum (NMC)

Revised and updated as per latest
CBME curriculum by NMC (2024).

4th
Edition

G K Pal

Co-authors Pravatī Pal | Nivedita Nanda

Complimentary Online Student Resource
only with Genuine Book



Dr. Wise
AI Chatbot

Scratch the code inside to access
Dr. Wise your Innovative
and Genius AI Chatbot

Scan for



TOC & Sample Chapter



Scan to



Buy Now!

Why to Buy this Book ?

- Fully revised and aligned with the latest CBME guidelines prescribed by the National Medical Commission (NMC), 2024.
- Clearly defined Learning Objectives introduced at the beginning of each chapter, categorized into "Must Know" and "Desirable to Know" for focused learning.
- Clinical relevance emphasized through dedicated Application Boxes and Clinical Boxes, while key facts are succinctly highlighted in Important Notes for easy retention.
- Extensive use of schematic illustrations and line diagrams, designed to be easily reproducible for exam-oriented preparation.
- Conceptual clarity enhanced through well-structured Flowcharts and Tables, presenting major physiological mechanisms and data in a simplified format.
- Clinical Case Scenarios appended at the end of each chapter to bridge theory with bedside application and promote problem-based learning.
- Key Concepts and Chapter-wise MCQs included at the end of each chapter to facilitate quick revision and self-assessment.
- Complimentary online resources featuring a rich repository of previous years' MCQs from various competitive exams, along with high-yield flowcharts, tables, figures, and clinical case discussions.

Learning Objectives On completion of study of this chapter:

The student will be able to: (MUST KNOW)

1. Understand the concept of definitive hemostasis.
2. Name the clotting factors.
3. Describe the mechanisms (intrinsic and extrinsic) of blood coagulation.
4. Understand the importance of clot retraction.
5. Explain the anticoagulating mechanism (fibrinolysis)
6. List the functions of plasmin.
7. Appreciate the role of plasminogen activators.
8. Explain the physiological basis of use of streptokinase and urokinase in acute myocardial infarction (AMI) and stroke.
9. List the inhibitors of fibrinolysis
10. Understand the clinical importance of 'enhanced fibrinolysis' and 'fibrinolytic deficiency'.
11. Outline the regulation of blood coagulation.

The student may also be able to: (DESIRABLE TO KNOW)

1. Describe various clotting factors.
2. Describe the mechanism and functions of clot retraction.
3. Explain the regulation of blood coagulation.

Learning Objectives On

The student will be able to:

1. Understand the clot
2. Name the clotting factors
3. Describe the mechanism
4. Understand the importance
5. Explain the anticoagulating mechanism
6. List the functions of plasmin
7. Appreciate the role of plasminogen activators
8. Explain the physiological basis
9. List the inhibitors of fibrinolysis
10. Understand the clinical importance
11. Outline the regulation of blood coagulation

The student may also be able to:

1. Describe various clotting factors
2. Describe the mechanism and functions of clot retraction
3. Explain the regulation of blood coagulation

PY2.9: Describe hemostasis, coagulation pathways, mechanism of action of anticoagulants and briefly discuss pathophysiological aspects of bleeding and clotting disorders (e.g. hemophilia, purpura).

INTRODUCTION

Coagulation of blood is a vital physiological process, as hemorrhage

Scientist contributed

In 1905, **Paul Morawitz** was the first scientist who systematically assembled coagulation factors into the scheme of coagulation and demonstrated the presence of calcium and thromboplastin (II) was converted to thrombin, which in turn converted fibrinogen (I) into a fibrin clot. This theory persisted for 40 years until the discovery of factor V.

Scientist contributed

In 1905, **Paul Morawitz** was the first scientist who systematically assembled coagulation factors into the scheme of coagulation and demonstrated that in the presence of calcium and thromboplastin, prothrombin (II) was converted to thrombin, which in turn converted fibrinogen (I) into a fibrin clot. This theory persisted for 40 years until the discovery of factor V.



Paul M

CLOTTING FACTORS

Coagulation of blood depends on a series of chemical reactions involving clotting factors. There are known 12 clotting factors

or three chains of chromosome # 2 at q23-q32.

- Fibrinogen is present in plasma
- Its plasma concentration is 2.0
- Its half-life in plasma is 3-5 days
- Fibrinogen is converted to fibrin (stabilized by physical contact stabilizing factor)
- Fibrin forms the structural meshwork

loose platelet plug into a solid hemostatic plug

Each chapter begins with clearly defined learning objectives, categorized as 'Must Know' and 'Desirable to Know!'

Table organizes essential information sequentially for better understanding.

Table 12.1: Factors controlling erythropoiesis.

A. Hormonal factors
1. Erythropoietin
2. Androgens
3. Estrogen
4. Thyroxine
5. Anterior pituitary hormones
- Growth hormone
- TSH, ACTH, LH, FSH, prolactin
6. Corticosteroid
7. Interleukins
B. Dietary factors
1. Vitamins (vitamin B ₁₂ , folic acid, vitamin C)
2. Proteins
3. Minerals (iron, copper, cobalt and nickel)
C. Other factors
1. Intrinsic factor
2. Chemical factors
3. Environmental factor: High altitude (hypoxia)
4. Drugs

(ACTH: adrenocorticotropic hormone; FSH: follicle-stimulating hormone; LH: luteinizing hormone; TSH: thyroid stimulating hormone)

and therefore oxygen requirement of the tissue is the major functional feedback for red cell production. Erythropoietin is the chief mediator of this functional feedback.

End-Product Feedback

The end-product feedback is due to the products of red cell destruction. It is believed that the products released from

produced mainly by the interstitial cells in peritubular capillary bed of kidney. To some extent, it is also produced by juxtaglomerular cells and extraglomerular mesangial cells of kidney. Kidney secretes about 85% of erythropoietin (Application Box 12.1). The rest 15% comes from liver. The nonparenchymal cells (Kupffer cells) of liver and peritumorous hepatocytes produce erythropoietin. There are also evidences that erythropoietin is produced in brain, uterus, and

Application Box 12.1

Renal disease causes anemia: As kidney is the major source of erythropoietin, chronic renal diseases that reduce renal mass significantly produce anemia. Anemia is also produced following nephrectomy. In such conditions, erythropoietin produced by liver fails to meet the normal demand of erythropoiesis as the amount secreted from liver is not adequate.

As kidney is the major source of erythropoietin, chronic renal diseases that reduce renal mass significantly produce anemia. Anemia is also produced following nephrectomy. In such conditions, erythropoietin produced by liver fails to meet the normal demand of erythropoiesis as the amount secreted from liver is not adequate.

erythropoietin containing 165 amino acids. The chains are attached with polypeptide side chains are necessary for the erythropoietin. Erythropoietin has dalton.

erythropoietin receptors that belong to the tyrosine kinase family. The receptor has tyrosine kinase activity. The receptor is activated by erythropoietin with its receptor initiates activation of a cascade of serine and threonine kinases that finally leads to activation of JAK-2 protein. Formation of JAK and

stimulating red cell production. In 1950, Kurt Ressmann provided strong support for existence of a hormonal mechanism, and few

activation of a cascade of serine and threonine kinases that finally leads to activation of JAK-2 protein. Formation of JAK and

Clinical relevance is highlighted through dedicated Application Boxes.

CHAPTER SUMMARY

KEY CONCEPTS

- Blood coagulation is initiated when tissue factor (tissue thromboplastin) is released into blood following tissue injury that activates VII, which is called extrinsic pathway of clotting mechanism, or exposed collagen activates factor XII through the intrinsic system. Finally, factor X is converted to Xa. This is the first stage in clotting.
- In the second stage, prothrombin is converted to thrombin, and thrombin converts fibrinogen to fibrin in the third stage.
- Clot retraction, which is the function of platelets, makes the clot stable.
- Fibrinolysis is initiated by plasmin that checks the spread of clot beyond the site of injury and prevents intravascular thrombosis.
- Vascular endothelium plays an important role in control of blood coagulation by secreting thrombomodulin that activates protein-C-protein-S complex.
- In pregnancy, fibrinolytic activity is less.

IMPORTANT TO KNOW (Must Read)

- In examinations, 'Mechanism of blood coagulation', usually comes as a **Long Question**.
- Intrinsic mechanism of blood coagulation, extrinsic mechanism of blood coagulation, fibrinolysis, and clot retraction, usually come as **Short Questions/Short Notes** in exams.
- In **Viva**, examiners may ask... name the clotting factors, what are the stages of blood clotting, steps of intrinsic and extrinsic pathway of clotting, clot retraction and its importance, mechanism of fibrinolysis, mechanism of action of vitamin K antagonist, tests to detect defects in extrinsic and intrinsic mechanisms of clotting, importance of estimating FDP, activators and inhibitors of plasmin, inhibitors of fibrinolysis, plasmin generation defects, why blood is not clotted normally in circulation, and factors regulating blood coagulation.

Each chapter ends with **key concepts** and **Important to know** for rapid revision and self-assessment.

MULTIPLE CHOICE QUESTIONS

- Which of the following clotting factor is absent in the table of list for clotting factors?
 - A. II
 - B. IV
 - C. VI
 - D. VIII
- Which of the following is the glass or contact factor?
 - A. Factor VII
 - B. Factor IX
 - C. Factor XI
 - D. Factor XII
- Which clotting factors are vitamin K dependent?
 - A. Factors 2, 7, 9 and 10
 - B. Factors 5, 8, 10 and 12
 - C. Factors 2, 3, 5 and 7
 - D. Factors 6, 9, 11 and 12
- The conversion of fibrinogen into fibrin occurs by:
 - A. Prothrombin
 - B. Thrombin
 - C. Thromboplastin
 - D. Platelets
- Not true of temporary hemostatic plug:
 - A. It is a plug formed by aggregation of platelets
 - B. Can be dissolved by anticoagulation
 - C. Seen following an injury to vessel wall
 - D. Gets converted to definitive plug by fibrin
- Role of platelet phospholipids in blood coagulation is to:
 - A. Provide a surface on which reagents are concentrated
 - B. Promote platelets adhesion
 - C. Facilitate platelets activation
 - D. Help in platelets aggregation
- In clotting mechanism via intrinsic and extrinsic pathway, the by reaction is:
 - A. Formation of thrombin
 - B. Formation of fibrin
 - C. Formation of prothrombin activator
 - D. Conversion of factor X to Xa
- Administration of aspirin in low dose prevents myocardial infarction by:
 - A. Inhibiting platelets aggregation
 - B. Preventing platelets adhesion
 - C. Initiating platelets activation
 - D. Retracting the blood clot
- Calcium deficiencies do not produce coagulation disorders because:
 - A. Only traces of calcium are required for coagulation
 - B. It facilitates release reaction of platelets
 - C. Calcium acts as a cofactor
 - D. All other clotting factors are intact
- Blood normally does not clot in circulation due to all, except:
 - A. Clotting factors are in inactive forms
 - B. Thrombomodulin prevents further clotting
 - C. Activation of fibrinolytic system that limits clotting
 - D. Presence of clotting factors in small amounts
- Human TPA (tissue plasminogen activator) used clinically in treatment of early myocardial infarction acts by:
 - A. Activation of fibrinolytic system
 - B. Stimulating heparin release from liver
 - C. Removing activated clotting factors from the circulation
 - D. Inhibiting thrombin
- Which of the following is NOT the function of thrombin?
 - A. Activates formation of prothrombin activator
 - B. Activates procarboxypeptidase B that inhibits plasmin mediated fibrinolysis
 - C. It does not have any anticlotting activity
 - D. It helps in repair of injured vessel wall

Multiple Choice Questions

amazon

REVIEWS

C R

★★★★★ **Worth the money**

Reviewed in India on 31 January 2025

Format: Paperback | **Verified Purchase**

Very good textbook with good explanations n pictures..They provide a chart with all the important cycles n mechanisms which helps you with a quick revision/understanding of the concept.

SAPTARSHI MITRA

★★★★★ **BEST PHYSIOLOGY TEXTBOOK**

Reviewed in India on 18 October 2024

Format: Paperback | **Verified Purchase**

THIS IS THE BEST PHYSIOLOGY TEXTBOOK (NOT COMPARING WITH BEST & TAYLOR, GUYTON & HALL - FOR KNOWLEDGE ONLY) SYSTEMATIC, WELL EXPLAINED WITH COLOUR PICTURE, CURRENT WINGS COVERED TOO.

THANKS AMAZON FOR RIGHT PRICE AND GREAT DELIVERY

Anonymous

★★★★★ **Qualities of the book**

Reviewed in India on 6 June 2024

Format: Paperback | **Verified Purchase**

One of the best books for medical students

The best conceptual book for physiology with well arranged point wise theory

Easy to understand, though theory is in bulk, but all topics theory covered in bullet points so easy to remember

May take sufficient time to cover

But till the final exam maximum topics can be covered and can be understood and memorised to the best w/o any confusion...

ThameenAnsari R

★★★★★ **Medical Physiology**

Reviewed in India on 24 January 2024

Format: Paperback | **Verified Purchase**

The new edition books are really helpful and useful. Books are enabled with additional information and concepts are also clear to comprehend.

Tanumoy S.

★★★★★ **Easy- Physy!**

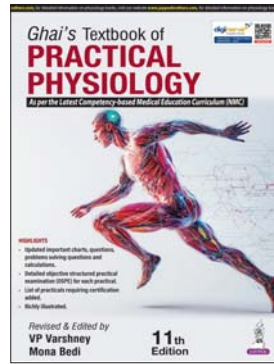
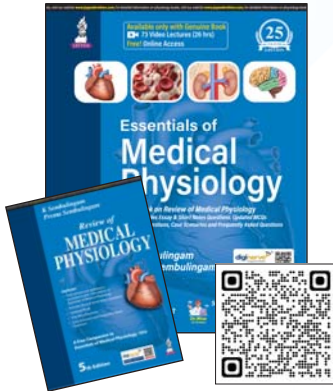
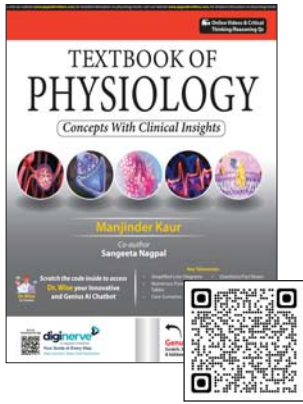
Reviewed in India on 29 June 2025

Format: Paperback | **Verified Purchase**

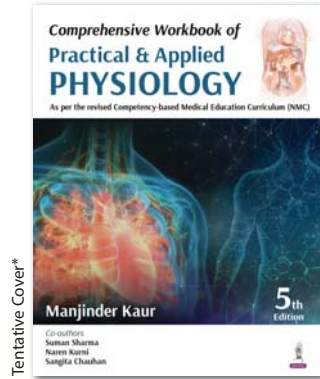
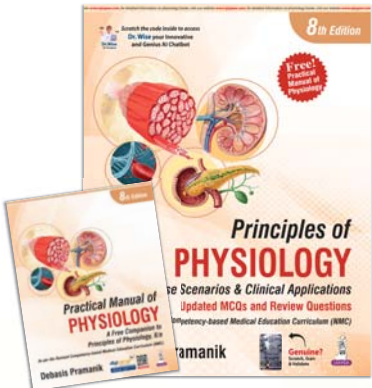
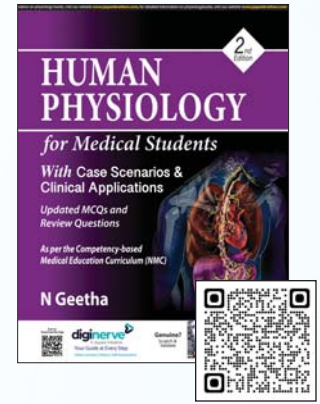
Awesome To the point, packed with infos and explained everything in a simplified way.



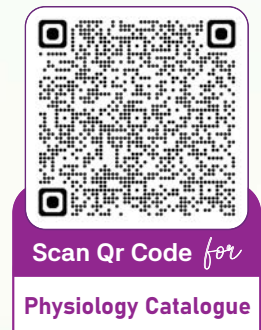
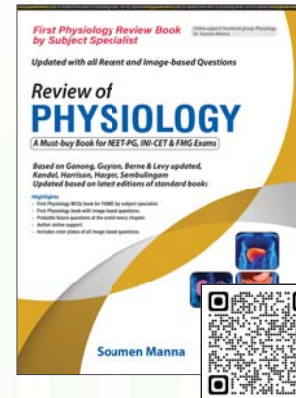
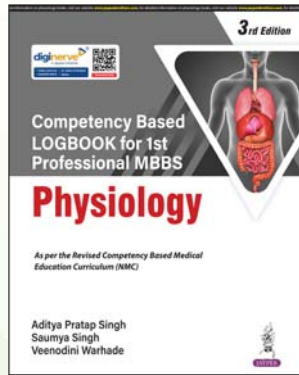
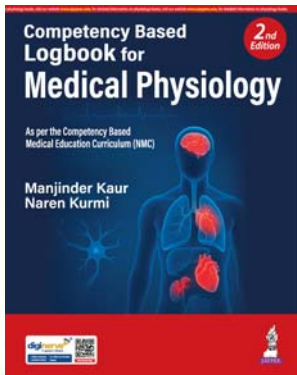
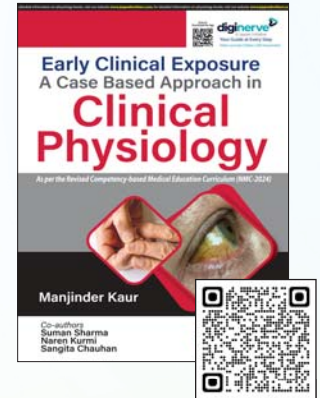
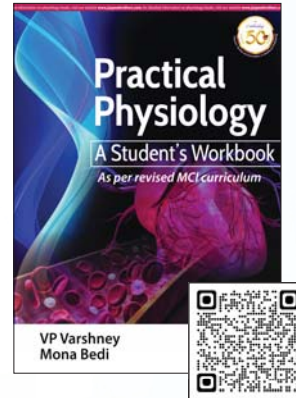
Other Useful Titles



Tentative Cover*



Tentative Cover*



One Destination 100% Original Medical Books at ejaypee.com



100% Original Medical Books
Get only genuine, publisher - Sourced Titles, No Piracy, No Duplicates.



Exclusive Discounts & Combos
Enjoy Unbeatable Prices and Special Deals available only on ejaypee.com.

How to Order on [ejaypee](http://ejaypee.com) ▶



Superfast & Reliable Delivery
Books are delivered Quickly and Safely to your doorstep across India.



Secure & Seamless Shopping
Shop with confidence through a Safe and Smooth checkout process.



Get Rewarded Everytime you Shop
Collect Points and Redeem Anytime!



www.ejaypee.com



Your **Reliable Partner for Authentic Medical Knowledge.**

Visit ▶

ejaypee.com

