

BRS
BOARD REVIEW SERIES

Neuroanatomy

FIFTH EDITION

Douglas J. Gould

Outline format highlights the most tested topics for USMLE Step 1

More than 575 board-style questions help test your memorization and mastery

Online access—offers greater study flexibility

 Wolters Kluwer Health | Lippincott Williams & Wilkins

BRS
BOARD REVIEW SERIES

Neuroanatomy

FIFTH EDITION

BRS
BOARD REVIEW SERIES

Neuroanatomy

FIFTH EDITION

Douglas J. Gould, Ph.D.

Professor
Department of Biomedical Sciences
Oakland University William Beaumont School of Medicine
Rochester, Michigan

Author of 1st–4th Editions:

James D. Fix, PhD

(1931–2010)



Wolters Kluwer | Lippincott Williams & Wilkins
Health

Philadelphia • Baltimore • New York • London
Buenos Aires • Hong Kong • Sydney • Tokyo

Acquisitions Editor: Crystal Taylor
Product Manager: Catherine Noonan
Marketing Manager: Joy Fisher-Williams
Designer: Holly Reid McLaughlin
Compositor: S4Carlisle Publishing Services

Fifth Edition

Copyright © 2014, 2008, 2002, 1995 Lippincott Williams & Wilkins, a Wolters Kluwer business.

351 West Camden Street
Baltimore, MD 21201

Two Commerce Square
2001 Market Street
Philadelphia, PA 19103

Printed in China

All rights reserved. This book is protected by copyright. No part of this book may be reproduced or transmitted in any form or by any means, including as photocopies or scanned-in or other electronic copies, or utilized by any information storage and retrieval system without written permission from the copyright owner, except for brief quotations embodied in critical articles and reviews. Materials appearing in this book prepared by individuals as part of their official duties as US government employees are not covered by the above-mentioned copyright. To request permission, please contact Lippincott Williams & Wilkins at 2001 Market Street, Philadelphia, PA 19103, via email at permissions@lww.com, or via website at lww.com (products and services).

Library of Congress Cataloging-in-Publication Data

Gould, Douglas J., author.

Neuroanatomy / Douglas J. Gould.—5th edition.

p. ; cm. — (Board review series)

Revised edition of: Neuroanatomy / James D. Fix. 4th ed. c2008.

Includes bibliographical references and index.

ISBN-13: 978-1-4511-7609-4

ISBN-10: 1-4511-7609-0

I. Fix, James D. Neuroanatomy. Revision of (work): II. Title. III. Series: Board review series.

[DNLM: 1. Neuroanatomy—Examination Questions. 2. Neuroanatomy—Outlines. WL 18.2]

QM451

611'.8076—dc23

2013005723

DISCLAIMER

Care has been taken to confirm the accuracy of the information present and to describe generally accepted practices. However, the authors, editors, and publisher are not responsible for errors or omissions or for any consequences from application of the information in this book and make no warranty, expressed or implied, with respect to the currency, completeness, or accuracy of the contents of the publication. Application of this information in a particular situation remains the professional responsibility of the practitioner; the clinical treatments described and recommended may not be considered absolute and universal recommendations.

The authors, editors, and publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accordance with the current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

Some drugs and medical devices presented in this publication have Food and Drug Administration (FDA) clearance for limited use in restricted research settings. It is the responsibility of the health care provider to ascertain the FDA status of each drug or device planned for use in their clinical practice.

To purchase additional copies of this book, call our customer service department at **(800) 638-3030** or fax orders to **(301) 223-2320**. International customers should call **(301) 223-2300**.

Visit Lippincott Williams & Wilkins on the Internet: <http://www.lww.com>. Lippincott Williams & Wilkins customer service representatives are available from 8:30 am to 6:00 pm, EST.

9 8 7 6 5 4 3 2 1

*To Marie for her love, patience, wisdom, and understanding.
To Maggie and Lulu for all the joy they bring.*



Reviewers

Marc Braunstein

Merrian Brooks

Christos Constantinidis, PhD

James L. Culberson, PhD

David Crawley

Ana C.G. Felix, MD

Karan Gulaya

Douglas James

Shonda Janke

Amelia Keaton

Kathleen M. Klueber, PhD

Albert Lamperti, PhD

Stephanie Markle

Fiore Mastroianni

Sidney L. Palmer, PhD

Sheree Perron

Nicholas Potvin

Libby Rhee

Amy Shah

Ricci Sylla

Penny Toliopoulos

Anne Williams



Preface

BRS Neuroanatomy, fifth edition, is a concise review of human neuroanatomy intended for health professions students including medical and dental students preparing for the United States Medical Licensing Examination (USMLE) Step 1 and other examinations. It presents the essentials of human neuroanatomy in a concise, tightly-outlined, well-illustrated format. There are more than 600 board-type questions with complete answers and explanations, some included at the end of each chapter and some in a comprehensive examination at the end of the book.

NEW TO THIS EDITION

- Color used throughout to enhance neuroanatomic pathways
- Color used to block in tables and highlight clinical correlations
- Localization of sensory disorders
- Updated color artwork throughout
- Updated terminology to conform with Terminologia Anatomica

To the Student

To make the most of this book, carefully study the illustrations, computed tomography scans, magnetic resonance images, angiograms as well as the figure legends; much of the board question information lies within the images and legends. The answers to at least 30 common USMLE questions are outlined below; refer to these tips as you review the chapters.



Acknowledgments

Special thanks to and in respectful memory of **Dr. James Fix**, for creating the first four editions of *BRS Neuroanatomy*—the foundation upon which this fifth edition is based. I thank my students and colleagues for their valuable input as the fifth edition was developed. I also thank the Lippincott Williams & Wilkins staff and their associates for their contributions to this edition—Crystal Taylor, Acquisitions Editor; Catherine Noonan, Managing Editor; and the student and faculty reviewers, who were invited by the publisher to provide valuable feedback and suggestions.

Contents

Reviewers vi
Preface vii
Acknowledgments viii

1. GROSS ANATOMY OF THE BRAIN 1

Objectives 1

- I. Introduction 1**
- II. Divisions of the Brain 1**
- III. Atlas of the Brain and Brainstem 10**

Review Test 22

2. MENINGES AND CEREBROSPINAL FLUID 24

Objectives 24

- I. Meninges 24**
- II. Ventricles 28**
- III. Cerebrospinal Fluid 30**
- IV. Hydrocephalus 30**
- V. Meningitis 31**
- VI. Herniation 32**
- VII. Circumventricular Organs 34**

Review Test 36

3. BLOOD SUPPLY OF THE CENTRAL NERVOUS SYSTEM 39

Objectives 39

- I. Arteries of the Spinal Cord 39**
- II. Venous Drainage of the Spinal Cord 40**
- III. Arteries of the Brain 41**
- IV. Cerebral Arterial Circle (of Willis) 45**
- V. Meningeal Arteries 45**
- VI. Veins of the Brain 45**
- VII. Venous Dural Sinuses 46**
- VIII. Angiography 48**
- IX. Intracranial Hemorrhage 52**

Review Test 54

4. DEVELOPMENT OF THE NERVOUS SYSTEM 58

Objectives 58

- I. Overview 58
- II. Development of the Neural Tube 58
- III. Neural Crest 59
- IV. Placodes 61
- V. Stages of Neural Tube Development 61
- VI. Spinal Cord (Medulla Spinalis) 63
- VII. Medulla oblongata (Myelencephalon) 64
- VIII. Metencephalon 66
- IX. Mesencephalon (Midbrain) 67
- X. Development of the Diencephalon, Optic Structures, and Hypophysis 68
- XI. Development of the Telencephalon 70
- XII. Congenital Malformations of the Central Nervous System 71

Review Test 77

5. NEUROHISTOLOGY 79

Objectives 79

- I. Overview 79
- II. Neurons 79
- III. Neuroglia 82
- IV. Nerve Cell Degeneration and Regeneration 86
- V. Axonal Transport 87
- VI. Capillaries of the Central Nervous System 87
- VII. Sensory Receptors 89

Review Test 91

6. SPINAL CORD 93

Objectives 93

- I. Introduction 93
- II. External Morphology 93
- III. Internal Morphology 98
- IV. Myotatic Reflex 101

Review Test 102

7. TRACTS OF THE SPINAL CORD 104

Objectives 104

- I. Ascending Tracts 104
- II. Descending Tracts 109
- III. Integrative Pathways 111
- IV. Clinical Correlations 112

Review Test 114

8. LESIONS OF THE SPINAL CORD 117

Objectives 117

- I. Lower Motor Neuron Lesions 117
- II. Upper Motor Neuron Lesions (UMNs) 119
- III. Sensory Pathway Lesions 119
- IV. Peripheral Nervous System Lesions 120
- V. Combined Upper and Lower Motor Neuron Lesions 120
- VI. Combined Motor and Sensory Lesions 121
- VII. Intervertebral Disk Herniation 124

Review Test 125

9. BRAINSTEM 129

Objectives 129

- I. Introduction 129
- II. Medulla Oblongata (Myelencephalon) 129
- III. Pons 134
- IV. Mesencephalon (Midbrain) 138
- V. Corticobulbar (Corticonuclear) Fibers 142

Review Test 143

10. CRANIAL NERVES 145

Objectives 145

- I. Introduction 145
- II. Nervus Terminalis (NT; Cranial Nerve 0) 145
- III. Olfactory Nerve (CN I) 145
- IV. Optic Nerve (CN II) 146
- V. Oculomotor Nerve (CN III) 148
- VI. Trochlear Nerve (CN IV) 149
- VII. Trigeminal Nerve (CN V) 150
- VIII. Abducent Nerve (CN VI) 151
- IX. Facial Nerve (CN VII) 151
- X. Vestibulocochlear Nerve (CN VIII) 154
- XI. Glossopharyngeal Nerve (CN IX) 154
- XII. Vagal Nerve (CN X) 155
- XIII. Accessory Nerve (CN XI) 156
- XIV. Hypoglossal Nerve (CN XII) 157

Review Test 159

11. TRIGEMINAL SYSTEM 162

Objectives 162

- I. Trigeminal Nerve (CN V) 162
- II. Ascending Trigeminothalamic Tracts 163

- III. Trigeminal Sensory Nuclei 165
- IV. Trigemino cerebellar Fibers 166
- V. Trigeminal Reflexes 167
- VI. Clinical Correlations 168

Review Test 170

12. LESIONS OF THE BRAINSTEM 172

Objectives 172

- I. Introduction 172
- II. Vascular Lesions of the Medulla 172
- III. Vascular Lesions of the Pons 173
- IV. Lesions of the Midbrain 175
- V. Acoustic Neuroma (Schwannoma) 176
- VI. Internuclear Ophthalmoplegia 177
- VII. Jugular Foramen (Vernet) Syndrome 177
- VIII. Subclavian Steal Syndrome 178

Review Test 179

13. DIENCEPHALON: THALAMUS AND HYPOTHALAMUS 183

Objectives 183

- I. Introduction: The Thalamus 183
- II. Boundaries of the Thalamus 183
- III. Primary Thalamic Nuclei and their Major Connections 184
- IV. Blood Supply of the Thalamus 187
- V. Internal Capsule 187
- VI. Blood Supply of the Internal Capsule 188
- VII. Clinical Correlations 188
- VIII. Overview: The Hypothalamus 189
- IX. Surface Anatomy of the Hypothalamus 189
- X. Hypothalamic Regions and Nuclei 189
- XI. Major Hypothalamic Connections 192
- XII. Major Fiber Systems 194
- XIII. Functional Considerations 195
- XIV. Clinical Correlations 196

Review Test 197

14. AUDITORY SYSTEM 202

Objectives 202

- I. Introduction 202
- II. Outer, Middle, and Inner Ear 202
- III. Auditory Pathway 204
- IV. Efferent Cochlear (Olivocochlear) Bundle 206
- V. Hearing Defects 206

- VI. Tuning Fork Tests 207
- VII. Brainstem Auditory Evoked Response (Baer) 207
- Review Test 209

15. VESTIBULAR SYSTEM 211

Objectives 211

- I. Introduction 211
- II. Labyrinth 211
- III. Vestibular Pathways 213
- IV. Efferent Vestibular Connections 214
- V. Medial Longitudinal Fasciculus 214
- VI. Vestibulo-Ocular Reflexes 215
- VII. Decerebrate and Decorticate Rigidity 216
- VIII. Clinical Correlations 216

Review Test 218

16. VISUAL SYSTEM 220

Objectives 220

- I. Introduction 220
- II. The Retina 220
- III. Visual Pathway 224
- IV. Pupillary Light Reflexes and Pathway 225
- V. Pupillary Dilation Pathway 227
- VI. The Convergence–Accommodation Reaction 227
- VII. Centers for Ocular Motility 228
- VIII. Clinical Correlations 229

Review Test 232

17. OLFATORY, GUSTATORY, AND LIMBIC SYSTEMS 236

Objectives 236

- I. Olfactory System 236
- II. Gustatory System 237
- III. Limbic System 239

Review Test 245

18. BASAL NUCLEI AND THE EXTRAPYRAMIDAL MOTOR SYSTEM 249

Objectives 249

- I. Basal Nuclei 249
- II. Extrapyrmidal Motor System 249

Review Test 256

19. CEREBELLUM 258

Objectives 258

- I. Overview 258
- II. Major Divisions of the Cerebellum 258
- III. Cerebellar Cortex 260
- IV. Major Cerebellar Pathways 262
- V. Cerebellar Dysfunction 264
- VI. Cerebellar Lesions 264

Review Test 266

20. AUTONOMOUS NERVOUS SYSTEM 268

Objectives 268

- I. Overview 268
- II. Divisions of the Autonomic Nervous System 268
- III. Visceral Afferent Fibers and Pain 272
- IV. Autonomic Innervation of Selected Organs 273
- V. Clinical Correlations 275

Review Test 276

21. NEUROTRANSMITTERS AND PATHWAYS 278

Objectives 278

- I. Introduction 278
- II. Acetylcholine 279
- III. Dopamine 280
- IV. Norepinephrine (Noradrenalin) 281
- V. Serotonin (5-Hydroxytryptamine [5-HT]) 282
- VI. Opioid Peptides 283
- VII. Nonopioid Neuropeptides 284
- VIII. Amino Acids 284
- IX. Nitric Oxide 287
- X. Functional and Clinical Correlations 287

Review Test 289

22. CEREBRAL CORTEX 293

Objectives 293

- I. Overview 293
- II. Neocortex 293
- III. Functional Areas of the Cerebral Cortex 294
- IV. Cerebral Dominance 299
- V. Split-Brain Syndrome 301
- VI. Blood Supply to the Major Functional Cortical Areas 302

VII. Apraxia	303
VIII. Aphasia	304
IX. Dysprosodies	305
Review Test	306

Comprehensive Examination 311

Appendix: Table of Cranial Nerves 339

Glossary 342

Index 353

Gross Anatomy of the Brain

Objectives

- Identify the major structures of the brain from typical brain sections and diagrams—use the Atlas of the Brain and Brains.com on p. 10.
- Describe the telencephalon, including the lobes of the cerebral hemispheres and the major gyri of each.
- Differentiate the structures of the limbic and olfactory senses from other parts of the brain.
- List the different parts of the diencephalon, brainstem, and cerebellum.

I. INTRODUCTION

- part of the central nervous system (CNS) that lies within the cranial vault—the **encephalon**. Its surface is convoluted and exhibits **gyri** and **sulci**.
- consists of the **cerebrum** (cerebral hemispheres and diencephalon), the **brainstem** (midbrain, pons, and medulla), and the **cerebellum**.
- weighs 350 g in the newborn and 1400 g in the adult.
- covered by three connective tissue membranes, the **meninges**.
- surrounded by **cerebrospinal fluid (CSF)** that supports it and protects it from trauma.

II. DIVISIONS OF THE BRAIN

The brain is classified into six postembryonic divisions: **telencephalon**, **diencephalon**, **mesencephalon**, **pons**, **medulla oblongata**, and **cerebellum**.

A. Telencephalon

- consists of the **cerebral hemispheres** and the **basal nuclei**. The cerebral hemispheres contain the lateral ventricles.
 1. **Cerebral hemispheres** (figures 1.1 through 1.5)
 - separated by the longitudinal cerebral fissure and the **faix cerebri**.
 - interconnected by commissural fiber bundles (i.e., corpus callosum).
 - consists of six lobes and the olfactory structures:
 - a. **Frontal lobe** (see figures 1.3 and 1.4)
 - extends from the central sulcus to the frontal pole.
 - lies superior to the lateral sulcus and anterior to the central sulcus.
 - made up of the following gyri:
 - (1) **Precentral gyrus**
 - consists of the primary motor area (area 4).

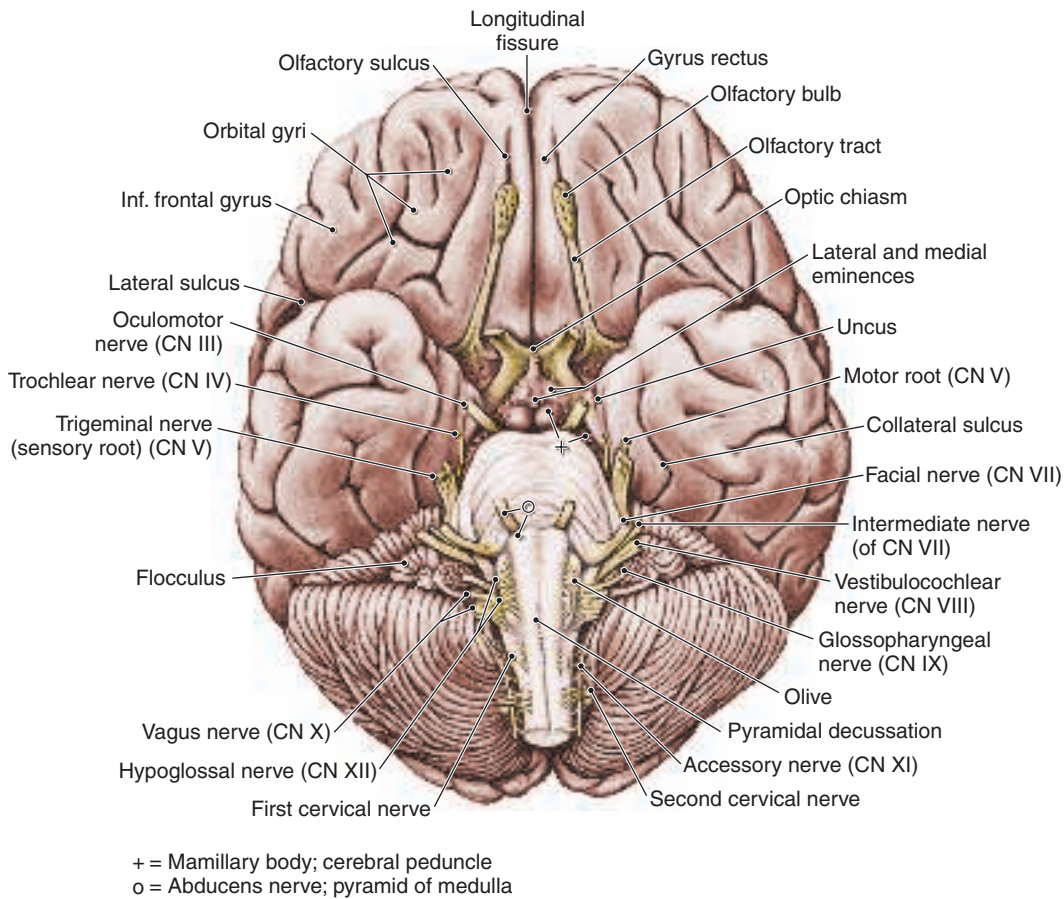
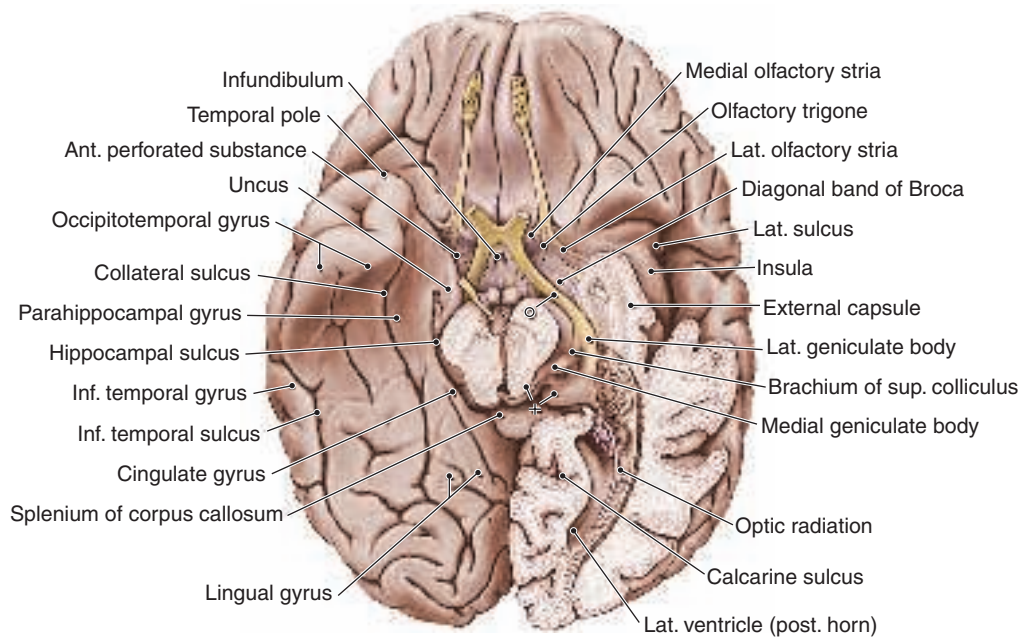


FIGURE 1.1. Base of the brain. (Modified from Truex RC, Kellner CE. *Detailed Atlas of the Head and Neck*. New York, NY: Oxford University Press; 1958:34.)

- (2) **Superior frontal gyrus**
 - contains supplementary motor cortex on the medial surface (area 6).
 - (3) **Middle frontal gyrus**
 - contains the frontal eye field (area 8).
 - (4) **Inferior frontal gyrus**
 - contains the Broca speech area in the dominant hemisphere (areas 44 and 45).
 - (5) **Gyrus rectus and orbital gyri**
 - separated by the olfactory sulcus.
 - (6) **Anterior paracentral lobule**
 - found on the medial surface between the superior frontal gyrus (paracentral sulcus) and the central sulcus.
 - represents a continuation of the precentral gyrus on the medial surface.
- b. Parietal lobe** (see Figures 1.3 through 1.5)
- extends from the central sulcus to the occipital lobe and lies superior to the temporal lobe.
 - contains the following lobules and gyri:
 - (1) **Postcentral gyrus**
 - the primary somatosensory area of the cerebral cortex (areas 3, 1, and 2).
 - (2) **Superior parietal lobule**
 - comprises association areas involved in somatosensory functions (areas 5 and 7).



o = Optic tract
 + = Brachium of inf. colliculus

FIGURE 12. Inferior surface of the brain showing the principal gyri and sulci. The left hemisphere has been dissected to show the visual pathways and relation of the optic radiation to the lateral ventricle. (Modified from Truex RC, Kellner CE. *Detailed Atlas of the Head and Neck*. New York, NY: Oxford University Press; 1958:46.)

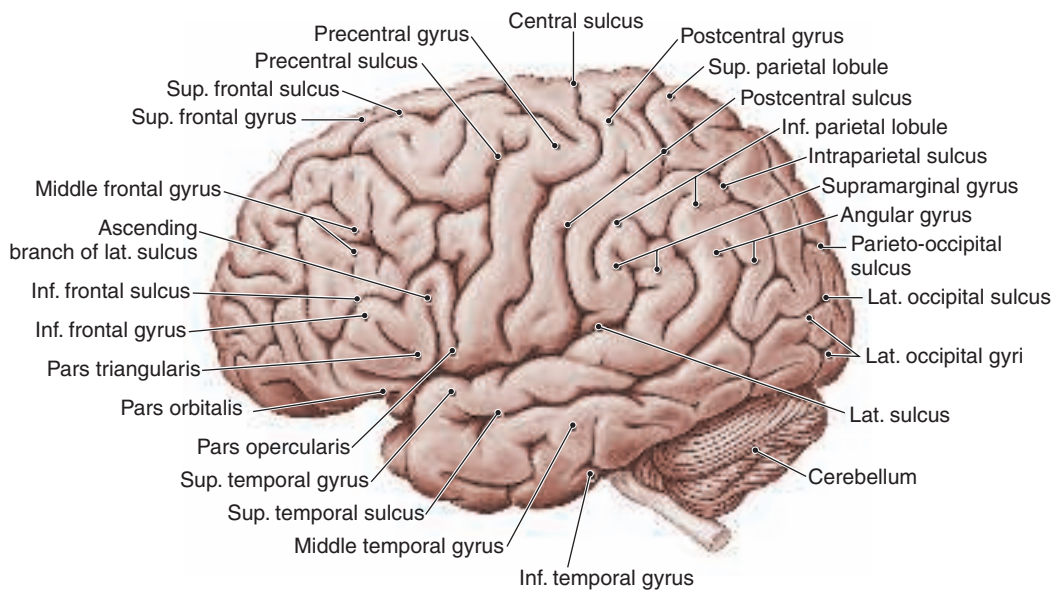
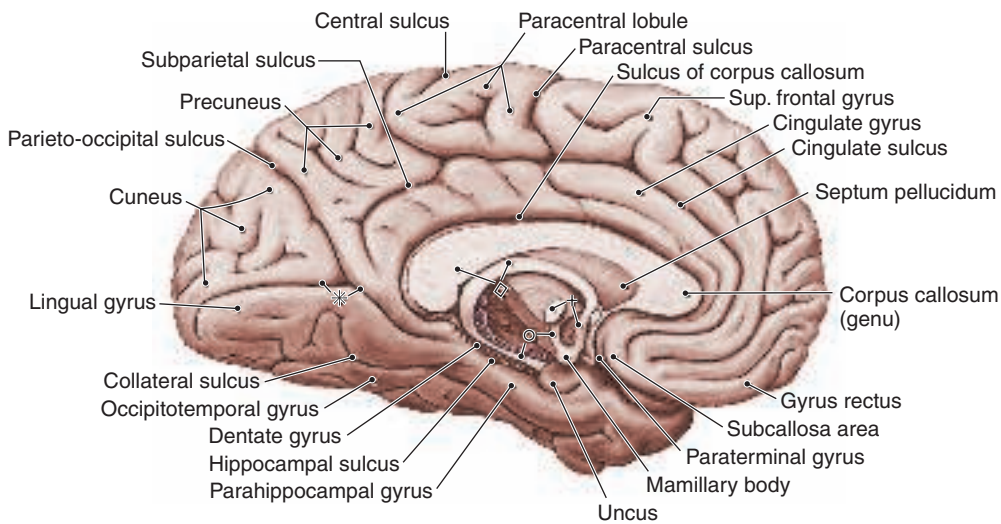


FIGURE 13. Lateral surface of the brain showing the principal gyri and sulci. (Modified from Truex RC, Kellner CE. *Detailed Atlas of the Head and Neck*. New York, NY: Oxford University Press; 1958:47.)



* = Calcarine fissure

◇ = Splenium of corpus callosum; body of fornix

+ = Interthalamic adhesion: ant. column of fornix

o = Fimbria of fornix; mamillothalamic tract

FIGURE 1.4. Medial surface of the brain showing the principal gyri and sulci. Parts of the thalamus and hypothalamus have been removed to show the fimbria and anterior column of the fornix and the mamillothalamic tract. (Modified from Truex RC, Kellner CE. *Detailed Atlas of the Head and Neck*. New York, NY: Oxford University Press; 1958:49.)

(3) Inferior parietal lobule

- **Supramarginal gyrus**

- (a) interrelates somatosensory, auditory, and visual inputs (area 40).

- **Angular gyrus** (area 39)

- (a) receives impulses from primary visual cortex.

(4) Precuneus

- located between the paracentral lobule and the cuneus.

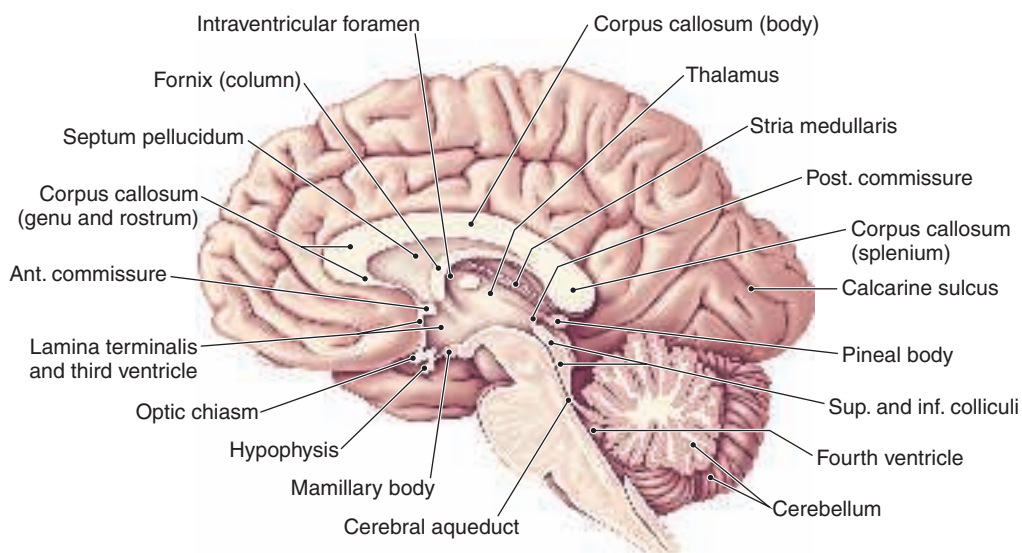


FIGURE 1.5. Midsagittal section of the brain and brainstem showing the structures surrounding the third and fourth ventricles. (Modified from Bear MF, Connors BW, Paradiso MA: *Neuroscience: Exploring the Brain*. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2007:207.)

(5) Posterior paracentral lobule

- located on the medial surface between the central sulcus and the precuneus.
- represents a continuation of the postcentral gyrus on the medial surface.

c. Temporal lobe (see Figures 1.2 through 1.4)

- extends from the temporal pole to the occipital lobe, lying inferior to the lateral sulcus.
- extends from the lateral sulcus to the collateral sulcus.
- contains the following gyri:

(1) Transverse temporal gyri of Heschl

- found within the lateral sulcus.
- extends from the superior temporal gyrus toward the medial geniculate body (Figure 1.6).
- the primary auditory areas of the cerebral cortex (areas 41 and 42).

(2) Superior temporal gyrus

- associated with auditory functions.
- contains the **Wernicke speech area** in the dominant hemisphere (area 22).
- contains the planum temporale on its superior (hidden) surface.

(3) Middle temporal gyrus**(4) Inferior temporal gyrus****(5) Lateral occipitotemporal gyrus (fusiform gyrus)**

- lies between the inferior temporal sulcus and the collateral sulcus.

d. Occipital lobe (see Figures 1.3 through 1.5)

- lies posterior to a line connecting the parieto-occipital sulcus and the preoccipital notch.

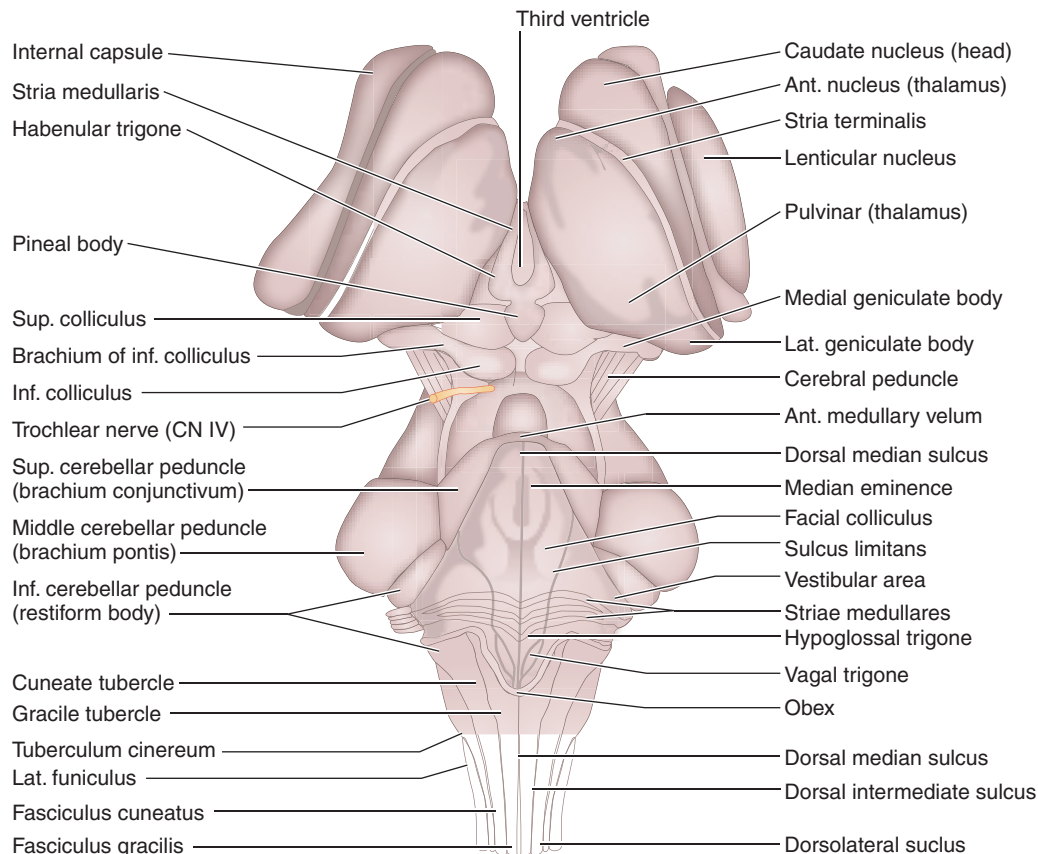


FIGURE 1.6. Posterior surface anatomy of the brainstem. The cerebellum has been removed to show the three cerebellar peduncles and the floor of the fourth ventricle (rhomboid fossa). (Modified from Truex RC, Carpenter MB. *Human Neuroanatomy*. Baltimore, MD: Williams & Wilkins; 1969:31.)

- contains two structures:
 - (1) **Cuneus**
 - situated between the parieto-occipital sulcus and the calcarine sulcus.
 - contains the visual cortex (areas 17, 18, and 19).
 - (2) **Lingual gyrus**
 - lies inferior to the calcarine sulcus.
 - contains the visual cortex (areas 17, 18, and 19).
 - e. **Insular lobe** (insula) (see Figure 1.2)
 - lies within the lateral sulcus.
 - has short and long gyri.
 - f. **Limbic lobe** (see Figures 1.4 and 22.1B)
 - a C-shaped collection of structures found on the medial hemispheric surface that encircles the corpus callosum and the lateral aspect of the midbrain.
 - includes the following structures:
 - (1) **Paraterminal gyrus and subcallosal area** (see Figure 1.4)
 - located anterior to the lamina terminalis and inferior to the rostrum of the corpus callosum.
 - (2) **Cingulate gyrus**
 - parallel and superior to the corpus callosum.
 - merges with the parahippocampal gyrus.
 - (3) **Parahippocampal gyrus**¹
 - lies between the hippocampal and collateral sulci and terminates in the **uncus**.
 - (4) **Hippocampal formation** (see Figures 1.2 and 1.4)
 - lies between the choroidal and hippocampal fissures.
 - connected to the hypothalamus and septal area via the **fornix**.
 - includes three structures:
 - (a) **Dentate gyrus** (see Figure 1.4)
 - (b) **Hippocampus** and
 - (c) **Subiculum** (see Figure 17.5)
 - g. **Olfactory structures** (see Figure 1.2)
 - found on the orbital surface of the brain and include the following:
 - (1) **Olfactory bulb and tract**
 - an outpouching of the telencephalon.
 - (2) **Olfactory bulb**
 - receives the olfactory nerve (CN I).
 - (3) **Olfactory trigone and striae**
 - (4) **Anterior perforated substance**
 - created by penetrating striate arteries.
 - (5) **Diagonal band of Broca** (see Figure 1.2)
 - interconnects the amygdaloid nucleus and the septal area.
- 2. Basal nuclei (ganglia)** (Figure 1.7; see Figures 1.6 and 18.1)
- constitute the subcortical nuclei of the telencephalon.
 - include the following structures:
 - a. **Caudate nucleus**
 - part of the striatum, together with the putamen.
 - b. **Putamen**
 - part of the striatum, together with the caudate nucleus.
 - part of the lentiform nucleus along with the globus pallidus.
 - c. **Globus pallidus**
 - part of the lentiform nucleus, together with the putamen.
 - d. **Subthalamic nucleus**
 - part of the diencephalon that functions with the basal nuclei.
- 3. Lateral ventricles** (see Figure 2.4)
- ependyma-lined cavities of the cerebral hemispheres.
 - contain **CSF** and **choroid plexus**.

¹Some authorities include the parahippocampal gyrus as a temporal lobe structure.

- [read The Myths of Innovation](#)
- [download Montana](#)
- [Pilgrimage to Dollywood: A Country Music Road Trip through Tennessee online](#)
- [**Creating HDR Photos: The Complete Guide to High Dynamic Range Photography online**](#)
- [read online Mobile User Experience: Patterns to Make Sense of It All](#)

- <http://fortune-touko.com/library/The-Myths-of-Innovation.pdf>
- <http://dadhoc.com/lib/The-Novel-Now--Contemporary-British-Fiction.pdf>
- <http://www.cafesystemcanarias.com/books/Pilgrimage-to-Dollywood--A-Country-Music-Road-Trip-through-Tennessee.pdf>
- <http://schroff.de/books/Creating-HDR-Photos--The-Complete-Guide-to-High-Dynamic-Range-Photography.pdf>
- <http://okawa-ladies.com/lib/The-Other-Side-of-the-Bridge.pdf>