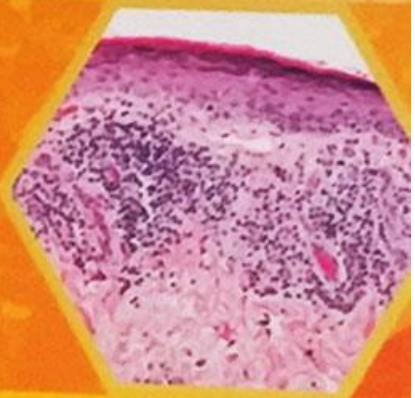
C&E Publishing, Inc.

Esteban and Gonzales' TEXTBOOK OF HISTOLOGY

Sixth Edition



ILOILO DOCTORS' COLLEGE
Library
IDCM0000001140

Eduardo G. Gonzales, M.D.

Esteban and Gonzales'

TEXTBOOK OF HISTOLOGY

Sixth Edition

Esteban and Gonzales' TEXTBOOK OF HISTOLOGY

Sixth Edition

Eduardo G. Gonzales, M.D.

3303
IDCMI
MEDICAL LIBRARY

C & E Publishing, Inc.
2022

M
GIL018
G589
2022
C2

C & E Publishing, Inc.

C & E Publishing, Inc. was established in 1993, and is a member of ABAP, PBAI, NBDB, and PEPA.

Esteban and Gonzales' Textbook of Histology
Sixth Edition
Published in 2022 by C & E Publishing, Inc.
839 EDSA, South Triangle, Quezon City
Tel. No.: (02) 8929-5088
E-mail: info@cebookshop.com

Copyright © 2022 by C & E Publishing, Inc.,
and Eduardo G. Gonzales, M.D.

ALL RIGHTS RESERVED. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the prior written permission of the publisher.

Cataloguing-in-Publication Data

QM551
.G589
2022

Gonzales, Edurado G., author.

Esteban and Gonzales' textbook of histology/ Eduardo G. Gonzales.—6th edition—Quezon City, Philippines: C & E Publishing Inc., ©2022.

xi, 552 pages : illustrations ; 7 in x 10 in

Includes bibliographical references and index.

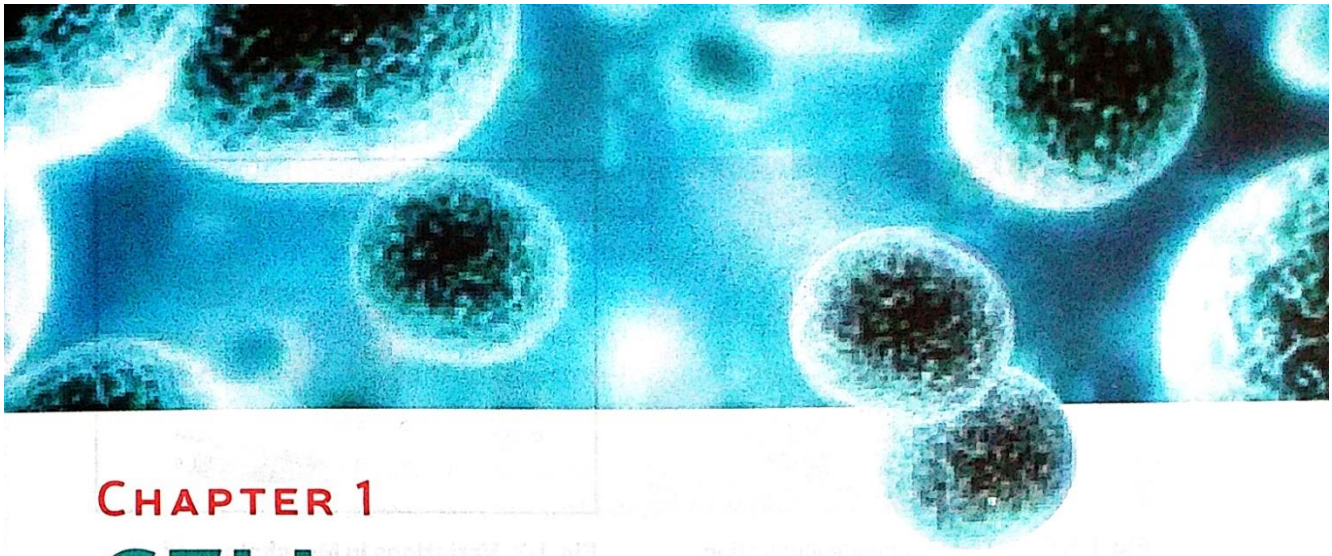
ISBN: 978-971-98-1816-8

EISBN: 978-971-98-1817-5

1. Histology. I. Title.

Book Design: Mirriam M. Velasco
Cover Design: Ruth Anne D. Ellorin

TABLE OF CONTENTS



CHAPTER 1
CELL

The cell is the basic morphological and functional unit of all living things. It is the smallest entity that has the capacity to perform all of life's functions and therefore, capable, under favorable environmental conditions, of independent existence. Indeed, numerous species of unicellular organisms exist. In fact, some, like the disease-causing bacteria are of great concern to medical science. However, as a rule, macroscopic organisms including humans are multicellular.

A human being actually starts as a single cell, the **fertilized ovum** (**zygote**), which results from the union of the **male gamete** (**sperm cell**; **spermatozoon**) and the **female gamete** (**ovum**). Multiplication (**mitosis**) of the fertilized ovum and differentiation of its progenies eventually give rise to an extremely complex organism that consists of a staggering number of cells (estimated at about 10^{14} or 100 trillion, in adults), which are classified into hundreds of cell types based on morphology and function.

To ensure the human being's survival, the cells that comprise the human body form a tightly knit and highly organized society. Thus, cells that perform the same general functions are linked together by some amount of intercellular material and/or cell-to-cell junctions to form **tissues**. Tissues, in turn, bond together in varying proportions to form more complex functional structures called **organs** and organs that have interrelated functions group together to form **organ systems**.

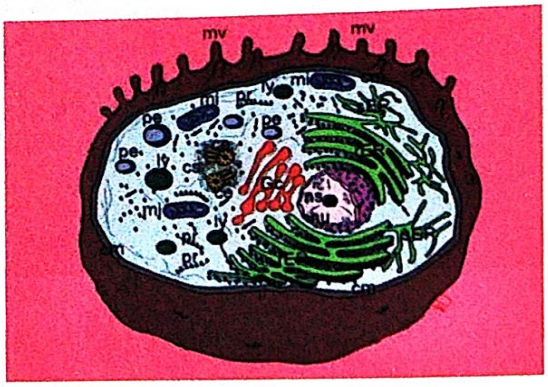


Fig. I-1. Cell. The composite illustration shows the different components of a cell, including the cell membrane (cm), mitochondria (mi), microvilli (mv), smooth endoplasmic reticulum (sER), ribosomes (at arrows), rough endoplasmic reticulum (rER), nucleus (nu), nucleolus (ns), peroxisome (pe), Golgi complex (Gc), lysosomes (ly), and centrosome (cs) which contains two centrioles (ce).

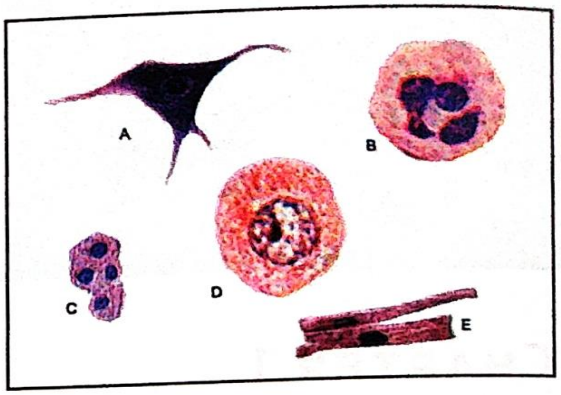


Fig. I-2. Variations in Morphology of Cells. Photomicrographic collage illustrates the differences in shape and the location and morphology of nucleus among cells. Neuron (A), Neutrophil (B), Hepatocytes (C), Oocyte (D), Skeletal Muscle Cells (E). Note: The cells are not scaled to size.

The cells of the body vary in size, shape, and form, not only among the different cell types but also among cells of the same cell type. These variations are largely dictated by the cells' functions and/or state of activity. Despite their wide morphological variations, however, human cells—like all eukaryotic cells—share a common basic structure. They consist of a mass of **cytoplasm** that is encased by a **cell membrane**, and a **nucleus**, a structure that is encased by a **nuclear envelope** and embedded in the cytoplasm.

CELL MEMBRANE (PLASMA MEMBRANE; PLASMALEMMA)

The cell membrane does not merely serve as an envelope that delimits the cell from its surroundings. It has many other functions. It protects the cell. It determines which substances can move in and out of the cell and regulates the movement of these substances to and from the cell. It provides attachment for the skeleton of the cell (**cytoskeleton**). It receives and sends out stimuli. It provides binding sites and receptors for enzymes and other substances. It allows for cell-to-cell recognition. And, in many cell types, it forms specialized junctions with the cell membrane of adjacent cells, or the extracellular matrix.