

ELSEVIER'S DICTIONARY OF BIOLOGY

compiled by

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1998

ELSEVIER

Amsterdam – Lausanne – New York – Oxford – Shannon – Singapore – Tokyo

ELSEVIER SCIENCE B.V.
Sara Burgerhartstraat 25
P.O. Box 211, 1000 AE Amsterdam, The Netherlands

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First edition 1998

Library of Congress Cataloging in Publication Data

A catalog record from the Library of Congress has been applied for.

ISBN: 0-444-82525-8

⊗ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).
Printed in The Netherlands.

epithelialis) with a → basement membrane, a layer of loose connective tissue (*lamina propria mucosae*), and a muscular layer (*lamina muscularis mucosae*). The oral, oesophageal, vaginal, and anal areas are lined by a stratified epithelium, elsewhere the epithelium is simple. There are many single gland cells (→ goblet cells) in the epithelium, and glands, e.g. gastric and intestinal glands, derived from the epithelium but located deeper in the connective tissue.

mucus (L.), 1. viscid secretion of glands of the vertebrate mucous membrane, containing inorganic salts, mucin, loosened epithelial cells, and leucocytes; 2. broader, any slimy secretion produced by organisms. *Adj.* **mucous**.

mud, organic material precipitated in water and composed of dead remains of plants, animals, and other organisms, usually containing also clay. *Cf.* peat.

Müllerian duct, **Müller's duct** (*Johannes Müller*, 1801—1858), **paramesonephric duct**; (L. *ductus paramesonephricus*), a tube developing parallel with the → Wolffian ducts from the coelomic embryonic mesothelium in jawed vertebrates; its development is associated with the formation of the mesonephros, and it is paired except in birds. The ducts arise as peritoneal pockets which extend caudally to join the urogenital sinuses, and then develop into the → oviducts (in mammals the uterine tubes, Fallopian tubes), in mammals also into the uterus and vagina. In amniotic vertebrates, the fertilization of eggs occurs in the oviduct. In males the Müllerian duct generally degenerates into vestigial structures (vagina masculina).

Müllerian mimicry (*Fritz Müller*, 1831—1897), *see* mimicry.

Müllerian regression factor, **MRF**, a polypeptide hormone secreted by → Sertoli cells of the embryonic testes in tetrapod vertebrates; inhibits the development of → Müllerian ducts, and together with testosterone stimulates the development of vas deferens and related structures. Also called Müllerian inhibiting substance (MIS) or Müllerian duct inhibitory factor.

Muller's ratchet (*Hermann Joseph Muller*, 1890—1967), a model by which Muller aimed to explain the evolution of sexual reproduction. According to the model, an asexual line of a population incorporates a kind of ratchet mechanism, such that the population

does not get rid of mutant genes, i.e. it can never have a load of mutation (*see* genetic load) smaller than that already existing. On the contrary, in a sexual line recombination leads to elimination of harmful mutations.

multi- (L. *multus* = much, many), denoting many, numerous.

multiaxial (L. *axis* < Gr. *axon* = axis, axle), having more than one axis; e.g. pertaining to a plant structure having an axis with several apical cells which form parallel filaments; e.g. some red algae.

multicellular (L. *cellula* = small cell), composed of many cells. *Noun* **multicellularity**.

multicellular organisms, eukaryotic organisms composed of more than one cell, as distinguished from unicellular organisms, → Protista. The cells of a multicellular organism are accompanied by intercellular adhesion and intercellular communication. The organisms are usually structurally and functionally differentiated into tissues and organs with specialized functions.

multienzyme complex, an enzyme system containing several or many polypeptide monomers with different enzyme activities; e.g. the **fatty acid synthase** in the cytoplasm for the synthesis of saturated long-chain fatty acids with 7 enzyme activities, such as acetyl CoA carboxylase, acetyl transacylase, and malonyl transacylase, or the → **pyruvate dehydrogenase complex** catalysing the formation of acetyl CoA.

multiform (L. *forma* = shape, form), consisting of many forms, having many forms or shapes. *Noun* **multiformity**.

multimer (Gr. *meros* = part), a union of two or more organic macromolecules, like a union of several → polypeptides forming a **multimeric** protein, or a protein complex composed of several protein units; if the participating molecules are of different types, it is a **heteromultimer**, if of the same type, a **homomultimer**. *Adj.* **multimeric**. *Cf.* polymer.

multi-net theory, a theory about the growth of the plant cell wall, stating that the wall is formed from separate layers of → microfibrils, the directions of which turn during the enlargement of the cell to form a multi-net structure.

multineuronal, pertaining to a muscle cell which is innervated by more than one neurone, usually one or more excitatory neurones and one inhibitory neurone; multineuronal