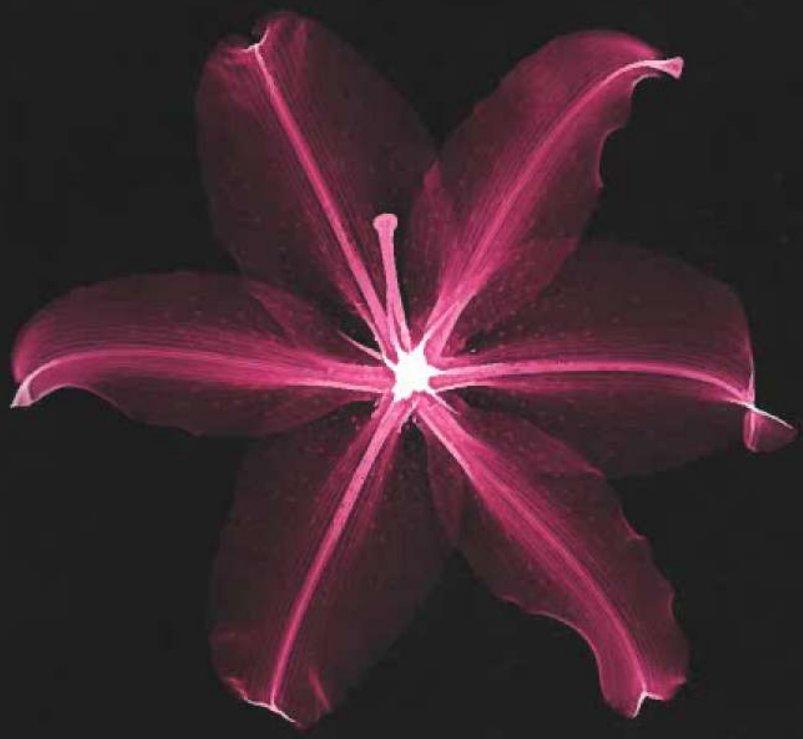
HENDERSON'S

Dictionary of BIOLOGY

Fourteenth Edition

Edited by Eleanor Lawrence



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biting and sucking
between tips of the
or the intake of food.
. embryonic cells or
the normal course
: rise to a particular
tive endoderm, pre-
ı. The designation
they are irreversibly
urse of development.
pl. neuron or part of
ne of axon terminal,
side of a synapse;
iberating neurotrans-
ıals.
ion enhanced trans-
: neuron and another
esult of the action of
apsing on the axon
mitting neuron.
on action of an inhib-
on the axon terminal

part or outgrowth on
s and spiders.
or to an opening such
acle.
ee to which something
esent in a population.
pread.
ssel conducting blood
enule.
r appearing in, early

ert. or situated in re-
bral column; (2) *appl.*
skull; (3) *appl.* the
tic nervous system.
anterior to pterygoid
ebrates; (2) the vomer
vertebrates; (3) in
brane bone in floor of

t is actively captured
by another organism

n.plu. the anterior
vertebra, articulating
physes of the vertebra
ng.
ds *n.*, *n.plu.* phylum
marine worm-like
ıimals with a warty

and superficially ringed body, with spines around the mouth.

Pribnow box short sequence of bases in the promoter regions of prokaryotic genes which appears to be the key recognition site for RNA polymerase. The consensus sequence is TATAATG, centred *ca.* 10 base pairs before the start of transcription.

prickle cells cells of the deeper layers of stratified squamous epithelium, connected by bundles of keratin fibres, which in isolated cells under the microscope project in tufts ('prickles') from the surface.

primaquine *n.* anti-malarial drug, which can cause haemolysis in people with glucose-6-phosphate dehydrogenase deficiency.

primary *a.* (1) first; (2) principal; (3) original; (4) *n.* one type of main flight feather in bird's wing, attached in the region of the posterior edge of the hand bones. *plu.* **primaries**.

primary cambium procambium *q.v.*

primary cell wall in plant cells, the first cell wall, laid down before and while the cell is growing and formed of cellulose microfibrils in a matrix of hemicelluloses, glycoprotein and pectic substances. It is relatively plastic and is the only cell wall present in most actively dividing cells or those engaged in photosynthesis or secretion. *cf.* secondary cell wall.

primary centre a part of central nervous system, especially of sensory cortex, which is the first to receive the input from a sensory organ.

primary consumer herbivore *q.v.*

primary culture culture of cells prepared directly from tissues.

primary ecological succession primary succession *q.v.*

primary endosperm nucleus triploid nucleus that derives from fusion of one generative nucleus with two polar nuclei in the embryo sac of flowering plants. The cell containing this nucleus divides by mitosis to produce the endosperm of the seed.

primary feathers primaries *q.v.*

primary focus collection of proliferating B and T cells in lymph node that is formed when B cells are stimulated by antigen in the presence of their corresponding T cells.

primary follicle *see* follicle (3).

primary germ layers *see* germ layers.

primary growth growth of roots and shoots from the time of initiation at the apical meristem in plant embryo to when their expansion and differentiation is completed. *cf.* secondary growth.

primary host host in which a parasite lives for much of its life cycle and in which it becomes sexually mature.

primary immune response the immune response made on contact with an antigen that has not been encountered before. It takes up to a week to develop and a week or two to reach maximum. *cf.* secondary immune response.

primary induction neural induction *q.v.*

primary lymphoid organs in mammals, the bone marrow and thymus, which produce B and T lymphocytes respectively, but which do not participate directly in immune reactions.

primary meristems the meristematic tissue in developing plant embryo. They consist of the outer protoderm (which gives rise to epidermis), surrounding the ground meristem (which gives rise to highly vacuolated loose ground tissue), which encloses the central procambium or procambial strand from which the vascular bundles arise.

primary mycelium haploid mycelium originating from a basidiospore.

primary oocyte diploid female germ cell at the point of entering the first meiotic division of oogenesis. It is a large cell with a large nucleus (germinal vesicle).

primary organizer *see* organizer.

primary phloem collectively, the protophloem and metaphloem, the phloem derived from the primary cambium during primary growth.

primary pit fields areas of plant cell wall containing many plasmodesmata, and in which pits are clustered.

primary plant body the plant body formed from growth at the apical meristems.

primary producer autotroph *q.v.*

primary production (PP) the assimilation and fixation of inorganic carbon and other inorganic nutrients into organic matter by autotrophs, which are therefore called primary producers.

primary productivity the amount of organic matter fixed by the autotrophic organisms in an ecosystem per unit time.

primary root root that develops as a continuation of the radicle in plant seedling.

primary sere natural plant succession on an area previously without vegetation, starting from bare ground and ending in a climax community.

primary sexual characters differences between the sexes relating to the reproductive organs and gametes.

primary spermatocyte *see* spermatocyte.

primary structure in proteins, the amino acid sequence. In nucleic acids, the nucleotide sequence.

primary succession plant succession that begins on bare ground.

primary transcript in eukaryotic cells, an RNA as it is transcribed from a gene and which has not yet been modified by e.g. splicing, capping or polyadenylation.

primase *n.* RNA polymerase that synthesizes the RNA primer for DNA synthesis during DNA replication.

Primates *n.* order of mammals known from the Paleocene and including tree shrews, lemurs, monkeys, apes and humans. They are largely arboreal with limbs modified for climbing, leaping or brachiating (swinging), large brains in relation to body size, a shortening of the snout and elaboration of the visual apparatus, often with stereoscopic vision.

prime movers the ultimate factors that determine the direction of evolutionary change. They are of two kinds: basic genetic mechanisms, preadaptations and constraints imposed by an organism's existing developmental programme on the one hand, and the set of all environmental influences that constitute the agents of natural selection on the other.

primer *n.* (1) short RNA which must be synthesized on a DNA template before DNA polymerase can start elongation of a new DNA chain. It is subsequently removed and the gap filled in with DNA; (2) in the polymerase chain reaction, a pair of synthetic oligonucleotides complementary to flanking regions of the gene to be copied, which are bound to the DNA before the reaction commences to ensure

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both containing copies of the transposon sequence.

resource *n.* anything provided by the environment to satisfy the requirements of a living organism, e.g. food, living space.

resource-holding potential the ability of an animal to gain and maintain possession of essential resources by fighting.

resource partitioning the division of scarce resources in an ecosystem so that species with similar requirements use the same resources at different times, in different ways, or in different places.

respiration *n.* any or all of the processes used by organisms to generate metabolically usable energy, chiefly in the form of ATP, from the oxidative breakdown of foodstuffs. May refer to processes ranging from the exchange of oxygen and carbon dioxide between organism and environment, to the biochemical processes generating ATP at the cellular level. *a.* **respiratory**, *pert.* or involved in respiration. *see also* aerobic respiration, anaerobic respiration, glycolysis, oxidative phosphorylation.

respiratory burst oxygen-requiring production of toxic oxygen metabolites triggered in macrophages and neutrophils by phagocytosis of bacteria and opsonized particles.

respiratory centres nuclei in medulla oblongata involved in the involuntary control of breathing.

respiratory chain series of electron carriers (e.g. quinones, flavoproteins, cytochromes) located in inner membrane of mitochondria. Electrons derived from respiratory metabolites are transferred along the chain in a series of redox reactions, which result eventually in the reduction of oxygen to water and the formation of ATP and NAD. *alt.* electron transport chain, electron transfer chain. *see also* chemiosmosis, oxidative phosphorylation.

respiratory control regulation of the rate of oxidative phosphorylation by the cellular ADP level. Low ADP inhibits, and high ADP stimulates oxygen consumption and ATP synthesis.

respiratory heart a name given to the auricle and ventricle of right side of heart in animals where there is no direct communication between right and left sides. *cf.* systemic heart.

respiratory index the amount of carbon dioxide produced per unit of dry weight per hour.

respiratory movements any movements connected with the supply of oxygen to respiratory surfaces and the removal of carbon dioxide, such as the movements of the thorax and diaphragm in mammals.

respiratory pigments (1) pigments such as haemoglobin and other haem proteins, which form an association with oxygen and carry it from the respiratory surfaces to tissue cells; (2) pigments concerned with cellular respiration, components of the respiratory chain such as cytochromes.

respiratory quotient (RQ) ratio of volume of carbon dioxide produced to volume of oxygen used in respiration.

respiratory sac a backward extension of the suprabranchial cavity, in certain air-breathing bony fishes.

respiratory substrate any substance that can be broken down by living organisms during respiration to yield energy.

respiratory surface surface at which gas exchange occurs between the environment and the body, e.g. gill lamellae or alveoli of lungs.

respiratory tract throat, bronchi and lungs.

respiratory trees in echinoderms, a respiratory system consisting of a series of tubules arising just within the anus into which water can be drawn and expelled.

respondent behaviour animal behaviour performed in response to an obvious stimulus.

response *n.* (1) the activity of a cell or organism in terms of e.g. movement, hormone or other secretion, enzyme production, changes in gene expression, as a result of a stimulus; (2) the behaviour of an organism as a result of fluctuations in the environment.

response latency the time interval between a stimulus and the response.

response regulator protein one of the members of a two-component system in bacteria, which is phosphorylated by the sensor protein.

restibrachium *n.* the restiform body or inferior peduncle of the cerebellum.

restiform *a.* having the appearance of a rope, *appl.* two bodies of nerve fibres on medulla oblongata, the inferior cerebellar peduncles.

resting cell or nucleus one that is not undergoing mitosis or meiosis.

resting metabolic rate (RMR) the metabolic rate, esp. of an animal, measured at rest. *cf.* basal metabolic rate.

resting potential the potential difference across a nerve or muscle cell membrane when it is not being stimulated, and which is usually about −70 millivolts (mV) in a nerve cell. *cf.* action potential.

Restionales *n.* order of xeromorphic tufted or climbing monocots including the family Restionaceae and others.

restitution *n.* (1) the reformation of a tissue or body by union of separated parts; (2) the reunion of breaks in chromosomes.

restriction *n.* (1) in bacteria, the breakdown of incoming DNA of another bacterial strain, phage or a foreign plasmid by particular types of endonucleases called restriction enzymes. *see also* modification, restriction endonuclease; (2) (*immunol.*) MHC restriction *q.v.*

restriction analysis the determination of the identity or internal structure of a gene or other piece of DNA by techniques that depend on the use of restriction enzymes to cut DNA into identifiable pieces.

restriction enzyme any of a large group of endonucleases produced by bacteria, which recognize short palindromic base sequences in DNA, cutting the double helix at a particular point within the sequence. Different restriction endonucleases recognize a different DNA sequence. Now used widely in genetic engineering, DNA cloning and gene mapping. *alt.* **restriction endonuclease**, site-specific endonuclease. *see also* restriction–modification system.

restriction fragment DNA fragment generated by treatment of DNA with a restriction enzyme or combination of restriction enzymes.

restriction fragment length polymorphism (RFLP) the presence or absence of a cutting site for a particular restriction enzyme in DNA of different individuals, which can be detected by comparison of

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:. It occurs e.g. in
the Gag–Pol fusion

g the insertion of
rotein chain during
ing of a specialized
g tRNA that pairs
that normally sig-

h research intended
tal laboratory find-
y useful therapy or

nzyme mediating the
f a substance across
bility barrier; (2) the
.) EF-G.
novement or removal
or habitat; (2) move-
solution within an
hloem of plant; (3)
angement in which
ne breaks off and is
homologous chromo-
iprocal translocation;
ovement of a protein

elongation factor EF-G.
ent ratio of content of
ice in shoot to that in
a substance's mobility
ation.
nbrane protein mediat-
a substance across a

ert. or crossing the

. across a membrane,
ne potential, transmem-

protein a protein that
a biological membrane.
of transmembrane pro-
ismembrane domain has
follows. Type I have a
which is cleaved, the N-
cellular, the C-terminus
pe II have an N-terminal
which is not cleaved and
ibrane-spanning domain
the N-terminus is cyto-
erminus is extracellular.
signal sequence, extra-

cellular N-terminus and cytoplasmic C-terminus. Type IV have a signal anchor in the C-terminal region, cytoplasmic N-terminus, extracellular C-terminus. *see* Fig. 26 (p. 392). *see also* membrane protein, membrane transport, membrane transport protein.

transmembrane potential membrane potential *q.v.*

transmethylase *alt.* methyltransferase.

transmissible *a. appl.* diseases that can be transmitted from one individual to another by contact, or by air, water, food or insect vectors, i.e. diseases caused by bacteria, viruses, fungi and other parasites. *cf.* non-transmissible.

transmissible spongiform encephalopathies group of neurodegenerative diseases of humans and animals in which the brain has a characteristic sponge-like appearance after death. They include scrapie in sheep, bovine spongiform encephalopathy (BSE) in cattle, and Creutzfeld–Jakob disease (CJD) in humans. The transmissible agent, called a prion, and the mechanism of the transmission, are not yet completely understood.

transmission electron microscope (TEM) electron microscope that produces an image from the diffraction of electrons after passage through the specimen. *cf.* scanning electron microscope.

transmission genetics genetics studied from the point of view of the mechanisms involved in the passage of a gene from one generation to the next.

transmitter neurotransmitter *q.v.*

transpalatine *n.* a cranial bone of crocodiles, connecting pterygoid with jugal and maxilla.

transpeptidation *n.* formation of peptide bonds between the short peptides in peptidoglycans of bacterial cell wall.

transpinalis *n.* a muscle connecting transverse processes of vertebrae.

transpiration *n.* the evaporation of water through stomata of plant leaves and stem.

transpirational pull the continuous loss of water through leaves by transpiration, causing the flow of water through xylem from roots to leaves.

transpiration stream the movement of water and inorganic solutes upwards from roots to leaves through the xylem.

transplant (1) *v.* to transfer tissue from one part to another part of the body of the same individual, or to transfer tissue from one individual to another; (2) *n.* tissue transferred in this way. *alt.* graft.

transplantation antigen histocompatibility antigen *q.v.*

transport *see* active transport, facilitated diffusion, passive transport, translocation.

transport protein (1) any protein that binds and transports a particular substance within the body or within a cell; (2) protein that transports a substance or ion across a biological membrane. *alt.* transporters. *see also* membrane transport proteins.

transport vesicle small membrane-bounded vesicle which carries material from one intracellular compartment to another within eukaryotic cells, budding off one compartment and fusing with the membrane of another.

transporter *see* transport proteins.

transposable genetic elements DNA sequences that possess the property of inserting themselves elsewhere on the chromosomes by a process called transposition. They are present in both eukaryotic and prokaryotic genomes. The simplest types of transposable element are bacterial insertion sequences, which carry only the genes necessary for their own transposition. Larger bacterial transposons also carry genes for other functions, such as antibiotic resistance. *alt.* mobile DNA elements, transposons. *see also* controlling element, drug-resistance plasmid, insertion sequence, retrotransposon, transposition.

transposase *n.* protein(s) specified by a transposable genetic element and responsible for its transposition.

transposition *n.* (1) the movement of a DNA sequence to another position on the same or a different DNA molecule. This may occur by excision and re-insertion elsewhere, or by replication of the sequence and insertion of a copy elsewhere. DNA sequences that can do this are known as transposable genetic elements or transposons, and most encode all the functions necessary for their transposition. Transposition may result in gene inactivation or changes in gene expression at the site of insertion. *alt.* **transpositional site-specific recombination**. *see also* retrotransposon; (2) translocation (definition) *q.v.*

transposon *n.* transposable genetic element *q.v.*

transposon mutagenesis the use of transposon insertion into a gene to produce a mutation whose location on the chromosome can be determined by tracking the transposon.

transpyloric plane upper of imaginary horizontal planes dividing abdomen into artificial regions.

***trans*-splicing** the generation of a mature RNA by the joining of two separate transcripts, as opposed to the more usual process of RNA splicing *q.v.*

transtubercular *a. appl.* plane of body through tubercles of iliac crests.

transudate *n.* any substance which has oozed out through a membrane or pores.

transvection *n.* the case where a chromosomal rearrangement that prevents synapsis between homologous regions changes the phenotype although the overall genotype remains unchanged. This is due to the ability of a mutation at or near one allele to influence the other allele only when they are synapsed.

transversal *a.* lying across or between, as a transversal wall.

transverse *a.* lying across or between, *appl.* section, a cross-section.

transverse process projection from each side of the neural arch of vertebra, with which a rib articulates.

transverse tubules ingrowths of plasma membrane which form interconnected tubules surrounding each myofibril in a skeletal muscle fibre.

transversion *n.* in nucleic acids, the substitution of a purine for a pyrimidine base, or vice versa.

transversum *n.* in many reptiles, a cranial bone extending from pterygoid to maxilla.

transversus *n.* a transverse muscle, as of abdomen, thorax, tongue, foot.

trapeziform *a.* trapezium-shaped.

trapezium *n.* (1) the 1st carpal bone at base of 1st metacarpal; (2) a portion of the pons Varolii in brain.

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