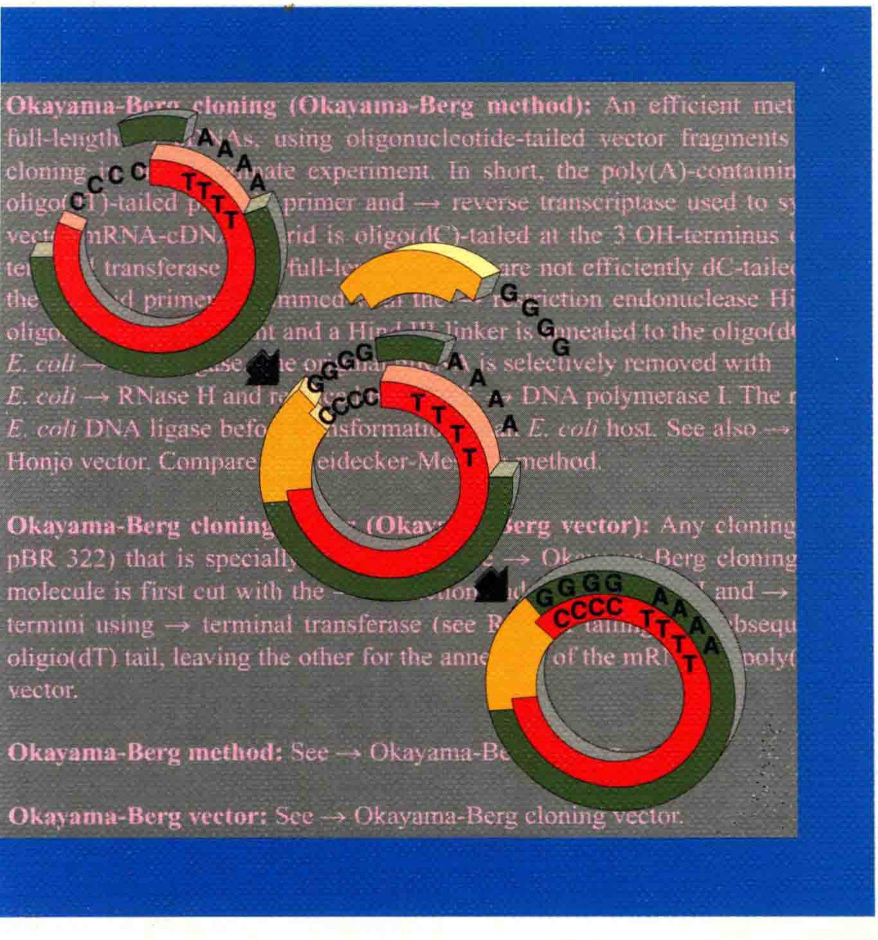
Günter Kahl

Dictionary of Gene Technology



VCH

Günter Kahl

Dictionary of Gene Technology

VCH Weinheim · New York · Basel · Cambridge · Tokyo

Prof. Dr. Günter Kahl
Pflanzliche Molekularbiologie
der Johann Wolfgang Goethe-Universität
Marie-Curie-Str. 9
D-60439 Frankfurt/Main

Published jointly by
VCH Verlagsgesellschaft mbH, Weinheim (Federal Republic of Germany)
VCH Publishers, Inc., New York, NY (USA)

Editorial Director: Dr. Hans-Joachim Kraus
Production Manager: Dipl.-Wirt.-Ing. (FH) Bernd Riedel

Library of Congress Card No. applied for

A catalogue record for this book is available from the British Library

Die Deutsche Bibliothek Cataloguing-in-Publication Data:

Kahl, Günter:

Dictionary of gene technology / Günter Kahl. – Weinheim;
New York; Basel; Cambridge; Tokyo: VCH, 1995
ISBN 3-527-30005-8
NE: HST

Printed on acid-free and chlorine-free paper.

Composition: U. Hellinger, D-69253 Heiligkreuzsteinach
Printing: strauss offsetdruck gmbh, D-69509 Mörlenbach
Bookbinding: IVB Heppenheim GmbH, D-64646 Heppenheim

Printed in the Federal Republic of Germany

Günter Kahl

Dictionary of Gene Technology

VCH

Distribution:

VCH, P.O. Box 101161, D-69451 Weinheim, Federal Republic of Germany

Switzerland: VCH, P.O. Box, CH-4020 Basel, Switzerland

United Kingdom and Ireland: VCH, 8 Wellington Court, Cambridge CB1 1HZ, United Kingdom

USA and Canada: VCH, 220 East 23rd Street, New York, NY 10010-4606, USA

Japan: VCH, Eikow Building, 10-9 Hongo 1-chome, Bunkyo-ku, Tokyo 113, Japan

ISBN 3-527-30005-8

Preface

The **Dictionary of Gene Technology** is the most modern and most comprehensive collection of all terms of this modern science. With a volume of more than 4000 entries it reflects the importance of gene technology for present-day biology. It also documents myriads of acronyms, a serious obstacle for clearness, and a swamp of jargons, a deterrence for students and other newcomers. While acronyms may well be a help in daily laboratory work, the numerous synonyms are indeed annoying, though they are characteristic of the discipline of gene technology. Sometimes they differ from each other by only a word more or less, or may be minor expression variants. Wherever possible, this dictionary stresses the most commonly used term, and treats inferior terms secondarily.

The **Dictionary of Gene Technology** targets at students in the fields of molecular biology and biotechnology, and seasoned researchers in other fields who are keen on making themselves familiar with the vocabulary of gene technology, specifically bioengineers, biochemists, biologists, chemical engineers, chemists, geneticists, medics, microbiologists and pharmacists, working at universities, in laboratories of industry or public institutions. It also offers a guide for reporters, scientific journalists and politicians in the stormy sea of public dispute over the pros and cons of gene technology. This book also serves as reference work for the active researcher in biotechnology, genetic engineering, and molecular genetics. Especially for this group the most recently introduced techniques and terms were included, which are embedded in a net of terms from allied sciences such as bacteriology, biochemistry, biophysics, biotechnology, cell biology, chemistry, cytogenetics, genetics, immunology and virology.

Gene Technology is an extremely rapidly expanding science. It is therefore inevitable that new terms will soon be created, new techniques will be introduced and this dictionary will have omissions. Also, I have striven to avoid errors, ambiguities and misinterpretations, and to be as complete as ever possible. Nevertheless, I am sure that certain inadequacies will be discovered, and I apologize for them at this stage. Sometimes the definition of an entry might look lengthy. However, I frequently felt that a brief definition would be inadequate to convey the essence of the entry.

A **Dictionary of Gene Technology** brings an author to the utmost limits of his capacity. It is therefore a pleasure to acknowledge the numerous supports of many colleagues, the patience of my co-workers in the Plant Molecular Biology Group at Frankfurt University, the exhaustive help of Mrs. S. Kost, and the cooperation of the VCH editor, Dr. H. J. Kraus, and, last but not least, the expert editing of Dr. P. Falkenburg.
I honestly appreciate the hospitality of various institutions in different countries, in which I have been working on this book, especially the Research Institute for Bioresources, Okayama University (Japan), the Department of Biology and Molecular Biology, University of California Los Angeles (USA), the International Center for Agricultural Research in the Dry Areas, Aleppo (Syria) and the Centro Agronomico Tropical de Investigacion y Ensenanza, Turrialba (Costa Rica). Last but not least I would like to thank Sigrid that she still knows me.

Frankfurt am Main, September 1994 — Günter Kahl

Instructions for Users

All the entries are arranged in strict alphabetical order, letter by letter. For example, "mismatched primer" precedes "mismatch **g**ene synthesis", and this is followed by "mismatch **r**epair". Or, "photo**d**igoxygenin" precedes "photo-**f**ootprinting", which in turn precedes "photo-**r**eactivation". In case an entry starts with or contains a Roman, Greek or Arabic numeral, it has first to be translated into Latin script. A few examples illustrate the translation:

cI	: c-**o**ne
exonuclease VII	: exonuclease **s**even
exonuclease III	: exonuclease **t**hree
5'	: **f**ive prime
G 418	: G **f**ourhundred and eighteen
λ	: lambda
P1	: p-**o**ne
ΦX 174	: phi X one-seven-four
Qβ	: q-**b**eta
RP 4	: RP **f**our

For help, the user may consult the Roman numerals and the Greek alphabet on page XII.

The main entry title, printed in bold type, is followed by synonyms in parentheses.

Cross referencing is either indicated by an arrow, or the words "see", "see also", and "compare".

Abbreviations and Symbols

a	- atto (10^{-18})
A	- adenine
Å	- Ångstrom unit
~	- approximately
≅	- approximately equal
Ap	- ampicillin
ATP	- adenosine triphosphate
bp	- base pair(s)
BSA	- bovine serum albumin
C	- cytosine
^{14}C	- radioactive carbon
°C	- centigrade (degrees Celsius)
Ca	- calcium
cDNA	- complementary DNA
Ci	- curie
cm	- centimeter(s)
Cm	- chloramphenicol
CO_2	- carbon dioxide
cpm	- counts per minute
D, Da	- Dalton
dATP	- deoxyadenosine triphosphate
dCTP	- deoxycytosine triphosphate
dGTP	- deoxyguanosine triphosphate
DMSO	- dimethyl sulfoxide

DNA	-	deoxyribonucleic acid
DNase	-	deoxyribonuclease
dNTP	-	deoxynucleotide triphosphate
ds	-	double-stranded
dT	-	deoxythymidine
DTT	-	dithiothreitol, Cleland's reagent
dTTP	-	deoxythymidine triphosphate
dUTP	-	deoxyuridine triphosphate
E. coli	-	*Escherichia coli*
EDTA	-	ethylenediaminetetraacetic acid
e.g.	-	for example
EtBr	-	ethidium bromide
EtOH	-	ethanol
f	-	femto (10^{-15})
5'	-	carbon atom 5 of deoxyribose
g	-	gram(s) or gravity
G	-	guanine
Gm	-	gentamycin
>	-	greater than
h	-	hour(s)
^{3}H	-	tritium, radioactive hydrogen
HCl	-	hydrochloric acid
HEPES	-	N-(2-hydroxyethyl)piperazine-N'-(2-ethanesulfonic acid)
HIV	-	human immunodeficiency virus
HRP	-	horseradish peroxidase
HPLC	-	high pressure liquid chromatography
HTE	-	high Tris-EDTA buffer
H_2O	-	water
H_2O_2	-	hydrogen peroxide
HVR	-	hypervariable region
i.e.	-	that is
IVS	-	intervening sequence, intron
k	-	kilo (10^{3})
kb	-	kilobase(s)
kg	-	kilogram(s)
Km	-	kanamycin
l	-	liter(s)
<	-	less than
LiCl	-	lithium chloride
LTE	-	low Tris-EDTA buffer
μ	-	micro (10^{-6})
μg	-	microgram(s)
μl	-	microliter(s)
m	-	meter(s) or milli (10^{-3})
M	-	molar or mega (10^{6})
mg	-	milligram(s)
Mg	-	magnesium
M_r	-	relative molecular mass
$MgCl_2$	-	magnesium chloride
$MgSO_4$	-	magnesium sulfate
min	-	minute(s)
ml	-	milliliter(s)
mm	-	millimeter(s)
mM	-	millimolar

mmol	-	millimole
mol	-	mole
mRNA	-	messenger RNA
mtDNA	-	mitochondrial DNA
MW	-	molecular weight
n	-	number or nano (10^{-9})
NaCl	-	sodium chloride
Na_2EDTA	-	disodium-EDTA
ng	-	nanogram(s)
NH_4Cl	-	ammonium chloride
NH_4OAc	-	ammonium acetate
nm	-	nanometer(s)
OD	-	optical density
OH	-	hydroxyl
oligo	-	oligonucleotide(s)
p	-	pico (10^{-12})
P	-	phosphorus
^{32}P	-	radioactive phosphorus
PAGE	-	polyacrylamide gel electrophoresis
PBS	-	phosphate buffered saline
PCR	-	polymerase chain reaction
PEG	-	polyethylene glycol
pg	-	picogram(s)
pH	-	logarithm of reciprocal of hydrogen (H) ion concentration
pp	-	page(s)
PVP	-	polyvinyl pyrolidone
RFL	-	restriction fragment length
RFLP(s)	-	restriction fragment length polymorphism(s)
RIA	-	radioimmunoassay
RNA	-	ribonucleic acid
RNase	-	ribonuclease
rpm	-	revolutions per minute
rRNA	-	ribosomal RNA
RT	-	room temperature
^{35}S	-	radioactive sulfur
SD	-	standard deviation
SDS	-	sodium dodecyl sulfate, lauryl sulfate
SE (SEM)	-	standard error (standard error of the mean)
sec	-	second(s)
ss	-	single-stranded
Sm	-	streptomycin
SSC	-	sodium chloride sodium citrate
SSO	-	sequence-specific oligonucleotide
SSP	-	sequence-specific probe
SSPE	-	sodium chloride-sodium phosphate-EDTA
Σ	-	sum of
T	-	thymine
$\tau_{1/2}$	-	half-life
TAE	-	Tris-acetate-EDTA
TBE	-	Tris-borate-EDTA
Tc	-	tetracycline
TE	-	Tris-EDTA-buffer
3'	-	carbon atom 3 of deoxyribose
Tp	-	trimethoprim

Tris	-	tris (hydroxymethyl) aminomethane
tRNA	-	transfer RNA
U	-	unit(s)
U	-	uracil
UV	-	ultraviolet
V	-	voltage, volt(s)
VNTR	-	variable number of tandem repeats
vol	-	volume
$\bar{X}$	-	mean
χ^2	-	chi squared
yr	-	year(s)

Greek Alphabet and Roman Numerals

Greek alphabet:

Capital	Lower case	Name
Α	α	alpha
Β	β	beta
Γ	γ	gamma
Δ	δ,∂	delta
Ε	ε	epsilon
Ζ	ζ	zeta
Η	η	eta
Θ	θ,ϑ	theta
Ι	ι	iota
Κ	κ	kappa
Λ	λ	lambda
Μ	μ	mu
Ν	ν	nu
Ξ	ξ	xi
Ο	ο	omicron
Π	π	pi
Ρ	ρ	rho
Σ	σ,ς	sigma
Τ	τ	tau
Υ	υ	upsilon
Φ	φ	phi
Χ	χ	chi
Ψ	ψ	psi
Ω	ω	omega

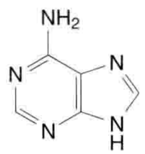
Roman numerals:

I	II	III	IV	V	VI	VII	VIII	IX	X
1	2	3	4	5	6	7	8	9	10
XX	XXX	XL	L	LX	LXX	LXXX	XC	IC	C
20	30	40	50	60	70	80	90	99	100
CC	CCC	CD	D	DC	DCC	DCCC	CM	XM	M
200	300	400	500	600	700	800	900	990	1000

Contents

A

A: Abbreviation for *a*denine (6-aminopurine, Ade), a → purine base characteristic for DNA and RNA.



Adenine

AATAAA sequence: See → poly(A) addition signal.

Ab: See → *a*nti*b*ody.

ABM paper: See → *a*mino*b*enzyloxy*m*ethylcellulose paper.

Abortive expression: The defective expression of a foreign gene in a transgenic environment (e.g. the *constitutive* expression of a transferred gene in the receiving organism that was *inducible* in the organism of origin). Abortive expression usually reflects the different complement of → transcription factors, but may also be due to so-called → position effects in the new → chromatin microenvironment.

Abortive infection (non-productive infection; incomplete infection): Infection of a bacterium by → bacteriophages which does not lead to the production of infective virus though some or all virus components are synthesized in the host cell. Consequently neither → lysis nor → lysogenization occur.

Abortive initiation: The interruption of → transcription of a gene after a few nucleotides have been polymerized. Abortive initiation leads to the dissociation of the → messenger RNA fragment from the template so that the initiation process can be repeated.

Abortive splicing: Any → splicing process that uses → cryptic splice sites or does not lead to the correct ligation of → exons. Thus the final splice product is a non-functional mRNA.

Abortive transduction (abortive transformation): A process whereby transduced DNA molecules persist in the cytoplasm of the recipient cell as nonreplicating but stable (circular) entities.

Abortive transfection (transient transfection): The uptake of foreign DNA into cultured animal or human cells, mediated by → direct gene transfer techniques, that does not result in its stable integration into the host cell's genome.

Abortive transformation: See → abortive transduction.

Abundance: The average number of molecules of a specific mRNA or a specific protein in a given cell at a given time.

Abundant RNA: See → high abundancy messenger RNA.

Abzyme (*a*nti*b*ody en*zyme*; *cat*alytic *m*onoclonal *a*nti*b*ody, catmab): An → antibody with enzymatic function(s).

Acceptor (recipient): Any cell that receives genetic information (DNA or RNA) from a → donor, e.g. in bacterial → conjugation.

Acceptor end: The trinucleotide CCA at the 3' end of → transfer RNA molecules. The terminal A becomes esterified to the amino acid via the 2'- or 3' position. See → acceptor stem.

Acceptor junction: See → acceptor splicing site.

Acceptor region: See → H-DNA.

Acceptor splice junction (acceptor splicing site, acceptor junction, acceptor splice signal, 3'-*s*plice *s*ite, 3'-SS, right splicing junction, splice acceptor site: The junction between an → exon and an → intron at the 3' end of the intron in eukaryotic → split genes with the → consensus sequence $^{C}_{T}$AG: G. The colon indicates the splice point. Compare → donor splice junction, → GT-AG rule. See → splice junction.

Acceptor splicing site: See → acceptor splice junction.

Acceptor stem: The double-stranded extension of → tRNA molecules that carries a 3'-CCA to which amino acids are attached.

Ac-Ds system: See → *ac*tivator-*d*i*s*sociation system.

ACE: See → *a*mplification *c*ontrol *e*lement.

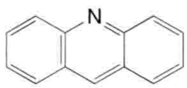
Acentric fragment: A → chromosome fragment that is the result of a chromosome breakage. Since it does not contain a → centromere, it is lost during mitosis.

***Acetabularia*:** Large unicellular green alga of the order Dasycladaceae, used for grafting experiments which demonstrated the nuclear control of cytoplasmic differentiation.

Acetylation: A → post-translational modification of proteins, i.e. the introduction of an acetyl residue (e.g. → histones are acetylated and consequently bind less strongly to DNA in → nucleosomes).

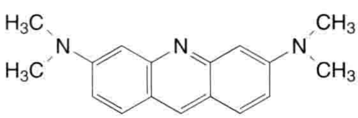
Acoustic gene transfer: A method for the → direct gene transfer into plants which employs ultrasonic shock waves, generated by a laboratory sonifier, to induce microscopic cracks in the cell walls and permeability changes in the plasma membrane of the target cells (e.g. → protoplasts). Ultrasonically transferred genes are efficiently expressed and → transformation frequencies increased.

Acridine dye: Any one of a series of mutagenic heterocyclic compounds, including acridine and its derivatives. At low concentrations, aminoacridines (e.g. Quinacrine) intercalate between the two strands of double-stranded DNA (dsDNA). Higher concentrations cause the binding of acridines to the outside of dsDNA, ssDNA, and ssRNA. Acridines interfere with DNA and RNA synthesis, cause frameshift mutations, and addition or deletion of bases. See → acridine orange, → acriflavine.



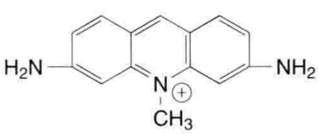
Acridine dye

Acridine orange (3,6-bis-[dimethylamino]-acridinium chloride, euchrysine): A basic acridine dye that binds to double-stranded nucleic acids by → intercalation, or to single and double-stranded nucleic acid by electrostatic interaction with the phosphate back-bone. Ultraviolet irradiation absorbed at 260 nm by a dye-dsDNA complex can be reemitted as fluorescence at 530 nm (green) or by single-stranded DNA or RNA at 640 nm (red).Acridine orange also functions as → mutagen. Sublethal concentrations of the dye are used for curing plasmids.



Acridine orange

Acriflavine (euflavine, 3,6-diamino-10-methylacridinium chloride): An → acridine dye producing → reading frame shift mutations.



Acriflavine

Acrylamide: See → polyacrylamide gel.

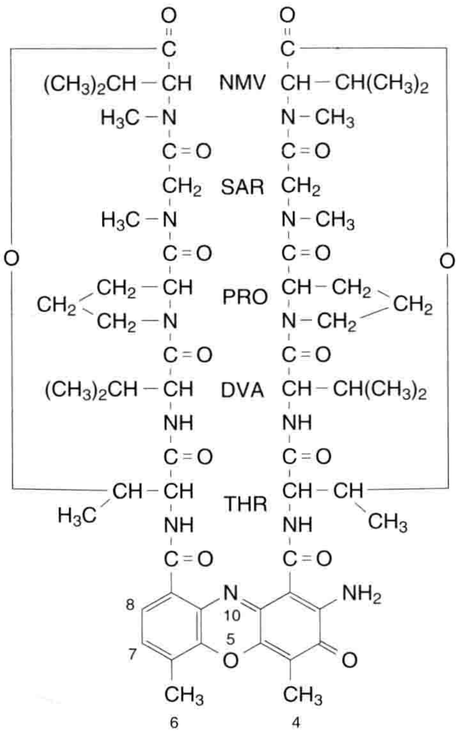
Acrylamide gel electrophoresis: An infelicitous term for → polyacrylamide gel electrophoresis.

Actidione: See → cycloheximide.

Actinomycetales: Gram-positive spore-forming soil bacteria that are responsible for the breakdown of complex substances such as cellulose, chitin and keratin. Producers of clinically important antibiotics (e.g. → streptomycin). Some Actinomycetales (Streptomycetes) are in use as a host-vector system for cloning. See also → actinomycin D.

Actinomycin C_1: See → actinomycin D.

Actinomycin D (actinomycin C_1, dactinomycin): A polypeptide lactone antibiotic from *Streptomyces chrysomallus*, *S. parvullus* and *S. antibioticus* that intercalates with its chromophore between 5'-GpC-3'of a DNA duplex molecule, its peptide side chains lying in the minor groove of the DNA double helix. The complex is stabilized by hydrogen bonds between the guanine base and the amino acid side chains of the antibiotic, by stacking forces between the chromophore ring and the guanosine base ring, and by numerous hydrophobic interactions between the peptide chains and the surface atoms of the minor groove of the DNA helix. Actinomycin D prevents gene expression by bacterial → RNA polymerase and eukaryotic RNA polymerases I and II.



The phenoxazone ring system is linked to two cyclic pentapeptides containing the unusual amino acids L-methyl valine (NMV), sarcosine (SAR), L-proline (PRO), D-valine (DVA) and threonine (THR).

Actinomycin D

Activating domain: The specific three-dimensional structure of a → transcription factor that is responsible for the activation of transcription, but not for DNA-protein interaction.

Activator:

a) Protein (trans-activating protein) or RNA (see → activator RNA) molecule which activates a gene after binding to → upstream regulatory sequences. See → transcription factor.
b) Small molecule which alters the conformation of an enzyme after binding to specific sites, thereby increasing its catalytic activity.
c) See → activator-dissociation system.
d) Morphogenetically active substance which stimulates and regulates the development of a specific embryonic tissue or organ.

***Activator-dissociation* system (Ac-Ds system):** A group of interacting transposable elements in maize (*Zea mays*). While Ac is an autonomous element and therefore can transpose from its original chromosomal site to another, Ds is non-autonomous, that is, unable to transpose by itself. Upon Ac-mediated activation, however, Ds may change the expression rate of flanking genes, the timing of gene expression, and may also cause chromosome breakage. Ac determines the time period during morphogenesis when Ds acts. Ac/Ds loci are recognized and mapped by their action on neighboring genes.

Activator RNA: The hypothetical transcript of an → integrator gene that binds to a → receptor gene and activates one or several specific sets of genes (Britten-Davidson model).

Active gene: Any → gene that is transcribed into a → ribosomal RNA, → transfer RNA, or → messenger RNA. Compare → cryptic gene.

Adaptation: Any change of the structure and/or function of an organism that enables it to better cope with changing environmental conditions.

Adapter primer (AP): A synthetic → oligodeoxynucleotide that functions as a → primer for e.g. → reverse transcriptase or as → amplimer in the → polymerase chain reaction, and additionally carries one or several → restriction endonuclease sites. Adapter primers are used for e.g. → rapid amplification of cDNA ends.

Adaptor (adapter, oligonucleotide adaptor):

a) A short synthetic → oligonucleotide with a preformed cohesive terminus. Such adaptor molecules are used to join one DNA duplex with → blunt ends to another DNA duplex with → cohesive ends. In short, the adaptor possesses one blunt end with a 5' phosphate group and a cohesive end which is not phosphorylated (to prevent → self-ligation). The adaptor is ligated to the blunt-ended DNA target fragment and the construct phosphorylated at the 5' termini with → polynucleotide kinase. Then the hybrid molecule is ligated into a corresponding → restriction site of the second DNA molecule (usually a vector). See for example → Eco RI adaptor ligation.
b) See → adaptor hypothesis.
c) Adaptor RNA: See → transfer RNA.
d) Adaptor (mediator): A nuclear protein that does not bind to DNA but mediates the interaction of other proteins with DNA.

Adaptor hypothesis: The theoretical requirement of a mediator ("adaptor") between the information-carrying → messenger RNA molecule and the protein it codes for. This adaptor should be able to recognize both kinds of molecules. The adaptor hypothesis was verified by the discovery of → transfer RNA (tRNA) and the corresponding → aminoacyl-tRNA synthetases.

Adaptor RNA: See → transfer RNA.

Additive recombination: Any → insertion of a new DNA sequence into an existing genome without the reciprocal loss of DNA (e.g. the insertion of → insertion sequences, the insertion of → transgenes).

Add-on sequence (5' add-on sequence): Any → restriction endonuclease recognition sequence that is attached to the 5'end of either one or both → oligonucleotide primers (see also → oligo(dT) priming) used in the → polymerase chain reaction. These sites facilitate the insertion of the amplified fragments into corresponding restriction sites in → cloning vectors. Other sequences can also be used as add-on sequences (e.g. → RNA polymerase promoters that allow transcription of the amplified sequences). See for example → PCR add-on primer.

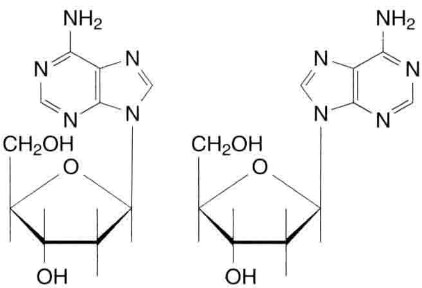
Address site: See → recognition sequence.

Ade: *Ade*nine, see → A.

Adenine: See → A.

Adenine *p*hospho*r*ibosyl *t*ransferase (APRT; EC 2.4.2.7): An enzyme catalyzing the transfer of ribose-5-phosphate from 5-phosphoribosylpyrophosphate onto the position 9 of adenine. The gene encoding APRT is constitutively expressed in adult vertebrate cells and is used as → selectable marker in mammalian transformation.

***Ad*en*o*sine (9-β-D-ribofuranosyladenine, ado):** A nucleoside that consists of → adenine linked to a ribose molecule.



syn configu-
ration

anti configu-
ration

Adenosine-5'-*d*i*p*hosphate (5'-ADP, ADP): A → purine nucleotide with a diphosphate group in ribose-O-phosphoester linkage at the 5'position of the ribose.

Adenosine-5'-*m*ono*p*hosphate (5'-AMP, AMP): A → purine nucleotide with a phosphorous group in ribose-O-phosphoester linkage at the 5'position of the ribose.

Adenosine-5'-*t*ri*p*hosphate (5'-ATP, ATP): A → purine nucleotide with an energy-rich triphosphate group in ribose-O-phosphoester linkage at the 5' position of the ribose. ATP serves as energy source and elementary unit in RNA synthesis. See → deoxyadenosine 5'-triphosphate.

Adenovirus: Any one of a series of viruses with a DNA-protein → core and a protein → capsid composed of 252 capsomers that contains a double-stranded DNA genome of about 36 kb whose termini carry so-called → inverted terminal repeats of variable length (i.e. from 60-160 bp). Adenoviruses infect a number of animal and human cells that show cytopathic effects. Usually the viral DNA is inserted into the recipient genome. The design of adenovirus DNA for genetic engineering of mammalian cells is based on several advantages. First it is possible to delete a considerable part of the viral genome without interfering with viral functions. The deleted segments can be replaced by foreign DNA. Secondly, necessary functions can be deleted, if a → helper virus complements them. Thirdly, adenoviruses have a broad host range, i.e. infect a broad spectrum of cell types. Fourthly, adenoviruses possess several strong → promoters (e.g. the so-called *m*ajor *l*ate *p*romoter [MLP] that normally drives the late transcription [see → late genes] of the genes encoding the capsid proteins) allowing the expression of foreign DNA. The MLP promoter is therefore used as part of → cloning vectors.

A-DNA: One of the three major conformations of double-stranded DNA (A-DNA, B-DNA, Z-DNA). In A-DNA the two strands of the partially dehydrated Watson-Crick double helix form a right-handed helical structure with approximately 11 bases per turn. The planes of the base-pairs in this helix are tilted 20° away from the perpendicular to the axis of the helix.

Ado: See → *ad*en*o*sine.

Ado Met: See → S-*ad*enosyl-L-*met*hionine.