

Index

a

A term 155
 absorbance unit (AU) 174
 adsorption of sample compounds and
 sample matrix compounds 37
 affinity chromatography 53
 agarose matrix 53
 alkylammonium salt 10
 alternative splicing 120
 amino-acyl tRNA (aa-tRNA) 73f., 131
 aminoacyl tRNA synthetase (ARS) 132
 anion exchanger 52, 154f.
 anion-exchange resin 50
 – silica-based 52
 aptamer 33
Arabidopsis 31
 autosampler injector 168

b

B term 155
 bacteria, RNA 24
 biological function 17
 – genetic approach 17
 – systems biology approach 17
 biological process
 – analysis 3
 – chemical reaction 17

c

C term 156
Caenorhabditis elegans 30
 capacity factor 147ff.
 carrier precipitate 38
 cartridge, *see* separation column
 catalytic RNA 22
 cDNA library synthesis, DNA and RNA
 chromatography 114
 cell culture 31
 cellulose affinity substrate 53

central dogma 127ff.
 cetyltrimethylammonium bromide
 (CTAB) 31
 chaotropic denaturing interaction
 mechanism 61
 chemical probing 140ff.
 chromatographic separation
 – data analysis 180
 – equation 147ff.
 – size analysis 180
 chromatographic term 148
 chromatography 4, 147ff.
 – plate theory 151
 – RNA 81ff., 101ff.
 classification, RNA 17ff.
 cleavage 140
 collection time 183
 column
 – extra-column effect 157
 – guard 170
 – oven 85, 171
 – protection 170
 – scavenger 170
 – type 6
 competitive RT-PCR product, DNA
 chromatography 117
 complementary DNA (cDNA) 135
 – library 114
 covariation 137
 crosslink 44

d

dead time 148
 dead volume 161
 denaturing HPLC (DHPLC) 89
 density gradient 71
 DEPC (diethyl pyrocarbonate) 87
 depletion column 38

- detection
– limit 172
– RNA chromatograph 172
detector sensitivity 172
dextran 53
dicer 76
diethylaminoethyl anion exchanger (DEAE) 48
difference-detecting engine 89
differential display (DD) 121
differential messenger RNA display 121ff.
– DNA chromatography 121
directed hydroxyl radical probing 143
DNA
– size-based separation of double-stranded DNA 107
– transcription 67
DNA chromatography 89, 114ff.
– differential messenger RNA display 121ff.
– RT-PCR product 117
DNA footprinting 139
Drosophila melanogaster 31
- e**
eddy diffusion 155
eluent
– chemistry 6
– degassing 162
elution
– gradient 57f.
– isocratic 57ff.
– shallow gradient 57f.
– volume 64
Escherichia coli 23
– RNA 23
eukaryote 28
eukaryotic gene expression, post-transcriptional control 76
extra-column effect 157
- f**
fluorescence 174
– detector 174
fluorescent detection 86
fluorescent dye 174f.
fluorescent tag 86, 176
footprinting 139ff.
N-formyl-methionyl-tRNA^{fMet} (f-Met-tRNA^{fMet}) 73
Förster resonance energy transfer (FRET) 139ff.
fragment collection 86, 182
full loop injection 168
- functional group 39f.
– attachment 43
fungi 30
- g**
gel electrophoresis 90
– agarose 92
– comparison of RNA chromatography 94
– polyacrylamide 92
gel filtration 63
gel filtration chromatography 53, 63
gel filtration material 54
– separation size range 54
gel permeation 53
gene function 79
gene regulation 76
– microRNA (miRNA) 78
general detector 172
gradient
– blank 163
– continuous 6
– formation 164
– shallow 57f., 88
– step 6
– type 56
guanidinium chloride 61f.
guide RNA (gRNA) 27
- h**
height equivalent of a theoretical plate 148ff.
HEMA 49
high-performance liquid chromatography (HPLC) 10f., 147ff.
– cleaning 185
– instrumentation 159ff.
– passivation 186ff.
– RNA chromatography 81
– silica-based 41
high-pressure gradient mixing 166
human telomerase RNA (hTR) 95
– nondenaturing condition 95
hybridization 62
hydroxyl radical probing 139
- i**
in vitro reconstitution assay 75
in vitro transcription system 68
in vitro transcription assay 68
initiation complex 73
injection valve 168
interaction type 40
internal loop 138
internal ribosome entry site (IRES) 76

ion-exchange chromatography 59, 154
 ion-exchange separation mechanism 57ff.
 ion-pairing on a reverse-phase substrate 56
 ion-pairing, reverse-phase liquid chromatography 82

I

liquid chromatography 82, 93
 liquid volume 63
 low-pressure gradient mixing 166

m

mass spectrometry detection 177
 mass spectrometry ionization method 178f.
 messenger RNA (mRNA) 21ff.
 – separation 108
 microarray hybridization technique 62
 microRNA (miRNA) 27, 78, 128
 – gene regulation 78
 mobile phase gradient 5
 model building 139
 modification interference 143
 monolith polymeric column 47
 monomer mix 46
 multicellular organism 30
 multipath 155

n

non-coding RNA (ncRNA) 27
 nucleotide analogue interference mapping (NAIM) 139

o

oligoribonucleotide, synthetic 111

p

partial loop injection 168
 peak broadening 157
 peak capacity 153
 peak diffusion 155
 peak resolution 148
 peak width 148ff.
 peptidyl-tRNA 74
 phase
 – mobile 4ff., 151ff.
 – stationary 4f., 151ff.
 plant 31
 plate theory, chromatography 151
 polyacrylamide gel electrophoresis (PAGE) 14, 92
 polyacrylamide gel filtration substrate 53
 polyacrylate polymer 49

polymer, functionalization 48
 polymeric resin substrate 44
 – porous and nonporous 45ff.
 precursor messenger RNA (pre-mRNA) 25, 128
 – splicing 71
 pressure, RNA chromatograph 167
 primary mature RNA (pri-mRNA) 25, 72
 primary transcript RNA (pri-miRNA) 27
 prokaryote 28
 pseudoknot 138
 pump, RNA chromatograph 159ff.

q

quantification, RNA chromatography 181

r

resin capacity 154
 retention 147f.
 retention factor 148ff.
 reverse phase ion-pairing separation mechanism 54
 reverse phase liquid chromatography 82, 154
 ribonuclease enzyme 14
 ribosomal RNA (rRNA) 21
 – 16S rRNA 75
 – separation 108
 30S ribosomal subunit 133
 50S ribosomal subunit 133
 – reconstitution 75
 ribosome 73
 70S ribosome initiator complex 73
 ribozyme 13, 22, 69, 133
 – hairpin 113
 RISC, *see* RNA-induced silencing complex
 RNA 12
 – analysis 3, 67ff.
 – biological classification 19
 – chemical classification 18
 – classification 17ff.
 – enzymatic treatment 13
 – eukaryotic cellular 24ff.
 – fluorescently labeled 112f.
 – poly(A) tail 62
 – prokaryotic cellular 20ff.
 – type 19ff.
 RNA affinity chromatography 7
 RNA catalysis 69
 RNA chromatograph 159ff.
 RNA chromatography 6ff., 81ff.
 – analysis 109ff.

- cDNA synthesis 114ff.
 - cleaning 185
 - comparison of gel electrophoresis 94
 - condition 87
 - double stranded 88, 102ff., 180f.
 - feature 101
 - instrumentation 85, 159ff.
 - liquid chromatography 93
 - passivation treatment 186ff.
 - separation 101ff.
 - single-stranded 88, 102ff., 181
 - temperature 171
 - temperature mode 88
 - total RNA extract 107
 - RNA editing 27
 - RNA extraction 1ff., 56, 67ff., 79
 - RNA footprinting 112, 139ff.
 - RNA high-performance liquid chromatography (HPLC) 10f., 41, 81ff.
 - RNA interference (RNAi) 26
 - pathway 76
 - RNA purification 71
 - commercially available kit 78
 - density gradient 71
 - RNA separation 1ff., 37ff., 82
 - cellular RNA 107
 - double-stranded 88, 102ff.
 - fully denaturing 90
 - messenger RNA 108
 - nondenaturing 89
 - partially denaturing 89
 - principle 147ff.
 - ribosomal RNA 108
 - separation column 169f.
 - single-stranded 88, 102ff.
 - total RNA 108
 - RNA structure 14, 41, 130
 - determination 135
 - primary 136
 - quaternary 138
 - secondary 136
 - tertiary 137
 - RNA structure–function probing 127
 - RNA-induced silencing complex (RISC) 26, 77, 128
 - RNA–protein complex interaction 69
 - RNase 61
 - chemical probing 142
 - rock, RNA 32
 - RT-PCR product, DNA chromatography 117
 - RUSH, 1 α and 1 β isoform 121
- s**
- selective detector 172
 - SELEX (systematic evolution of ligands by exponential enrichment) 34, 62
 - separation, *see also* RNA separation 152
 - separation column 159, 169f.
 - separation factor 148
 - Shine–Delgarno sequence 73
 - short hairpin RNA 34
 - short interfering RNA/small interfering RNA (siRNA) 26, 76ff.
 - signal recognition particle (SRP) complex 22
 - signal recognition particle RNA (srpRNA) 22
 - silica anion exchanger 52
 - silica hydrogel bead 50
 - silica material
 - functionalization 51
 - pellicular 51f.
 - porous and nonporous 51f.
 - silica–glass-based substrate 50
 - size analysis, RNA chromatography 180
 - size exclusion 63
 - small hairpin RNA (shRNA) 27
 - small interfering RNA (siRNA), *see* short interfering RNA
 - small nuclear ribonucleic protein (snRNP) 26, 72
 - small nuclear RNA (snRNA) 26, 72
 - small nucleolar ribonucleoprotein (snoRNP) 25
 - small nucleolar RNA (snoRNA) 25
 - soft animal 30
 - soil, RNA 32
 - solid-phase extraction 8
 - solid-phase interaction 37ff.
 - solid-phase substrate 39ff.
 - solid surface interaction 41
 - spin-column 9
 - spliceosome 26
 - splicing, alternative 120
 - stem loop 138
 - step-gradient process 6
 - structure–function paradigm 127
 - substrate 40
 - sucrose gradient 70
 - synthetic RNA 32

t

TEAA (triethyl ammonium acetate) 11, 55, 83
telomerase RNA 24, 105
– human (hTR) 95
Tetrahymena, nuclear extract 69
tetraloop bulge 138
tetramethylammonium chloride (TMAC) 59
theoretical plate number 148
total RNA, separation 108
transcription 67
transfer-messenger RNA (tmRNA) 22
transfer RNA (tRNA) 20, 131
– analysis 109
translation 72

u

ultraviolet (UV) detection 86
ultraviolet-visible (UV-VIS) detector 173

v

van Deemter equation 155
van Deemter plot 156
vault RNA (vRNA) 22
virus 32
– RNA 76
volume
– dead 161
– elution 64
– interstitial or void 64
– liquid 64
vRNA–protein complex (vRNP) 22

w

Watson–Crick complementarity 137
wobble rule 139

y

yeast 29

