Restriction enzymes and their isoschizomers

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INTRODUCTION

Since the last compilation of restriction enzymes (1), 156 new entries have been added including 12 new specificities. With the growing size of this database and the recognition that the most widespread use of the information is as a database for computer programs predicting restriction enzyme cleavage patterns, the new format has been continued. This format is intended to contain the minimal amount of information required by a computer program. It should be noted that only enzymes for which the recognition sequence is known are included. This new list is shown in the first Table, while an alphabetical listing of all Type II enzymes is presented in the second Table. A copy of the restriction enzyme data base in its previous format (2), including enzymes of unknown recognition sequence, will be available upon request. It should also be noted that an alternative compilation of these enzymes has recently been produced (3).

The database shown in these Tables is available online through the BIONET computer resource. A version corresponding to the printed text is located in the file <ROBERTS>RESTRICT.NAR Several alternative versions are available and are documented in <ROBERTS>RESTRICT.DOC

In forming this list, all endonucleases cleaving DNA at a specific sequence have been considered to be restriction enzymes, although in most cases there is no direct genetic evidence for the presence of a restriction-modification system. The endonucleases are named in accordance with the proposal of Smith and Nathans (4).

Several enzymes appear in this list with revised names. These revisions were made to avoid confusion with existing enzymes or to increase the uniformity of the names. In each case the name changes were made with the approval of the appropriate authors. The specific changes are as follows. *Eag*KI replaces *Eag*I (5) and *Ani*MI replaces *Ani*I (130) , since the latter names had been used for other enzymes. *Nsp*I-V replaces *Nsp*(7524)I-V (6). This had already been used in many publications and catalogs. *Cvi*QI replaces *Cvi*II (7) to show that this enzyme comes from a strain different from that encoding *Cvi*I.

Type II enzymes

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
*Aat*II		GACGT↓C		MNRU	8
*Acc*I		GT↓MKAC		ABGIMNPRU	9
*Acy*I		GR↓CGYC			10
	*Aha*II	GR↓CGYC		N	11
	*Aos*II	GR↓CGYC			12
	*Ast*WI	GR↓CGYC			13
	*Asu*III	GR↓CGYC			13
	*Bbi*II	GR↓CGYC		A	14
	*Hgi*DI	GR↓CGYC			15
	*Hgi*GI	GR↓CGYC			15
	*Hgi*HII	GR↓CGYC			16
	*Nla*SII	GRCGYC			17
*Afl*II		C↓TTAAG		AGN	18
*Afl*III		A↓CRYGT		G	18
*Aha*III		TTT↓AAA			19
	*Dra*I	TTT↓AAA		ABGIMNPRU	20
*Alu*I		AG↓CT	3(5)	ABGIMNPRU	17,21-24
	*Mlt*I	AG↓CT			25,26
	*Otu*I	AGCT			27
	*Otu*NI	AGCT			28
	*Oxa*I	AGCT			29
*Atw*NI		CAGNNN↓CTG		N	30
*Apa*I		GGGCC↓C	4(5)	BGIMNPRU	31,32
*Apa*LI		G↓TGCAC		AGN	33
	*Ame*I	GTGCAC			27
	*Sno*I	G↓TGCAC			34,35
	*Vne*I	G↓TGCAC			36
*Asu*I		G↓GNCC		P	37
	*Apu*I	GGNCC			38
	*Bac*36	G↓GNCC			38
	*Bsp*BII	G↓GNCC			39
	*Cfr*4I	GGNCC			41,44
	*Cfr*8I	GGNCC			41,44

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Cfr*13I	G↓GNCC	4(5)	AU	40,41
	*Cfr*23I	GGNCC			42
	*Cfr*33I	GGNCC			43
	*Cfr*45I	GGNCC			43
	*Cfr*46I	GGNCC			43
	*Cfr*47I	GGNCC			43
	*Cfr*NI	GGNCC			45
	*Eco*39I	GGNCC			46
	*Eco*47II	GGNCC			47
	*Mja*II	GGNCC			48
	*Nla*DII	GGNCC			49
	*Nmu*EII	GGNCC			50
	*Nmu*SI	GGNCC			51
	*Nsp*IV	G↓GNCC		R	6
	*Psp*I	GGNCC			52
	*Sau*96I	G↓GNCC		BGMNP	53
	*Sdy*I	GGNCC			54
*Asu*II		TT↓CGAA		GP	13,55
	*Bst*BI	TTCGAA		N	56
	*Fsp*II	TT↓CGAA			57
	*Lsp*I	TT↓CGAA			34,35
	*Mla*I	TT↓CGAA			58
	*Nsp*V	TTCGAA		AR	6
	*Nsp*BI	TTCGAA			59
*Ava*I		C↓YCGRG		ABGIMNPRU	60,61
	*Aqu*I	C↓YCGRG	1(5)		62,63
	*Avr*I	CYCGRG			64
	*Bst*SI	C↓YCGRG			56
	*Eco*88I	CYCGRG			65
	*Nsp*III	C↓YCGRG		R	6
	*Nsp*SAI	C↓YCGRG			66
*Ava*II		G↓GWCC		ABGIMNPR	60,61,67,68
	*Afl*I	G↓GWCC			18
	*Asp*697I	GGWCC			69

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	BamN_xI	G↓GWCC			70-72
	*Bme*216I	G↓GWCC			73,74
	*Bti*I	GGWCC			75
	*Cau*I	G↓GWCC			76,77
	*Clm*II	GGWCC			78
	*Eag*MI	G↓GWCC			79
	*Eco*47I	G↓GWCC		U	47,80
	*Erp*I	G↓GWCC			38
	*Fdi*I	G↓GWCC			81,82
	*Fsp*MSI	G↓GWCC			38
	*Gsp*AI	GGWCC			83
	*Hgi*BI	G↓GWCC			15
	*Hgi*CII	G↓GWCC			15
	*Hgi*EI	G↓GWCC			15
	*Hgi*HIII	G↓GWCC			16
	*Hgi*JI	G↓GWCC			16
	*Nsp*HII	GGWCC			59
	*Sfn*I	GGWCC			84
	*Sin*AI	GGWCC			85
	*Sin*BI	GGWCC			85
	*Sin*CI	GGWCC			85
	*Sin*DI	GGWCC			85
	*Sin*EI	GGWCC			85
	*Sin*FI	GGWCC			85
	*Sin*GI	GGWCC			85
	*Sin*HI	GGWCC			85
	*Sin*I	G↓GWCC		P	86,87
	*Sin*JI	GGWCC			85
	*Tru*I	GGWCC			88
*Ava*III		ATGCAT		G	89,90
	*Eco*T22I	ATGCA↓T		U	91
	*Nsi*I	ATGCA↓T		BMNP	92
*Avr*II		C↓CTAGG		N	64,93
*Bal*I		TGG↓CCA	4(5)	ABGIN	94,32
*Bam*HI		G↓GATCC	5(5)	ABGIMNPRU	95-97

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Aac*I	GGATCC			98
	*Aae*I	GGATCC			98
	*Acc*EBI	G↓GATCC			99
	*Ali*12257I	GGATCC			100
	*Ali*12258I	GGATCC			100
	*Ali*I	G↓GATCC			101
	*Bam*FI	GGATCC			102
	*Bam*KI	GGATCC			102
	*Bam*NI	GGATCC			71
	*Bst*I	G↓GATCC		GR	103,104
	*Bst*QI	GGATCC			56
	*Cel*I	GGATCC			105
	*Dds*I	GGATCC			106
	*Gdo*I	GGATCC			98
	*Gin*I	GGATCC			107
	*Gox*I	GGATCC			98
	*Mle*I	GGATCC			25
	*Nas*BI	GGATCC			25
	*Nsp*SAIV	G↓GATCC			66
	*Rhs*I	GGATCC			108
*Bbv*I		GCAGC(8/12)		GIN	97,109-111
	*Alw*XI	GCAGC(8/12)			112
*Bbv*II		GAAGAC(2/6)			113
*Bcl*I		T↓GATCA		ABGIMNRU	114
	*Atu*CI	TGATCA			115
	*Bsp*XII	T↓GATCA			116
	*Bst*GI	TGATCA			117
	*Bst*KI	TGATCA			56
	*Cpe*I	TGATCA			118
	*Cth*I	TGATCA			119
	*Fba*I	TGATCA			84
	*Pov*I	T↓GATCA			120
	*Sst*IV	TGATCA			121
*Bgl*I		GCCNNNN↓NGGC		BGIMNPRU	122-125
	*Van*I	GCCNNNNNGGC			126

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
*Bgl*II		A↓GATCT		ABGIMNPRU	122,123,127
	*Nsp*MACI	A↓GATCT			128
*Bin*I		GGATC(4/5)			129
	*Alw*I	GGATC(4/5)		N	130
	*Bth*II	GGATC			131
*Bse*PI		GCGCGC			117
	*Bso*PI	GCGCGC			117
	*Bsr*HI	GCGCGC			117
	*Bss*HII	G↓CGCGC		GN	117,476
*Bsm*AI		GTCTC			132
*Bsm*I		GAATGC(1/-1)		GN	55
*Bsp*HI		T↓CATGA		N	133
	*Rsp*XI	T↓CATGA		G	134
*Bsp*MI		ACCTGC(4/8)		N	130,135
*Bsp*MII		T↓CCGGA		N	130,135
	*Acc*III	T↓CCGGA		AG	55,136
	*Kpn*2I	TCCGGA			137
	*Mro*I	T↓CCGGA		U	138
*Bsr*I		ACTGG(1/-1)			27
*Bst*EII		G↓GTNACC		BGMNRU	139,140
	*Asp*AI	G↓GTNACC			35
	*Bst*31I	GGTNACC			141
	*Bst*DI	GGTNACC			56
	*Bst*PI	G↓GTNACC			142
	*Cfr*7I	GGTNACC			41
	*Cfr*19I	GGTNACC			43
	*Eca*I	G↓GTNACC			143
	*Eco*91I	GGTNACC			144
	*Eco*O65I	G↓GTNACC			145,146
	*Kox*I	G↓GTNACC			147
	*Nsp*SAII	G↓GTNACC			66
*Bst*XI		CCANNNNN↓NTGG		GNP	117,148
	*Bss*GI	CCANNNNNNTGG			117
	*Bst*TI	CCANNNNNNTGG			117
*Cau*II		CC↓SGG			76,77,149

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Aha*I	CC↓SGG			11
	*Ase*II	CC↓SGG			150
	*Bcn*I	CC↓SGG	2(4)	A	151-155
	*Hgi*S21I	CCSGG			156
	*Nci*I	CC↓SGG		BGMNU	157,158
	*Rsh*II	CCSGG			73
*Cfr*10I		R↓CCGGY	2(5)	AU	41,44,155,159
*Cfr*I		Y↓GGCCR	4(5)		44,155,160,161
	*Cfr*14I	YGGCCR			41
	*Cfr*38I	YGGCCR			42
	*Cfr*39I	YGGCCR			43
	*Cfr*40I	YGGCCR			43
	*Eae*I	Y↓GGCCR	4(5)	GN	162,163
	*Eco*90I	YGGCCR			144
	*Eco*164I	YGGCCR			164
	*Eco*HI	YGGCCR			28
*Cla*I		AT↓CGAT		ABGMNR	165
	*Asp*707I	ATCGAT			69
	*Ban*III	ATCGAT		U	8
	*Bcm*I	AT↓CGAT			166
	*Bsc*I	AT↓CGAT			35,167
	*Bsp*106I	AT↓CGAT			168
	*Bsp*XI	AT↓CGAT			116
*Cvi*JI		RG↓CY			169
	*Cvi*KI	RGCY			170
	*Cvi*LI	RGCY			170
	*Cvi*MI	RGCY			170
	*Cvi*NI	RGCY			170
	*Cvi*OI	RGCY			170
*Dde*I		C↓TNAG	1(5)	BGIMNPRU	171-173
*Dpn*I*		GA↓TC		ABGIMNP	174-176
	*Cfu*I*	GA↓TC			177,178
	*Nan*II*	GATC			179
	*Ngo*DIII*	GATC			180
	*Nmu*DI*	GATC			50

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Nmu*EI*	GATC			181
	*Nsu*DI*	GATC			50
*Dra*II		RG↓GNCCY		GM	182-184
	*Eco*O109I	RG↓GNCCY		AGN	185
	*Pss*I	RGGNC↓CY		I	106,186
*Dra*III		CACNNN↓GTG		MN	182-184
*Dsa*I		C↓CRYGG			187
*Ear*I		CTCTTC			27
*Eco*31I		GGTCTC(1/5)			188
	*Eco*42I	GGTCTC			189
	*Eco*51I	GGTCTC			164
	*Eco*95I	GGTCTC			191
	*Eco*97I	GGTCTC			192
	*Eco*101I	GGTCTC			189
	*Eco*120I	GGTCTC			189
	*Eco*127I	GGTCTC			190
	*Eco*129I	GGTCTC			190
	*Eco*155I	GGTCTC			189
	*Eco*156I	GGTCTC			189
	*Eco*157I	GGTCTC			189
	*Eco*162I	GGTCTC			190
	*Ppa*I	GGTCTC			130
*Eco*47III		AGC↓GCT		AU	47
	*Ait*I	AGC↓GCT			193
*Eco*57I		CTGAAG(16/14)			194
	*Fsf*I	CTGAAG			195
*Eco*NI		CCTNN↓NNNAGG			196
	*Bst*WI	CCTNNNNNAGG			132
*Eco*RI		G↓AATTC	3(6)	ABGIMNPRU	197-199
	*Eco*82I	GAATTC			191
	*Eco*159I	GAATTC			190
	*Rsr*I	G↓AATTC			200,201
	*Sso*I	G↓AATTC			202
*Eco*RII[5]		↓CCWGG	2(5)	BG	203-205
	*Aeu*I	CC↓WGG			150

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
+	*Aor*I	CC↓WGG			98
+	*Apy*I	CC↓WGG		M	206
	*Atu*BI	CCWGG			207
	*Atu*II	CCWGG			208
	*Bin*SI	CCWGG			131
	*Bst*GII	CCWGG			117
+	*Bst*NI	CC↓WGG		N	209
	*Bst*OI	CCWGG			56
	*Cdi*27I	CCWGG			210
	*Cfr*5I	CCWGG			41,44
	*Cfr*11I	CCWGG			41,44
	*Cfr*20I	CCWGG			43
	*Cfr*22I	CCWGG			43
	*Cfr*24I	CCWGG			43
	*Cfr*25I	CCWGG			43
	*Cfr*27I	CCWGG			43
	*Cfr*28I	CCWGG			43
	*Cfr*29I	CCWGG			43
	*Cfr*30I	CCWGG			43
	*Cfr*31I	CCWGG			43
	*Cfr*35I	CCWGG			43
	*Cfr*S37I	CCWGG			156
	*Cth*II	CC↓WGG			119
	*Eag*KI	CCWGG			5
	*Eca*II	CCWGG			55
	*Ecl*66I	CCWGG			192
	*Ecl*II	CCWGG			211
	*Ecl*S39I	CCWGG			156
	*Eco*38I	CCWGG			46
	*Eco*40I	CCWGG			46
	*Eco*41I	CCWGG			46
	*Eco*60I	CCWGG			44
	*Eco*61I	CCWGG			44
	*Eco*67I	CCWGG			191
	*Eco*70I	CCWGG			191

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Eco*71I	CCWGG			212
	*Eco*128I	CCWGG			190
	*Eco*136I	CCWGG			190
	*Eco*165I	CCWGG			164
	*Mph*I	CCWGG			213
+	*Mva*I	CC↓WGG	2(4)	AU	214,215
	*Sgr*II	CCWGG			216
	*Taq*XI	CC↓WGG			217
	*Zan*I	CC↓WGG			218
*Eco*RV		GAT↓ATC		ABGIMNPRU	219,220
	*Bst*RI	GATATC			56
	*Ceq*I	GAT↓ATC			221
	*Eco*32I	GAT↓ATC			44,222
	*Hja*I	GATATC			477
	*Nan*I	GATATC			179
	*Nfl*AI	GATATC			223
	*Nsi*CI	GAT↓ATC			224
*Esp*I		GC↓TNAGC		G	225
	*Cel*II	GCTNAG			105
*Fin*I		GTCCC			130
*Fnu*4HI		GC↓NGC		N	226
	*Fbr*I	GC↓NGC			84
*Fnu*DII		CG↓CG			227
	*Acc*II	CG↓CG		AG	9,228
	*Bce*FI	CGCG			229
	*Bce*RI	CGCG			102
	*Bep*I	CG↓CG			230
	*Bst*UI	CG↓CG		N	56
	*Bsu*1192II	CGCG			54
	*Bsu*1193I	CGCG			54,102
	*Bsu*6633I	CGCG			102,231
	*Bsu*EII	CGCG			54,232
	*Fsp*MI	CGCG			130
	*Hin*1056I	CGCG			233
	*Mvn*I	CG↓CG		M	234

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Pfl*AI	CGCG			27
	*Tha*I	CG↓CG		BI	235
*Fok*I		GGATG(9/13)		AMN	236
	*Hin*GUII	GGATG			237-239
*Gdi*II		YGGCCG(-5/-1)			240
*Gsu*I		CTGGAG(16/14)			241,242
*Hae*I		WGG↓CCW			238
*Hae*II		RGCGC↓Y		ABGIMNR	243,244
	*Hin*HI	RGCGCY			245
	*Ngo*I	RGCGCY			246
*Hae*III		GG↓CC	3(5)	ABGIMNPRU	247,248,249
	*Asp*742I	GGCC			156
	*Bce*71I	GGCC			250
	*Bli*I	GGCC			251
	*Blu*II	GGCC			240
	*Bse*I	GGCC			252
	*Bsh*AI	GGCC			83
	*Bsh*BI	GGCC			83
	*Bsh*CI	GGCC			83
	*Bsh*DI	GGCC			83
	*Bsh*EI	GGCC			83
	*Bsh*FI	GGCC			83
	*Bsh*I	GGCC			83
	*Bsp*71I	GGCC			250
	*Bsp*211I	GG↓CC			250
	*Bsp*226I	GGCC			250
	*Bsp*RI	GG↓CC			253-255
	*Bss*CI	GGCC			117
	*Bst*CI	GGCC			117
	*Bst*JI	GGCC			56
	*Bsu*1076I	GGCC			102
	*Bsu*1114I	GGCC			102
	*Bsu*RI	GG↓CC	3(5)	G	248,256,257
	*Clm*I	GGCC			78
	*Clt*I	GG↓CC			258

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Dsa*II	GG↓CC			187
	*Fin*SI	GGCC			84
	*Fnu*DI	GG↓CC			227
	*Hhg*I	GGCC			55
	*Mni*I	GGCC			213
	*Mnn*II	GGCC			259
	*Ngo*II	GGCC			260
	*Ngo*PII	GG↓CC			224
	*Ngo*SI	GGCC			49
	*Nla*I	GGCC			261
	*Pai*I	GGCC			107
	*Pal*I	GG↓CC		R	262,263
	*Ppu*I	GGCC			107
	*Sfa*I	GG↓CC			264
	*Spl*III	GGCC			265
	*Sua*I	GG↓CC			266
	*Sul*I	GGCC			267
	*Tsp*ZNI	GGCC			268
	*Ttn*I	GGCC			82
	*Vha*I	GGCC			108
*Hga*I		GACGC(5/10)		N	181,245,269
*Hgi*AI		GWGCW↓C		N	270
	*Asp*HI	GWGCW↓C			479
*Hgi*CI		G↓GYRCC			15,271
	*Ban*I	G↓GYRCC		GIMNRU	8,271
	*Eco*50I	GGYRCC			164
	*Eco*64I	GGYRCC			191
	*Hgi*HI	G↓GYRCC			16
*Hgi*EII		ACCNNNNNNGGT			15
*Hgi*JII		GRGCY↓C			16
	*Ban*II	GRGCY↓C		GIMNRU	8
	*Bvu*I	GRGCY↓C			272
	*Cfr*48I	GRGCYC			43
	*Eco*24I	GRGCYC			210
	*Eco*25I	GRGCYC			210

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Eco*26I	GRGCYC			44
	*Eco*35I	GRGCYC			210
	*Eco*68I	GRGCYC			192
	*Eco*113I	GRGCYC			189
	*Eco*T38I	GRGCYC			91
	*Kox*II	GRGCY↓C			147
*Hha*I		GCG↓C	2(5)	ABGNPRU	273,274
	*Bca*I	GCGC			28
	*Cfo*I	GCGC		BIMP	106
	*Fnu*DIII	GCG↓C			227
	*Hin*GUI	GCGC			237,275
	*Hin*P1I	G↓CGC		N	276
	*Hin*S1I	GCGC			276
	*Hin*S2I	GCGC			276
	*Mnn*IV	GCGC			259
	*Sci*NI	G↓CGC			277
*Hin*dII		GTY↓RAC	5(6)	M	278-281
	*Chu*II	GTYRAC			282
	*Hin*1160II	GTYRAC			233
	*Hin*1161II	GTYRAC			233
	*Hin*JCI	GTY↓RAC			283
	*Hinc*II	GTY↓RAC		ABGINPRU	284
	*Mnn*I	GTYRAC			259
*Hin*dIII		A↓AGCTT	1(6)	ABGIMNPRU	280,281,285
	*Asp*52I	AAGCTT			156
	*Bbr*I	AAGCTT			55
	*Bpe*I	AAGCTT			286,287
	*Bst*FI	A↓AGCTT			288
	*Cfr*32I	AAGCTT			43
	*Chu*I	AAGCTT			282
	*Eco*65I	AAGCTT			192
	*Eco*98I	AAGCTT			192
	*Eco*VIII	A↓AGCTT			289
	*Hin*173I	AAGCTT			237
	*Hin*1076III	AAGCTT			233

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Hin*JCII	AAGCTT			283
	*Hin*bIII	AAGCTT			55,290
	*Hin*fII	AAGCTT			291
	*Hsu*I	A↓AGCTT			55
	*Mki*I	AAGCTT			213
*Hin*fI		G↓ANTC		ABGIMNPRU	290,292,293
	*Cvi*BI	G↓ANTC			294
	*Cvi*CI	GANTC			294
	*Cvi*DI	GANTC			294
	*Cvi*EI	GANTC			294
	*Cvi*FI	GANTC			294
	*Cvi*GI	GANTC			294
	*Fnu*AI	G↓ANTC			227
	*Hha*II	G↓ANTC	2(6)		295-297
	*Nca*I	GANTC			298
	*Nov*II	GANTC			298
	*Nsi*HI	GANTC			299
*Hpa*I		GTT↓AAC	5(6)	ABGIMNPRU	300-302
	*Bse*II	GTTAAC			252
*Hpa*II		C↓CGG	2(5)	BGMNPRU	249,300,301
	*Asp*748I	CCGG			156
	*Bsu*1192I	CCGG			54,102
	*Bsu*FI	CCGG	1(5)		54,102,232
	*Fin*II	CCGG			130
	*Hap*II	C↓CGG		AGI	245,303
	*Mni*II	CCGG			213
	*Mno*I	C↓CGG			55,304
	*Msp*I	C↓CGG	1(5)	ABGIMNPRU	111,305,306
	*Sec*II	CCGG			307
	*Sfa*GUI	CCGG			308
*Hph*I		GGTGA(8/7)		N	290,309
	*Ngo*BI	GGTGA	-2(5)		49,480
*Kpn*I		GGTAC↓C		ABGIMNPRU	310,311
	*Asp*718I	G↓GTACC		M	312
	*Eco*149I	GGTACC			190

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Kpn*K14I	GGTACC			156
	*Nmi*I	GGTACC			313
	*Sth*AI	GGTACC			85
	*Sth*BI	GGTACC			85
	*Sth*CI	GGTACC			85
	*Sth*DI	GGTACC			85
	*Sth*EI	GGTACC			85
	*Sth*FI	GGTACC			85
	*Sth*GI	GGTACC			85
	*Sth*HI	GGTACC			85
	*Sth*I	G↓GTACC			85
	*Sth*JI	GGTACC			85
	*Sth*KI	GGTACC			85
	*Sth*LI	GGTACC			85
	*Sth*MI	GGTACC			85
	*Sth*NI	GGTACC			314
*Ksp*632I		CTCTTC(1/4)			478
MaeI		C↓TAG		M	315
	*Mja*I	CTAG			48
*Mae*II		A↓CGT		M	315
*Mae*III		↓GTNAC		M	315
*Mbo*I[6]		↓GATC		BGINR	316
+	*Bce*243I	↓GATC			317
	*Bsa*PI	GATC			117
	*Bsp*64I	GATC			250
+	*Bsp*67I	↓GATC			250
	*Bsp*74I	GATC			250
	*Bsp*76I	GATC			250
	*Bsp*105I	↓GATC			250
+	*Bsp*AI	↓GATC			39
+	*Bsr*PII	GATC			117
	*Bss*GII	GATC			117
	*Bst*EIII	GATC			55,139,318
	*Bst*XII	GATC			117
	*Cpa*I	GATC			254
+	*Cpf*I	↓GATC			182

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Cvi*AI	↓GATC	2(6)		319,320
	*Cvi*BII	GATC			321
	*Cvi*HI	GATC			170
	*Dpn*II	GATC			174,176
	*Fnu*AII	GATC			55,227
	*Fnu*CI	↓GATC			227
+	*Fnu*EI	↓GATC			227
	*Hac*I	↓GATC			322
	*Meu*I	GATC			25
	*Mme*II	GATC			323
	*Mno*III	GATC			55
	*Mos*I	GATC			316
	*Msp*67II	GATC			38
	*Mth*I	GATC			117
	*Nde*II	↓GATC		B	298
	*Nfl*AII	GATC			223
	*Nfl*BI	GATC			324
	*Nfl*I	GATC			298
	*Nla*DI	GATC			49
	*Nla*II	↓GATC			261
	*Nme*CI	↓GATC			224
	*Nph*I	↓GATC			224
	*Nsi*AI	GATC			325
	*Nsp*AI	GATC			25
	*Nsu*I	GATC			50
	*Pfa*I	GATC			305
	*Sal*AI	GATC			196
	*Sal*HI	GATC			196
+	*Sau*3AI	↓GATC	4(5)	ABGIMNPRU	326,327
	*Sau*6782I	GATC			328
	*Sin*MI	GATC			50
	*Tru*II	GATC			88
*Mbo*II		GAAGA(8/7)	5(6)	BGINR	316,329-331
	*Ncu*I	GAAGA			332
	*Tce*I	GAAGA			267

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
*Mlu*I		A↓CGCGT		ABGIMNPRU	236
	*Ape*I	ACGCGT			196
*Mme*I		TCCRAC(20/18)			323
*Mnl*I		CCTC(7/7)		GN	111,333
*Mse*I		T↓TAA		N	130
*Mst*I		TGC↓GCA			110,334
	*Aos*I	TGC↓GCA		G	12
	*Avi*II	TGC↓GCA			87
	*Fdi*II	TGC↓GCA			81,82
	*Fsp*I	TGC↓GCA		GN	57,335
	*Gsp*AII	TGCGCA			83
*Nae*I		GCC↓GGC		GMNU	336
	*Ame*II	GCCGGC			27
	*Ani*MI	GCCGGC			130
	*Ape*AI	GCCGGC			27
	*Apr*I	GCCGGC			25
	*Eco*56I	GCCGGC			44
	*Mis*I	GCCGGC			139
	*Nas*WI	GCCGGC			25
	*Nba*I	GCCGGC			54
	*Nbr*I	GCCGGC			54
	*Ngo*MI	GCCGGC			337
	*Nmu*FI	GCCGGC			50
	*Nmu*I	GCCGGC			298
	*Nsp*WI	GCCGGC			25
	*Nta*SII	GCCGGC			84
	*Pgl*I	GCCGGC			338
	*Psp*61I	GCCGGC			38
	*Rlu*I	GCCGGC			339-341
	*Sac*AI	GCCGGC			45
	*Sal*CI	GCCGGC			27
	*Sao*I	GCCGGC			342
	*Sau*AI	GCCGGC			324
	*Sau*BMKI	GCC↓GGC			343
	*Ska*I	GCCGGC			50

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
*Nar*I		GG↓CGCC		BGN	344
	*Bbe*AI	GGCGCC			131
	*Bbe*I	GGCGC↓C		A	345
	*Bin*SII	GGCGCC			131
	*Eco*78I	GGC↓GCC			346
	*Nam*I	GGCGCC			347
	*Nda*I	GG↓CGCC			348
	*Nun*II	GG↓CGCC		G	117
	*Sfo*I	GGCGCC			130
*Nco*I		C↓CATGG		ABGMNPR	117
	*Nsp*SAIII	CCATGG			66
*Nde*I		CA↓TATG		BNR	349
*Nhe*I		G↓CTAGC		BGMNPR	313
*Nla*III		CATG↓		N	261
*Nla*IV		GGN↓NCC		N	261
	*Bcr*I	GGNNCC			193
*Not*I		GC↓GGCCGC		AGMNPRU	350,351
*Nru*I		TCG↓CGA		ABGMNRU	313
	*Ama*I	TCGCGA			108
	*Sal*DI	TCGCGA			27
	*Sbo*13I	TCG↓CGA			91
*Nsp*I		RCATG↓Y		A	6
	*Nsp*HI	RCATG↓Y		G	59
*Nsp*BII		CMG↓CKG		G	59
*Pfl*MI		CCANNNN↓NTGG		N	130
*Ple*I		GAGTC(4/5)		N	352
*Pma*CI		CAC↓GTG			353
	*Eco*72I	CAC↓GTG			354
*Ppu*MI		RG↓GWCCY		N	130,355
*Pst*I		CTGCA↓G	5(6)	ABGIMNPRU	332,356,357
	*Ali*2882I	CTGCAG			100
	*Ali*AJI	CTGCA↓G			358
	*Asp*36I	CTGCAG			210
	*Asp*708I	CTGCAG			69
	*Bbi*I	CTGCAG			14

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Bce*170I	CTGCAG			102
	*Bsp*63I	CTGCA↓G			250
	*Bsp*78I	CTGCAG			250
	*Bsp*BI	CTGCA↓G			39
	*Bsu*BI	CTGCAG			102,359
	*Cau*III	CTGCAG			360
	*Cfl*I	CTGCA↓G			322
	*Cfr*A4I	CTGCA↓G			361
	*Eae*PI	CTGCAG			229
	*Ecl*77I	CTGCAG			192
	*Ecl*593I	CTGCAG			156
	*Eco*48I	CTGCAG			164
	*Eco*49I	CTGCAG			164
	*Eco*83I	CTGCAG			192
	*Eco*133I	CTGCAG			190
	*Eco*141I	CTGCAG			189
	*Eco*161I	CTGCAG			190
	*Eco*167I	CTGCAG			190
	*Mau*I	CTGCAG			107
	*Mkr*I	CTGCAG			25
	*Nas*I	CTGCAG			84
	*Ngb*I	CTGCAG			25
	*Noc*I	CTGCAG			313
	*Pma*44I	CTGCA↓G			361
	*Pma*I	CTGCAG			111
	*Pmy*I	CTGCAG			362
	*Sal*PI	CTGCA↓G			363,364
	*Sfl*I	CTGCA↓G			213
	*Ska*II	CTGCAG			50
	*Xma*II	CTGCAG			365
	*Xor*I	CTGCAG			366
	*Xph*I	CTGCAG			367
	*Yen*AI	CTGCAG			368
	*Yen*BI	CTGCAG			368
	*Yen*CI	CTGCAG			368

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Yen*DI	CTGCAG			368
	*Yen*EI	CTGCAG			368
	*Yen*I	CTGCA↓G			368
*Pvu*I		CGAT↓CG		ABGMNPRU	369
	*Bma*AI	CGATCG			27
	*Bma*BI	CGATCG			27
	*Bma*CI	CGATCG			27
	*Bma*DI	CGATCG			27
	*Bma*I	CGATCG			28
	*Ecl*JI	CGAT↓CG			370
	*Nbl*I	CGAT↓CG			111
	*Rsh*I	CGAT↓CG			371
	*Rsp*I	CGATCG			372
	*Xni*I	CGATCG			259
	*Xor*II	CGAT↓CG		B	366,369
*Pvu*II		CAG↓CTG	4(4)	ABGIMNPRU	369,373
	*Bav*I	CAG↓CTG			374
	*Cfr*6I	CAG↓CTG	4(4)		41,44,373,375
	*Mzi*I	CAGCTG			376
*Rsa*I		GT↓AC		ABGIMNPRU	377
	*Cvi*QI	G↓TAC			7
*Rsr*II		CG↓GWCCG		GN	378
	*Cpo*I	CGGWCCG			27
*Sac*I		GAGCT↓C		AGIMNPRU	379
	*Eco*136II	GAGCTC			190
	*Eco*ICRI	GAGCTC			107
	*Nas*SI	GAGCTC			84
	*Sco*I	GAGCTC			342
	*Sst*I	GAGCT↓C		B	380,381
*Sac*II		CCGC↓GG		GINPRU	379
	*Bae*I	CCGCGG			55,258
	*Cfr*37I	CCGCGG			42
	*Cfr*41I	CCGCGG			42
	*Cfr*42I	CCGCGG			43
	*Cfr*43I	CCGCGG			43

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Cfr*45II	CCGCGG			43
	*Csc*I	CCGC↓GG			382
	*Ecc*I	CCGCGG			55,383
	*Ecl*28I	CCGCGG			210
	*Ecl*37I	CCGCGG			46
	*Eco*55I	CCGCGG			164
	*Eco*92I	CCGCGG			192
	*Eco*96I	CCGCGG			192
	*Eco*99I	CCGCGG			192
	*Eco*100I	CCGCGG			189
	*Eco*104I	CCGCGG			212
	*Eco*134I	CCGCGG			190
	*Eco*135I	CCGCGG			190
	*Eco*158I	CCGCGG			189
	*Gal*I	CCGC↓GG			322
	*Gce*GLI	CCGC↓GG			384
	*Gce*I	CCGC↓GG			322
	*Mra*I	CCGCGG			385
	*Ngo*DI	CCGCGG			180
	*Ngo*III	CCGCGG			386
	*Ngo*PIII	CCGC↓GG			224
	*Nla*DIII	CCGCGG			49
	*Nla*SI	CCGCGG			17
	*Pae*AI	CCGC↓GG			387
	*Saa*I	CCGCGG			130
	*Sab*I	CCGCGG			342
	*Sak*I	CCGCGG			45
	*Sbo*I	CCGCGG			388,389
	*Sfr*I	CCGCGG			388,389
	*Shy*I	CCGCGG			390
	*Sst*II	CCGC↓GG		B	380
	*Tgl*I	CCGCGG			109
*Sal*I		G↓TCGAC		ABGIMNPRU	391
	*Hgi*CIII	G↓TCGAC			15
	*Hgi*DII	G↓TCGAC			15

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Nop*I	G↓TCGAC			111
	*Rhe*I	GTCGAC			108
	*Rhp*I	GTCGAC			108
	*Rrh*I	GTCGAC			54
	*Rro*I	GTCGAC			54
	*Xam*I	GTCGAC			391
	*Xci*I	G↓TCGAC			392
*Sau*I		CC↓TNAGG		M	393
	*Aoc*I	CC↓TNAGG			87
	*Axy*I	CC↓TNAGG		G	394
	*Bsu*36I	CC↓TNAGG		N	395
	*Cvn*I	CC↓TNAGG		B	396,397
	*Eco*76I	CCTNAGG			192
	*Eco*81I	CC↓TNAGG		AU	398
	*Eco*115I	CCTNAGG			189
	*Eco*118I	CCTNAGG			189
	*Mst*II	CC↓TNAGG			111
	*Oxa*NI	CC↓TNAGG			112
	*Sec*III	CCTNAGG			307
*Sca*I		AGT↓ACT		ABGMNPRU	399,400
	*Asp*763I	AGTACT			156
	*Bst*MI	AGTACT			56
*Scr*FI		CC↓NGG		N	401
	*Eco*43I	CCNGG			402
	*Eco*51II	CCNGG			164
	*Eco*80I	CCNGG			192
	*Eco*85I	CCNGG			402
	*Eco*93I	CCNGG			192
	*Eco*153I	CCNGG			189
	*Msp*67I	CC↓NGG			38
	*Sso*II	↓CCNGG	2(5)		202,403
*Sdu*I		GDGCH↓C		G	404,405
	*Aoc*II	GDGCH↓C			87
	*Bsp*1286I	GDGCH↓C		N	55,102,406
	*Nsp*II	GDGCH↓C		R	6

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
*Sec*I		C↓CNNGG			307
*Sfa*NI		GCATC(5/9)		N	115
*Sfi*I		GGCCNNNN↓NGGCC		GNPRU	407
*Sma*I		CCC↓GGG	3(5)	ABGIMNPRU	365,408,409
	*Cfr*9I	C↓CCGGG	2(4)		41,44,375,410
	*Xcy*I	C↓CCGGG		R	411
	*Xma*I	C↓CCGGG		INP	365
*Sna*BI		TAC↓GTA		GMN	412
	*Eco*105I	TAC↓GTA			413
	*Eco*158II	TACGTA			189
*Sna*I		GTATAC			414
	*Xca*I	GTA↓TAC			415
*Spe*I		A↓CTAGT		BMN	313
*Sph*I		GCATG↓C		ABGIMNPRU	416
	*Pae*I	GCATG↓C			417
	*Spa*XI	GCATGC			107
*Spl*I		C↓GTACG		A	265
	*Pfu*I	CGTACG			27
*Ssp*I		AAT↓ATT		BMN	400
*Stu*I		AGG↓CCT		ABGMNPR	418
	*Aat*I	AGG↓CCT		IU	8
	*Asp*78I	AGGCCT			156
	*Cty*I	AGGCCT			28
	*Eco*147I	AGGCCT			137
	*Gdi*I	AGG↓CCT			240
	*Nta*SI	AGGCCT			84
*Sty*I		C↓CWWGG		BGNP	419
	*Eco*130I	CCWWGG			137
	*Eco*T14I	C↓CWWGG		A	420
	*Eco*T104I	CCWWGG			420
	*Sbl*AI	CCWWGG			421
	*Sbl*BI	CCWWGG			421
	*Sbl*CI	CCWWGG			421
*Taq*I		T↓CGA	4(6)	BGIMNPRU	422,423
	*Cvi*BIII	TCGA			321

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Tfl*I	TCGA			423
	*Tth*HB8I	T↓CGA	4(6)	A	423-426
*Taq*II[7]		GACCGA(11/9)			55,427
*Taq*II[7]		CACCCA(11/9)			
*Tsp*45I		GTSAC			428
*Tsp*EI		AATT			429
*Tth*111I		GACN↓NNGTC		AGINR	310
	*Fsu*I	GACNNNGTC			342
	*Nta*I	GACNNNGTC			84
	*Spl*II	GACNNNGTC			265
	*Tte*I	GACNNNGTC			310
	*Ttr*I	GACNNNGTC			310
*Tth*111II		CAARCA(11/9)			430
*Vsp*I		AT↓TAAT			431
	*Ase*I	AT↓TAAT		N	150
*Xba*I		T↓CTAGA		ABGIMNPRU	432
*Xho*I		C↓TCGAG		ABGIMNPRU	433
	*Abr*I	C↓TCGAG			434
	*Asp*47I	CTCGAG			156
	*Asp*703I	CTCGAG			69
	*Bbi*III	CTCGAG			14
	*Blu*I	C↓TCGAG			433
	*Bss*HI	CTCGAG			117
	*Bst*HI	CTCGAG			117
	*Bst*LI	CTCGAG			56
	*Bst*VI	CTCGAG			435
	*Bsu*MI	CTCGAG	3(5)		102,232
	*Bth*I	CTCGAG			131
	*Ccr*I	C↓TCGAG			436
	*Dde*II	CTCGAG			55
	*Mca*I	CTCGAG			69
	*Mec*I	CTCGAG			376
	*Mpu*I	CTCGAG			376
	*Msi*I	CTCGAG			55,290
	*Pae*R7I	C↓TCGAG	5(6)	N	437,438

Enzyme[1]	Isoschizomers	Recognition[2] Sequence	Me[3] site	Commercial[4] source	Reference
	*Pan*I	C↓TCGAG			107
	*Pfl*NI	CTCGAG			28
	*Pfl*WI	CTCGAG			439
	*Sau*3239I	C↓TCGAG			440,441
	*Sci*I	CTC↓GAG			38
	*Scu*I	CTCGAG			388
	*Sex*I	CTCGAG			388
	*Sga*I	CTCGAG			388
	*Sgo*I	CTCGAG			388
	*Sla*I	C↓TCGAG			442
	*Slu*I	CTCGAG			389
	*Spa*I	CTCGAG			388
	*Xpa*I	C↓TCGAG			433
*Xho*II		R↓GATCY		GM	109,233,443
	*Ait*AI	RGATCY			27
	*Ait*II	RGATCY			193
	*Bst*YI	R↓GATCY		N	56
	*Mfl*I	R↓GATCY		A	444
*Xma*III		C↓GGCCG	4(5)	B	32,445
	*Bst*ZI	CGGCCG			56
	*Eag*I	C↓GGCCG		N	446
	*Eco*52I	C↓GGCCG		AU	34,80
*Xmn*I		GAANN↓NNTTC		GN	54,447
	*Asp*700I	GAANN↓NNTTC		M	69

Type I enzymes

Enzyme	Recognition sequence	Me site[3]	Reference
*Eco*AI	GAGNNNNNNNGTCA	2(6) -3(6)	448,449
*Eco*BI	TGANNNNNNNNTGCT	3(6)	450-454
*Eco*DI	TTANNNNNNNGTCY		455
*Eco*DXXI	TCANNNNNNNATTC		456,457
*Eco*KI	AACNNNNNNGTGC		458-461

Enzyme	Recognition sequence	Me site[3]		Reference
*Eco*R124I	GAANNNNNNRTCG			462
*Eco*R124/3I	GAANNNNNNNRTCG		-3(6)	462
*Sty*SBI	GAGNNNNNNRTAYG	2(6)	-4(6)	463
*Sty*SPI	AACNNNNNNGTRC	2(6)	-3(6)	463
*Sty*SQI	AACNNNNNNRTAYG			464

Type III enzymes

Enzyme	Isoschizomers	Recognition Sequence	Me[3] site	Reference
*Eco*P15I		CAGCAG		465,466
*Eco*PI		AGACC	3(6)	467-471
*Hinf*III		CGAAT		472,473
	*Hin*eI	CGAAT		474

FOOTNOTES

1. * signifies that *Dpn*I and its isoschizomers require the presence of 6-methyladenosine within the recognition sequence GATC.
2. Recognition sequences are given using the standard abbreviations (475) to represent ambiguity:

R = G or A
Y = C or T
M = A or C
K = G or T
S = G or C
W = A or T
H = A or C or T
B = G or T or C
V = G or C or A
D = G or A or T
N = A or C or G or T

3. The site of methylation by the cognate methylase when known is indicated as follows. The first number shows the base within the recognition sequence that is modified. A negative number indicates the complementary strand. The number in parentheses indicates the specific methylation involved. (6) = N6-methyladenosine (5) = 5-methylcytosine (4) = N4-methylcytosine.
4. Commercial sources of restriction enzymes are abbreviated as follows:
   - A Amersham (4/87)
   - B Bethesda Research Laboratories (9/87)
   - G Anglian Biotechnology Ltd. (1/88)
   - I International Biotechnologies Inc (7/87)
   - M Boehringer-Mannheim (3/88)
   - N New England Biolabs (3/88)
   - P Pharmacia P-L Biochemicals (3/88)
   - R Promega Biotec (9/87)
   - U United States Biochemical Corporation (2/88)
5. *Eco*RII isoschizomers fall into two classes based upon their sensitivity to methylation. *Eco*RII will not cleave when the second cytosine in the recognition sequence is methylated to 5-methylcytosine whereas *Mva*I will cleave such a sequence. Isoschizomers of *Eco*RII that are like *Mva*I are indicated by +.
6. *Mbo*I isoschizomers fall into two classes based upon their sensitivity to methylation. *Mbo*I will not cleave when the recognition sequence contains 6-methyladenosine whereas *Sau*3AI will not cleave when its recognition sequence contains 5-methylcytosine. Isoschizomers of *Mbo*I that are like *Sau*3AI are indicated by +.
7. *Taq*II differs from other restriction enzymes in recognizing two distinct sequences: GACCGA(11/9) and CACCCA(11/9).

Alphabetical listing of Type II restriction enzymes

*Aac*I (*Bam*HI)
*Aat*II
*Acc*I
*Acy*I
*Afl*II
*Aha*II (*Acy*I)
*Ait*I (*Eco*47III)
*Ali*2882I (*Pst*I)
*Ali*AJI (*Pst*I)
*Alw*NI
*Ame*I (*Apa*LI)
*Aoc*I (*Sau*I)
*Aos*I (*Mst*I)
*Apa*LI
*Apr*I (*Nae*I)

*Aae*I (*Bam*HI)
*Abr*I (*Xho*I)
*Acc*II (*Fnu*DII)
*Aeu*I (*Eco*RII)
*Afl*III
*Aha*III
*Ait*II (*Xho*II)
*Ali*122571 (*Bam*HI)
*Alu*I
*Alw*XI (*Bbv*I)
*Ame*II (*Nae*I)
*Aoc*II (*Sdu*I)
*Aos*II (*Acy*I)
*Ape*I (*Mlu*I)
*Apu*I (*Asu*I)

*Aat*I (*Stu*I)
*Acc*EBI (*Bam*HI)
*Acc*III (*Bsp*MII)
*Afl*I (*Ava*II)
*Aha*I (*Cau*II)
*Ait*AI (*Xho*II)
*Ali*I (*Bam*HI)
*Ali*12258I (*Bam*HI)
*Alw*I (*Bin*I)
*Ama*I (*Nru*I)
*Ani*MI (*Nae*I)
*Aor*I (*Eco*RII)
*Apa*I
*Ape*AI (*Nae*I)
*Apy*I (*Eco*RII)

*Aqu*I (*Ava*I)
*Asp*36I (*Pst*I)
*Asp*78I (*Stu*I)
*Asp*703I (*Xho*I)
*Asp*718I (*Kpn*I)
*Asp*763I (*Sca*I)
*Ast*WI (*Acy*I)
*Asu*III (*Acy*I)
*Atu*CI (*Bcl*I)
*Ava*III
*Avr*II
*Bac*I (*Sac*II)
*Bam*HI
*Bam*NxI (*Ava*II)
*Ban*III (*Cla*I)
*Bbe*I (*Nar*I)
*Bbi*III (*Xho*I)
*Bbv*II
*Bce*170I (*Pst*I)
*Bce*RI (*Fnu*DII)
*Bcn*I (*Cau*II)
*Bgl*I
*Bin*SI (*Eco*RII)
*Blu*I (*Xho*I)
*Bma*AI (*Pvu*I)
*Bma*DI (*Pvu*I)
*Bsa*PI (*Mbo*I)
*Bse*II (*Hpa*I)
*Bsh*AI (*Hae*III)
*Bsh*DI (*Hae*III)
*Bsm*I
*Bsp*63I (*Pst*I)
*Bsp*71I (*Hae*III)
*Bsp*78I (*Pst*I)
*Bsp*211I (*Hae*III)
*Bsp*AI (*Mbo*I)
*Bsp*HI
*Bsp*RI (*Hae*III)
*Bsr*I
*Bss*CI (*Hae*III)
*Bss*HI (*Xho*I)
*Bst*31I (*Bst*EII)
*Bst*DI (*Bst*EII)
*Bst*FI (*Hin*dIII)
*Bst*HI (*Xho*I)
*Bst*LI (*Xho*I)
*Bst*OI (*Eco*RII)
*Bst*RI (*Eco*RV)
*Bst*UI (*Fnu*DII)
*Bst*XI
*Bst*ZI (*Xma*III)
*Bsu*1114I (*Hae*III)
*Bsu*1193I (*Fnu*DII)
*Bsu*EII (*Fnu*DII)
*Bsu*RI (*Hae*III)
*Bti*I (*Ava*II)
*Cau*II
*Ase*I (*Vsp*I)
*Asp*47I (*Xho*I)
*Asp*697I (*Ava*II)
*Asp*707I (*Cla*I)
*Asp*742I (*Hae*III)
*Asp*AI (*Bst*EII)
*Asu*I
*Atu*II (*Eco*RII)
*Ava*I
*Avi*II (*Mst*I)
*Axy*I (*Sau*I)
*Bal*I
*Bam*KI (*Bam*HI)
*Ban*I (*Hgi*CI)
*Bav*I (*Pvu*II)
*Bbi*I (*Pst*I)
*Bbr*I (*Hin*dIII)
*Bca*I (*Hha*I)
*Bce*243I (*Mbo*I)
*Bcl*I
*Bcr*I (*Nla*IV)
*Bgl*II
*Bin*SII (*Nar*I)
*Blu*II (*Hae*III)
*Bma*BI (*Pvu*I)
*Bme*216I (*Ava*II)
*Bsc*I (*Cla*I)
*Bse*PI
*Bsh*BI (*Hae*III)
*Bsh*EI (*Hae*III)
*Bsm*AI
*Bsp*64I (*Mbo*I)
*Bsp*74I (*Mbo*I)
*Bsp*105I (*Mbo*I)
*Bsp*226I (*Hae*III)
*Bsp*BI (*Pst*I)
*Bsp*MI
*Bsp*XI (*Cla*I)
*Bsr*HI (*Bse*PI)
*Bss*GI (*Bst*XI)
*Bss*HII (*Bse*PI)
*Bst*BI (*Asu*II)
*Bst*EII
*Bst*GI (*Bcl*I)
*Bst*JI (*Hae*III)
*Bst*MI (*Sca*I)
*Bst*PI (*Bst*EII)
*Bst*SI (*Ava*I)
*Bst*VI (*Xho*I)
*Bst*XII (*Mbo*I)
*Bsu*36I (*Sau*I)
*Bsu*1192I (*Hpa*II)
*Bsu*6633I (*Fnu*DII)
*Bsu*FI (*Hpa*II)
*Bth*I (*Xho*I)
*Bvu*I (*Hgi*JII)
*Cau*III (*Pst*I)
*Ase*II (*Cau*II)
*Asp*52I (*Hin*dIII)
*Asp*700I (*Xmn*I)
*Asp*708I (*Pst*I)
*Asp*748I (*Hpa*II)
*Asp*HI (*Hgi*AI)
*Asu*II
*Atu*BI (*Eco*RII)
*Ava*II
*Avr*I (*Ava*I)
*Bac*36I (*Asu*I)
*Bam*FI (*Bam*HI)
*Bam*NI (*Bam*HI)
*Ban*II (*Hgi*JII)
*Bbe*AI (*Nar*I)
*Bbi*II (*Acy*I)
*Bbv*I
*Bce*71I (*Hae*III)
*Bce*FI (*Fnu*DII)
*Bcm*I (*Cla*I)
*Bep*I (*Fnu*DII)
*Bin*I
*Bli*I (*Hae*III)
*Bma*I (*Pvu*I)
*Bma*CI (*Pvu*I)
*Bpe*I (*Hin*dIII)
*Bse*I (*Hae*III)
*Bsh*I (*Hae*III)
*Bsh*CI (*Hae*III)
*Bsh*FI (*Hae*III)
*Bso*PI (*Bse*PI)
*Bsp*67I (*Mbo*I)
*Bsp*76I (*Mbo*I)
*Bsp*106I (*Cla*I)
*Bsp*1286I (*Sdu*I)
*Bsp*BII (*Asu*I)
*Bsp*MII
*Bsp*XII (*Bcl*I)
*Bsr*PII (*Mbo*I)
*Bss*GII (*Mbo*I)
*Bst*I (*Bam*HI)
*Bst*CI (*Hae*III)
*Bst*EIII (*Mbo*I)
*Bst*GII (*Eco*RII)
*Bst*KI (*Bcl*I)
*Bst*NI (*Eco*RII)
*Bst*QI (*Bam*HI)
*Bst*TI (*Bst*XI)
*Bst*WI (*Eco*NI)
*Bst*YI (*Xho*II)
*Bsu*1076I (*Hae*III)
*Bsu*1192II (*Fnu*DII)
*Bsu*BI (*Pst*I)
*Bsu*MI (*Xho*I)
*Bth*II (*Bin*I)
*Cau*I (*Ava*II)
*Ccr*I (*Xho*I)

*Cdi*27I (*Eco*RII)
*Ceq*I (*Eco*RV)
*Cfr*I
*Cfr*6I (*Pvu*II)
*Cfr*9I (*Sma*I)
*Cfr*13I (*Asu*I)
*Cfr*20I (*Eco*RII)
*Cfr*24I (*Eco*RII)
*Cfr*28I (*Eco*RII)
*Cfr*31I (*Eco*RII)
*Cfr*35I (*Eco*RII)
*Cfr*39I (*Cfr*I)
*Cfr*42I (*Sac*II)
*Cfr*45II (*Sac*II)
*Cfr*48I (*Hgi*JII)
*Cfr*S37I (*Eco*RII)
*Chu*II (*Hind*II)
*Clm*I (*Hae*III)
*Cpa*I (*Mbo*I)
*Cpo*I (*Rsr*II)
*Cth*II (*Eco*RII)
*Cvi*BII (*Mbo*I)
*Cvi*DI (*Hin*fI)
*Cvi*GI (*Hin*fI)
*Cvi*KI (*Cvi*JI)
*Cvi*NI (*Cvi*JI)
*Cvn*I (*Sau*I)
*Dds*I (*Bam*HI)
*Dra*I (*Aha*III)
*Dsa*I
*Eae*PI (*Pst*I)
*Eag*MI (*Ava*II)
*Eca*II (*Eco*RII)
*Ecl*28I (*Sac*II)
*Ecl*77I (*Pst*I)
*Ecl*S39I (*Eco*RII)
*Eco*26I (*Hgi*JII)
*Eco*35I (*Hgi*JII)
*Eco*40I (*Eco*RII)
*Eco*43I (*Scr*FI)
*Eco*47III
*Eco*50I (*Hgi*CI)
*Eco*52I (*Xma*III)
*Eco*57I
*Eco*64I (*Hgi*CI)
*Eco*68I (*Hgi*JII)
*Eco*72I (*Pma*CI)
*Eco*80I (*Scr*FI)
*Eco*83I (*Pst*I)
*Eco*90I (*Cfr*I)
*Eco*93I (*Scr*FI)
*Eco*97I (*Eco*31I)
*Eco*100I (*Sac*II)
*Eco*105I (*Sna*BI)
*Eco*118I (*Sau*I)
*Eco*128I (*Eco*RII)
*Eco*133I (*Pst*I)
*Cel*I (*Bam*HI)
*Cfl*I (*Pst*I)
*Cfr*4I (*Asu*I)
*Cfr*7I (*Bst*EII)
*Cfr*10I
*Cfr*14I (*Cfr*I)
*Cfr*22I (*Eco*RII)
*Cfr*25I (*Eco*RII)
*Cfr*29I (*Eco*RII)
*Cfr*32I (*Hind*III)
*Cfr*37I (*Sac*II)
*Cfr*40I (*Cfr*I)
*Cfr*43I (*Sac*II)
*Cfr*46I (*Asu*I)
*Cfr*A4I (*Pst*I)
*Cfu*I (*Dpn*I)
*Chy*I (*Stu*I)
*Clm*II (*Ava*II)
*Cpe*I (*Bcl*I)
*Csc*I (*Sac*II)
*Cvi*AI (*Mbo*I)
*Cvi*BIII (*Taq*I)
*Cvi*EI (*Hin*fI)
*Cvi*HI (*Mbo*I)
*Cvi*LI (*Cvi*JI)
*Cvi*OI (*Cvi*JI)
*Dde*I
*Dpn*I
*Dra*II
*Dsa*II (*Hae*III)
*Eag*I (*Xma*III)
*Ear*I
*Ecc*I (*Sac*II)
*Ecl*37I (*Sac*II)
*Ecl*593I (*Pst*I)
*Eco*24I (*Hgi*JII)
*Eco*31I
*Eco*38I (*Eco*RII)
*Eco*41I (*Eco*RII)
*Eco*47I (*Ava*II)
*Eco*48I (*Pst*I)
*Eco*51I (*Eco*31I)
*Eco*55I (*Sac*II)
*Eco*60I (*Eco*RII)
*Eco*65I (*Hind*III)
*Eco*70I (*Eco*RII)
*Eco*76I (*Sau*I)
*Eco*81I (*Sau*I)
*Eco*85I (*Scr*FI)
*Eco*91I (*Bst*EII)
*Eco*95I (*Eco*31I)
*Eco*98I (*Hind*III)
*Eco*101I (*Eco*31I)
*Eco*113I (*Hgi*JII)
*Eco*120I (*Eco*31I)
*Eco*129I (*Eco*31I)
*Eco*134I (*Sac*II)
*Cel*II (*Esp*I)
*Cfo*I (*Hha*I)
*Cfr*5I (*Eco*RII)
*Cfr*8I (*Asu*I)
*Cfr*11I (*Eco*RII)
*Cfr*19I (*Bst*EII)
*Cfr*23I (*Asu*I)
*Cfr*27I (*Eco*RII)
*Cfr*30I (*Eco*RII)
*Cfr*33I (*Asu*I)
*Cfr*38I (*Cfr*I)
*Cfr*41I (*Sac*II)
*Cfr*45I (*Asu*I)
*Cfr*47I (*Asu*I)
*Cfr*NI (*Asu*I)
*Chu*I (*Hind*III)
*Cla*I
*Clt*I (*Hae*III)
*Cpf*I (*Mbo*I)
*Cth*I (*Bcl*I)
*Cvi*BI (*Hin*fI)
*Cvi*CI (*Hin*fI)
*Cvi*FI (*Hin*fI)
*Cvi*JI
*Cvi*MI (*Cvi*JI)
*Cvi*QI (*Rsa*I)
*Dde*II (*Xho*I)
*Dpn*II (*Mbo*I)
*Dra*III
*Eae*I (*Cfr*I)
*Eag*KI (*Eco*RII)
*Eca*I (*Bst*EII)
*Ecl*II (*Eco*RII)
*Ecl*66I (*Eco*RII)
*Ecl*JI (*Pvu*I)
*Eco*25I (*Hgi*JII)
*Eco*32I (*Eco*RV)
*Eco*39I (*Asu*I)
*Eco*42I (*Eco*31I)
*Eco*47II (*Asu*I)
*Eco*49I (*Pst*I)
*Eco*51II (*Scr*FI)
*Eco*56I (*Nae*I)
*Eco*61I (*Eco*RII)
*Eco*67I (*Eco*RII)
*Eco*71I (*Eco*RII)
*Eco*78I (*Nar*I)
*Eco*82I (*Eco*RI)
*Eco*88I (*Ava*I)
*Eco*92I (*Sac*II)
*Eco*96I (*Sac*II)
*Eco*99I (*Sac*II)
*Eco*104I (*Sac*II)
*Eco*115I (*Sau*I)
*Eco*127I (*Eco*31I)
*Eco*130I (*Sty*I)
*Eco*135I (*Sac*II)

*Eco*136I (*Eco*RII)
*Eco*147I (*Stu*I)
*Eco*155I (*Eco*31I)
*Eco*158I (*Sac*II)
*Eco*161I (*Pst*I)
*Eco*165I (*Eco*RII)
*Eco*ICRI (*Sac*I)
*Eco*O109I (*Dra*II)
*Eco*RV
*Eco*T38I (*Hgi*JII)
*Erp*I (*Ava*II)
*Fbr*I (*Fnu*4HI)
*Fin*I
*Fnu*4HI
*Fnu*CI (*Mbo*I)
*Fnu*DIII (*Hha*I)
*Fsf*I (*Eco*57I)
*Fsp*MI (*Fnu*DII)
*Gal*I (*Sac*II)
*Gdi*I (*Stu*I)
*Gin*I (*Bam*HI)
*Gsp*AII (*Mst*I)
*Hae*I
*Hap*II (*Hpa*II)
*Hgi*BI (*Ava*II)
*Hgi*CIII (*Sal*I)
*Hgi*EI (*Ava*II)
*Hgi*HI (*Hgi*CI)
*Hgi*JI (*Ava*II)
*Hha*I
*Hin*173I (*Hind*III)
*Hin*1160II (*Hind*II)
*Hin*GUII (*Fok*I)
*Hin*JCII (*Hind*III)
*Hin*S2I (*Hha*I)
*Hind*II
*Hinf*II (*Hind*III)
*Hpa*II
*Kox*I (*Bst*EII)
*Kpn*K14I (*Kpn*I)
*Lsp*I (*Asu*II)
*Mae*III
*Mbo*II
*Meu*I (*Mbo*I)
*Mja*I (*Mae*I)
*Mkr*I (*Pst*I)
*Mlt*I (*Alu*I)
*Mme*II (*Mbo*I)
*Mnl*I
*Mnn*IV (*Hha*I)
*Mos*I (*Mbo*I)
*Mra*I (*Sac*II)
*Msi*I (*Xho*I)
*Msp*67II (*Mbo*I)
*Mth*I (*Mbo*I)
*Mzi*I (*Pvu*II)
*Nan*I (*Eco*RV)
*Eco*136II (*Sac*I)
*Eco*149I (*Kpn*I)
*Eco*156I (*Eco*31I)
*Eco*158II (*Sna*BI)
*Eco*162I (*Eco*31I)
*Eco*167I (*Pst*I)
*Eco*NI
*Eco*RI
*Eco*T14I (*Sty*I)
*Eco*T104I (*Sty*I)
*Esp*I
*Fdi*I (*Ava*II)
*Fin*II (*Hpa*II)
*Fnu*AI (*Hin*fI)
*Fnu*DI (*Hae*III)
*Fnu*EI (*Mbo*I)
*Fsp*I (*Mst*I)
*Fsp*MSI (*Ava*II)
*Gce*I (*Sac*II)
*Gdi*II
*Gox*I (*Bam*HI)
*Gsu*I
*Hae*II
*Hga*I
*Hgi*CI
*Hgi*DI (*Acy*I)
*Hgi*EII
*Hgi*HII (*Acy*I)
*Hgi*JII
*Hha*II (*Hin*fI)
*Hin*1056I (*Fnu*DII)
*Hin*1161II (*Hind*II)
*Hin*HI (*Hae*II)
*Hin*P1I (*Hha*I)
*Hin*bIII (*Hind*III)
*Hind*III
*Hja*I (*Eco*RV)
*Hph*I
*Kox*II (*Hgi*JII)
*Kpn*2I (*Bsp*MII)
*Mae*I
*Mau*I (*Pst*I)
*Mca*I (*Xho*I)
*Mfl*I (*Xho*II)
*Mja*II (*Asu*I)
*Mla*I (*Asu*II)
*Mlu*I
*Mni*I (*Hae*III)
*Mnn*I (*Hind*II)
*Mno*I (*Hpa*II)
*Mph*I (*Eco*RII)
*Mro*I (*Bsp*MII)
*Msp*I (*Hpa*II)
*Mst*I
*Mva*I (*Eco*RII)
*Nae*I
*Nan*II (*Dpn*I)
*Eco*141I (*Pst*I)
*Eco*153I (*Scr*FI)
*Eco*157I (*Eco*31I)
*Eco*159I (*Eco*RI)
*Eco*164I (*Cfr*I)
*Eco*HI (*Cfr*I)
*Eco*O65I (*Bst*EII)
*Eco*RII
*Eco*T22I (*Ava*III)
*Eco*VIII (*Hind*III)
*Fba*I (*Bcl*I)
*Fdi*II (*Mst*I)
*Fin*SI (*Hae*III)
*Fnu*AII (*Mbo*I)
*Fnu*DII
*Fok*I
*Fsp*II (*Asu*I)
*Fsu*I (*Tth*111I)
*Gce*GLI (*Sac*II)
*Gdo*I (*Bam*HI)
*Gsp*AI (*Ava*II)
*Hac*I (*Mbo*I)
*Hae*III
*Hgi*AI
*Hgi*CII (*Ava*II)
*Hgi*DII (*Sal*I)
*Hgi*GI (*Acy*I)
*Hgi*HIII (*Ava*II)
*Hgi*S211 (*Cau*II)
*Hhg*I (*Hae*III)
*Hin*1076III (*Hind*III)
*Hin*GUI (*Hha*I)
*Hin*JCI (*Hind*II)
*Hin*S1I (*Hha*I)
*Hinc*II (*Hind*II)
*Hin*fI
*Hpa*I
*Hsu*I (*Hind*III)
*Kpn*I
*Ksp*632I
*Mae*II
*Mbo*I
*Mec*I (*Xho*I)
*Mis*I (*Nae*I)
*Mki*I (*Hind*III)
*Mle*I (*Bam*HI)
*Mme*I
*Mni*II (*Hpa*II)
*Mnn*II (*Hae*III)
*Mno*III (*Mbo*I)
*Mpu*I (*Xho*I)
*Mse*I
*Msp*67I (*Scr*FI)
*Mst*II (*Sau*I)
*Mvn*I (*Fnu*DII)
*Nam*I (*Nar*I)
*Nar*I

*Nas*I (*Pst*I)
*Nas*WI (*Nae*I)
*Nbr*I (*Nae*I)
*Nco*I
*Nde*I
*Nfl*AI (*Eco*RV)
*Ngb*I (*Pst*I)
*Ngo*III (*Sac*II)
*Ngo*DIII (*Dpn*I)
*Ngo*PIII (*Sac*II)
*Nla*I (*Hae*III)
*Nla*IV
*Nla*DIII (*Sac*II)
*Nla*SII (*Acy*I)
*Nmu*I (*Nae*I)
*Nmu*EII (*Asu*I)
*Noc*I (*Pst*I)
*Nov*II (*Hin*fI)
*Nsi*I (*Ava*III)
*Nsi*HI (*Hin*fI)
*Nsp*III (*Ava*I)
*Nsp*AI (*Mbo*I)
*Nsp*HI (*Nsp*I)
*Nsp*SAI (*Ava*I)
*Nsp*SAIV (*Bam*HI)
*Nsu*I (*Mbo*I)
*Nta*SII (*Nae*I)
*Otu*NI (*Alu*I)
*Pae*I (*Sph*I)
*Pai*I (*Hae*III)
*Pfa*I (*Mbo*I)
*Pfl*NI (*Xho*I)
*Pgl*I (*Nae*I)
*Pma*44I (*Pst*I)
*Pov*I (*Bcl*I)
*Ppu*MI
*Pss*I (*Dra*II)
*Pvu*II
*Rhs*I (*Bam*HI)
*Rro*I (*Sal*I)
*Rsh*II (*Cau*II)
*Rsr*I (*Eco*RI)
*Sab*I (*Sac*II)
*Sac*AI (*Nae*I)
*Sal*AI (*Mbo*I)
*Sal*HI (*Mbo*I)
*Sau*I
*Sau*3239I (*Xho*I)
*Sau*BMKI (*Nae*I)
*Sbf*CI (*Sty*I)
*Sca*I
*Sco*I (*Sac*I)
*Sdu*I
*Sec*II (*Hpa*II)
*Sfa*GUI (*Hpa*II)
*Sfi*I
*Sfo*I (*Nar*I)
*Nas*BI (*Bam*HI)
*Nba*I (*Nae*I)
*Nca*I (*Hin*fI)
*Ncu*I (*Mbo*II)
*Nde*II (*Mbo*I)
*Nfl*AII (*Mbo*I)
*Ngo*I (*Hae*II)
*Ngo*BI (*Hph*I)
*Ngo*MI (*Nae*I)
*Ngo*SI (*Hae*III)
*Nla*II (*Mbo*I)
*Nla*DI (*Mbo*I)

*Nme*CI (*Mbo*I)
*Nmu*DI (*Dpn*I)
*Nmu*FI (*Nae*I)
*Nop*I (*Sal*I)
*Nph*I (*Mbo*I)
*Nsi*AI (*Mbo*I)
*Nsp*I
*Nsp*IV (*Asu*I)
*Nsp*BI (*Asu*II)
*Nsp*HII (*Ava*II)
*Nsp*SAII (*Bst*EII)
*Nsp*WI (*Nae*I)
*Nta*I (*Tth*111I)
*Nun*II (*Nar*I)
*Oxa*I (*Alu*I)
*Pae*AI (*Sac*II)
*Pal*I (*Hae*III)
*Pfl*AI (*Fnu*DII)
*Pfl*WI (*Xho*I)
*Ple*I
*Pma*CI
*Ppa*I (*Eco*31I)
*Psp*I (*Asu*I)
*Pst*I
*Rhe*I (*Sal*I)
*Rlu*I (*Nae*I)
*Rsa*I
*Rsp*I (*Pvu*I)
*Rsr*II
*Sac*I
*Sak*I (*Sac*II)
*Sat*CI (*Nae*I)
*Sal*PI (*Pst*I)
*Sau*3AI (*Mbo*I)
*Sau*6782I (*Mbo*I)
*Sbf*AI (*Sty*I)
*Sbo*13I (*Nru*I)
*Sci*I (*Xho*I)
*Scr*FI
*Sdy*I (*Asu*I)
*Sec*III (*Sau*I)
*Sfa*I (*Hae*III)
*Sfi*I (*Pst*I)
*Sfr*I (*Sac*II)
*Nas*SI (*Sac*I)
*Nbl*I (*Pvu*I)
*Nci*I (*Cau*II)
*Nda*I (*Nar*I)
*Nfl*I (*Mbo*I)
*Nfl*BI (*Mbo*I)
*Ngo*II (*Hae*III)
*Ngo*DI (*Sac*II)
*Ngo*PII (*Hae*III)
*Nhe*I
*Nla*III
*Nla*DII (*Asu*I)
*Nla*SI (*Sac*II)
*Nmi*I (*Kpn*I)
*Nmu*EI (*Dpn*I)
*Nmu*SI (*Asu*I)
*Not*I
*Nru*I
*Nsi*CI (*Eco*RV)
*Nsp*II (*Sdu*I)
*Nsp*V (*Asu*II)
*Nsp*BII
*Nsp*MACI (*Bgl*II)
*Nsp*SAIII (*Nco*I)
*Nsu*DI (*Dpn*I)
*Nta*SI (*Stu*I)
*Otu*I (*Alu*I)
*Oxa*NI (*Sau*I)
*Pae*R7I (*Xho*I)
*Pan*I (*Xho*I)
*Pfl*MI
*Pfu*I (*Spl*I)
*Pma*I (*Pst*I)
*Pmy*I (*Pst*I)
*Ppu*I (*Hae*III)
*Psp*61I (*Nae*I)
*Pvu*I
*Rhp*I (*Sal*I)
*Rrh*I (*Sal*I)
*Rsh*I (*Pvu*I)
*Rsp*XI (*Bsp*HI)
*Saa*I (*Sac*II)
*Sac*II
*Sal*I
*Sal*DI (*Nru*I)
*Sao*I (*Nae*I)
*Sau*96I (*Asu*I)
*Sau*AI (*Nae*I)
*Sbf*BI (*Sty*I)
*Sbo*I (*Sac*II)
*Sci*NI (*Hha*I)
*Scu*I (*Xho*I)
*Sec*I
*Sex*I (*Xho*I)
*Sfa*NI
*Sfn*I (*Ava*II)
*Sga*I (*Xho*I)

*Sgo*I (*Xho*I)
*Sin*I (*Ava*II)
*Sin*CI (*Ava*II)
*Sin*FI (*Ava*II)
*Sin*JI (*Ava*II)
*Ska*II (*Pst*I)
*Sma*I
*Sno*I (*Apa*LI)
*Spe*I
*Spl*II (*Tth*111I)
*Sso*II (*Scr*FI)
*Sst*II (*Sac*II)
*Sth*AI (*Kpn*I)
*Sth*DI (*Kpn*I)
*Sth*GI (*Kpn*I)
*Sth*KI (*Kpn*I)
*Sth*NI (*Kpn*I)
*Sua*I (*Hae*III)
*Taq*II
*Tfi*I (*Taq*I)
*Tru*I (*Ava*II)
*Tsp*EI
*Tth*111I
*Tth*I (*Hae*III)
*Vha*I (*Hae*III)
*Xam*I (*Sal*I)
*Xci*I (*Sal*I)
*Xho*II
*Xma*III
*Xor*I (*Pst*I)
*Xph*I (*Pst*I)
*Yen*BI (*Pst*I)
*Yen*EI (*Pst*I)
*Sgr*II (*Eco*RII)
*Sin*AI (*Ava*II)
*Sin*DI (*Ava*II)
*Sin*GI (*Ava*II)
*Sin*MI (*Mbo*I)
*Sla*I (*Xho*I)
*Sna*I
*Spa*I (*Xho*I)
*Sph*I
*Spl*III (*Hae*III)
*Ssp*I
*Sst*IV (*Bcl*I)
*Sth*BI (*Kpn*I)
*Sth*EI (*Kpn*I)
*Sth*HI (*Kpn*I)
*Sth*LI (*Kpn*I)
*Stu*I
*Sul*I (*Hae*III)
*Taq*XI (*Eco*RII)
*Tgl*I (*Sac*II)
*Tru*II (*Mbo*I)
*Tsp*ZNI (*Hae*III)
*Tth*111II
*Tth*I (*Tth*111I)
*Vne*I (*Apa*LI)
*Xba*I
*Xcy*I (*Sma*I)
*Xma*I (*Sma*I)
*Xmn*I
*Xor*II (*Pvu*I)
*Yen*I (*Pst*I)
*Yen*CI (*Pst*I)
*Zan*I (*Eco*RII)
*Shy*I (*Sac*II)
*Sin*BI (*Ava*II)
*Sin*EI (*Ava*II)
*Sin*HI (*Ava*II)
*Ska*I (*Nae*I)
*Slu*I (*Xho*I)
*Sna*BI
*Spa*XI (*Sph*I)
*Spl*I
*Sso*I (*Eco*RI)
*Sst*I (*Sac*I)
*Sth*I (*Kpn*I)
*Sth*CI (*Kpn*I)
*Sth*FI (*Kpn*I)
*Sth*JI (*Kpn*I)
*Sth*MI (*Kpn*I)
*Sty*I
*Taq*I
*Tce*I (*Mbo*II)
*Tha*I (*Fnu*DII)
*Tsp*45I
*Tte*I (*Tth*111I)
*Tth*HB8I (*Taq*I)
*Van*I (*Bgl*I)
*Vsp*I
*Xca*I (*Sna*I)
*Xho*I
*Xma*II (*Pst*I)
*Xni*I (*Pvu*I)
*Xpa*I (*Xho*I)
*Yen*AI (*Pst*I)
*Yen*DI (*Pst*I)

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