Compilation of sequences of tRNA genes

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INTRODUCTION

In the compilation of tRNA-genes the sequences have been aligned and displayed as has been done in the case of the tRNA sequences (Fig. 1 in accompanying compilation).

The nucleotides preceding nucleotide residue 1 and the nucleotides following the residue 76 as well as the intervening sequences have been excluded from the compilation. Some genes of $tRNA^{His}$ possess a nucleoside in position zero which is transcribed and occurs in processed tRNA. The CCA sequence is included only if it is coded for in the gene. The occurrence of the intervening sequence after a particular nucleotide is indicated by an asterisk and defined in the footnote. The title of each sequence is build-up according to the rules used in the accompanying tNRA-sequence-compilation.

The compilation is deposited in the Nucleotide Sequence Data Library of EMBL, Heidelberg, and available there on magnatic tape upon request.

The compilers would welcome any information regarding missing material or erroneous presentation.

Acknowledgements: We thank Rudolf Jung for cooperation and Fonds der Chemischen Industrie for financial support.

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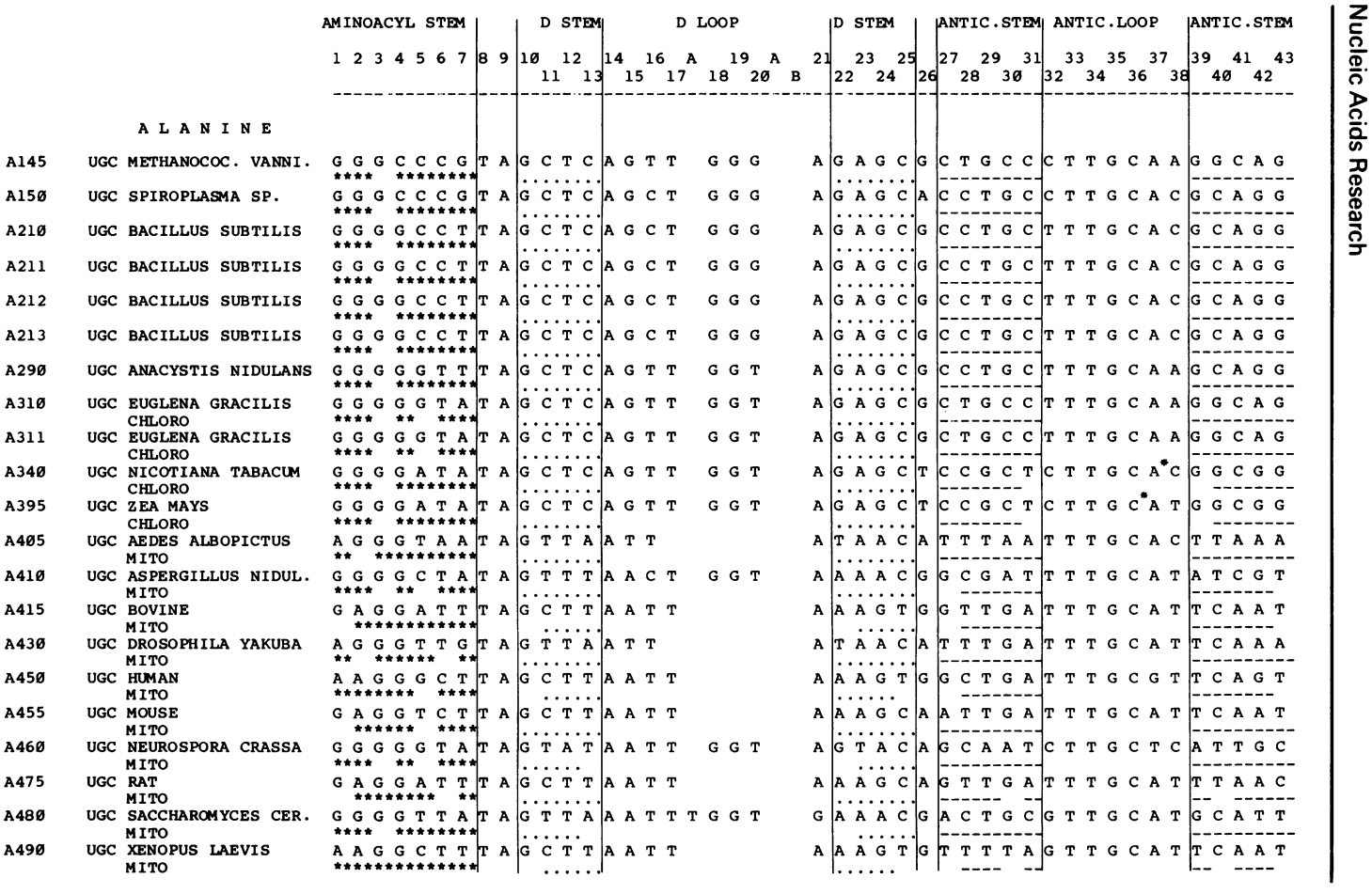
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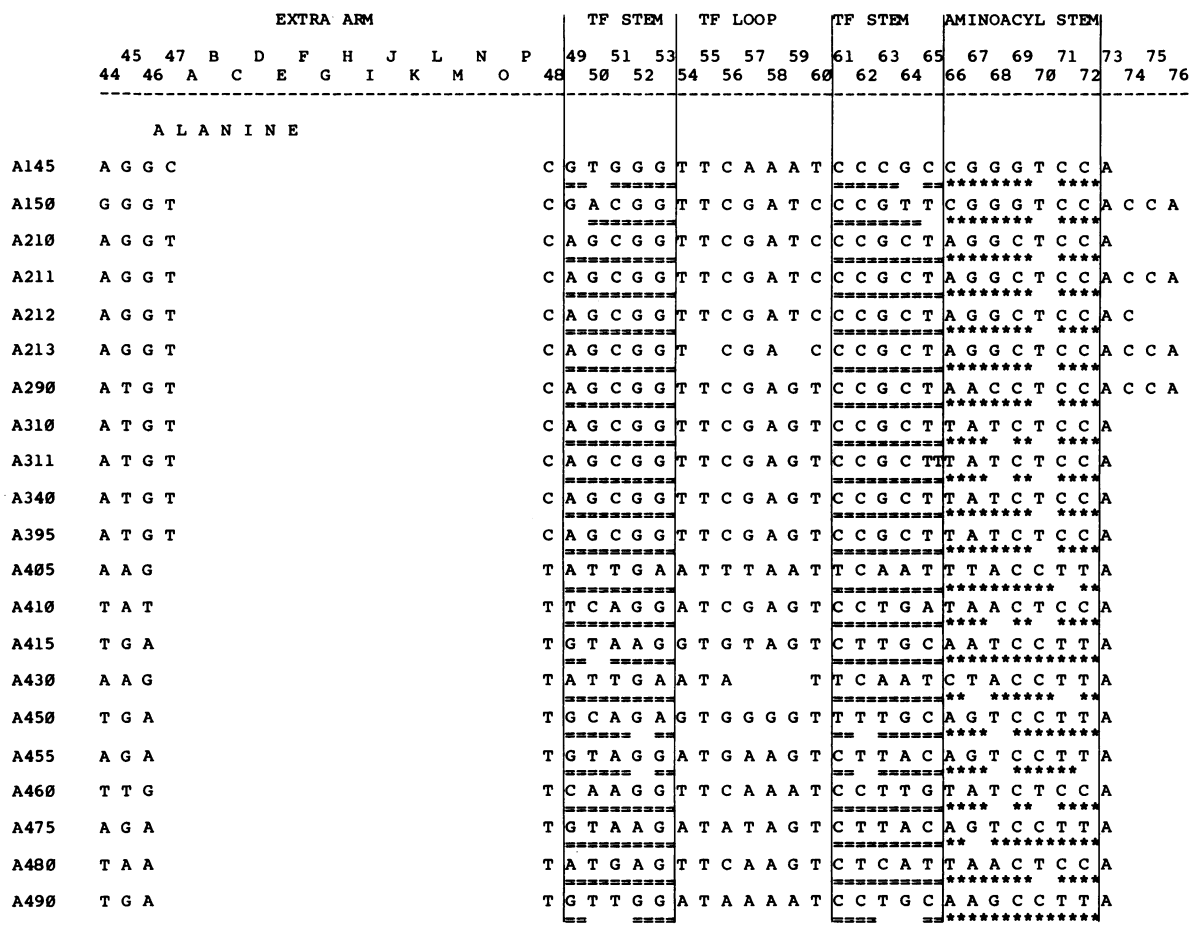
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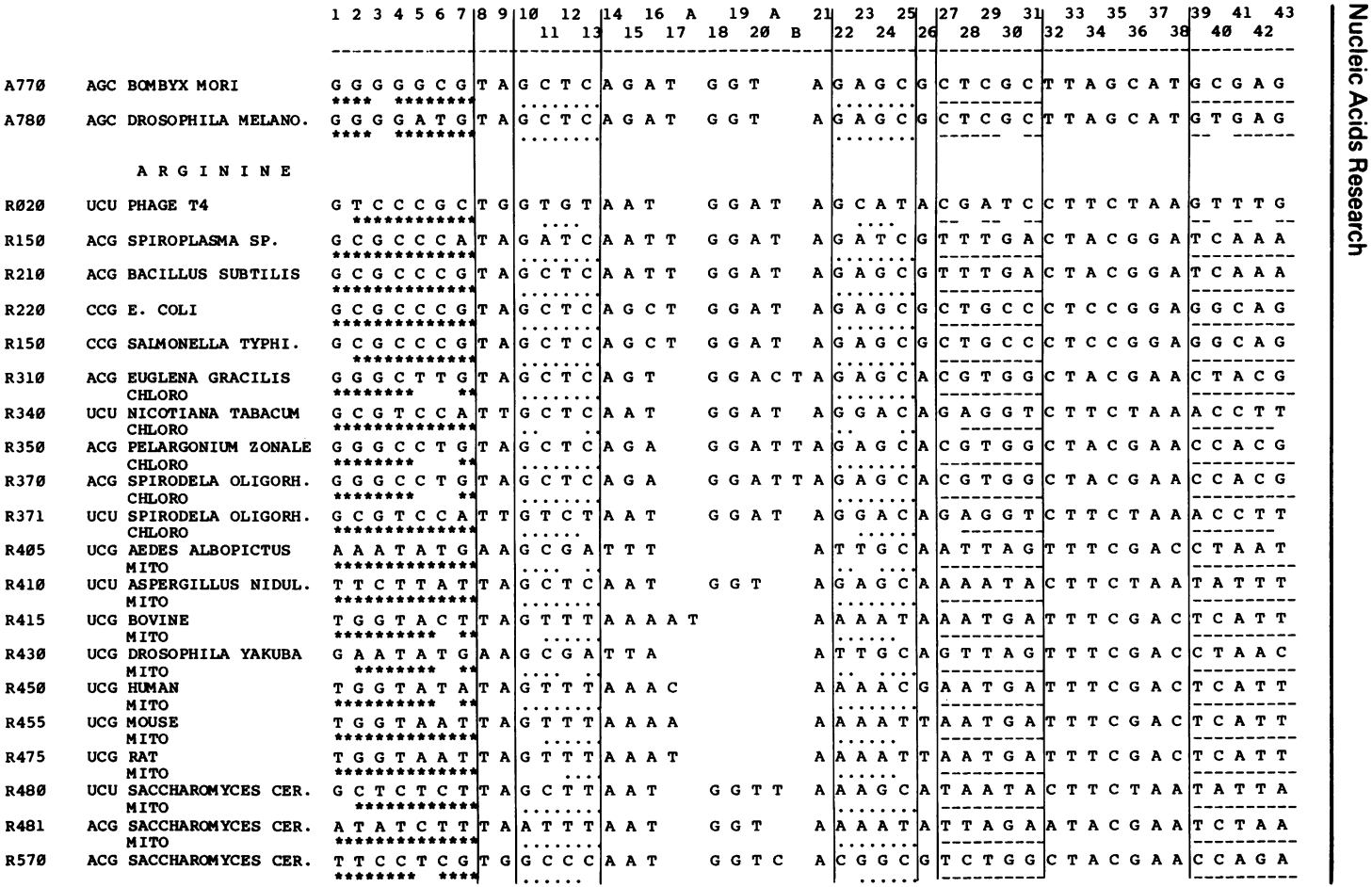
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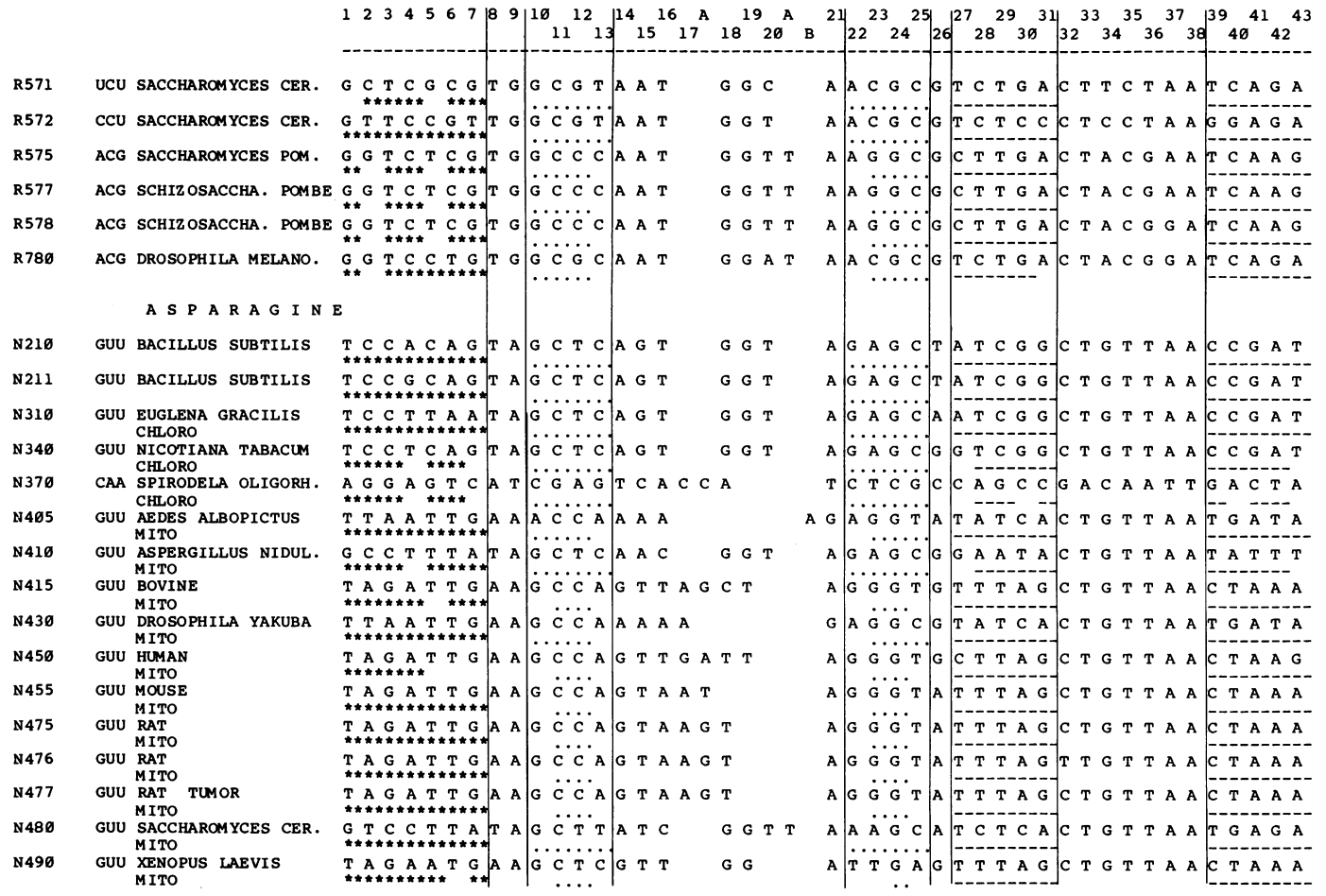
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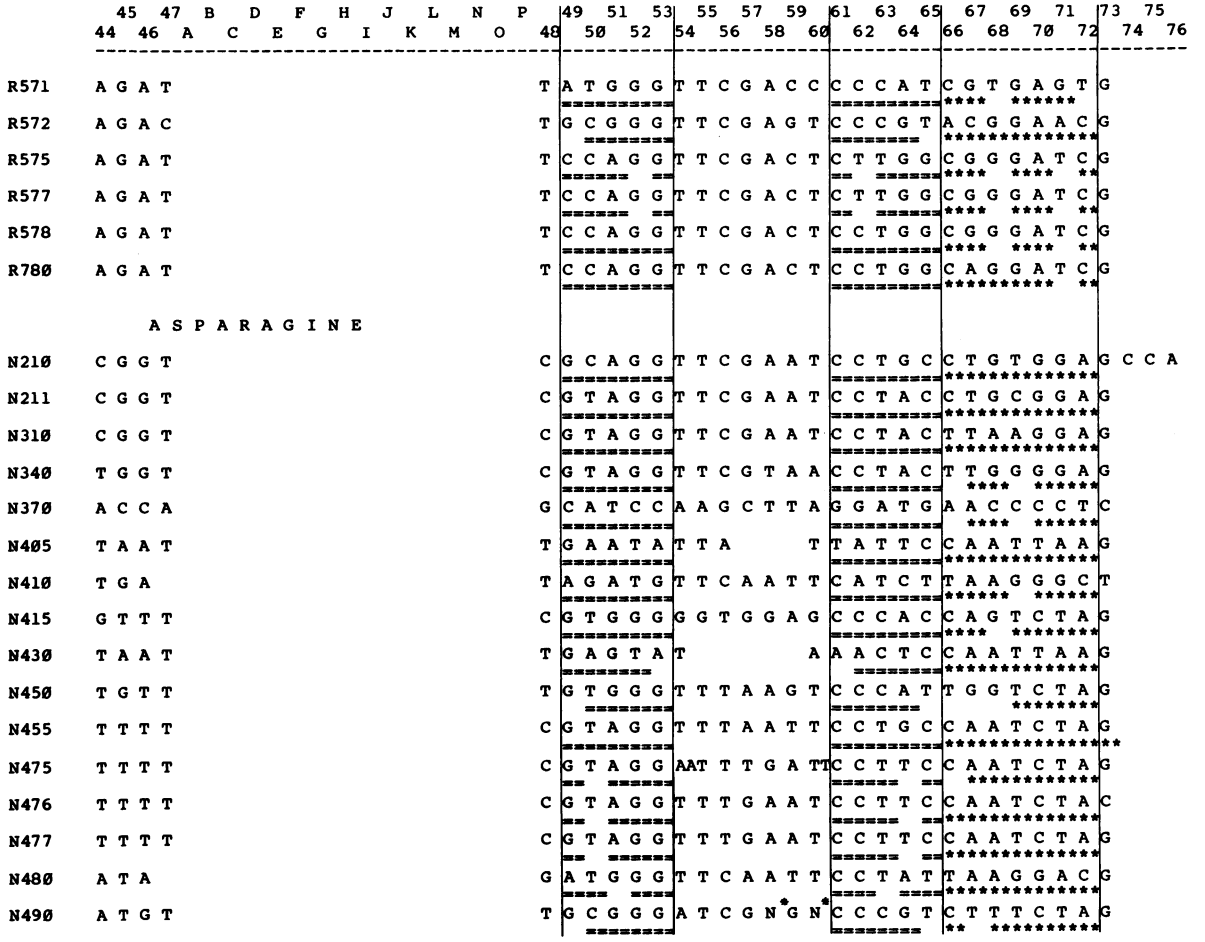
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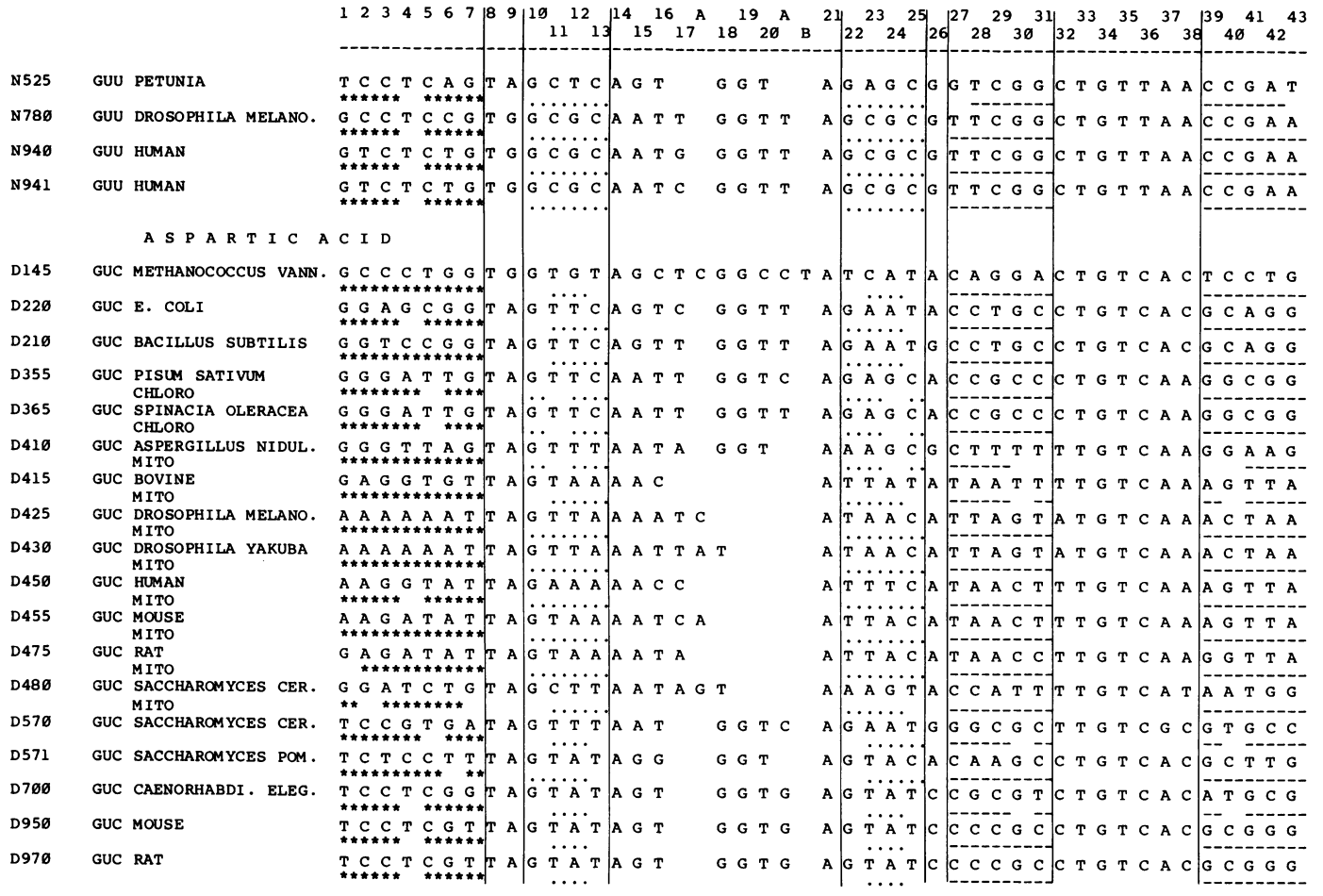
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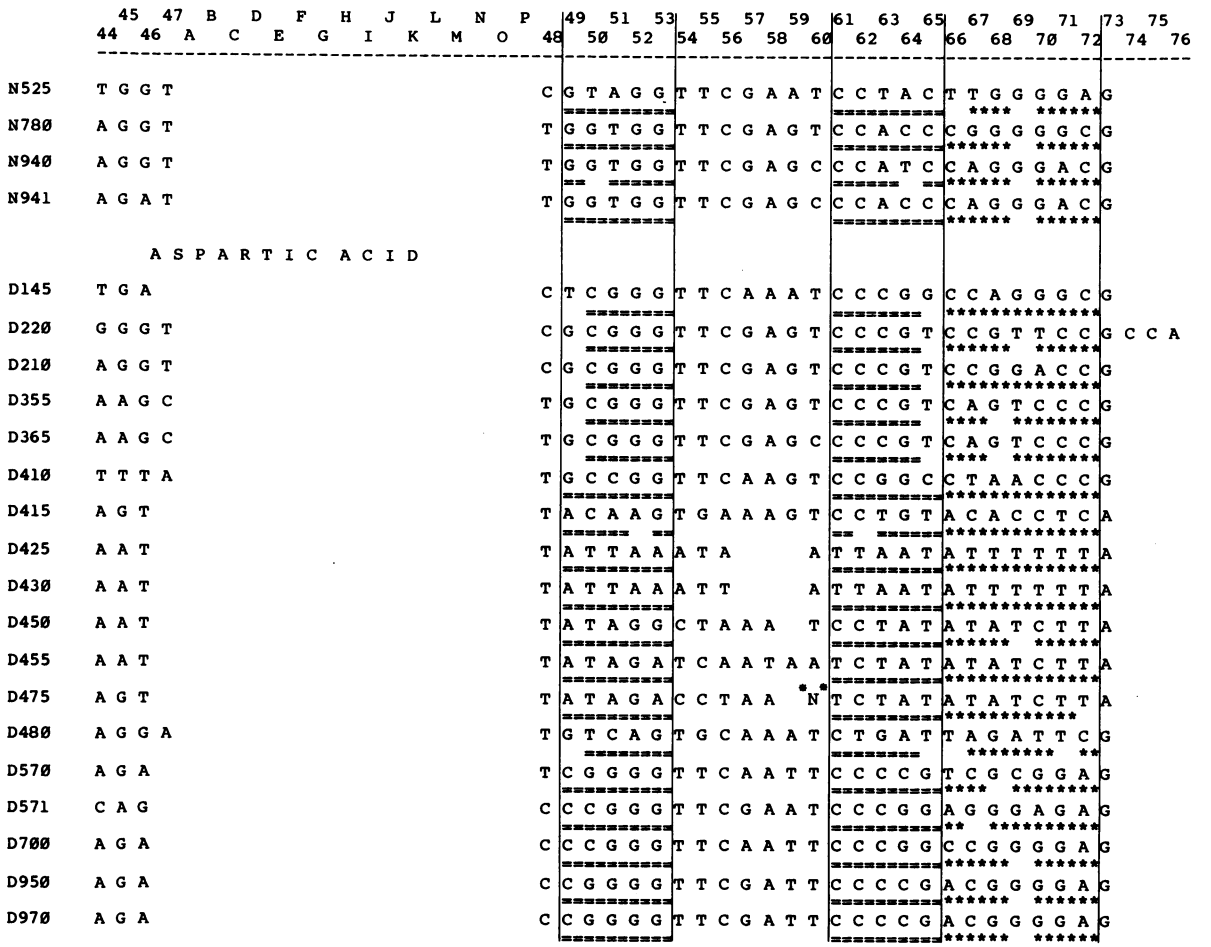
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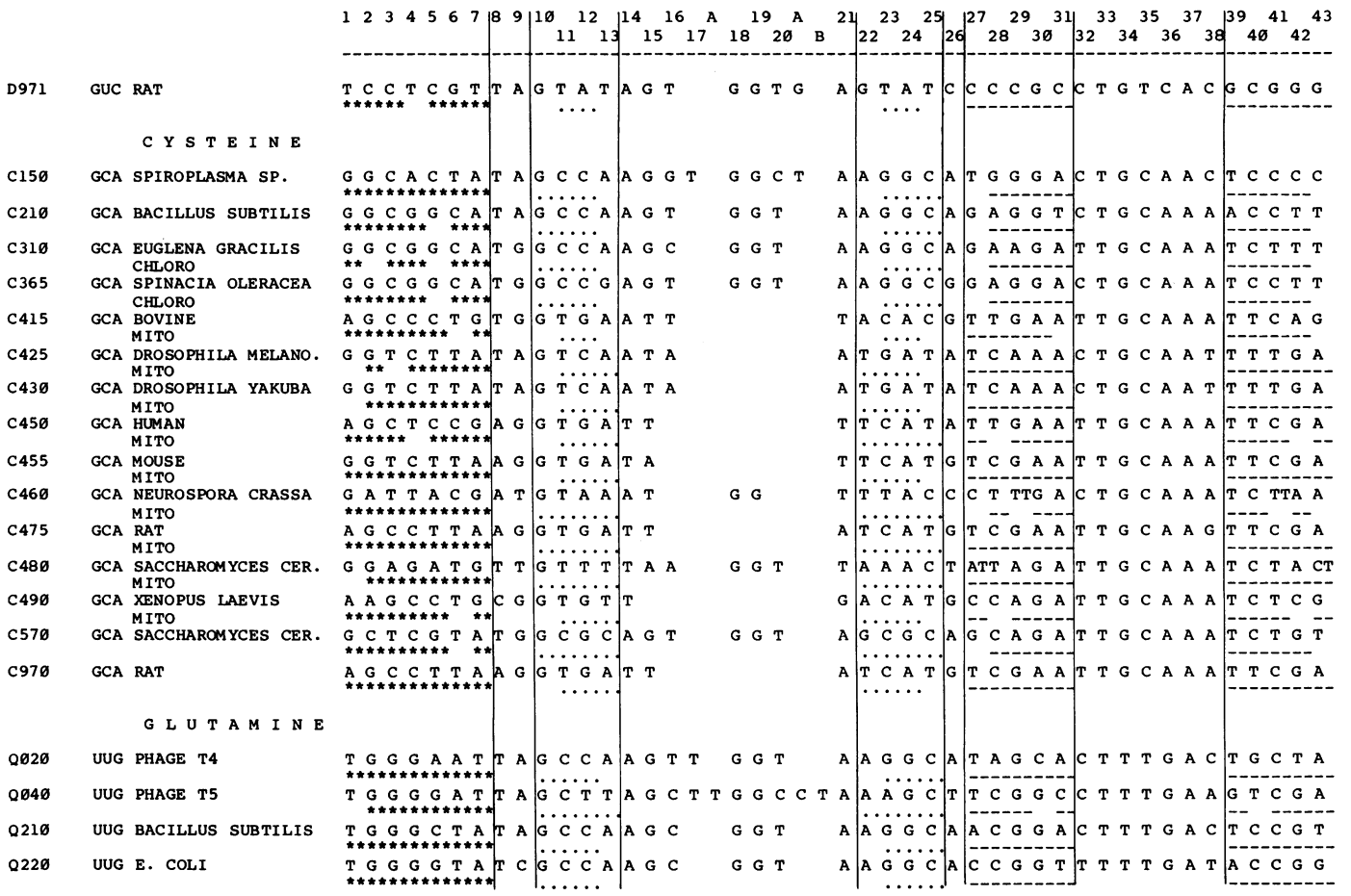
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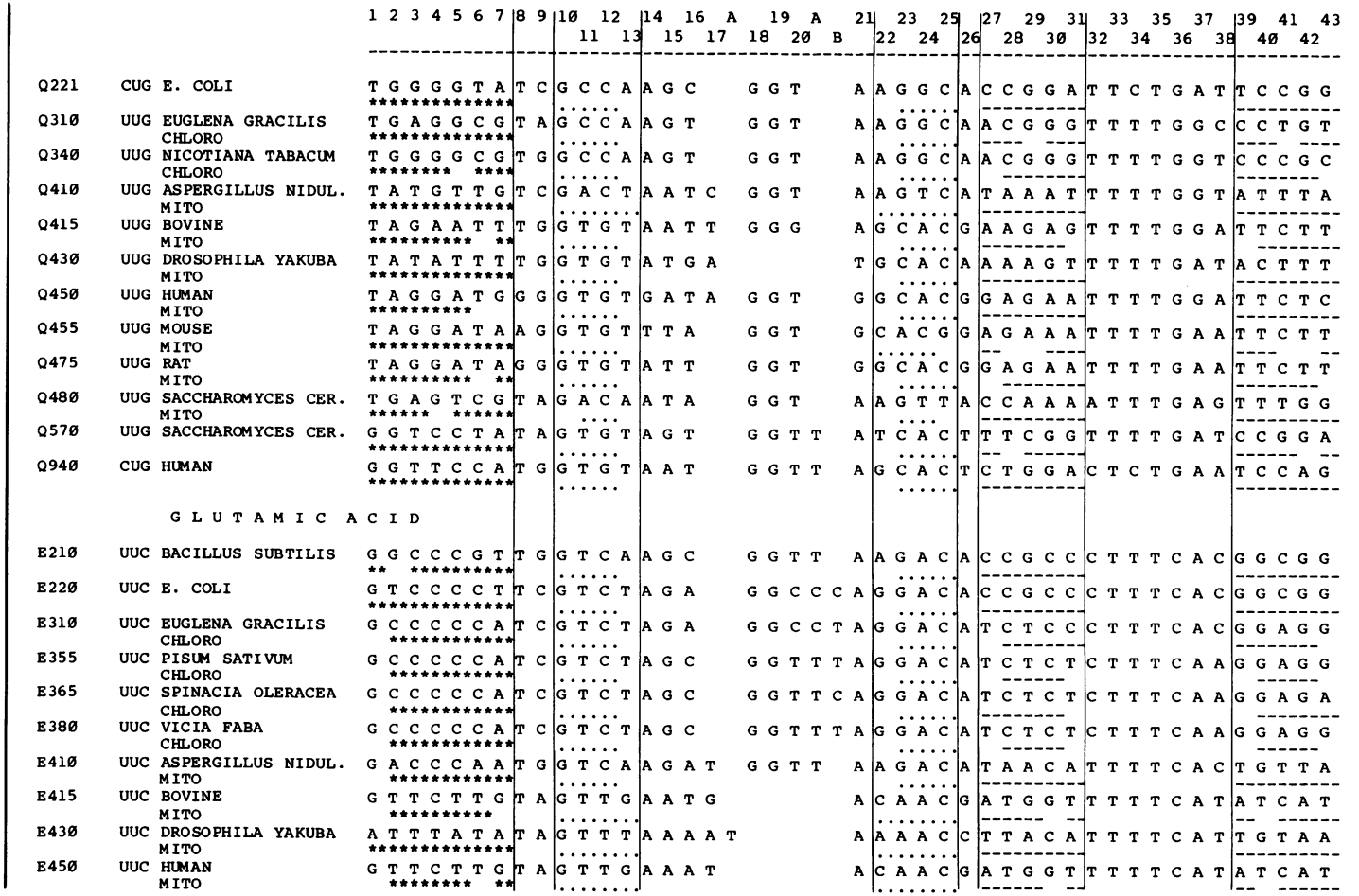
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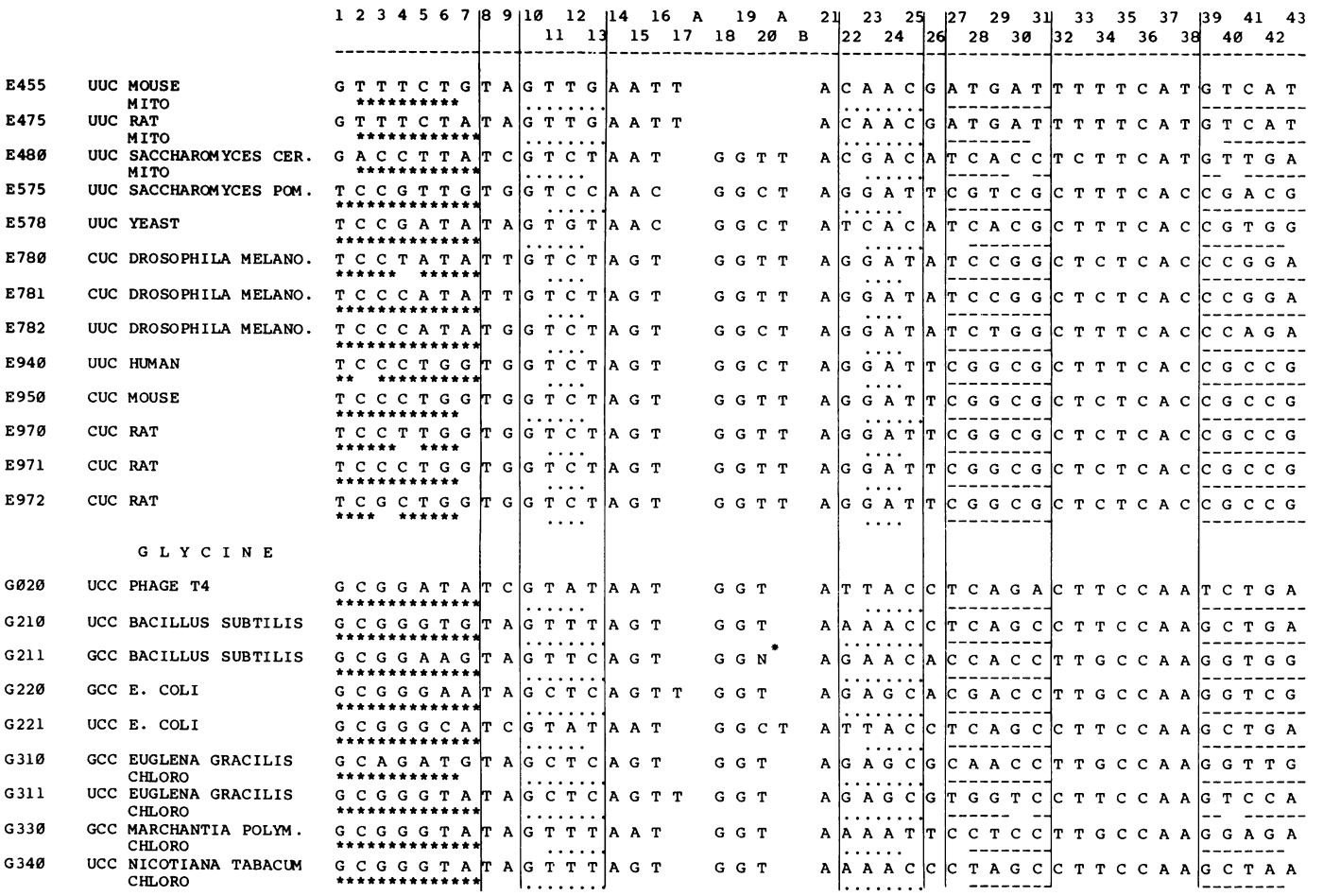
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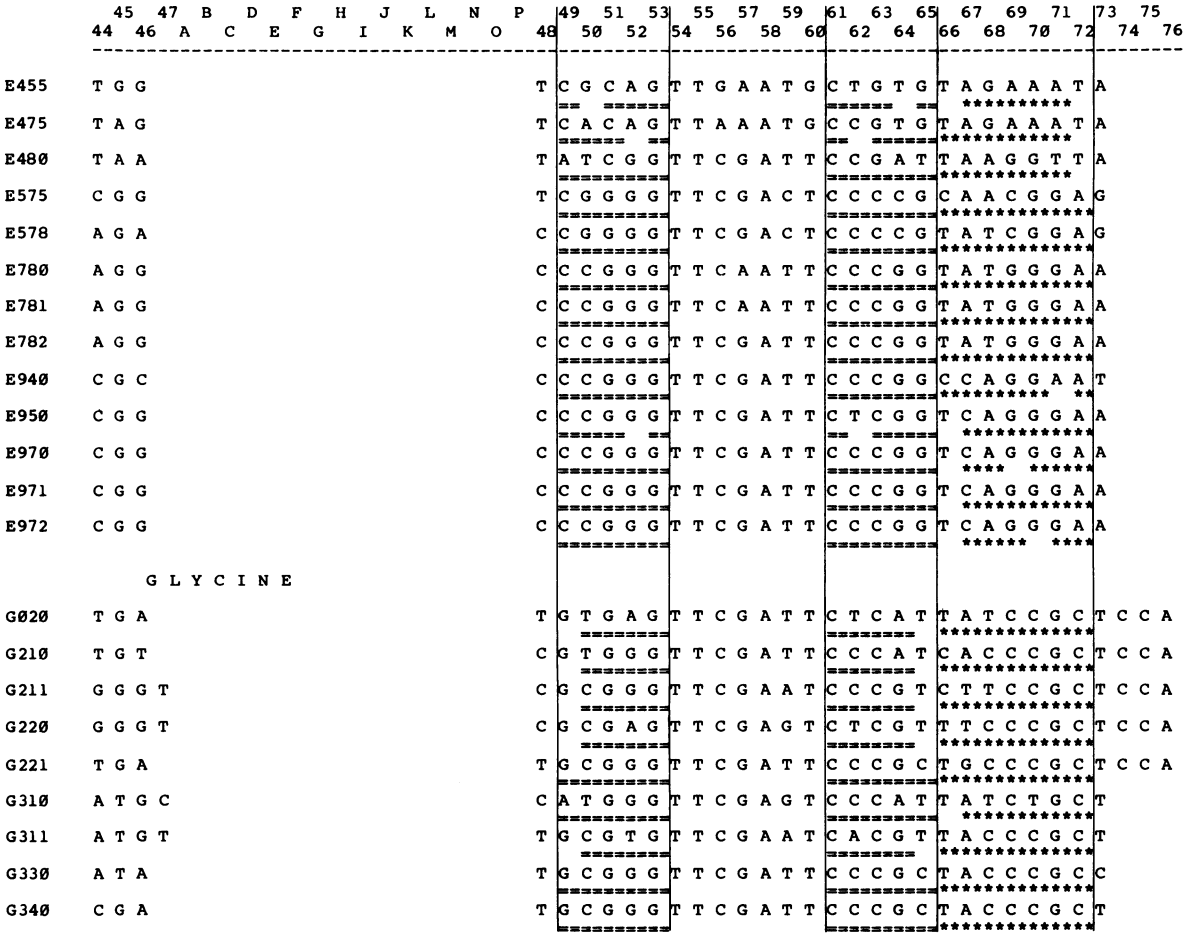
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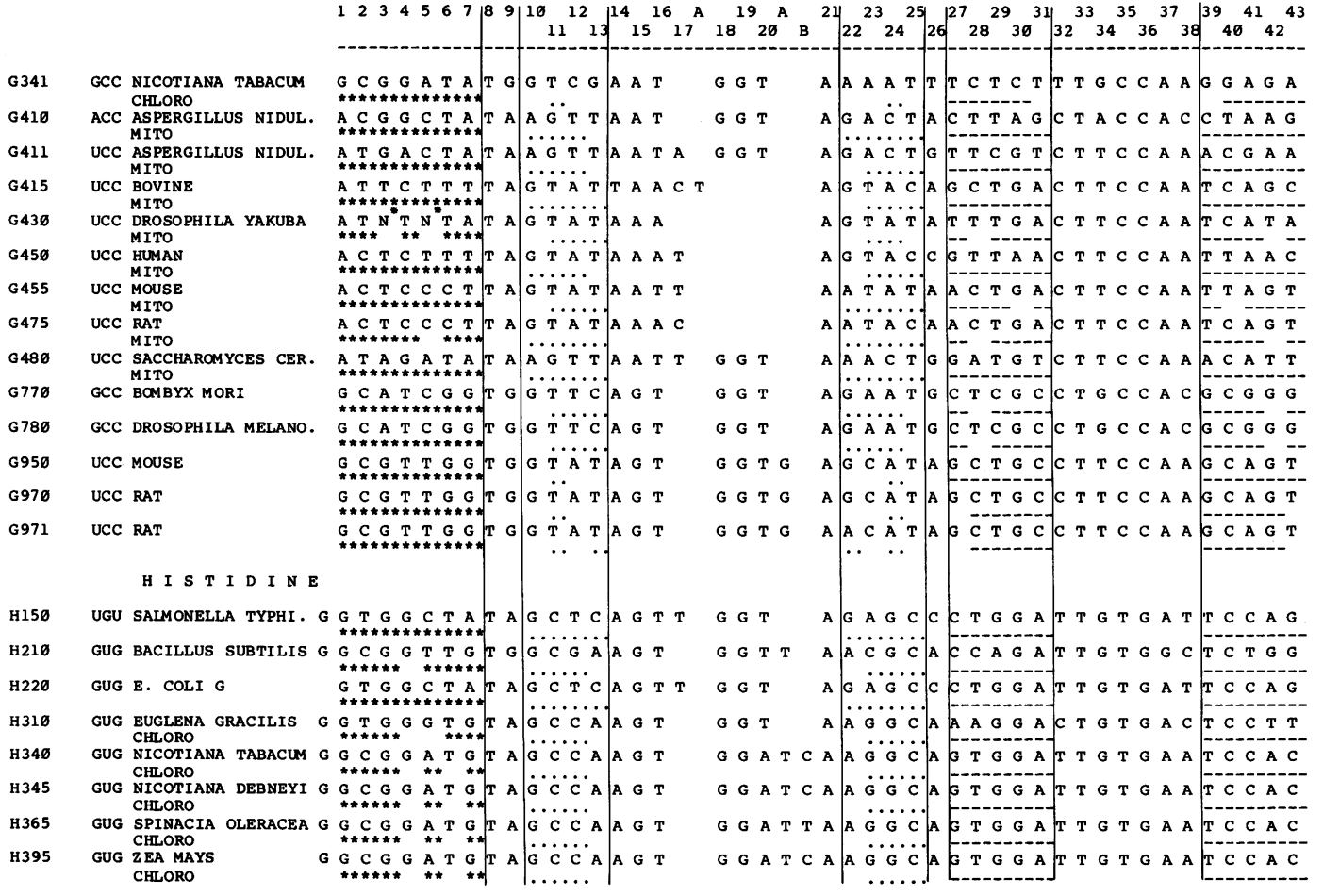
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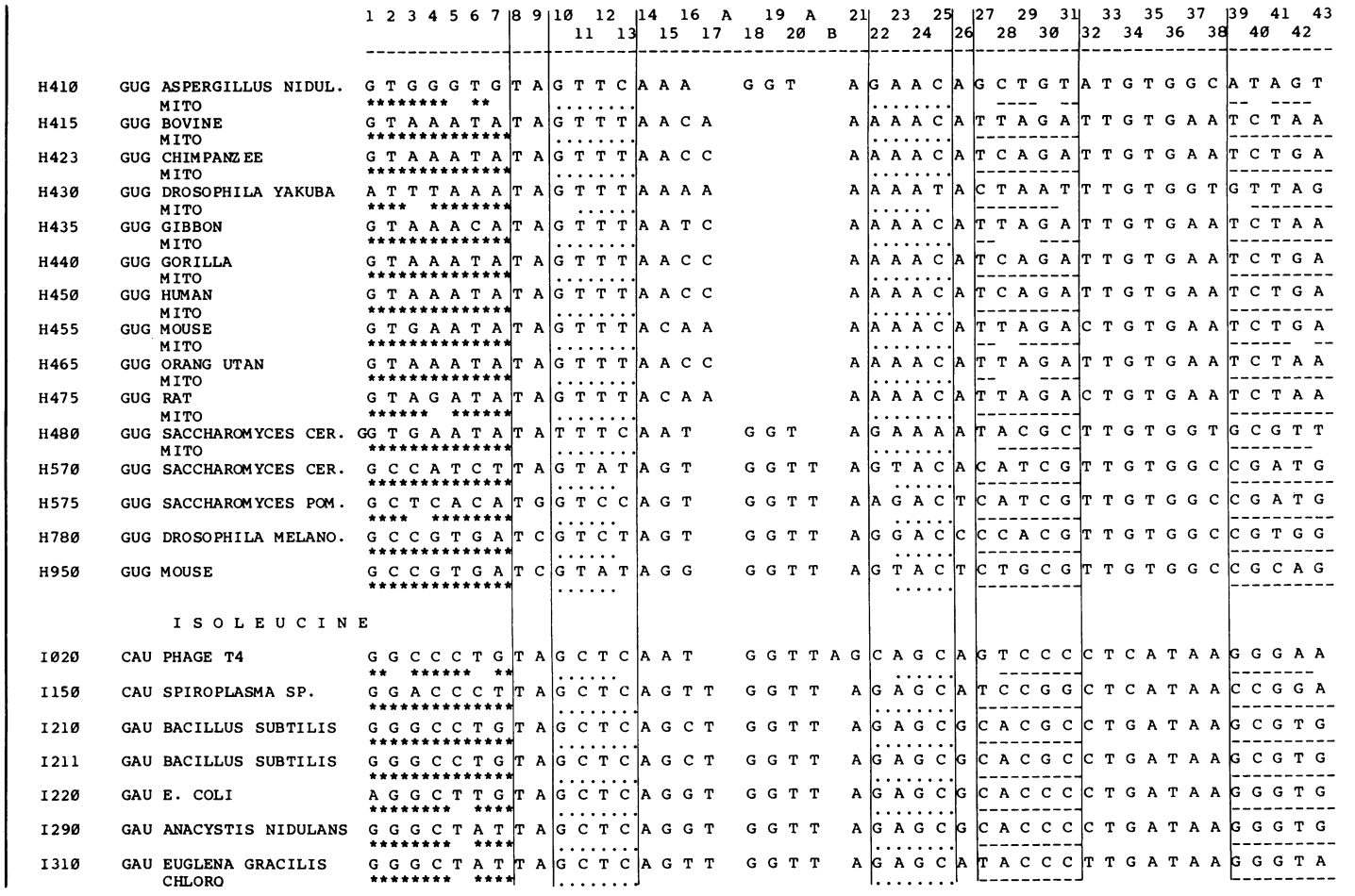
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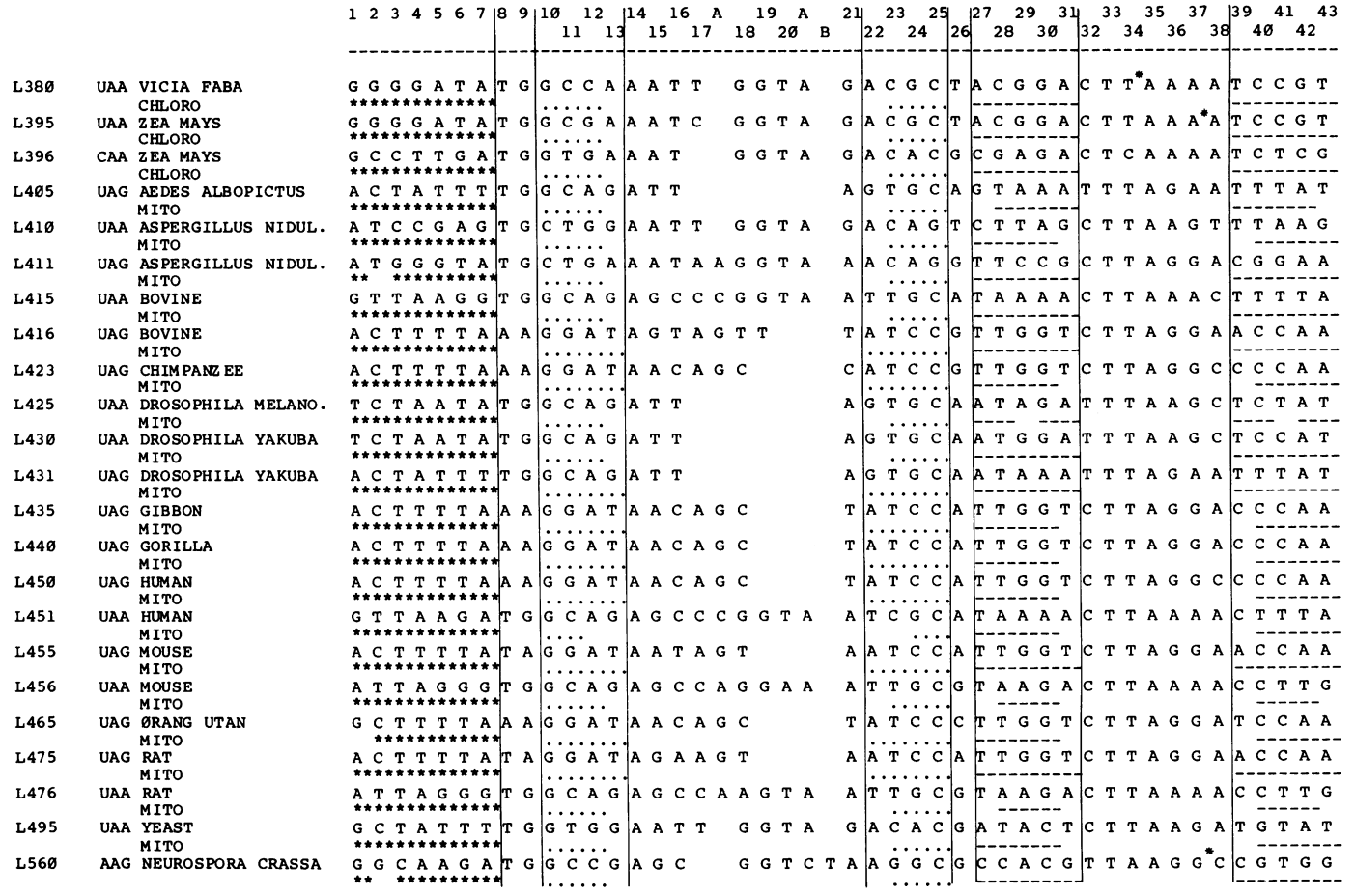
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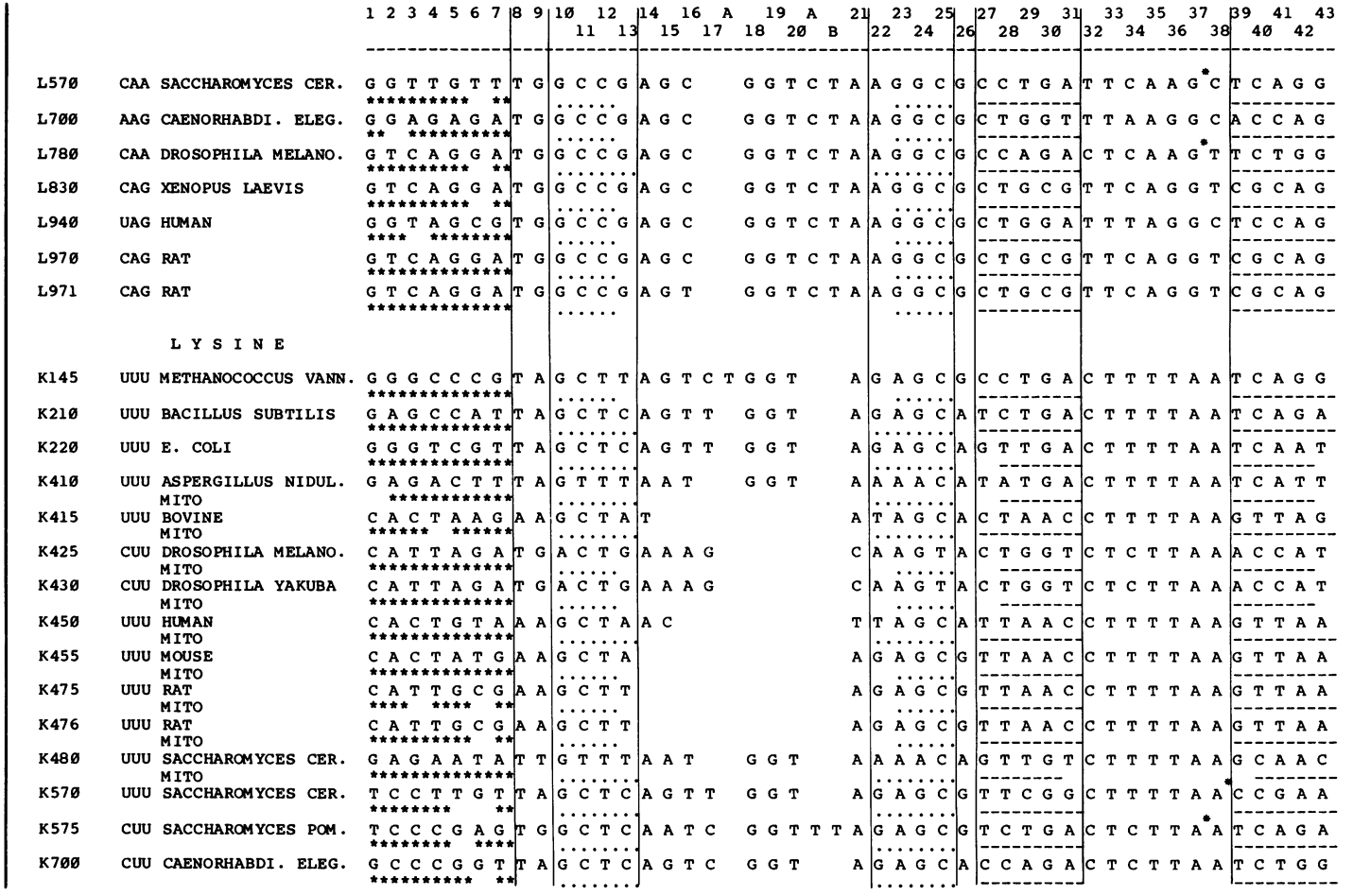
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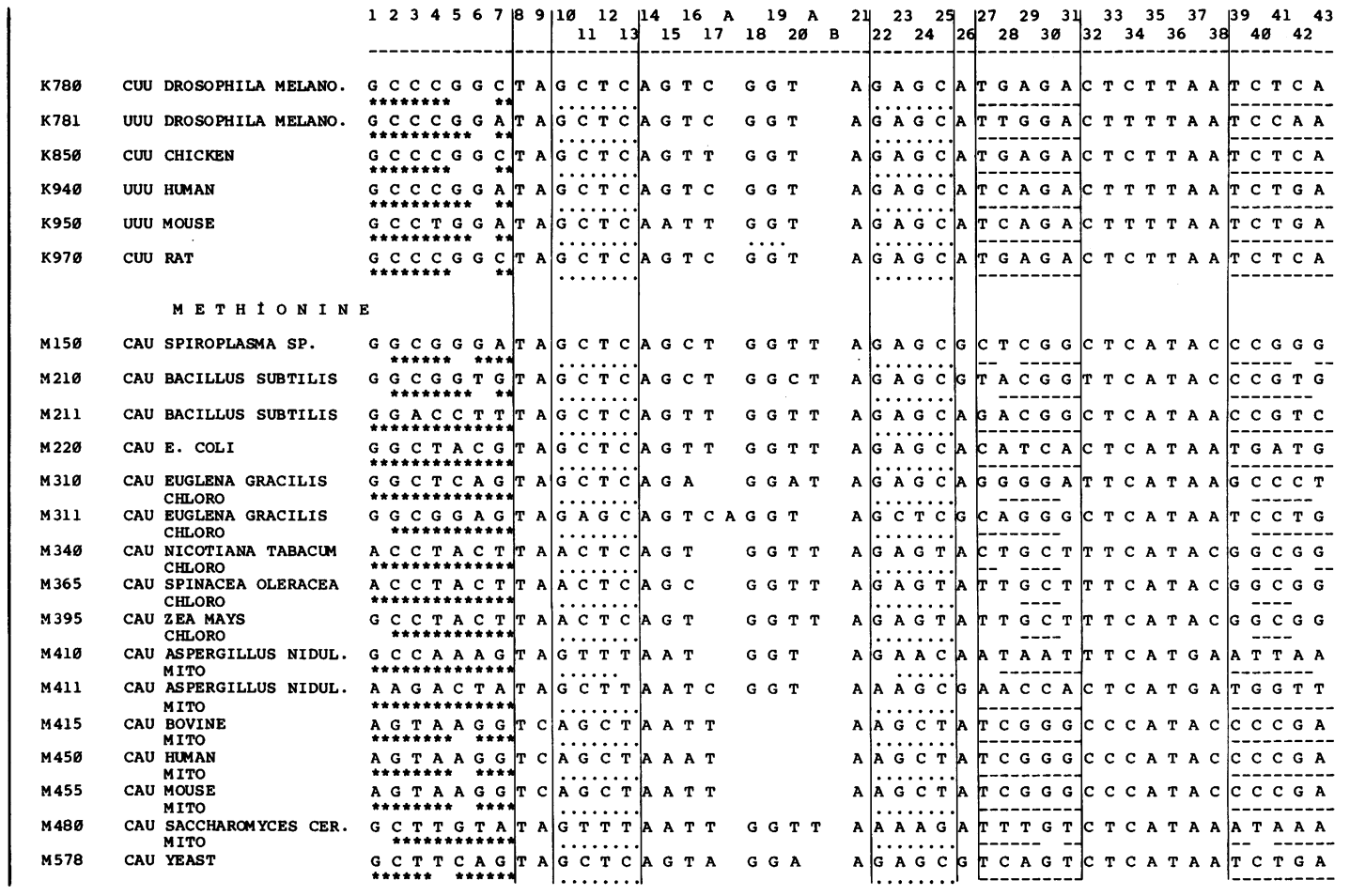
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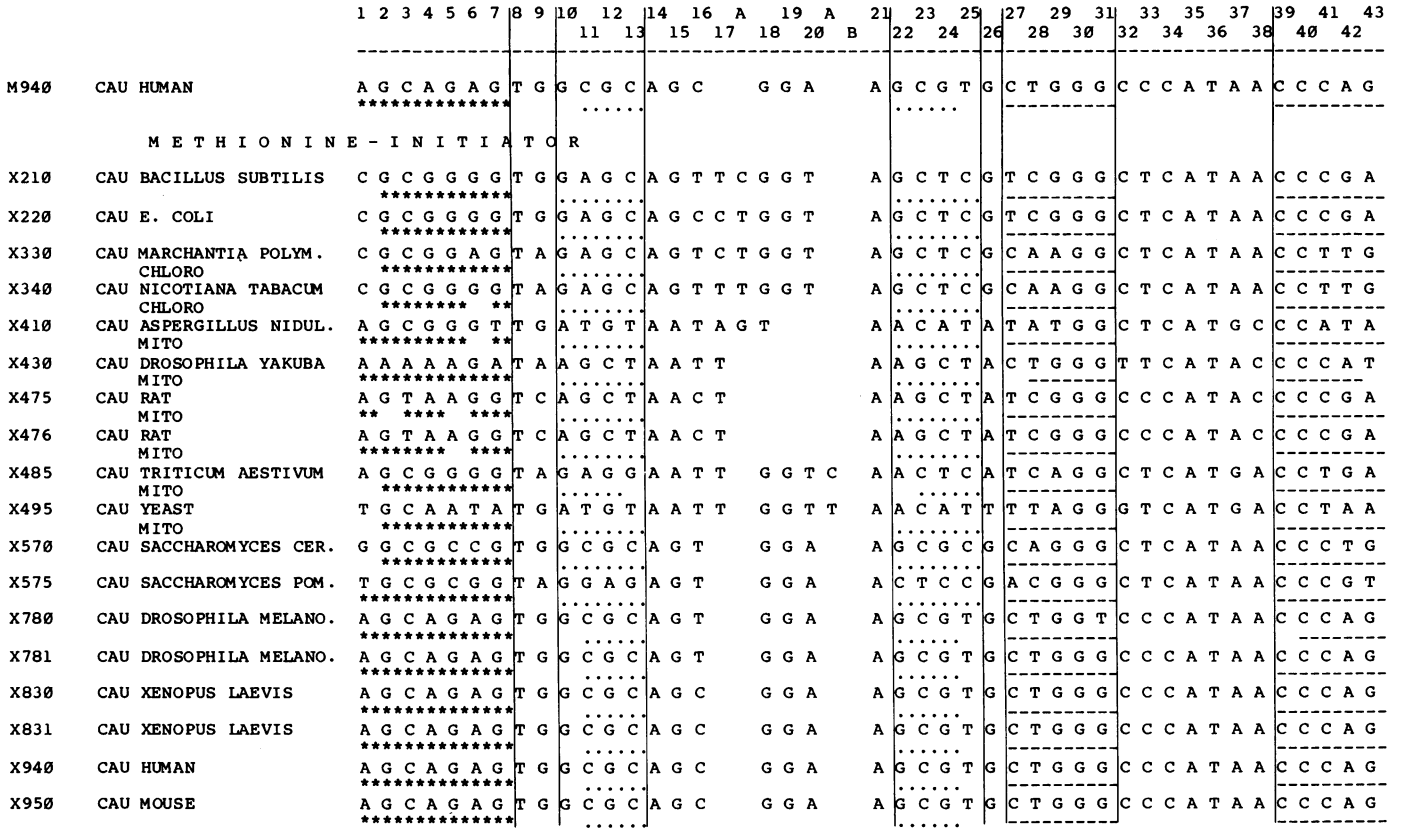
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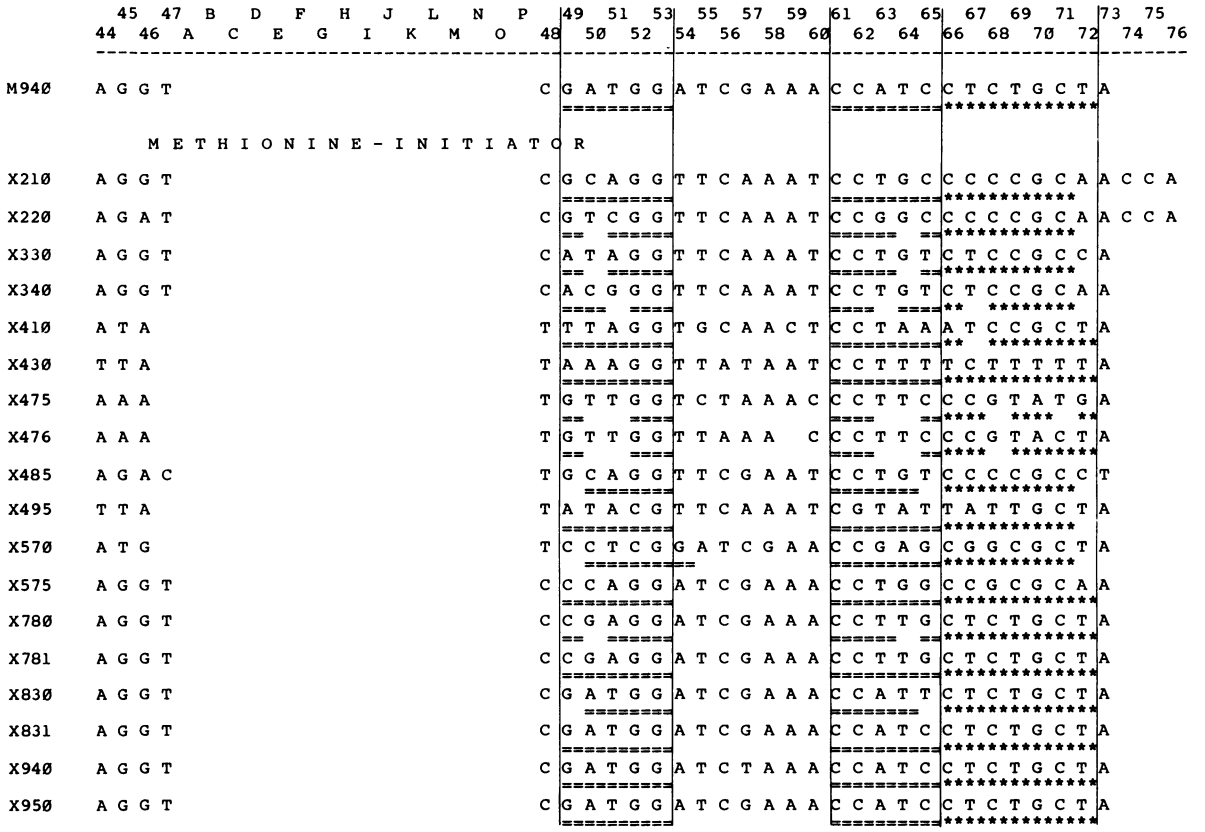
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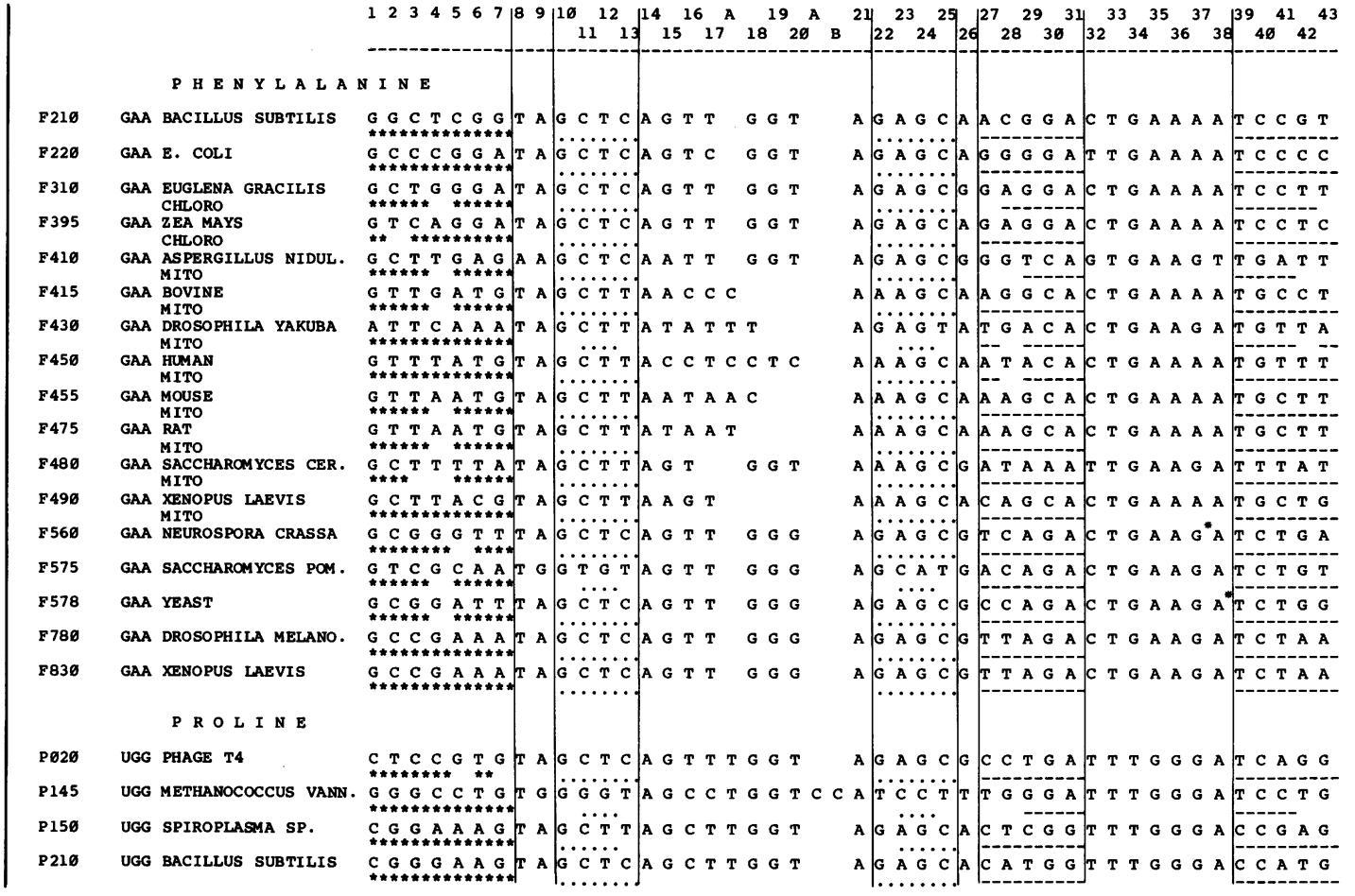
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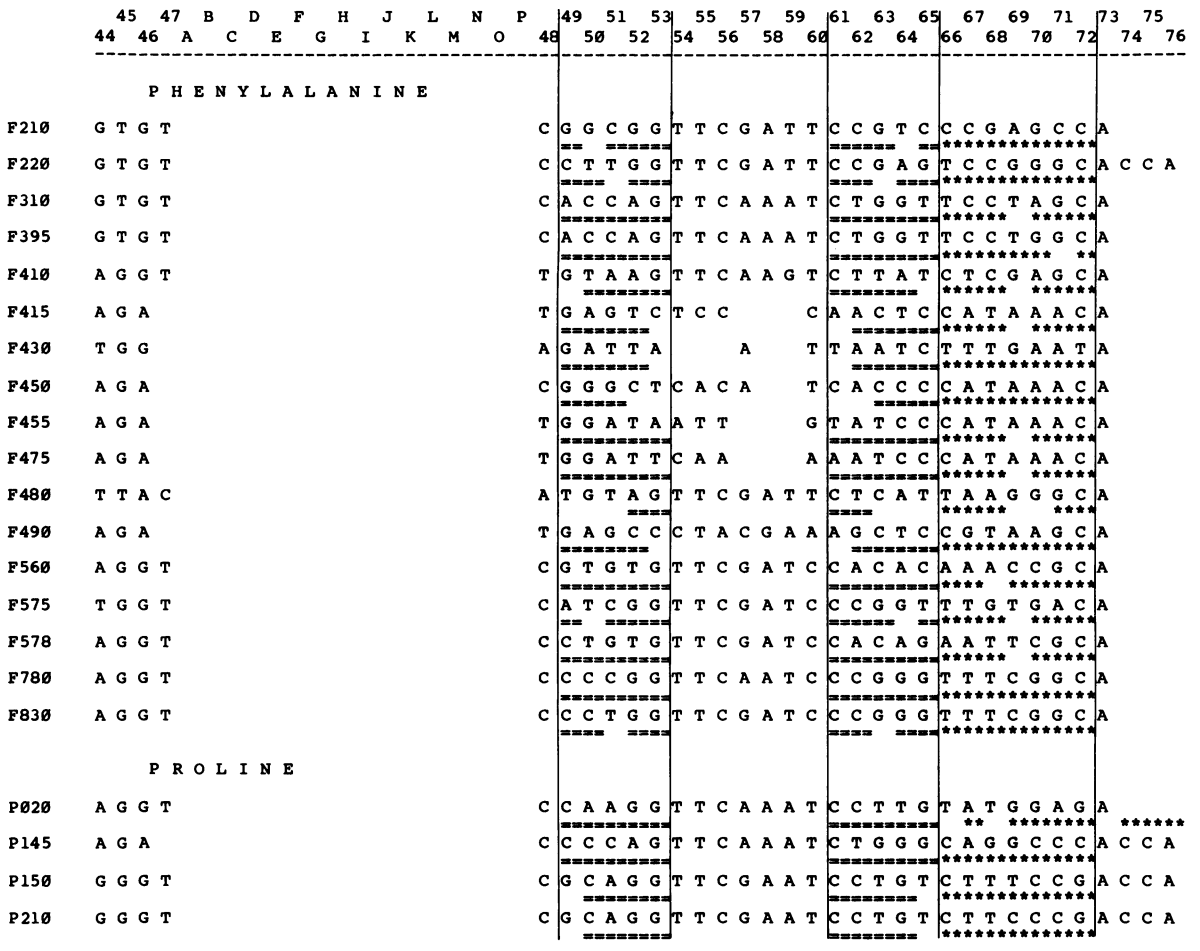
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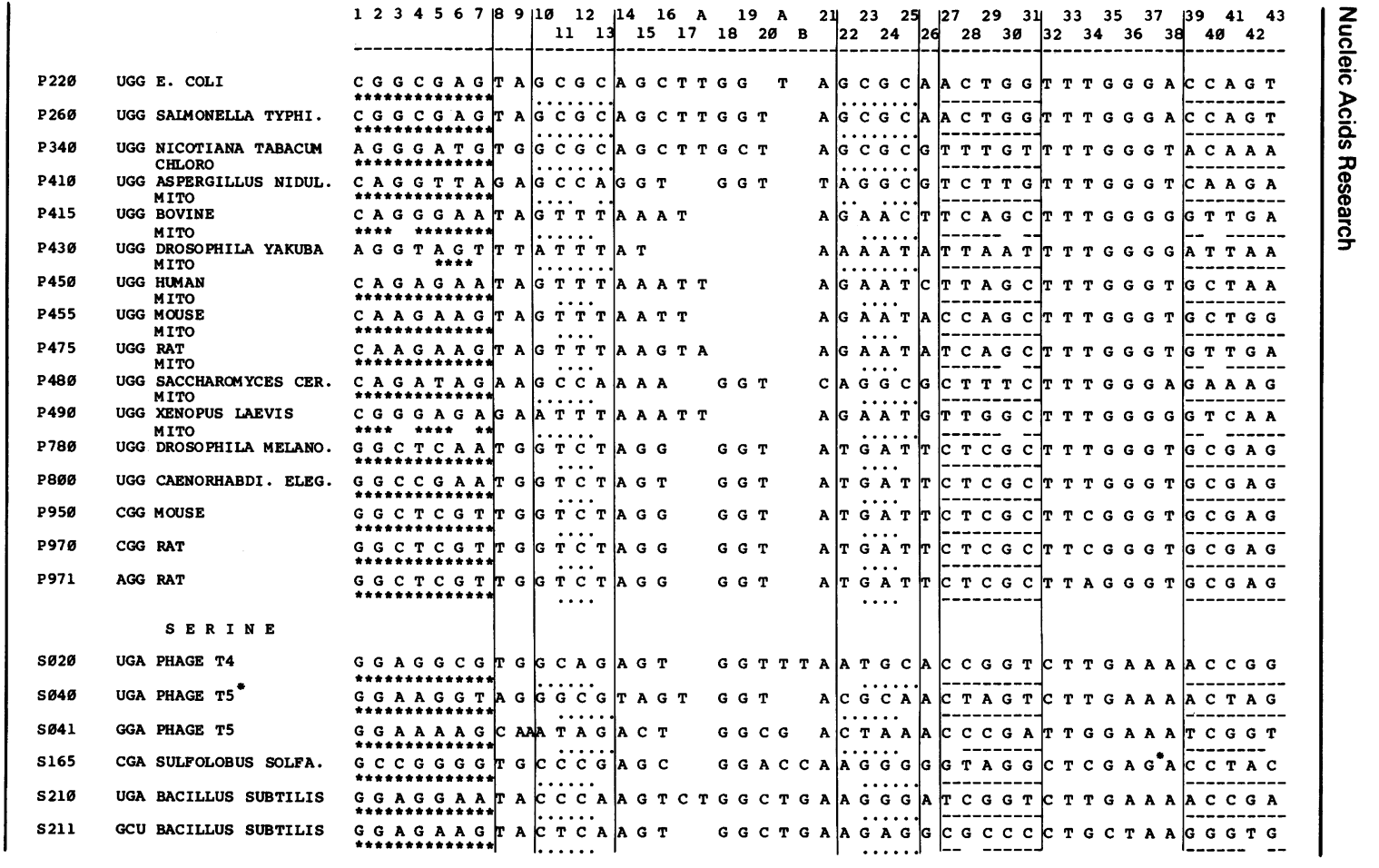
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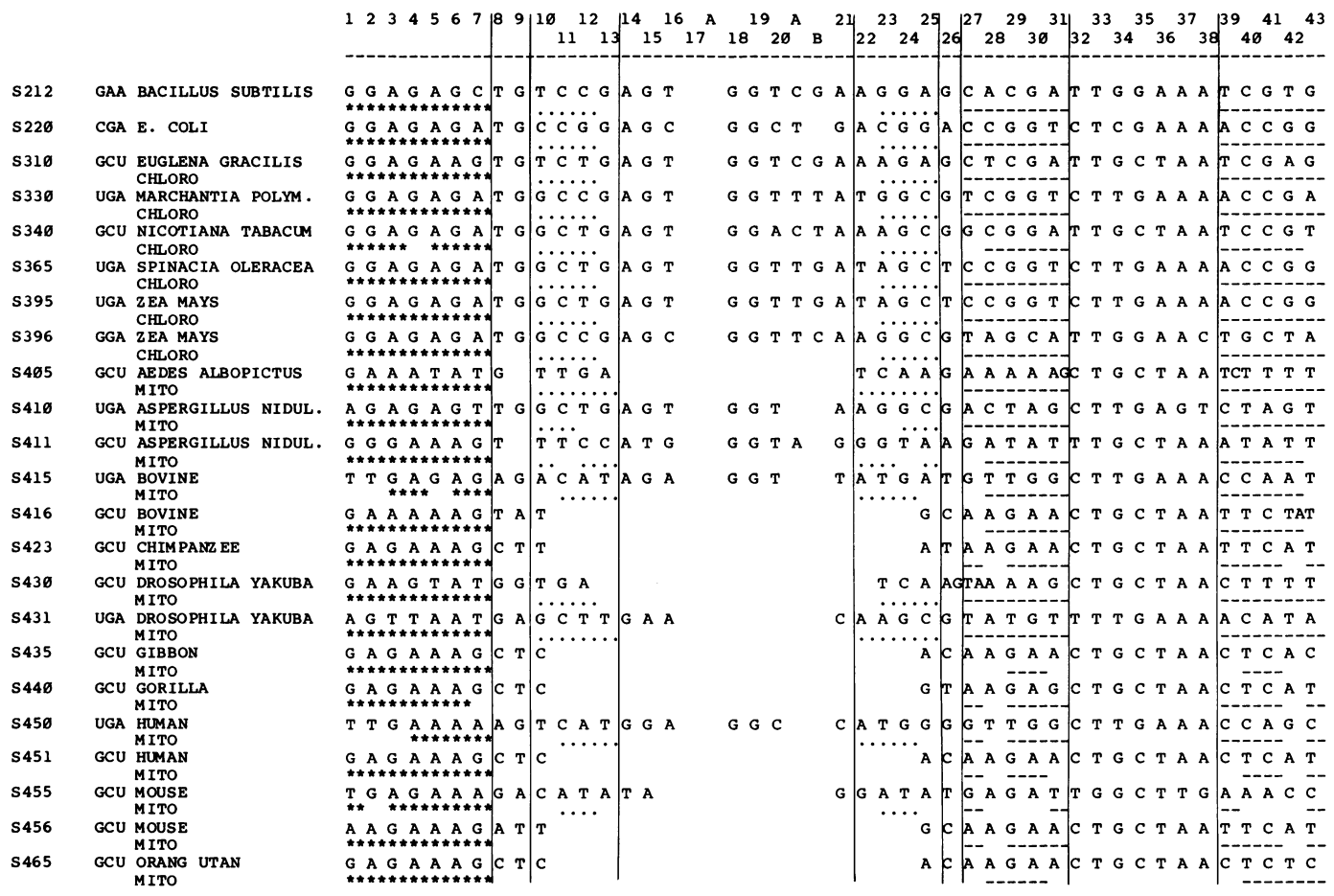
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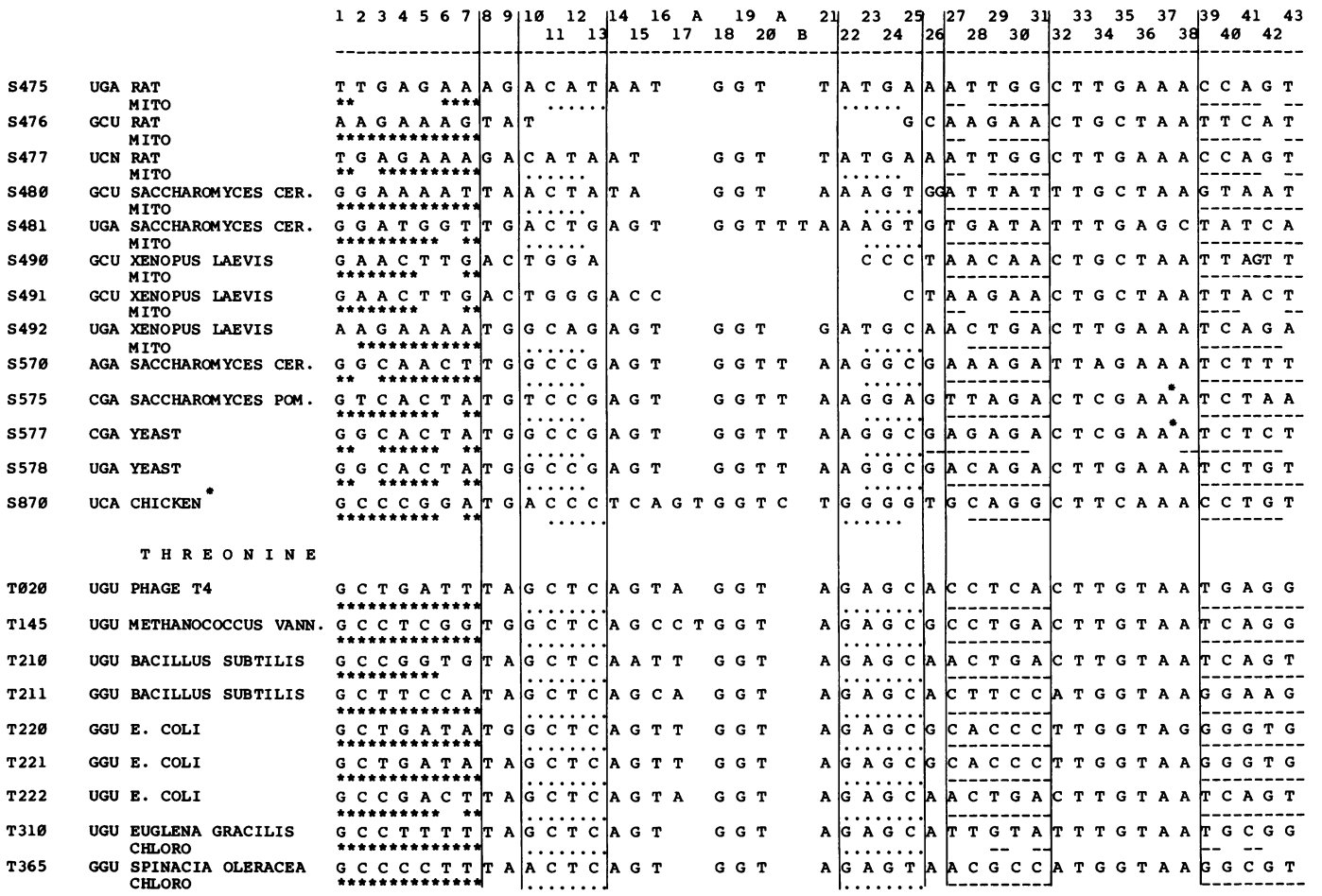
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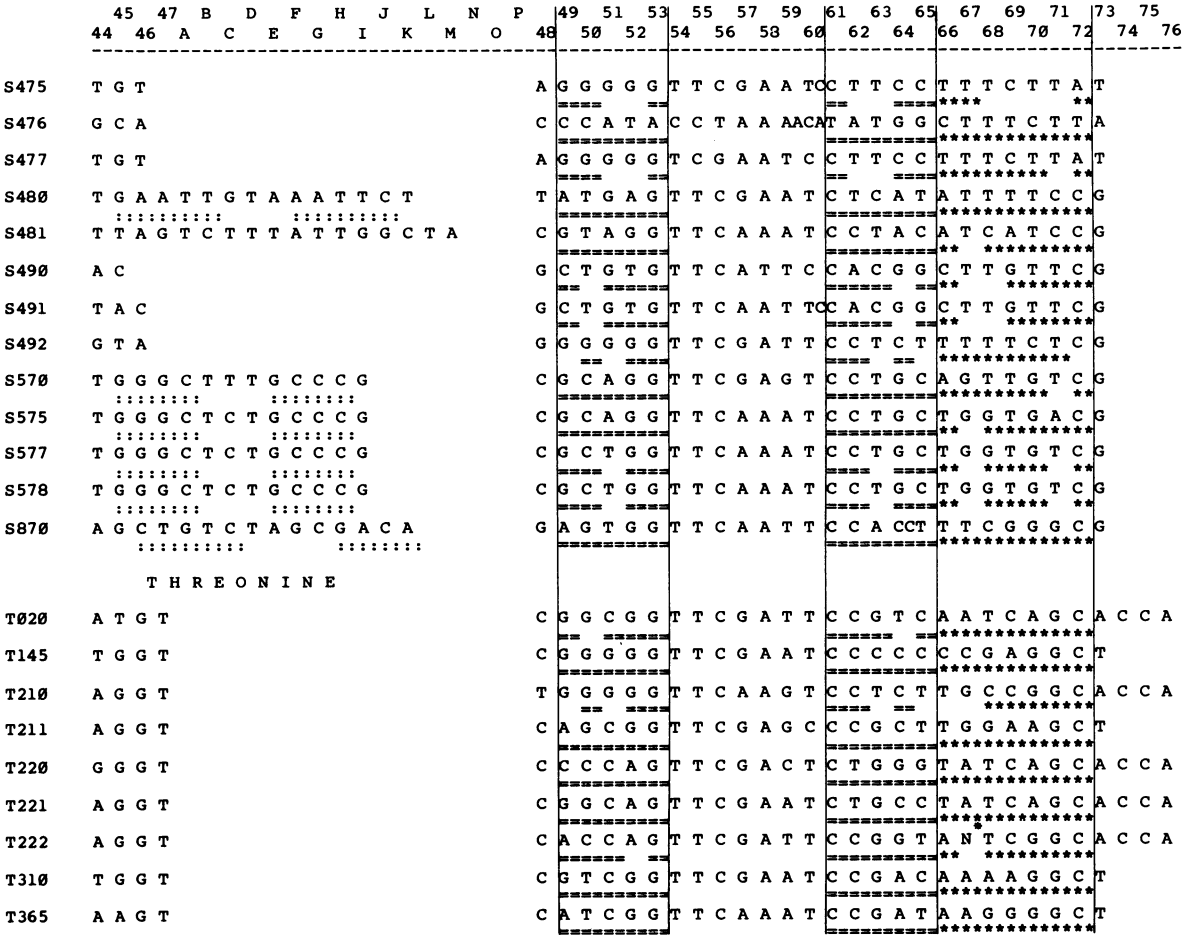
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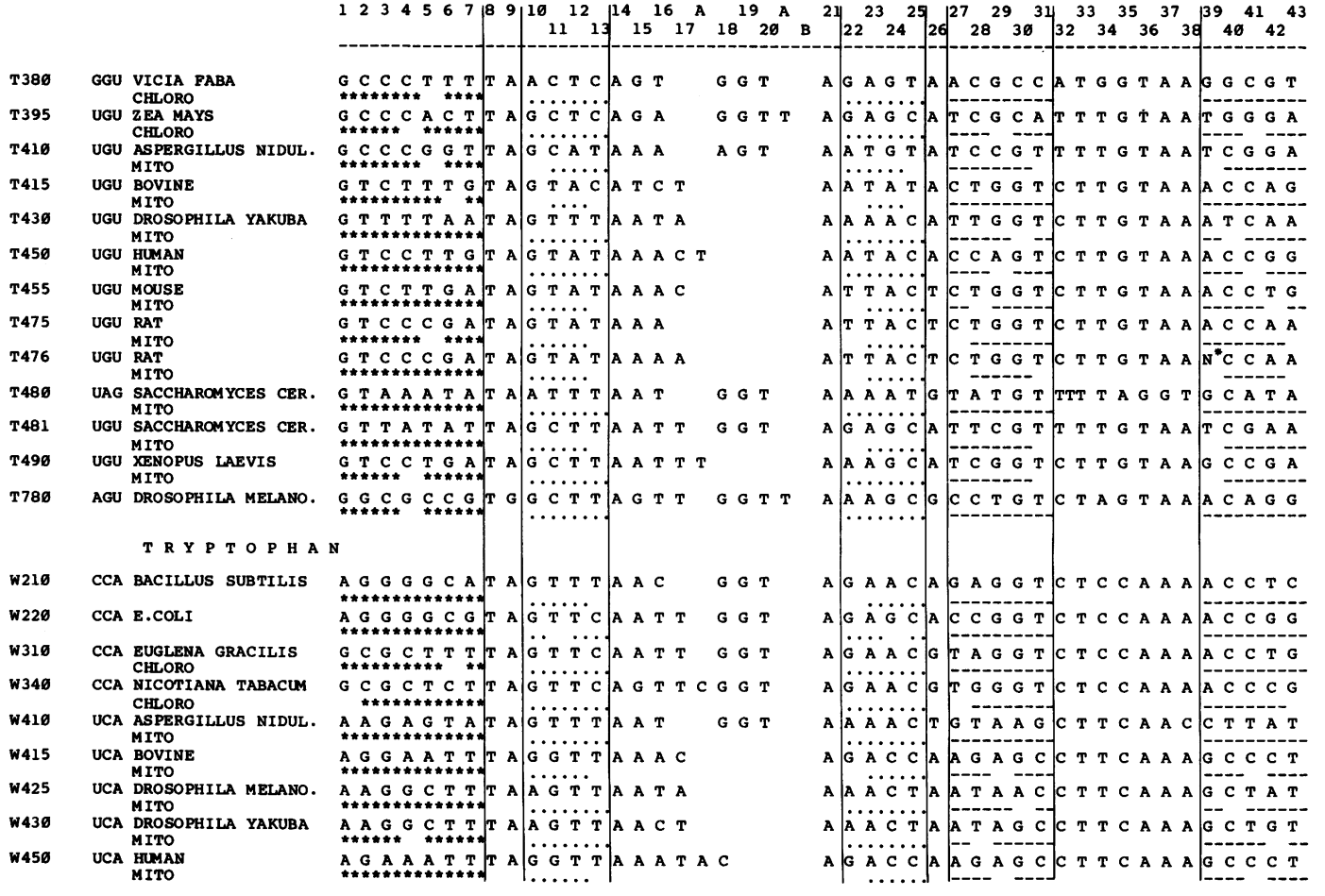
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CHLORO
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MITO
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MITO
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TRYPTOPHAN
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CHLORO
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CHLORO
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MITO
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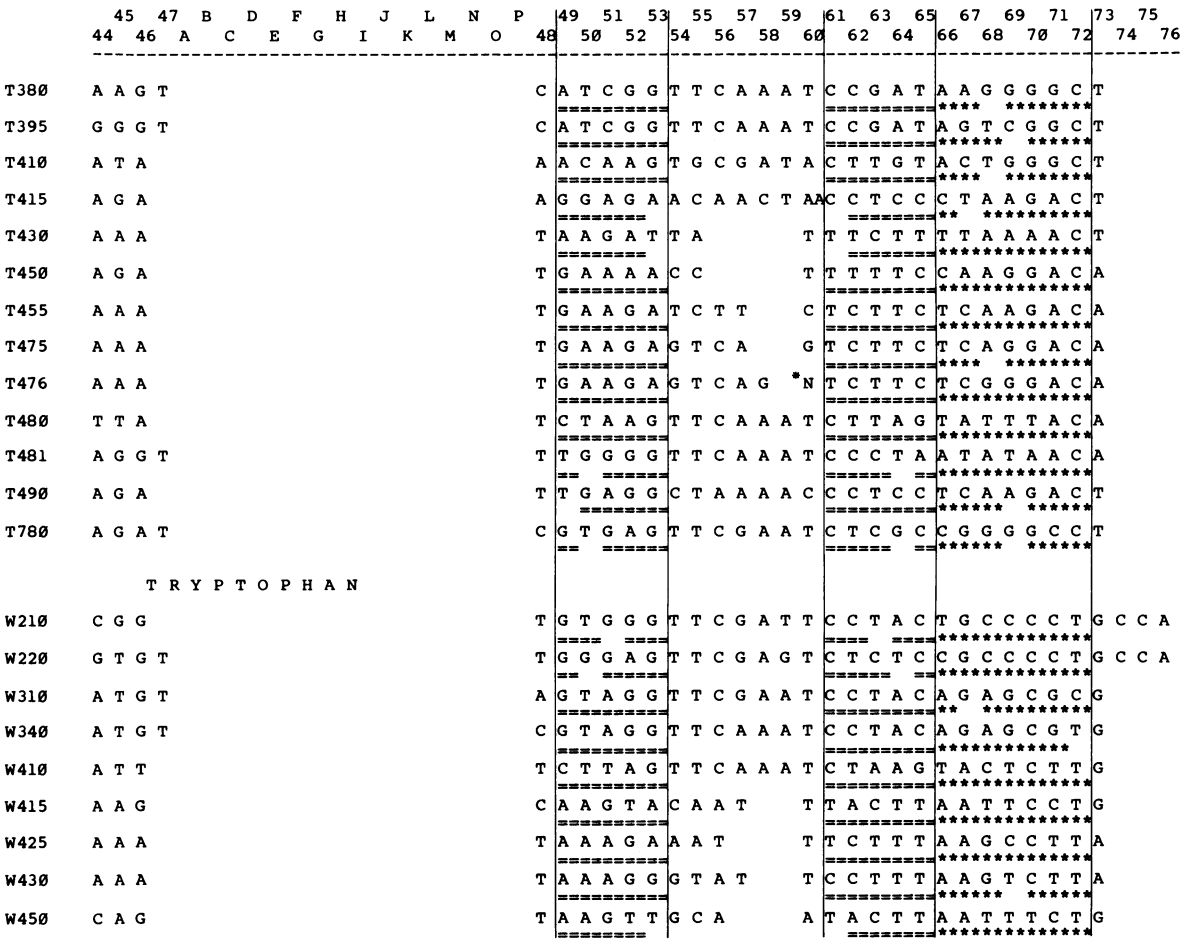
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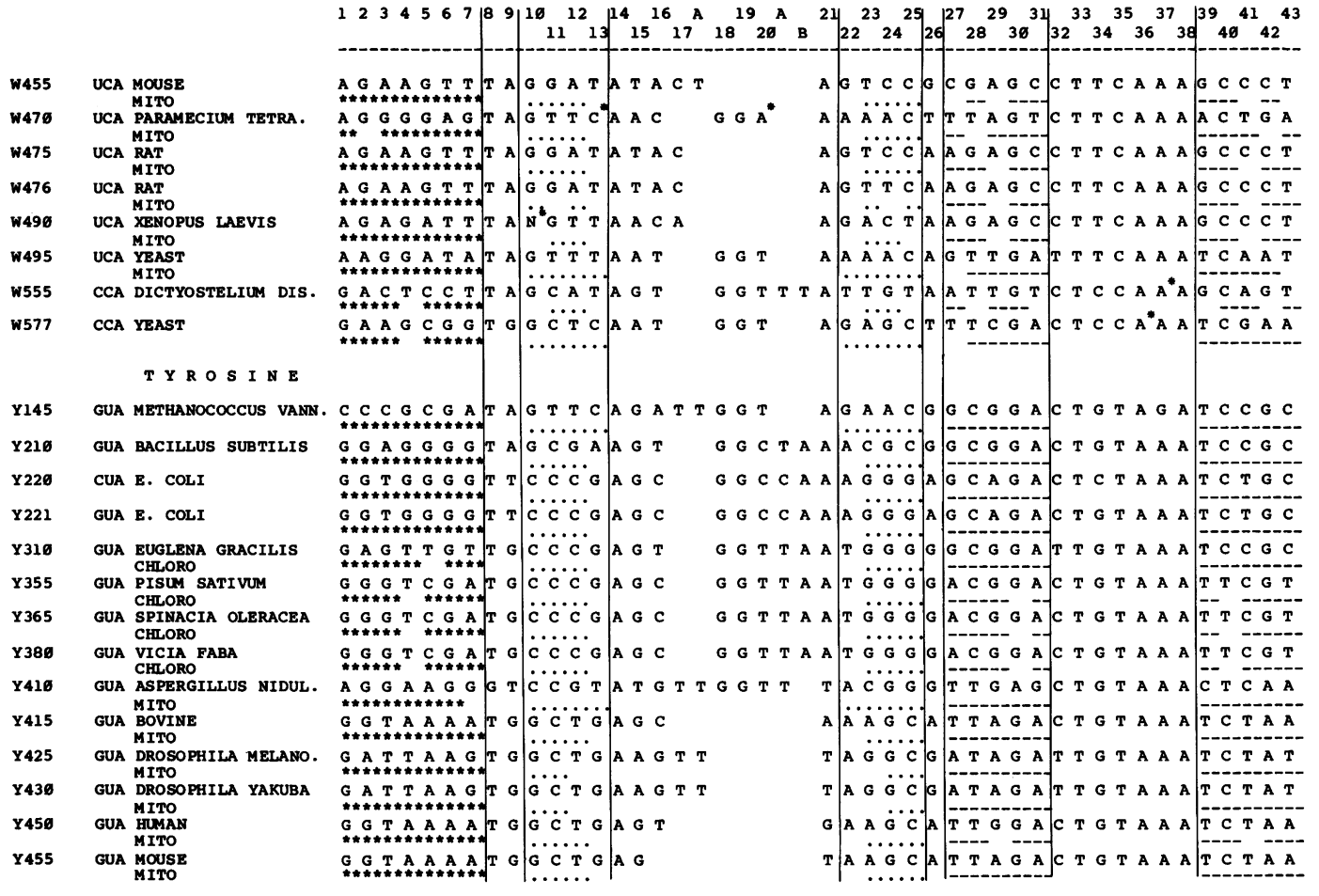
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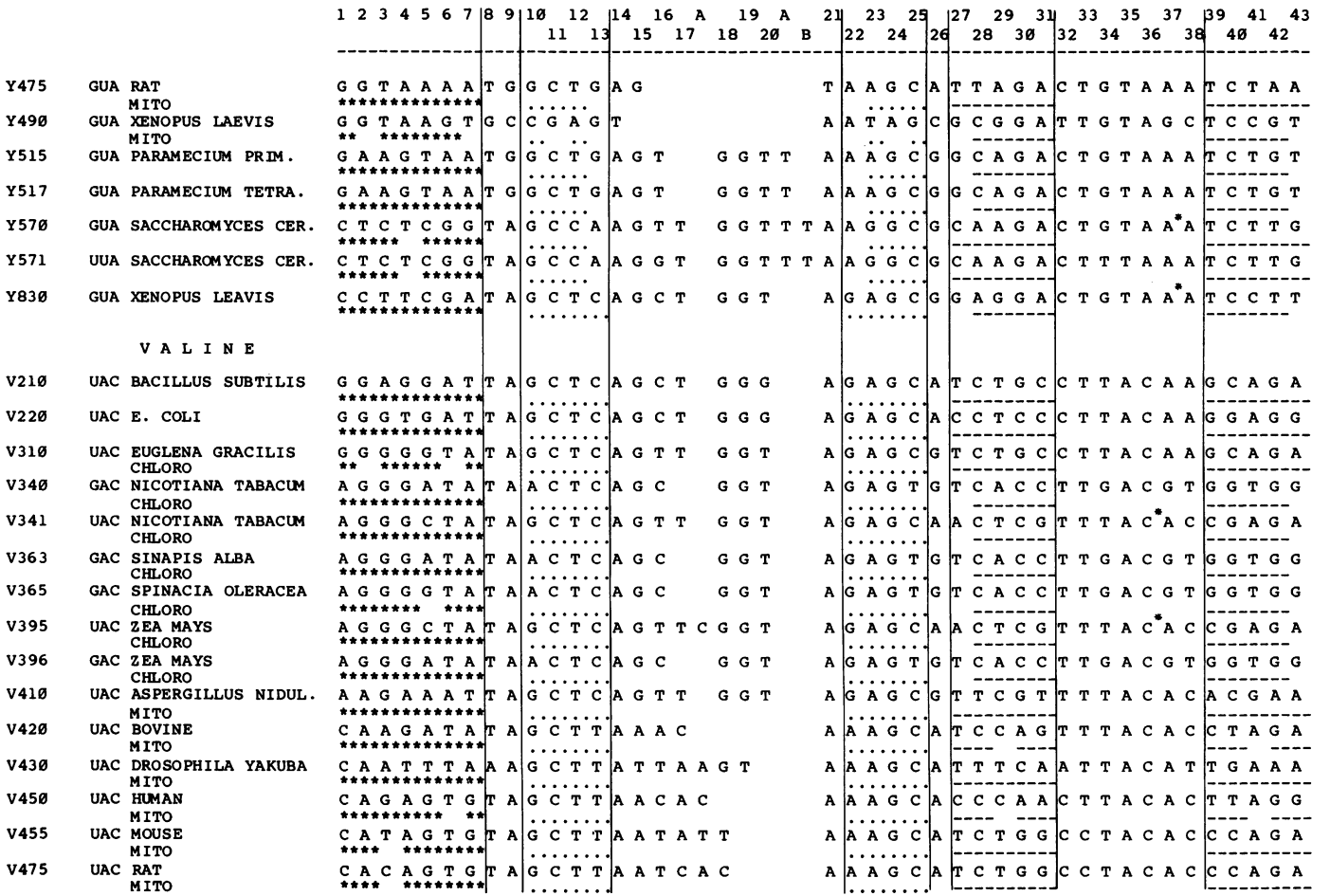
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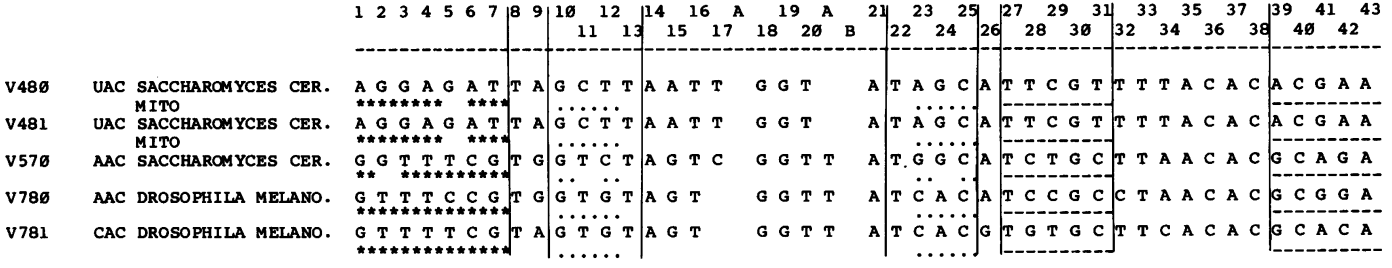
V450 A G A T T T C A A C T T A A C T T G A C C G C T C T G A
V455 A G A T T T C A T G A C C A T G A A C A C T C T G A
V475 A G A A T T C A T A A A T G A A C A C T T T G A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V480 UAC SACCHAROMYCES CER. MITO A G G A G A T T A G C T T A A T T G G T A T A G C A T T C G T T T T A C A C A C G A A
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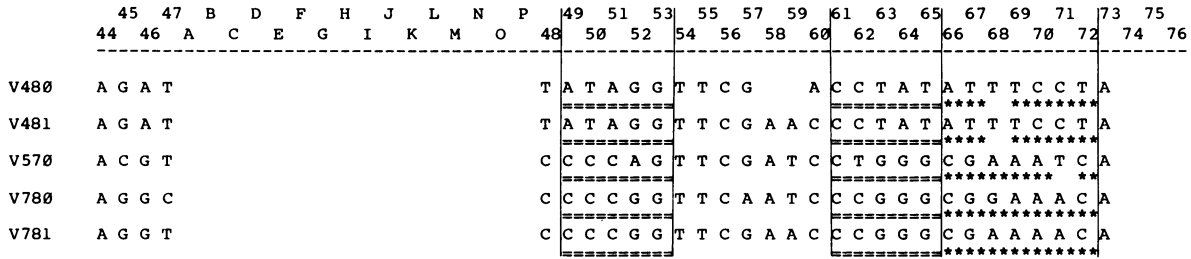
V780 AAC DROSOPHILA MELANO. G T T T C C G T G G T G T A G T G G T T A T C A C A T C C G C C T A A C A C G C G G A
V781 CAC DROSOPHILA MELANO. G T T T T C G T A G T G T A G T G G T T A T C A C G T G T G C T T C A C A C G C A C A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44 46 A C E G I K M O 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76
V480 A G A T T A T A G G T T C G A C C T A T A T T T C C T A
V481 A G A T T A T A G G T T C G A A C C C T A T A T T T C C T A
V570 A C G T C C C C A G T T C G A T C C T G G G C G A A A T C A
V780 A G G C C C C C G G T T C A A T C C C G G G C G G A A A C A
V781 A G G T C C C C G G T T C G A A C C C G G G C G A A A A C A

F O O T N O T E S

A340/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 710 BP
A395/36 AFTER RESIDUE 36,37 OR 38 INTERVENING SEQUENCE OF 806 BP
N490/58 N IS EITHER G OR A
N490/60 N IS EITHER A OR G
D475/59 N IS EITHER A OR T
D475/60 N IS EITHER * OR C
C365/62 N IS EITHER C OR T
Q570/73 POSITIONS BEYOND 73 WAS NOT DETERMINED
G211/20 N IS EITHER A OR T
G430/3 N IS EITHER C OR A
G430/5 N IS EITHER A OR C
I340/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 707 BP
I395/38 AFTER RESIDUE 38 INTERVENING SEQUENCE OF 949 BP
L165/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 15 BP
L380/34 AFTER RESIDUE 34 INTERVENING SEQUENCE OF 451 BP
L395/37 AFTER RESIDUE 34 INTERVENING SEQUENCE OF 458 BP
L560/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 27 BP
L570/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 32 OR 33 BP
L780/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 38 (LEU A) OR 45 (LEU B) BP
K570/38 AFTER RESIDUE 38 INTERVENING SEQUENCE OF 23 BP
K575/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 8 BP
M210/48 N IS EITHER C OR T
F560/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 16 BP
F578/38 AFTER RESIDUE 38 INTERVENING SEQUENCE OF 18 OR 19 BP
S040/0 IN KRYUKOV ET AL. ALIGNMENT DEVIATING
S165/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 25 BP
S210/46 E.F.WAWROUSEK ET AL. FIND FOUR G
S451/57 N IS EITHER A OR G
S575/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 16 BP
S577/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 19 BP
S870/0 UGA SUPPRESSOR TRNA
T222/67 N IS EITHER G OR C
T476/39 N IS EITHER G OR A
T476/59 N IS EITHER * OR C
W470/13 N IS EITHER T OR C
W470/20 N IS EITHER T OR A
W490/10 N IS EITHER G OR T
W555/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 13 BP
W577/36 AFTER RESIDUE 36,37 INTERVENING SEQUENCE OF 34 BP
Y570/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 14 BP
Y830/37 AFTER RESIDUE 37 INTERVENING SEQUENCE OF 13 BP
V341/36 AFTER RESIDUE 36 OR 37 INTERVENING SEQUENCE OF 571 BP
V395/36 AFTER RESIDUE 36, 37 OR 38 INTERVENING SEQUENCE OF 603 BP

A145 M.JARSCH, A.BOECK (1983) NUCL. ACIDS RES. 11, 7537-7544

A150 M.J.ROGERS, A.A.STEINMETZ, R.T.WALKER (1984) ISRAEL J. MED. SCI. 20, 768-772

A210 E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM 259, 3694-3702

A211 K.LOUGHNEY, E.LUND, J.E.DAHLBERG (1982) NUCL. ACIDS RES. 10, 1607-1624
E.F.WAWROUSEK, J.N.HANSEN (1983) J. BIOL. CHEM. 258, 291-298

A212 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774

A213 N.OGASAWARA, S.MORIYA, H.YOSHIKAWA (1983) NUCL. ACIDS RES. 11, 6301-6318

A290 S.E.WILLIAMSON, W.F.DOOLITTLE (1983) NUCL. ACIDS RES. 11, 225-235
N.TOMIOKA, M.SUGIURA (1984) MOL. GEN. GENET. 193, 427-430

A310 L.GRAF, H.KOESSEL, E.STUIZ (1980) NATURE 286, 908-910;
R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

A311 M.R.EL-GEWELY, R.B.HELLING, J.G.TH.DIBBITS (1984) MOL. GEN. GENET. 194, 432-443

A340 F.TAKAIWA, M.SUGIURA (1982) NUCL. ACIDS RES. 10, 2665-2676

A395 W.KOCH, K.EDWARDS, H.KOESSEL (1981) CELL 25, 203-213

A405 C.HSUCHEN, D.T.DUBIN (1984) BIOCHEM. INT. 8, 385-391

A410 H.G.KOECHEL, C.M. LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

A415 S.ANDERSON ET AL. (1982) J.MOL.BIOL. 156, 683-717

A430 D.O.CLARY, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 2367-2379

A450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465

A455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

A460 M.R.GREEN, M.F.GRIMM, R.R.GOEWERT, R.A.COLLINS (1981) J. BIOL. CHEM. 256, 2027-2034

A475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289;
R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 191-196
G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563
M.TAIRA ET AL. (1983) NUCL. ACIDS RES. 2, 1635-1643

A480 S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255, 9075-9081

A490 J.F.H.WONG, D.P.MA, R.K.WILSON, B.A.ROE (1983) NUCL. ACIDS. RES. 11, 4977-5004

A770 O.HAGENBUECHLE, D.LARSON, G.I.HALL, K.U.SPRAGUE (1979) CELL 18, 1217-1229
R.L.GARBER, L.P.GAGE (1979) CELL 18, 817-828
D.G.MCRTON, K.U.SPRAGUE (1982) MOL. CELL. BIOL. 1524-1531

A780 R.DELOTTO, P.SCHEIL (1984) J. MOL. BIOL. 179, 587-605

R000 G.P.MAZZARA, G.PLUNKETT, W.H.MCCLAIN (1981) PROC. NATL. ACAD. SCI. USA. 78, 889-892

R150 M.J.ROGERS, A.A.STEINMETZ, R.T.WALKER (1984) ISRAEL J. MED. SCI. 20, 768-772

R210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F. WAWROUSEK, J.N. HANSEN (1983) J. BIOL. CHEM. 258, 291-298
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984), J. BIOL. CHEM. 259, 3694-3702

R220 L.M.HSU, H.J.KLEE, J.ZAGORSKI, M.J.FOURNIER (1984) J. BACT. 158, 934-942

R150 L.BOSSI (1983) MOL. GEN. GENET. 192, 163-170

R310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

R340 H.DEND, M.SUGIURA (1984) PROC. NATL. ACAD. SCI. USA 81, 405-408

R350 D.HELDMUND, M.MEIZLAFF, E.SERFLING (1984) NUCL. ACIDS RES. 12, 8253-8268

R370 R.J.A.KEUS ET AL. (1984) NUCL. ACIDS RES. 12, 5639-5646

R371 R.J.A.KEUS ET AL. (1984) NUCL. ACIDS RES. 12, 5639-5646

R405 C-C.HSUCHEN, D.T.DUBIN (1984) BIOCHEM. INT. 8, 385-391

R410 R.NETZKER, H.G.KOECHEL, N.BAZAK, H.KUENTZEL (1982) NUCL. ACIDS RES. 10, 4783-4794
E.GRISI, T.A.BROWN, R.B.WARING, C.SCAZZOCCHIO, R.W.DAVIES (1982) NUCL. ACIDS RES. 10, 3531-3539

R415 S.ANDERSON ET AL. (1982) J.MOL.BIOL. 156, 683-717

R430 D.O.CLARY, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 2367-2379

R450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465

R455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1982) CELL 26, 167-180

R475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 151-158
G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563

R480 S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255, 9075-9081
D.L.MILLER, N.C.MARTIN (1981) CURR. GEN. 4, 135-143

R481 N.C.MARTIN, D.MILLER, J.HARTLEY, P.MOYNIHAN, J.E.DONELSON (1980) CELL 19, 339-343
S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255, 9075-9081
D.L.MILLER, N.C.MARTIN (1981) CURR. GEN. 4, 135-143

R570 R.E.BAKER, A.EIGEL, D.VOEGTEL, H.FELDMANN (1982) EMBO-J. 1, 291-295

R571 O.SCHMIDT ET AL. (1980) NATURE 287, 750-752
J.VILLANUEVA, P.BULL, P.VALENZUELA, A.VENEGAS (1984) FEBS LETTERS 167, 165-169
G.THIREOS, M.D.PENN, H.GREER (1984) PROC. NATL. ACAD. SCI. USA 81, 5096-5100

R572 J.GAFNER, E.M.DE ROBERTIS, P.PHILIPPSEN (1983) EMBO-J. 2, 583-591

R575 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546

R577 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546

R578 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546

R780 P.H.YEN, N.DAVIDSON (1980) CELL 22, 137-148
S.SHARP ET AL. (1983) NUCL. ACIDS RES. 11, 8677-8690

N210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984), J. BIOL. CHEM. 259, 3694-3702

N211 E.F.WAWROUSEK, J.N.HANSEN (1983) J. BIOL. CHEM. 258, 291-298
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702

N310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

N340 A.KATO, H.SHIMADA, M.KUSUDA, M.SUGIURA (1981) NUCL. ACIDS RES. 9, 5601-5607
N370 R.J.A.KEUS ET AL. (1984) NUCL. ACIDS RES. 12, 5639-5646
N405 C-C.HSUCHEN, D.T.DUBIN (1984) BIOCHEM. INT. 8, 385-391
N410 R.NETZKER, H.G.KOECHEL, N.BASAK, H.KUENTZEL (1982) NUCL. ACIDS RES. 10, 4783-4794
E.GRISI, T.A.BROWN, R.B.WARING, C.SCAZZOCCHIO, R.W.DAVIES (1982) NUCL. ACIDS RES. 10, 3531-3539
N415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717
N430 D.O.CLARY, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 2367-2379
N450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465
N455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180
N475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563
N476 R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 191-196
N477 M.TAIRA ET AL.(1983) NUCL. ACIDS RES. 11, 1635-1643
N480 G.CORUZZI, S.G.BONITZ, B.E.THALENFELD, A.TZAGOLOFF (1981) J. BIOL. CHEM. 256, 12780-12787
N490 J.F.H.WONG, D.P.MA, R.K.WILSON, B.A.ROE (1983) NUCL. ACIDS RES. 11, 4977-5004
N525 N.BAWNIK, J.S.BECKMANN, S.SARID, V.DANIEL (1983) NUCL. ACIDS RES. 11, 1117-1122
N780 B.HOVEMAN, S.SHARP, H.YAMADA, D.SOELL (1980) CELL 19, 889-895
N940 D.P.MA, E.LUND, J.E.DAHLBERG, B.A.ROE (1984) GENE 28, 257-262
N941 D.P.MA, E.LUND, J.E.DAHLBERG, B.A.ROE (1984) GENE 28, 257-262
D145 G.WICH, M.JARSCH, A.BOECK (1984) MOL. GEN. GENET. 196, 146-151
D220 R.A.YOUNG (1979) J. BIOL. CHEM. 254, 12725-12731
T.SEKIYA, M.MORI, N.TAKAHASHI, S.NISHIMURA (1980) NUCL. ACIDS RES. 8, 3809-3827
W.R.FOLK, H.HOFSTETTER, M.L.BIRNSTIEL (1982) NUCL. ACIDS RES. 10, 7153-7162
D210 Y.YAMADA, M.CHIKI, H.ISHIKURA (1983) NUCL. ACIDS RES. 11, 3037-3045
C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702
D355 O.F.RASMUSSEN, B.M.STUMMANN, W.HENNINGSEN (1984) NUCL. ACIDS RES. 12, 9143-9153
D365 K.HOLSCHLH, W.BOTTOMLEY, P.R.WHITFELD (1983) NUCL. ACIDS RES. 11, 8547-8554
D410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633
D415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717
D425 M.H.L.DE BRUIJN (1983) NATURE 304, 234-241
D430 D.O.CLARY, D.R.WOLSTENHOLME (1983) NUCL. ACIDS RES. 11, 4211-4227
D450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465
D455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180
D475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563
R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 151-158
D480 S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255,9075-9081
D.L.MILLER, D.R.NAJARIAN, J.R.FOLSE, N.C.MARTIN (1981) J. BIOL. CHEM. 256, 9774-9777
D.L.MILLER, N.C.MARTIN (1981) CURR. GEN. 4, 135-143
D570 O.SCHMIDT ET AL. (1980) NATURE 287, 750-752
J.GAFNER, E.M.DE ROBERTIS, P.PHILIPPSEN (1983) EMBO-J. 2, 583-591
D571 J.MAO ET AL. (1982) NUCL. ACIDS RES. 10, 487-500
D700 T.A.TRANQUILLA, R.CORTESE, D.MELTON, J.D.SMITH (1982) NUCL. ACIDS RES. 10, 7919-7934
D950 J.E.LOONEY, J.D.HARDING (1983) NUCL. ACIDS RES. 11, 8761-8775
D970 T.SEKIYA, Y.KUCHINO, S.NISHIMURA (1981) NUCL. ACIDS RES. 9, 2239-2250
K.SHIBUYA, S.NOGUCHI, S.NISHIMURA, T.SEKIYA (1982) NUCL. ACIDS RES. 10, 4441-4448
D.R.MAKOWSKI, R.A.HAAS, K.P.DOLAN, D.GRUNBERGER (1983) NUCL.ACIDS RES. 11, 8609-8624
D971 A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906
C150 M.J.ROGERS, A.A.STEINMETZ, R.T.WALKER (1984) ISRAEL J. MED. SCI. 20, 768-772
C210 E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (9184) J. BIOL. CHEM. 259, 3694-3702
C310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL 3, 169-175
C365 K.HOLSCHLH, W.BOTTOMLEY, P.R.WHITFELD (1983) NUCL. ACIDS RES. 11, 8547-8554
C415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717
C425 M.H.L.DE BRUIJN (1983) NATURE 304, 234-241
C430 D.O.CLARY, D.R.WOLSTENHOLME (1983) NUCL. ACIDS RES. 11, 6859-6872
C450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465
C455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180
C460 H.DE VRIES, P.HAIMA, M.BRINKER, J.C.DE JONGE (1985) FEBS LETTERS 179, 337-342
C475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563
R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN 4, 151-158
C480 J.L.BOS, K.A.OSINGA, G.VAN DER HORST, P.BORST (1979) NUCL. ACIDS RES. 6, 3255-3266
R.E.BERLANI, C.PENTELLA, G.MACINO, A.TZAGOLOFF (1980) J. BACT. 141, 1086-1097
C490 J.F.H.WONG, D.P.MA, R.K.WILSON, B.A.ROE (1983) NUCL. ACIDS RES. 11, 4977-5004
C570 F.S.GENBAUFFE, G.E.CHISHOLM, T.G.COOPER (1984) J. BIOL. CHEM. 259, 10518-10525
C970 M.TAIRA, E.YOSHIDA, M.KOBAYASHI, K.YAGINUMA, K.KOIKE (1983) NUCL. ACIDS RES. 11, 1635-1643
R.GROSSKOPF, H.FELDMANN (1981) CURR.GEN. 4, 191-196
Q020 K.FUKADA, J.ABELSON (1980) J. MOL. BIOL. 139, 377-391
Q040 M.G.SHLYAPNIKOV ET AL. (1984) BIOCHIM. BIOPHYS. ACTA 782, 313-319
Q210 E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702
Q220 N.NAKAJIMA, H.OZEKI, Y.SHIMURA (1981) CELL 23, 239-249
Q221 N.NAKAJIMA, H.OZEKI, Y.SHIMURA (1981) CELL 23, 239-249
Q310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175
Q340 H.IENO, M.SUGIURA (1983) NUCL. ACIDS RES. 11, 8407-8414
Q410 H.G.KOECHEL, C.M. LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

Q415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717

Q430 D.O.CLARY, J.M.GODDARD, S.C.MARTIN, C.M.-R.FAURON, D.R.WOLSTENHOLME (1982) NUCL. ACIDS RES. 10, 6619-6637

Q450 S.ANDERSON ET AL. (1981) NATURE 290, 457-46

Q455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

Q475 P.CANIATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289

D.R.WOLSTENHOLME, C.M.-R.FAURON, J.R.GODDARD (1982) GENE 20, 63-69

Q480 R.E.BERLANI, S.G.BONITZ, G.CORUZZI, M.NOBREGA, A.TZAGOLOFF (1980) NUCL. ACIDS RES. 8, 5017-5030

Q570 G.TSCHUMPER, J.CARBON (1982) J. MOL. BIOL. 156,293-307

Q940 K.L.ROY, H.COOKE, R.BUCKLAND (1982) NUCL. ACIDS RES. 10, 7313-7322

E210 Y.YAMADA, M.CHKI, H.ISHIKURA (1983) NUCL. ACIDS RES. 11, 3037-3045

C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774

E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259 3694-3702

E220 J.BROSIUS, T.J.DULL, D.D.SLEETER, H.F.NOLLER (1981) J. MOL. BIOL. 148, 107-127

E.A.MORGAN, T.IKEMURA, L.E.POST, M.NOMURA (1980) IN:TRANSFER RNA,

D.SOELL, J.ABELSON, P.SCHIMMEL (ED), COLD SPRING HARB. 259-266

E310 R.B.HALLICK ET AL.(1984) PLANT. MOL. BIOL. 3, 169-175

E355 O.F.RASMUSSEN, B.M.STUMMANN, W.HENNINGSEN (1984) NUCL. ACIDS RES. 12, 9143-9153

E365 K.HOLSCHLH, W.BOTTOMLEY, P.R.WITHFELD (1984) PLANT MOL. BIOL. 3, 313-317

E380 M.KUNZ, J.H.WEIL, A.STEINMETZ (1984) NUCL. ACIDS RES. 12, 5037-5047

E410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

E415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717

E430 D.O.CLARY, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 2367-2379

E450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465

E455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

E475 G.GOERTZ, H.FELDMANN (1982) CURR. GEN. 5, 221-225

K.KOIKE ET AL. (1982) GENE 20, 177-185

E480 F.G.NOBREGA, A.TZAGOLOFF (1980) FEBS LETTERS 113, 52-54

E575 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546

E578 A.EIGEL, H.FELDMANN (1982) EMBO-J. 1, 1245-1250

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E780 H.A.HOSBACH, M.SILBERKLANG, B.J.MCCARTHY (1980) CELL 21, 169-178

E781 H.A.HOSBACH, M.SILBERKLANG, B.J.MCCARTHY (1980) CELL 21, 169-178

E782 Z.K.INDIK, K.D.TARTOF (1982) NUCL. ACIDS RES. 10, 4159-4172

E940 J.P.GODDARD, M.SQUIRE, M.BIENZ, J.D.SMITH (1983) NUCL. ACIDS RES. 11, 2551-2562

E950 J.E.LOONEY, J.D.HARDING (1983) NUCL. ACIDS RES. 11, 8761-8775

E970 T.SEKIYA, Y.KUCHINO, S.NISHIMURA (1981) NUCL. ACIDS RES. 9, 2239-2250

E971 A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906

E972 A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906

G020 K.FUKADA, J.ABELSON (1980) J. MOL. BIOL. 139, 377-391

G210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774

E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702

G211 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774

E.F.WAWROUSEK, J.N.HANSEN (1983) J. BIOL. CHEM. 258, 291-298

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G220 S.D.TUCKER, A.S.GOPALAKRISHNAN, R.BOLLINGER, W.DOWHAN, E.J.MURGOLA (1982) J. BACT. 152, 773-779

G221 G.AN, J.D.FRIESEN (1980) GENE 12, 33-39

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A.MIYAJIMA, T.YOKOTA, Y.TAKEBE, N.NAKAMURA, Y.KAZIRO (1983) J. BIOCHEM. 93, 1101-1108

G310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

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G330 K.UMESONO, H.INOKUCHI, K.OHYAMA, H.OZEKI (1984) NUCL. ACIDS RES. 12, 9551-9565

G340 H.DENO, M.SUGIURA (1984) PROC. NATL. ACAD. SCI. USA 81, 405-408

G341 M.OHME, T.KAMOGASHIRA, K.SHINOZOKI, M.SUGIURA (1984) NUCL. ACIDS RES. 12, 6741-6749

G410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

G411 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

G415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717

G430 D.O.CLARY, J.A.WAHLETHNER, D.R.WOLSTENHOLME (1983) NUCL. ACIDS RES. 11, 2411-2425

G450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465

G455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

G475 P.CANIATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289

R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 151-158

G.PEPE ET AL. (1983) BIOCHEM. INT. 6, 553-563

G480 S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255, 9075-9081

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G770 A.FOURNIER ET AL.(1984) EMBO-J. 3, 1547-1522

G780 N.D.HERSHEY, N.DAVIDSON (1980) NUCL. ACIDS RES. 8, 4899-4910

G950 J.C.HU, B.D.COTE, E.LUND, J.E.DAHLBERG (1983) NUCL. ACIDS RES. 11, 4809-4821

J.E.LOONEY, J.D.HARDING (1983) NUCL. ACIDS RES. 11, 8761-8775

G970 T.SEKIYA, Y.KUCHINO, S.NISHIMURA (1981) NUCL. ACIDS RES. 9, 2239-2250

A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906

G971 A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906

H150 L.BOSSI (1983) MOL. GEN. GENET. 192, 163-170

H210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774

E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702

H220 L.M.HSU, H.J.KLEE, J.ZAGORSKI, M.J.FOURNIER (1984) J. BACT. 158, 934-942

H310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

H340 M.SUGITA, A.KATO, H.SHIMADA, M.SUGIURA (1984) MOL. GEN. GENET. 194, 200-205

H345 G.ZURAWSKI, W.BOTTOMLEY, P.R.WITHFELD (1984) NUCL. ACIDS RES. 12, 6547-6558

H365 G.ZURAWSKI, W.BOTTOMLEY, P.R.WHITFELD (1984) NUCL. ACIDS RES. 12, 6547-6558

H395 Z.SCHWARZ, S.O.JOLLY, A.A.STEINMETZ, L.BOGORAD (1981) PROC. NATL.

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H410 R.NETZKER, H.G.KOECHEL, N.BAZAK, H.KUENTZEL (1982) NUCL. ACIDS RES. 10, 4783-4794

H415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717

H423 W.M.BROWN, E.M.PRAGER, A.WANG, A.C.WILSON (1982) J.MOL.EVOL. 18, 225-239

H430 D.O.CLARY, J.A.WAHLETTNER, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 3747-3762

H435 W.M.BROWN, E.M.PRAGER, A.WANG, A.C.WILSON (1982) J. MOL. EVOL. 18, 225-239

H440 W.M.BROWN, E.M.PRAGER, A.WANG, A.C.WILSON (1982) J. MOL. EVOL. 18, 225-239

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H455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

H465 W.M.BROWN, E.M.PRAGER, A.WANG, A.C.WILSON (1982) J. MOL. EVOL. 18, 225-239

H475 R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 191-196

H480 J.L.BOS, K.A.OSINGA, G.VAN DER HORST, P.BORST (1979) NUCL. ACIDS RES. 6, 3255-3266;
R.E.BERLANI, C.PENTELLA, G.MACINO, A.TZAGOLOFF (1980) J. BACT. 141, 1096-1097

H570 F.DEL REY, T.F.DONAHUE, G.R.FINK (1983) J. BIOL. CHEM. 258, 8175-8182

H575 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546

H780 L.COOLEY, B.APPEL, D.SOELL (1982) PROC. NATL. ACAD. SCI. USA 79, 6475-6479

H950 J.H.HAN, J.D.HARDING (1982) NUCL. ACIDS RES. 10, 4891-4900

I000 K.FUKADA, J.ABELSON (1980) J. MOL. BIOL. 139, 377-391
G.P.MAZZARA, G.PLUNKETT, W.H.MCCLAIN (1981) PROC. NATL. ACAD. SCI. USA 78, 889-892

I150 M.J.ROGERS, A.A.STEINMETZ, R.T.WALKER (1984) ISRAEL J. MED. SCI. 20, 768-772

I210 K.LOUGHNEY, E.LUND, J.E.DAHLBERG (1982) NUCL. ACIDS RES. 10, 1607-1624
N.OGASAWARA, S.MORIYA, H.YOSHIKAWA (1983) NUCL. ACIDS RES. 11, 6301-6318

I211 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702

I220 T.SEKIYA, S.NISHIMURA (1979) NUCL. ACIDS RES. 6, 575-592

I290 S.E.WILLIAMSON, W.F.DOOLITTLE (1983) NUCL. ACIDS RES. 11, 225-235
N.TOMIOKA, M.SUGIURA, (1984) MOL. GEN. GENET. 193, 427-430

I310 L.GRAF, H.KOESSEL, E.STUTZ (1980) NATURE 286, 908-910;
T.MIYATA, R.KIKUNO, Y.OSHIMA (1982) NUCL. ACIDS RES. 10, 1771-1780
R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175
M.R.EL-GEWELY, R.B.HELLING, J.G.TH.DIBBITS (1984) MOL. GEN. GENET. 194, 432-443

I340 F.TAKAIWA, M.SUGIURA (1982) NUCL. ACIDS RES. 10, 2665-2676

I365 M.A.KASHDAN, B.S.DUDOCK (1982) J. BIOL. CHEM. 257, 11191-11194
W.G.GRUISSEM, B.M.GREENBERG, G.ZURAWSKI, D.M.PRESCOTT, R.B.HALLICK (1983) CELL 35, 815-828

I395 W.KOCH, K.EDWARDS, H.KOESSEL (1981) CELL 25, 203-213;
P.GUILLEMAUT, J.H.WEIL (1982) NUCL. ACIDS RES. 10, 1653-1659

I410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

I415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717

I430 D.O.CLARY, J.M.GODDARD, S.C.MARTIN, C.M.-R. FAURON, D.R.WOLSTEN-HOLME (1982) NUCL. ACIDS RES. 10, 6619-6637

I450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465

I455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180

I475 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
D.R.WOLSTENHOLME, C.M.-R.FAURON, J.M.GODDARD (1982) GENE 20, 63-69

I780 B.HOVEMANN, S.SHARP, H.YAMADA, D.SOELL (1980) CELL 19, 889-895
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L000 K.FUKADA, J.ABELSON (1980) J. MOL. BIOL. 139, 377-391

L150 L.BOSSI (1983) MOL. GEN. GENET. 192, 163-170
L165 B.P.KAINE, R.GUPTA, C.R.WOESE (1983) PROC. NATL. ACAD SCI. USA 80, 3309-3312

L210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702

L211 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
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L213 E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM 259, 3694-3702

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L220 .DUESTER, R.K.CAMPEN, W.M.HOLMES (1981) NUCL. ACIDS RES. 9, 2121-2139
L.M.HSU, H.J.KLEE, J.ZAGORSKI, M.J.FOURNIER (1984) J. BACT. 158, 934-942

L221 M.YOSHIMURA, H.INOKUCHI, H.OZEKI (1984) J. MOL. BIOL. 177, 627-644

L222 N.NAKAJIMA, H.OZEKI, Y.SHIMURA (1981) CELL 23, 239-249

L310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175

L311 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL 3, 169-175

L380 G.BONNARD, F.MICHEL, J.H.WEIL, A.STEINMETZ (1984) MOL. GEN. GENET. 194, 330-336

L395 A.STEINMETZ, E.J.GUBBINS, L.BOGORAD (1982) NUCL. ACIDS RES. 10, 3027-3037

L396 A.A.STEINMETZ, E.T.KREBBERS, Z.SCHWARZ, E.J.GUBBINS, L.BOGORAD (1983) J. BIOL. CHEM. 258, 5503-5511

L405 C-C.HSUCHEN, R.M.KOTIN, D.T.DUBIN (1984) NUCL. ACIDS RES. 12, 7771-7785

L410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

L411 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633

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L425 M.H.L.DE BRUIJN (1983) NATURE 304, 234-241

L430 D.O.CLARY, D.R.WOLSTENHOLME (1983) NUCL. ACIDS RES. 11, 4211-4227

L431 D.O.CLARY, J.A.WAHLETTNER, D.R.WOLSTENHOLME (1984) NUCL. ACIDS RES. 12, 3747-3762

L435 W.M.BROWN, E.M.PRAGER, A.WANG, A.C.WILSON (1982) J. MOL. EVOL.

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L456 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1983) CELL 26, 167-180
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L475 R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 191-196
L476 G.SACCONE ET AL. (1981) NUCL. ACIDS RES. 9, 4139-4148
L495 B.BERLANI, S.G.BONITZ, G.CORUZZI, M.NOBREGA, A.TZAGOLOFF (1980) NUCL. ACIDS RES. 8, 5017-5030
L560 L.HUIET, B.M.TYLER, N.H.GILES (1984) NUCL. ACIDS RES. 12, 5757-5765
L570 D.N.STANDRING, A.VENEGAS, W.J.RUTTER (1981) PROC. NATL. ACAD. SCI. USA 78, 5963-5967
A.ANDREADIS, Y-P.HSU, G.B.KOHLHAW, P.SCHIMMEL (1982) CELL 31, 319-325
L700 T.A.TRANQUILLA, R.CORTESE, D.MELTON, J.D.SMITH (1982) NUCL. ACIDS RES. 10, 7919-7934
L780 R.R.ROBINSON, N.DAVIDSON (1981) CELL 23, 251-259
L830 G.GALLI, H.HOFSTETTER, M.L.BIRNSTIEL (1981) NATURE 294, 626-631
L940 K.L.ROY, H.COOKE, R.BUCKLAND (1982) NUCL. ACIDS RES. 10, 7313-7322
L970 D.R.MAKOWSKI, R.A.HAAS, K.P.DOLAN, D.GRUNBERGER (1983) NUCL. ACIDS RES. 11, 8609-8624
L971 A.ROSEN, S.SARID, V.DANIEL (1984) NUCL. ACIDS RES. 12, 4893-4906
K145 G.WICH, M.JARSCH, A.BOECK (1984) MOL. GEN. GENET. 196, 146-151
K210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
Y.YAMADA, M.CHKI, H.ISHIKURA (1983) NUCL. ACIDS RES. 11, 3037-3045
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K220 M.YOSHIMURA, M.KIMURA, M.ONO, H.INOKUCHI, H.OZEKI (1984) J. MOL. BIOL. 177, 609-625
K410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633
K415 S.ANDERSON ET AL. (1982) J. MOL. BIOL. 156, 683-717
K425 M.H.L.DE BRUIN (1983) NATURE 304, 234-241
K430 D.O.CLARY, D.R. WOLSTENHOLME (1983) NUCL. ACIDS RES. 11, 4211-4227
K450 S.ANDERSON ET AL. (1981) NATURE 290, 457-465
K455 M.J.BIBB, R.A.VAN ETTEN, C.T.WRIGHT, M.W.WALBERG, D.A.CLAYTON (1981) CELL 26, 167-180
K475 R.GROSSKOPF, H.FELDMANN (1981) CURR. GEN. 4, 151-158
K476 P.CANTATORE ET AL. (1982) NUCL. ACIDS RES. 10, 3279-3289
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K480 S.G.BONITZ, A.TZAGOLOFF (1980) J. BIOL. CHEM. 255, 9075-9081
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K570 F.J.DEL REY, T.F.DONAHUE, G.R.FINK (1982) PROC. NATL. ACAD. SCI. USA 79, 4138-4142
K575 V.GAMULIN ET AL. (1983) NUCL. ACIDS RES. 11, 8537-8546
K700 T.A.TRANQUILLA, R.CORTESE, D.MELTON, J.D.SMITH (1982) NUCL. ACIDS RES. 10, 7919-7934
K780 D.DEFRANCO, O.SCHMIDT, D.SOELL (1980) PROC. NATL. ACAD. SCI. USA 77, 3365-3368
B.HOVEMANN, S.SHARP, H.YAMADA, D.SOELL (1980) CELL 19, 889-895
P.H.YEN, N.DAVIDSON (1980) CELL 22, 137-148
K781 D.DEFRANCO ET AL. (1982) NUCL. ACIDS RES. 10, 5799-5808
K850 S.WITTIG, B.WITTIG (1982) NATURE 297, 31-38
K940 K.L.ROY, H.COOKE, R.BUCKLAND (1982) NUCL. ACIDS RES. 10, 7313-7322
K950 J.H.HAN, J.D.HARDING (1983) NUCL. ACIDS RES. 11, 2053-2064
K970 T.SEKIYA, R.NISHIZAWA, K.MATSUDA, Y.TAYA, S.NISHIMURA (1982) NUCL. ACIDS RES. 10, 6411-6419
M150 M.J.ROGERS, A.A.STEINMETZ, R.T.WALKER (1984) ISRAEL J. MED. SCI. 20, 768-772
M210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
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M220 N.NAKAJIMA, H.OZEKI, Y.SHIMURA (1981) CELL 23, 239-249
M310 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175
M311 R.B.HALLICK ET AL. (1984) PLANT. MOL. BIOL. 3, 169-175
M340 H.DEND, A.KATO, K.SHINOZAKI, M.SUGIURA (1982) NUCL. ACIDS RES. 10, 7511-7520
M365 W.GRUISSEM, B.M.GREENBERG, G.ZURAWSKI, D.M.PRESCOTT, R.B.HALLICK (1983) CELL 35, 815-828
M395 A.A.STEINMETZ, E.T.KREBBERS, Z.SCHWARZ, E.J.GUBBINS, L.BOGORAD (1983) J. BIOL. CHEM. 258, 5503-5511
M410 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633
M411 H.G.KOECHEL, C.M.LAZARUS, N.BASAK, H.KUENTZEL (1981) CELL 23, 625-633
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M480 G.CORUZZI, S.G.BONITZ, B.E.THALENFELD, A.TZAGOLOFF (1981) J. BIOL. CHEM. 256, 12780-12787
M578 J.CLAH, H.FELDMANN (1980) NUCL. ACIDS RES. 8, 1975-1986
M940 T.SANIOS, M.ZASLOFF (1981) CELL 23, 699-709
X210 C.J.GREEN, B.S.VOLD (1983) NUCL. ACIDS RES. 11, 5763-5774
E.F.WAWROUSEK, N.NARASIMHAN, J.N.HANSEN (1984) J. BIOL. CHEM. 259, 3694-3702
X220 S.ISHII ET AL. (1984) NUCL. ACIDS RES. 12, 3333-3342
X330 K.UMESONO, H.INOKUCHI, K.OHYAMA, H.OZEKI (1984) NUCL. ACIDS RES. 12, 9551-9565
X340 M.OHME, T.KAMOGASHIRA, K.SHINOZOKI, M.SUGIURA (1984) NUCL. ACIDS RES. 12, 6741-6749
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