

SUPPLEMENTAL MATERIAL

STRUCTURE-FUNCTION-RELATIONSHIP OF TERPENOID GLYCOSYLTRANSFERASES FROM PLANTS

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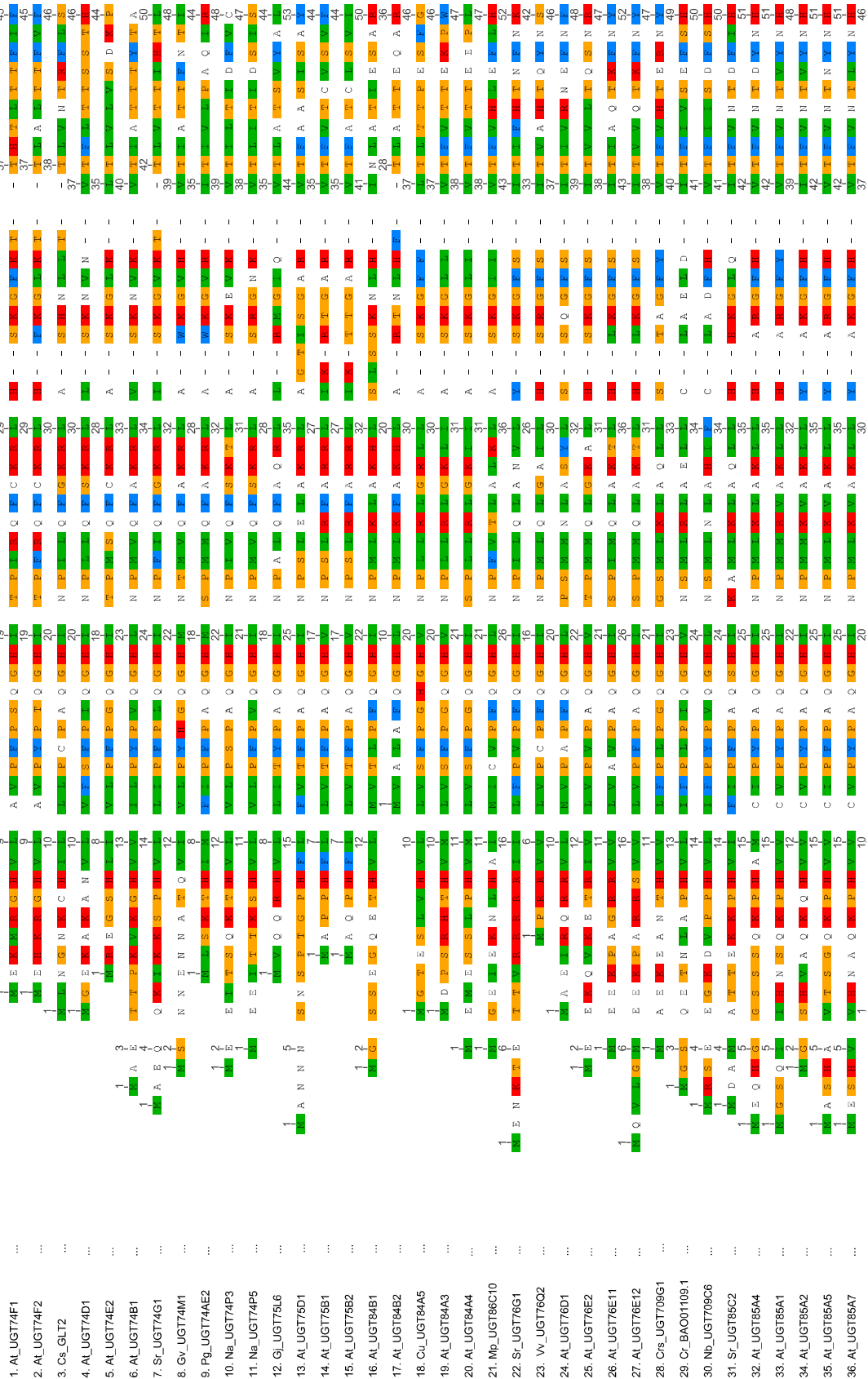
³State Key Laboratory of Tea Plant Biology and Utilization and International Joint Laboratory on Tea Chemistry and Health Effects, Anhui Agricultural University, Hefei, Anhui 230036, People's Republic of China

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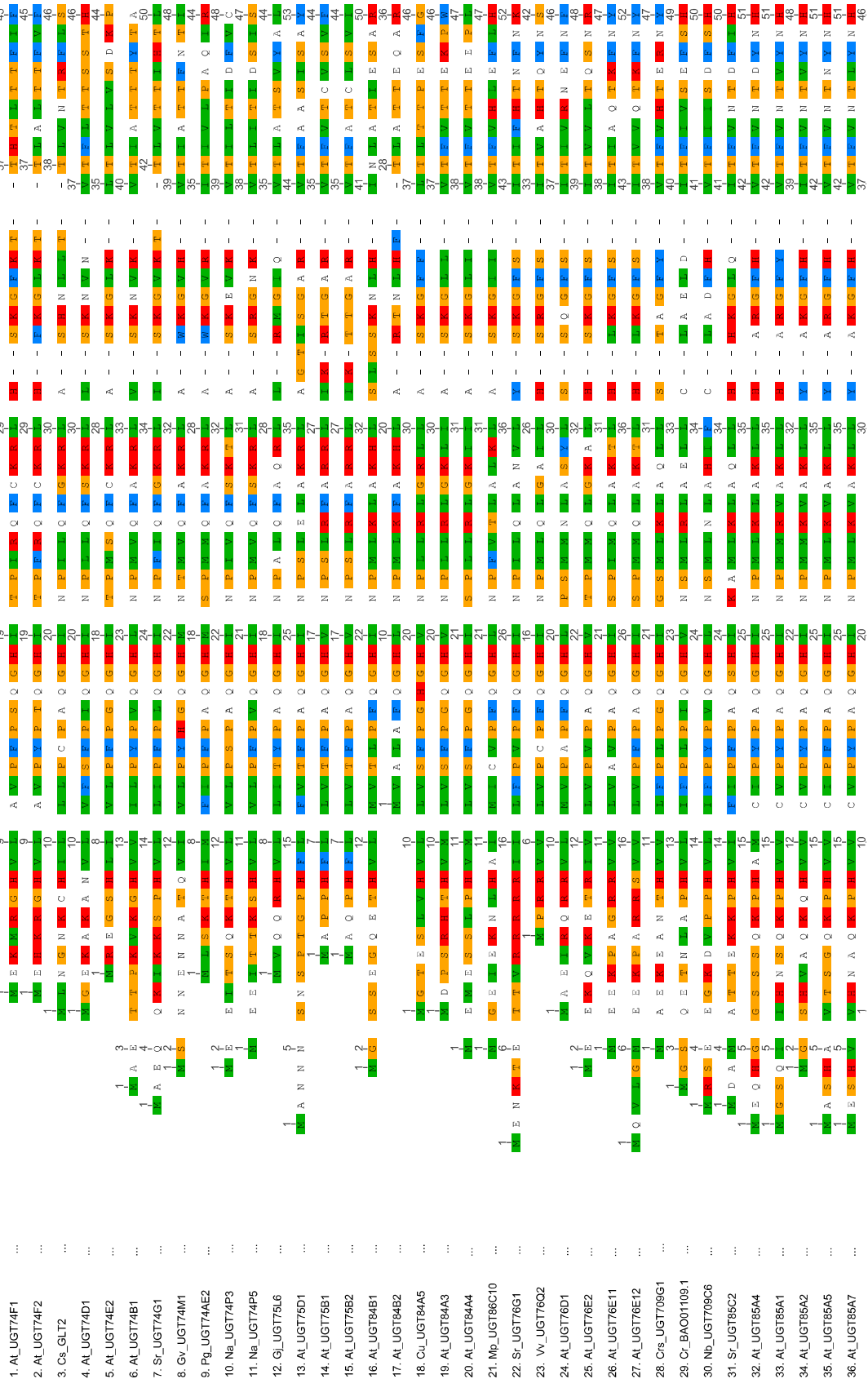
Sequence Logo

Identity



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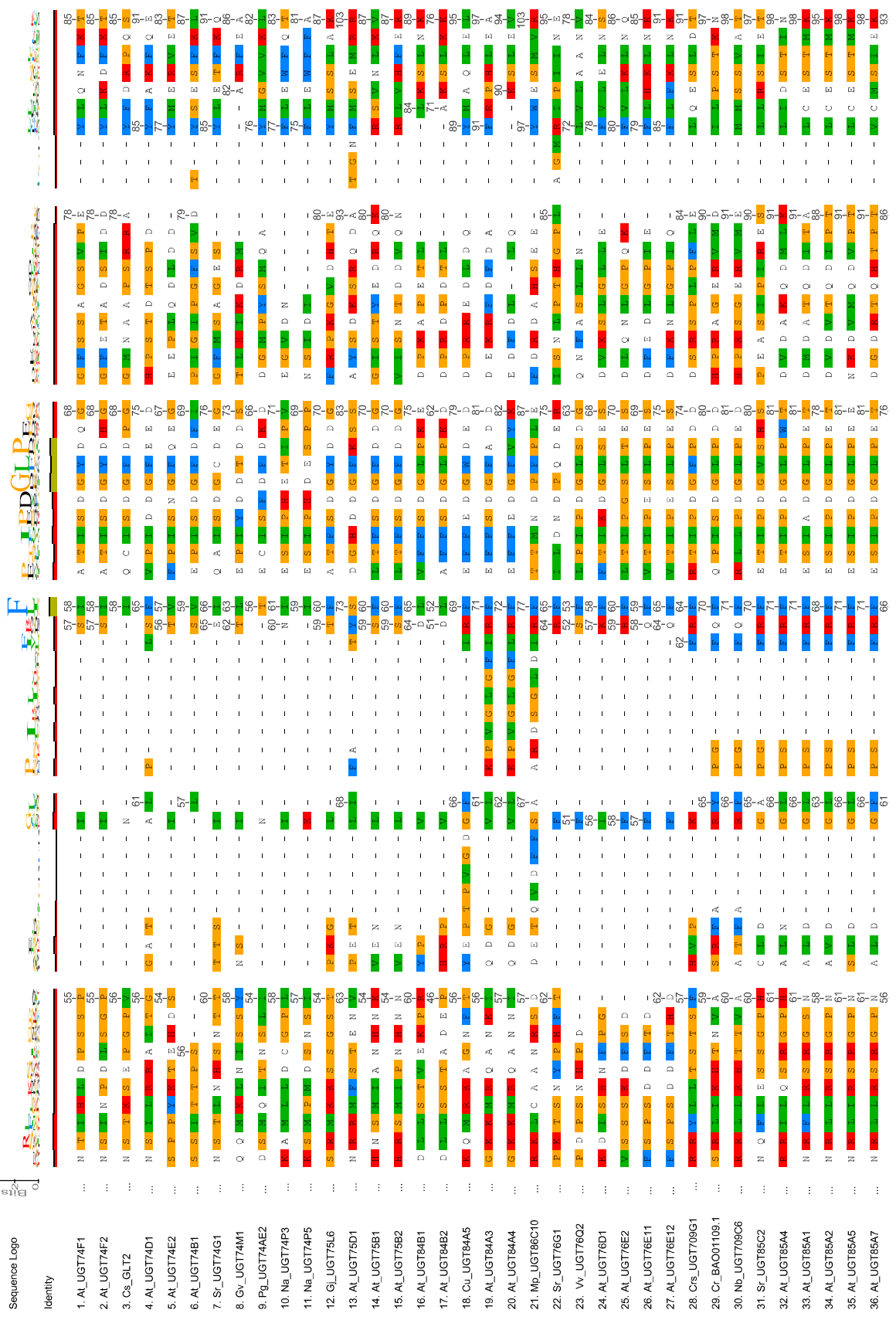
Identity





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38. Pp_UGT85A2	...	1	3	1	A S R E E R P P A	13	V V P P P A Q G R A	23	N P R Q A	33	N - - Y R C F R H - -	40	T F N T E E N	49
39. Cf_UGT85A84	...	1	3	1	A G N D R R P R A	13	C P P P A Q G R A	23	N P R N A	33	R - - R Q G R Y - -	40	T F N T E E N	49
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41. Nb_UGT85A73	...	1	3	1	E A E E R R R R A	13	C P Y P A Q G R A	23	N P R R A	33	R - - R R R G R Y - -	40	T F N T E E N	49
42. Ad_UGT85A38	...	1	3	1	A G R P E R R R A	10	C P Y P A Q G R A	20	N P R R A	30	R - - S R R G R Y - -	37	T F N T E E N	46
43. Vv_UGT85A69	...	1	3	1	G S R E R R R A	9	V S S P G M G R A	19	N P R R A	29	R - - R R R G R Y - -	38	T F N T E E N	48
44. Mb_UGT72AY1	...	1	3	1	D S S Q R R R A	7	X P A P P G R A	17	P P V G N R A	27	A T - - R R N R T	37	A T T T S S	47
45. Al_UGT88A1	...	1	3	1	O E E A	5	X P A P P G R A	15	S V V E G R A	25	R S R N P S S	35	V V P P P Y Q	45
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47. Al_UGT71C2	...	1	3	1	A Q Q E A E	10	P P P P P G R A	20	A T E A R R R	30	S S Q P S R R R T	40	T H R W S T P	50
48. Ml_UGT71G1	...	1	3	1	S D N N N S E	6	P P P P A P G G R A	16	A S A E A A Q	26	T N D D N N V - -	42	T F C C R F P	51
49. Pg_UGT71A27	...	1	3	1	R R S E E	6	S S P A R A S G R A	16	A G S E A R R	26	S S R R E N S - -	35	T R S A C R F P	44
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51. Fv_UGT71A49	...	1	3	1	K R A S E	10	P P P P G M G R A	10	S T V E A A	20	C R D D N R - -	27	T Y V M R P P	36
52. Gj_UGT94E5	...	1	3	1	R R S R S R N	11	F P W A Y G R A	21	S P V E A R R	31	T D - - R - - G A - -	38	Y C S T P N	47
53. Cs_UGT94P1	...	1	3	1	N Q N R S S	7	P P W A Q G R A	21	P P E A R R	31	T N - - - N P R - -	38	Y C S T P N	47
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55. Sf_UGT91D2	...	1	3	1	S D R R R Q	18	P P W A P G R A	28	P P Q S S R	38	A - - E R G - - R - -	44	C S T P N	53
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59. Sa_UGT73L1	...	1	3	1	G S N Q R R V V	11	P P Y P A T G R A	21	P P N A R R A	31	A E R R N R - -	39	T P R N R - -	48
60. Nb_UGT73A24	...	1	3	1	G Q R R R	7	P P P A R G R A	17	P P N A R R A	27	V R - - R A G V R - -	34	T T T T R R N A	43
61. Nb_UGT73A25	...	1	3	1	G Q R R R	7	P P P A R G R A	17	P P D A R R A	27	A S - - R - - G V R - -	34	T T T P N E	43
62. Fv_UGT73AC3	...	1	3	1	S E P P R E R V	10	P P P A Q G R A	20	P P D A R R A	30	A S - - R - - G R R - -	34	T T T P N	47
63. Gm_UGT73P2	...	1	3	1	X R Q E R G S	11	P P P S S R A	21	P P S D A R R	31	A A - - R G A R S - -	38	S S T T S N A	47
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66. Ml_UGT73F3	...	1	3	1	E E Q P R R R V	13	P P P A Q G R A	23	P P N A R R A	33	A S - - - N Q R - -	40	T T T P S N A	49
67. Gm_UGT73F2	...	1	3	1	Q Q R P R R R V	11	P P P A S G R A	21	P P S D A R R	31	A S - - R - - G Q Q - -	38	T V T T P A N A	47
68. Gm_UGT73F4	...	1	3	1	Q Q R P R R R V	11	P P P S P G R A	21	P P C G A R R	31	A S - - R - - G Q R - -	38	T V T T P Y N A	47
69. Gh_UGT73C14	...	1	3	1	A Q G R R R	7	P P P A Q G R A	17	P P S D A R R	27	A Q - - R - - G Q R - -	34	T R S T T P V Y	43
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71. Al_UGT73C3	...	1	3	1	P P P R R R F	16	P P P A Q G R A	26	P P S D A R R	36	A Q - - R - - G V R - -	43	T V T T P Q N A	52
72. Bv_UGT73C10	...	1	3	1	P P S R R R F	15	P P P A Q G R A	25	P P D A R R A	35	A Q - - R - - G R - -	42	T T T P P N A	51
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74. Al_UGT73C5	...	1	3	1	R S P R R R F	14	P P P A Q G R A	24	P P D A R R A	34	A Q - - R - - G R - -	41	T T T P P N A	50
75. Al_UGT73C6	...	1	3	1	R S P R R R F	15	P P P A Q G R A	25	P P S D A R R	35	A Q - - R - - G R - -	42	T T T P P N A	51

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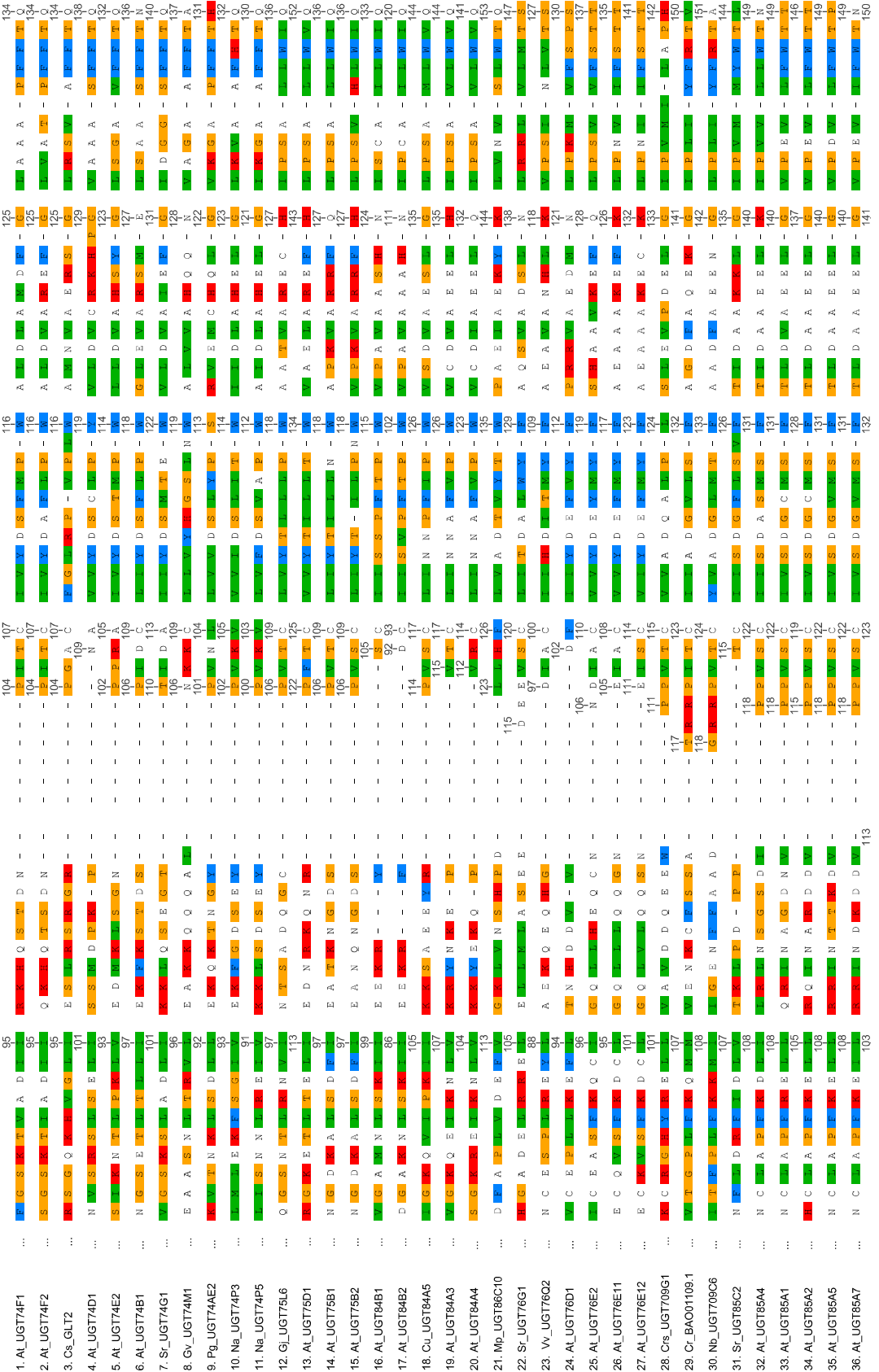


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39. Cf_UGT85A84	... K R A G Q S X G P A	A D - - - - - I G C	P D - - - - - P R 69	E P D G G P P S S 79	D C D A T T Q D D P S 89	- - - C E S T T 96
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41. Nb_UGT85A73	... K R A G Q S X G P E	S S - - - - - I G C	S S - - - - - P R 69	E P D G G P P P S 79	E A D A T T Q D D P P S 89	- - - C E S T T 96
42. Ad_UGT85A38	... K R A G Q S X G P E	S S - - - - - I G C	S S - - - - - P R 69	E P D G G P P P S 79	D D A U U Q P P P P S 89	- - - C E S T T 96
43. Vv_UGT85A69	... T R A G Q S X G P E	S S N - - - - - I G C	P P U - - - - - S Q 66	E P D G G P P P S 76	N D A U U Q D D P P S 86	- - - C A S T T 93
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47. Al_UGT1C2	... P Q S D T A A	K S - - - - - E S	E S - - - - - T 75	E D Q N P P P P S 85	P P A S E E S Y 95	- - - E P E 104
48. Ml_UGT1G1	... P A D S - - - - - S	K S - - - - - A 68	Q - - - - - P 74	E E E P - - - P P 82	E P S S E E E T 92	- - - E T E S 101
49. Pp_UGT1A27	... D T G A D N - - - - -	K S - - - - - T N	P V P R K T V S N	P E T D - - - P Q N 71	X S S S P R R A A P	- - - S S E V Q 86
50. Al_UGT1B6	... - - - S S A N T S S	T S - - - - - S N	N R R S V E S S C	G D - - - - - Q Q 71	T E R A T D S -	- - - Q S S P 86
51. Fv_UGT1A49	... T A D C S I D - - - - -	K S A - - - - - V D	P S K T Q S R R	P N - - - - - P Q E 77	P S Q C T G A T G E	- - - T F D S R S S 96
52. Gj_UGT94E5	... G P F R K T G K	X S - - - - - T -	- - - - - T P A 58	E D T P - - - P P P 78	Y T T N G P P P -	- - - E A T T K 83
53. Cs_UGT94P1	... S S - - - - - T D	X S - - - - - S -	- - - - - S -	P S E - - - - P P P 75	Y T T N G P P -	- - - N S T 91
54. Pp_UGT94Q2	... S S - - - - - D S S P	S - - - - - - -	- - - - - T 71	P S S E - - - D P P E 71	T T T N G P P S -	- - - E S T 89
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58. Na_UGT1T1	... S F S S T D N D	E D - - - - - I G C	P P S D G S P 73	P P P P P D P P P N	A S M D P A D Q 93	- - - Y Y Q A D 100
59. Sa_UGT73L1	... S F S S T D N D	K S - - - - - I G C	S S S H T R 67	P S T E M G P P E G	E N E S S A S S P	- - - E A I G R Y 94
60. Nb_UGT73A24	... S F S S A Q R E	K S - - - - - I G C	E - - - - - R 67	E A E N D P P E E	C E D D Q P S D	- - - E K P N 94
61. Nb_UGT73A25	... S F S S X S Q R E	K S - - - - - I G C	E - - - - - R 67	E A E N D P P E E	C E D D Q P S S	- - - E K P N 94
62. Fv_UGT73AC3	... S F S S X S Q R E	Q T - - - - - N	- - - - - S R V S D	E N D - - - A S P - 81	- - - - - T D	- - - S S S A P 98
63. Gm_UGT73P2	... T R S Q S S D D	A S - - - - - C	P - - - - - T V N 80	E A Q V G P P G	E A N G D T P P	- - - E S T P S Y 108
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65. Ml_UGT73K1	... Q P F D T E E	K A A - - - - - C	- - - - - R 71	P S A Q G P P T G	E N E A A S D N	- - - Q T A C R Y 98
66. Ml_UGT73F3	... K S T R S S S D	A P S - - - - - E	- - - - - R 71	P S A Q G P P T G	E N E A A S D N	- - - Q T A C R Y 98
67. Gm_UGT73F2	... Q R X S S P S -	- - - - - - -	- - - - - R 64	P S Q Q V G P P E G	E S S S T T D S	- - - T T M R 91
68. Gm_UGT73F4	... G R X S S P S -	- - - - - - -	- - - - - Q R 64	P A D G P P D	E S S A T T D	- - - A D T A R Y 91
69. Gh_UGT73C14	... G R X S S P S -	E S - - - - - I G C	- - - - - Q R 67	E A D V G P P D	E R S A T T D	- - - A D T A R Y 91
70. Al_UGT73C1	... G R X S S P S -	Q S - - - - - I G C	P - - - - - Q R 72	P G R E G G S V	E N D K S V	- - - E D S S Y 99
71. Al_UGT73C3	... A R P X N N N A	E S - - - - - I G C	P - - - - - R 76	P S Q E S G S P E G	E N D G S D S	- - - G A S T P 103
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73. Bv_UGT73C11	... A R P X N N N A	E S - - - - - I G C	P - - - - - R 75	P S Q E A G P P E G	E N D S S T	- - - E A P 102
74. Al_UGT73C5	... A R P X N N N A	E S - - - - - I G C	P - - - - - R 74	P S Q E A G P P E G	E N D S T S	- - - E T P 101
75. Al_UGT73C6	... A R P X N N N A	E S - - - - - I G C	P - - - - - R 75	P V E A G Q E E	E N D S D T P	- - - E S T P 102

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Sequence Logo

Identity



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IP Ext

LV D

RBC

ISK

ESL

EXA EFS

IP Ext



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38. Pp_UGT85A2	T K N S S P D S	- - - - -	A D G T S	D A A E E F	E E -	130	A D G T S	D A A E E F	139
39. Cf_UGT85A84	T K N S N A P A	- - - - -	D G A G N S	A E A E Q E F	E E -	140	S D G A G N	A E E A	147
40. Gf_UGT85A24	A E N G P S S	- - - - -	D G V S S	E A A E	E E -	141	S D G A G N	A E E A	148
41. Nb_UGT85A73	K N D P N T S	- - - - -	D G V S S	E A A Q E E	E E -	142	S D G A G N	A E E A	149
42. Ad_UGT85A38	G K N N P G S S	- - - - -	D G V S S	D A A E E	E E -	143	S D G A G N	A E E A	150
43. Vv_UGT85A69	K N N D P G P	- - - - -	D G V S S	D A A Q E E	E E -	144	S D G A G N	A E E A	151
44. Nb_UGT72A1	S T A S S R P	- - - - -	D G V S S	D A A Q E E	E E -	145	S D G A G N	A E E A	152
45. Al_UGT88A1	S S S N F N	- - - - -	D F C T	D T A D E F	E E -	146	S D G A G N	A E E A	153
46. Vv_UGT88A20	N N P N Q A	- - - - -	D F C T	A A Q	E E -	147	S D G A G N	A E E A	154
47. Al_UGT1C2	N A S T	- - - - -	D F C	D G N E E N	E E -	148	S D G A G N	A E E A	155
48. Mt_UGT1G1	K A T K T	- - - - -	D F C	D G N E E G	E E -	149	S D G A G N	A E E A	156
49. Pp_UGT1A27	P P D S S G V	- - - - -	D F C	D A N E E N	E E -	150	S D G A G N	A E E A	157
50. Al_UGT1B6	P P D A A P A	- - - - -	D F C T	D A N E E G V	E E -	151	S D G A G N	A E E A	158
51. Fv_UGT1A49	P P D A A T K	- - - - -	D F C T	D A N E E G	E E -	152	S D G A G N	A E E A	159
52. Gf_UGT94E5	K A N G A P E	- - - - -	D A T Q T	A A H	E E -	153	S D G A G N	A E E A	160
53. Cs_UGT94P1	A P E A S T S	- - - - -	D S P S	A Q S T A	E E -	154	S D G A G N	A E E A	161
54. Pp_UGT94Q2	N A E T A G P T	- - - - -	D N P S	E A S S T	E E -	155	S D G A G N	A E E A	162
55. Sf_UGT91D2	E D P Y G Q A S	- - - - -	D N P S	E A S S T	E E -	156	S D G A G N	A E E A	163
56. Gm_UGT91H4	K A Y E G Q A V A	- - - - -	D F A A	E P A K S V	E E -	157	S D G A G N	A E E A	164
57. Cs_UGT91Q2	A B D G V P P	- - - - -	D F A A	E P A K S V	E E -	158	S D G A G N	A E E A	165
58. Na_UGT1T1	K A E P R N E	- - - - -	D P D	A D A E N	E E -	159	S D G A G N	A E E A	166
59. Sa_UGT73L1	A Y T S Q R P	- - - - -	D P D	A D A E N	E E -	160	S D G A G N	A E E A	167
60. Nb_UGT73A24	A A T S Q E P	- - - - -	D P D	A D A E N	E E -	161	S D G A G N	A E E A	168
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63. Gm_UGT73P2	G G S G V Q Q	- - - - -	D P D	A D A E N	E E -	164	S D G A G N	A E E A	171
64. Gu_UGT73P12	Q G S G V Q E Q	- - - - -	D P D	A D A E N	E E -	165	S D G A G N	A E E A	172
65. Mt_UGT73K1	A A R P R A D	- - - - -	D P D	A D A E N	E E -	166	S D G A G N	A E E A	173
66. Mt_UGT73F3	T G A G R E P	- - - - -	D P D	A D A E N	E E -	167	S D G A G N	A E E A	174
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68. Gm_UGT73F4	Q A A G R E P	- - - - -	D P D	A D A E N	E E -	169	S D G A G N	A E E A	176
69. Gh_UGT73C14	S A A N K E E A	- - - - -	D P D	A D A E N	E E -	170	S D G A G N	A E E A	177
70. At_UGT73C1	K A S G E E P	- - - - -	D P D	A D A E N	E E -	171	S D G A G N	A E E A	178
71. At_UGT73C3	K A N G E E P	- - - - -	D P D	A D A E N	E E -	172	S D G A G N	A E E A	179
72. Bv_UGT73C10	K A N G E E P	- - - - -	D P D	A D A E N	E E -	173	S D G A G N	A E E A	180
73. Bv_UGT73C11	K A N G E E P	- - - - -	D P D	A D A E N	E E -	174	S D G A G N	A E E A	181
74. At_UGT73C5	K A N G E E P	- - - - -	D P D	A D A E N	E E -	175	S D G A G N	A E E A	182
75. At_UGT73C6	K A N G E E P	- - - - -	D P D	A D A E N	E E -	176	S D G A G N	A E E A	183



37. Cs_UGT85K11	... S I - A C G E E G V Y 156	R Y P Q - Q E G 185	S P E K D E S E 175	D G S - D Y Y 184	D N P G G R N - 194	- - - - - R K D D S P S 200
38. Pp_UGT85A2	... S I - A C G E E G V Y 157	Q Y Y E - E E G 186	T P F K D A F D 176	A N G Y - D T E 185	D M P G G R D - 195	- - - - - R K P D S P S 201
39. Cf_UGT85A84	... S I - A C G E E G V Y 158	Q Y A N - E E G 187	T P F E E A S Q 177	A N G Y E - T T 186	D M P G G R D - 196	- - - - - R K P D S P S 202
40. GJ_UGT85A24	... S I - A C G E E G V Y 159	Y A E - E E G 188	T P F K D A S Y 178	S N G Y - E Q S 187	D M P G G R D - 197	- - - - - R K P D S P S 203
41. Nb_UGT85A73	... S I - A C G E E G V Y 160	Y Y E - E E G 189	A P F K D A T D 178	N G Y E - T T 188	D M P G G R D - 198	- - - - - R K P D S P S 204
42. Ad_UGT85A38	... S I - A C G E E G V Y 161	Y N - E E G 190	T P F K D A S Y 179	N G Y E - D Y 189	D M P G G R D - 199	- - - - - R K P D S P S 205
43. Vv_UGT85A69	... S I - A C G E E G V Y 162	Y S S - D E G 191	T P F K D E S Y 180	N G Y E - D Y 190	D M P G G R D - 200	- - - - - R K P D S P S 206
44. Nb_UGT2AY1	... T - A V T P A A A 151	Y C Q V P D - E E 189	E F V E E E E 179	N G Y - D Y 179	D M P G G R D - 189	- - - - - R K P D S P S 207
45. Al_UGT88A1	... G I - A A C A A A A 151	Y P T D - E T T 189	P G N R D P P 170	- - - - - 172	- - - - - P D D P S P S 185	- - - - - R K P D S P S 208
46. Vv_UGT88A20	... G I - A A C A A A A 151	Y P T D - E T T 189	P G N R D P P 170	- - - - - 172	- - - - - P D D P S P S 185	- - - - - R K P D S P S 209
47. Al_UGT1C2	... C - S I A S P F I G T 162	Y T P F H - Q Q 171	N K S R D N T 167	- - - - - 164	- - - - - P G I C K A 179	- - - - - R K P D S P S 210
48. Ml_UGT1G1	... S I - N G E I S S 148	E E - - - E 166	T K P - - - E 177	S S - - - D E E 173	- - - - - P G I G P P 192	- - - - - R K P D S P S 211
49. Pp_UGT1A27	... A - G I A G E G A 143	S - - - - N Q 165	E E - - - D Q 164	S D - - - D Q 171	N P G S - - - 161	- - - - - R K P D S P S 212
50. Al_UGT1B6	... S I - N A G E F G G 152	S - - - - N Q 165	S Q - - - N D 164	N S - - - D U E 168	S - - - - S A - - - N 175	- - - - - R K P D S P S 213
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52. GJ_UGT94E5	... S I - S I S I S I S I S I 147	- - - - - - - - - 151	E E N - R D C T E 169	D S - - - D A E 154	S - - - - S S - - - N 183	- - - - - R K P D S P S 215
53. Cs_UGT94P1	... G I - A T V S I S I S I 147	- - - - - - - - - 151	E E N - R D C T E 169	D S - - - D A E 154	S - - - - S S - - - N 183	- - - - - R K P D S P S 216
54. Pp_UGT94Q2	... A - A A S S S S - 165	Q - - - - - - - - - 151	- - - - - C G S E 162	- - - - - P A 166	- - - - - Q I G - - - E 175	- - - - - R K P D S P S 217
55. Sf_UGT91D2	... P P A A A A A A A A 157	- - - - - - - - - 155	- - - - - A T Y 175	- - - - - E E 167	- - - - - S P D D N S 187	- - - - - R K P D S P S 218
56. Gm_UGT91H4	... P I - A P N P P P P 147	- - - - - - - - - 155	- - - - - E D E D P P T K 177	- - - - - P T A 170	- - - - - P F T T R K 187	- - - - - R K P D S P S 219
57. Cs_UGT91Q2	... S I - A A T N V E P G 152	- - - - - - - - - 155	D Y S S S S E 173	- - - - - Y S F 178	- - - - - E N T P S A 188	- - - - - R K P D S P S 220
58. Na_UGT1T1	... S I - S R E F G P P 151	- - - - - - - - - 155	K P R K S S S E 166	- - - - - Y S - - - P P P P 175	- - - - - D E P S A E S 185	- - - - - R K P D S P S 221
59. Sa_UGT73L1	... S I - Y N X N S 151	- - - - - - - - - 155	N G S K P P E 171	- - - - - V S - - - P P P P 175	- - - - - S M P G I P D 185	- - - - - R K P D S P S 222
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62. Fv_UGT73AC3	... G I - P S S C 155	- - - - - - - - - 155	N P P R K N S 164	- - - - - S E 168	- - - - - Y P N P P P E 178	- - - - - R K P D S P S 225
63. Gm_UGT73P2	... S I - Y A A S A A 155	- - - - - - - - - 155	A P I Q E S G 168	- - - - - S E 168	- - - - - P G G P P D 182	- - - - - R K P D S P S 226
64. Gu_UGT73P12	... S I - Y P A Q S A 155	- - - - - - - - - 155	S P I A P P E A K 176	- - - - - N D 180	- - - - - P G G P P D N 190	- - - - - R K P D S P S 227
65. Ml_UGT73K1	... C - P D C E 155	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 228
66. Ml_UGT73F3	... C - P D C E 155	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 229
67. Gm_UGT73F2	... P I - P S G A A 148	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 230
68. Gm_UGT73F4	... P I - P S G A A 148	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 231
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71. Al_UGT73C3	... G I - C P N C 153	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 234
72. Bv_UGT73C10	... C - C P C 153	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 235
73. Bv_UGT73C11	... C - C P C 153	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 236
74. Al_UGT73C5	... G I - C P C 153	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 237
75. Al_UGT73C6	... G I - C P C 153	- - - - - - - - - 155	S S P I A S D 166	- - - - - N E 170	- - - - - P G P P P E 180	- - - - - R K P D S P S 238

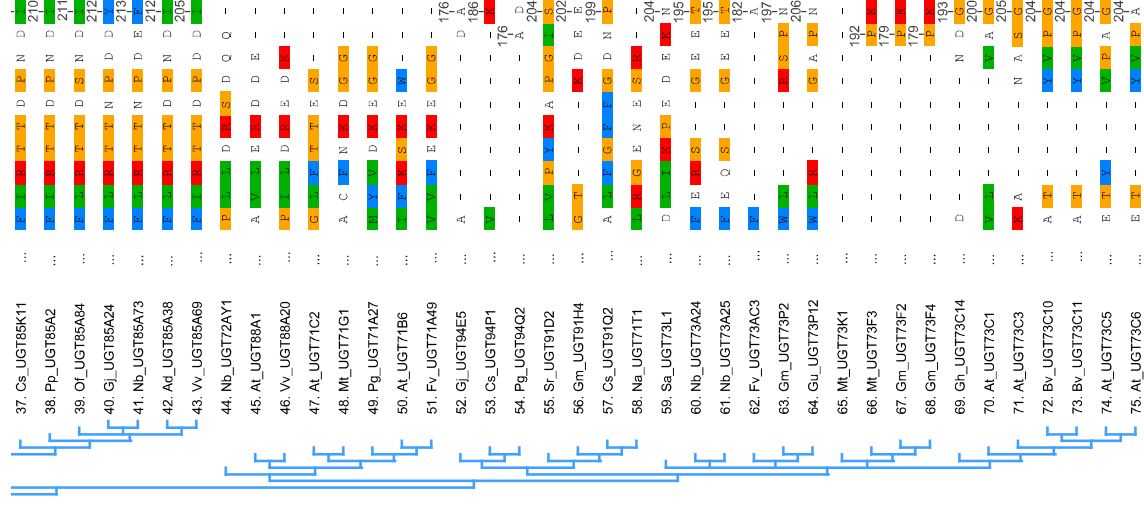


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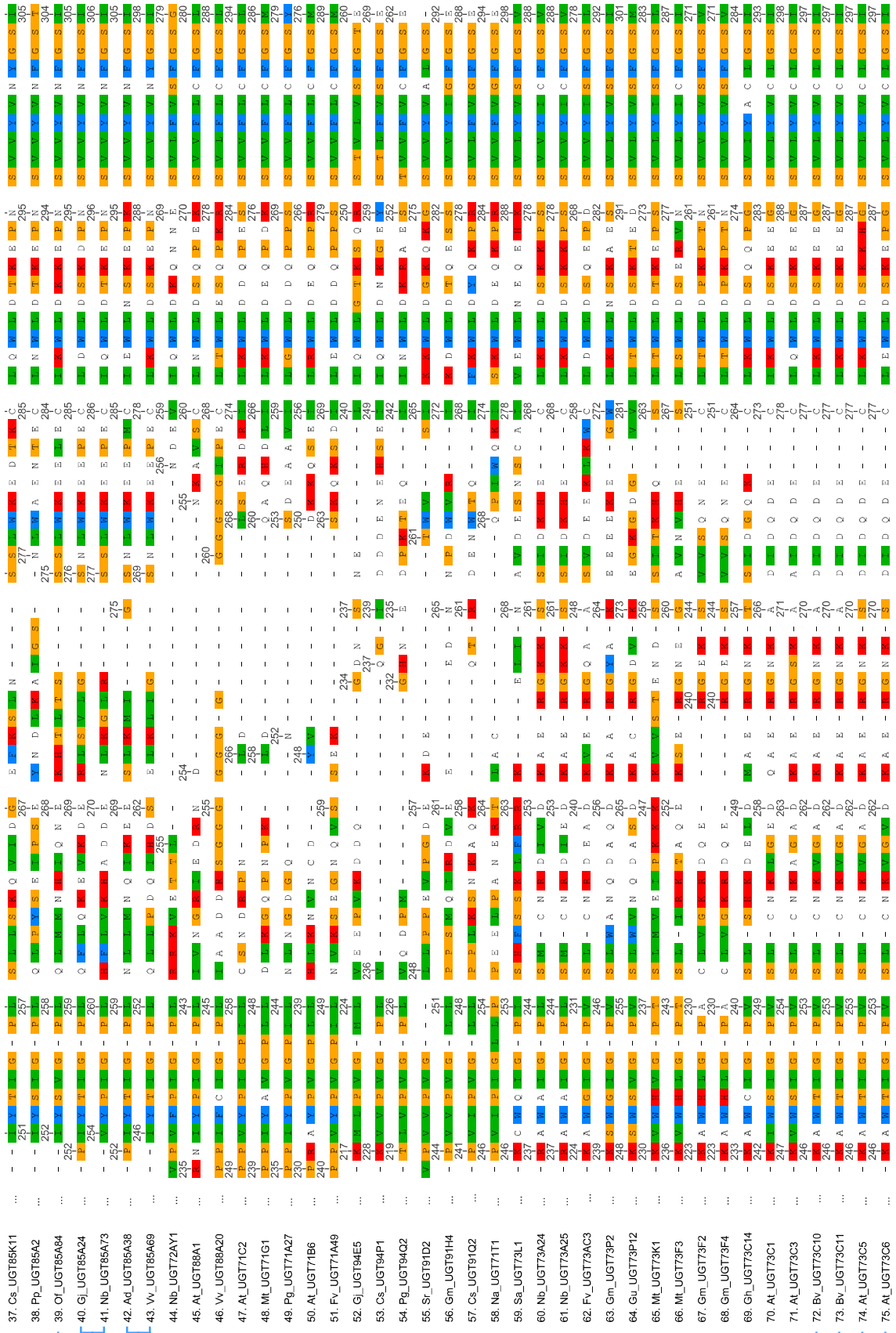
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3. Cs_GLT2	... - - - - - 183 - - - - - 190 - - - - - 200 - - - - - 210 - - - - - 220 - - - - -
4. AL_UGT74D1	... - - - - - 186 - - - - - 191 - - - - - 201 - - - - - 211 - - - - - 221 - - - - -
5. AL_UGT74E2	... - - - - - 186 - - - - - 191 - - - - - 201 - - - - - 211 - - - - - 221 - - - - -
6. AL_UGT74B1	... - - - - - 188 - - - - - 194 - - - - - 204 - - - - - 214 - - - - - 224 - - - - -
7. Sr_UGT74G1	... - - - - - 189 - - - - - 195 - - - - - 205 - - - - - 215 - - - - - 225 - - - - -
8. Gv_UGT74M1	... - - - - - 203 - - - - - 213 - - - - - 223 - - - - - 233 - - - - - 243 - - - - -
9. Pg_UGT74E2	... - - - - - 182 - - - - - 186 - - - - - 196 - - - - - 206 - - - - - 216 - - - - -
10. Na_UGT74P3	... - - - - - 185 - - - - - 190 - - - - - 200 - - - - - 210 - - - - - 220 - - - - -
11. Na_UGT74P5	... - - - - - 180 - - - - - 185 - - - - - 195 - - - - - 205 - - - - - 215 - - - - -
12. GJ_UGT75L6	... - - - - - 191 - - - - - 201 - - - - - 211 - - - - - 221 - - - - - 231 - - - - -
13. AL_UGT75D1	... - - - - - 207 - - - - - 215 - - - - - 225 - - - - - 235 - - - - - 245 - - - - -
14. AL_UGT75B1	... - - - - - 180 - - - - - 186 - - - - - 196 - - - - - 206 - - - - - 216 - - - - -
15. AL_UGT75B2	... - - - - - 180 - - - - - 186 - - - - - 196 - - - - - 206 - - - - - 216 - - - - -
16. AL_UGT84B1	... - - - - - 172 - - - - - 177 - - - - - 187 - - - - - 197 - - - - - 207 - - - - -
17. AL_UGT84B2	... - - - - - 197 - - - - - 202 - - - - - 212 - - - - - 222 - - - - - 232 - - - - -
18. Cu_UGT84A5	... - - - - - 197 - - - - - 205 - - - - - 215 - - - - - 225 - - - - - 235 - - - - -
19. AL_UGT84A3	... - - - - - 200 - - - - - 204 - - - - - 214 - - - - - 224 - - - - - 234 - - - - -
20. AL_UGT84A4	... - - - - - 209 - - - - - 214 - - - - - 224 - - - - - 234 - - - - - 244 - - - - -
21. Mp_UGT86C10	... - - - - - 180 - - - - - 183 - - - - - 193 - - - - - 203 - - - - - 213 - - - - -
22. Sr_UGT76G1	... - - - - - 185 - - - - - 188 - - - - - 198 - - - - - 208 - - - - - 218 - - - - -
23. Vv_UGT76Q2	... - - - - - 192 - - - - - 195 - - - - - 205 - - - - - 215 - - - - - 225 - - - - -
24. AL_UGT76D1	... - - - - - 191 - - - - - 194 - - - - - 204 - - - - - 214 - - - - - 224 - - - - -
25. AL_UGT76E2	... - - - - - 197 - - - - - 200 - - - - - 210 - - - - - 220 - - - - - 230 - - - - -
26. AL_UGT76E11	... - - - - - 200 - - - - - 205 - - - - - 215 - - - - - 225 - - - - - 235 - - - - -
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28. Cs_UGT709G1	... - - - - - 209 - - - - - 214 - - - - - 224 - - - - - 234 - - - - - 244 - - - - -
29. Cf_BAO01109.1	... - - - - - 207 - - - - - 211 - - - - - 221 - - - - - 231 - - - - - 241 - - - - -
30. Nb_UGT709C6	... - - - - - 211 - - - - - 216 - - - - - 226 - - - - - 236 - - - - - 246 - - - - -
31. Sr_UGT85C2	... - - - - - 216 - - - - - 226 - - - - - 236 - - - - - 246 - - - - - 256 - - - - -
32. AL_UGT85A4	... - - - - - 213 - - - - - 218 - - - - - 228 - - - - - 238 - - - - - 248 - - - - -
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34. AL_UGT85A2	... - - - - - 207 - - - - - 212 - - - - - 222 - - - - - 232 - - - - - 242 - - - - -
35. AL_UGT85A5	... - - - - - 212 - - - - - 217 - - - - - 227 - - - - - 237 - - - - - 247 - - - - -
36. AL_UGT85A7	... - - - - - 213 - - - - - 218 - - - - - 228 - - - - - 238 - - - - - 248 - - - - -





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38. Pp_UGT85A2	... E E V T I D P N D 211	-- -- -- -- --	S A E N P N U S D 236	E E Q E D A S A	S S E E E S K A 226
39. Cf_UGT85A84	... E E V T I D P N D 212	-- -- -- -- --	S A E N P N U S D 237	E E D V D A S A	S S E E E A P K A 227
40. Gj_UGT85A24	... E E V T I N P D D 213	-- -- -- -- --	S A E N P N A Q S 238	E E D V N A S A	S S E E E A K A 228
41. Nb_UGT85A73	... E E V T I N P D E 214	-- -- -- -- --	S A E N P N P E 247	E E A E E T A A	S S E E E A K A 229
42. Ad_UGT85A38	... E E V T I D P N D 205	-- -- -- -- --	S A E N P N U S D 230	E E Q E E E A A	S S E E E S A A 220
43. Vv_UGT85A69	... E E V T I D P D D 206	-- -- -- -- --	S A E N P N U S D 231	E E Q E V D A A	S S E E E K A A 208
44. Al_UGT85A1	... P D S D Q Q -	-- -- -- -- --	D G E T N N A 228	E E P E T N A A	K K E E Y T D 209
45. Al_UGT88A1	... A E E D D E -	-- -- -- -- --	S G E N P N T D A 219	E E N E A A A A	K K E E Y T D 209
46. Vv_UGT88A20	... P D E E D R K -	-- -- -- -- --	A G T V N P T D A 216	E E P P A A A A	N N S T H P R S A 206
47. Al_UGT1C2	... G T P T E S -	-- -- -- -- --	R G G V N P T E A 242	E E P P A A A A	E A E K P E E 222
48. Mt_UGT1G1	... A C N N D G G -	-- -- -- -- --	R G G V N P T E A 242	E E N A D D A A	R K A A E K P E D 209
49. Pg_UGT1A27	... G V G D E G G -	-- -- -- -- --	R G G V N P T E A 242	E E Q S S D A A	S S K P R R C E E 215
50. Al_UGT1B6	... E K S E X -	-- -- -- -- --	R G G V N P T E A 242	E E P Q A T F -	T T Q A K P F E E 214
51. Fv_UGT1A49	... V V P E E G G -	-- -- -- -- --	R G G V N P T E A 242	E E P P A A Q S -	N N A K R Y E E 214
52. Gj_UGT94E5	... A - - - D A 176	-- -- -- -- --	E - G K X D Y D Y 221	E E - G K X D Y D Y 221	A E P N R D C D 192
53. Cs_UGT94P1	... - - - - - 186	-- -- -- -- --	E - G K X D Y D Y 221	E E - G K X D Y D Y 221	A A S N D Q P S C 202
54. Pp_UGT94Q2	... - - - - - 176	-- -- -- -- --	E - G K X D Y D Y 221	E E - G K X D Y D Y 221	D E A C E P S T 190
55. St_UGT91D2	... P P X A P G 204	-- -- -- -- --	D C G V N P T E A 242	E E G V A K N S -	- - - - - K G 216
56. Gm_UGT91H4	... G T - - - D E F 202	-- -- -- -- --	D G P V N P T E A 242	E E - G D K X D Y D Y 223	E D N K A V S S C 218
57. Cs_UGT91Q2	... A E G E F G D N P 199	-- -- -- -- --	R A A E V Y S C R S E 225	E E - G E V Y S C R S E 225	G R V G K T E G S 215
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63. Gm_UGT73P2	... W - - - - S P N 206	-- -- -- -- --	R G G V N P T E A 242	E E - S A V Y E Y 241	R T R G Q S E X K S D 213
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66. Mt_UGT73F3	... - - - - - 179	-- -- -- -- --	R G G V N P T E A 242	E E - E G T Y E Y E 223	G E E A E N D 209
67. Gm_UGT73F2	... - - - - - 179	-- -- -- -- --	R G G V N P T E A 242	E E - E C Q Q R 216	G V T E T V K S E 196
68. Gm_UGT73F4	... - - - - - 193	-- -- -- -- --	R G G V N P T E A 242	E E - E C Q Q R 216	D R V T K E E S 196
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71. At_UGT73C3	... K A - - - N A S G 204	-- -- -- -- --	R G G V N P T E A 242	E E - P P Y V K D Y 240	D E V K A E Y T S 221
72. Bv_UGT73C10	... A T - - - X P G 204	-- -- -- -- --	R G G V N P T E A 242	E E - P A A N G Y 239	D E V K A E Y T S 220
73. Bv_UGT73C11	... A T - - - X P G 204	-- -- -- -- --	R G G V N P T E A 242	E E - P A A N D 239	E D E A D T S 220
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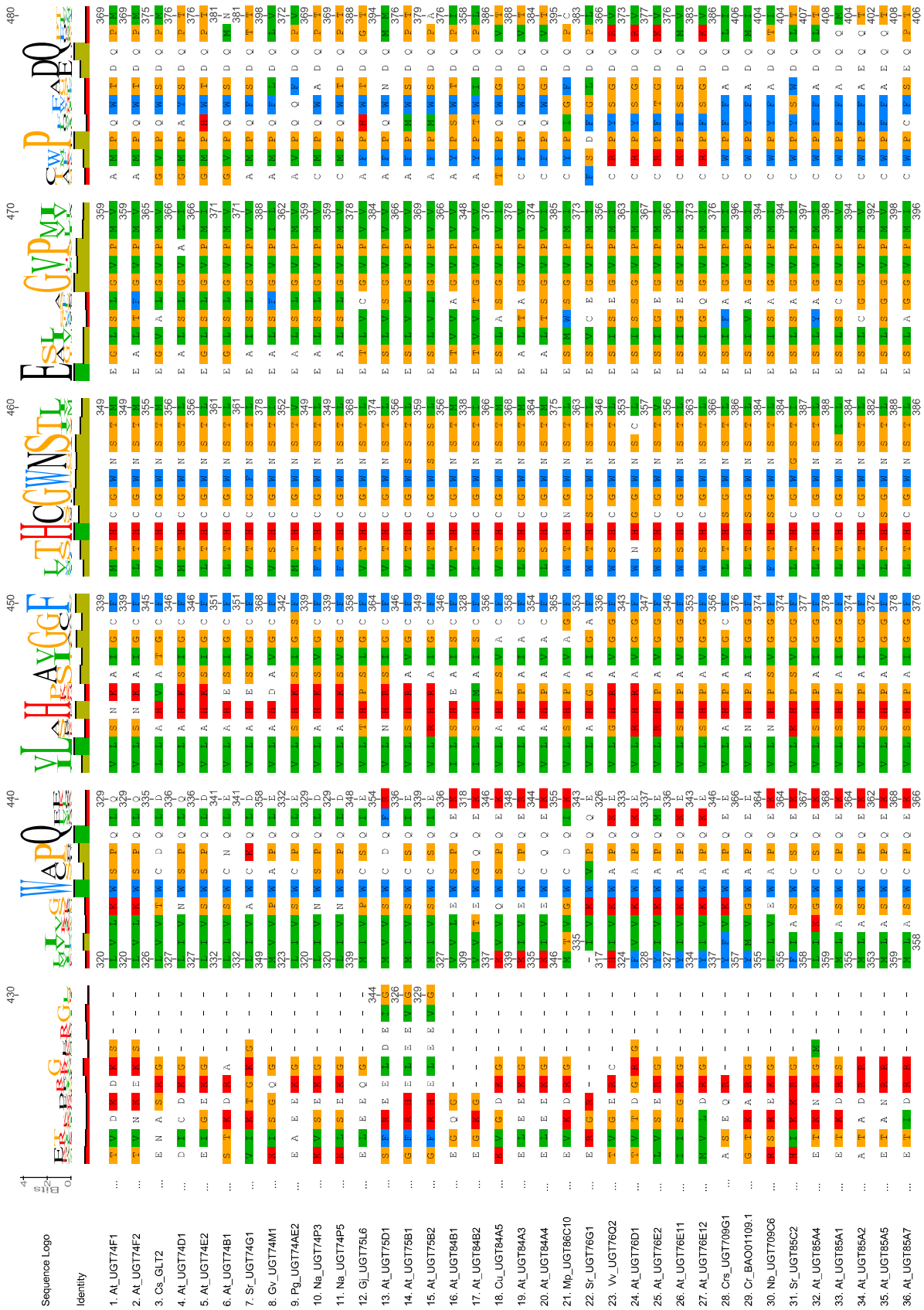


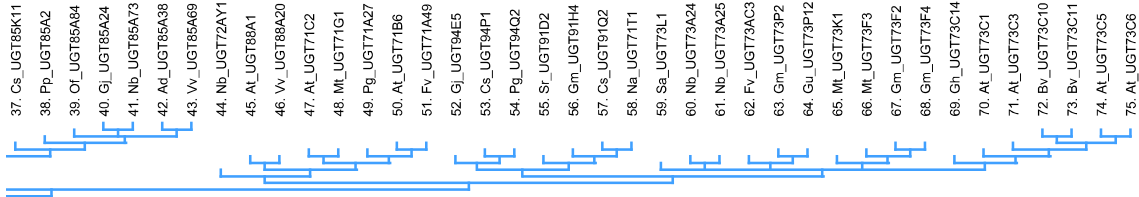
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 50. AL_UGT1B6
 51. Fv_UGT1A49
 52. Gj_UGT94E5
 53. Cs_UGT94P1
 54. Pp_UGT94Q2
 55. St_UGT91D2
 56. Gm_UGT91H4
 57. Cs_UGT91Q2
 58. Na_UGT1T1
 59. Sa_UGT73L1
 60. Nb_UGT73A24
 61. Nb_UGT73A25
 62. Fv_UGT73AC3
 63. Gm_UGT73P2
 64. Gu_UGT73P12
 65. Ml_UGT73K1
 66. Ml_UGT73F3
 67. Gm_UGT73F2
 68. Gm_UGT73F4
 69. Gh_UGT73C14
 70. Al_UGT73C1
 71. Al_UGT73C3
 72. Bv_UGT73C10
 73. Bv_UGT73C11
 74. Al_UGT73C5
 75. Al_UGT73C6

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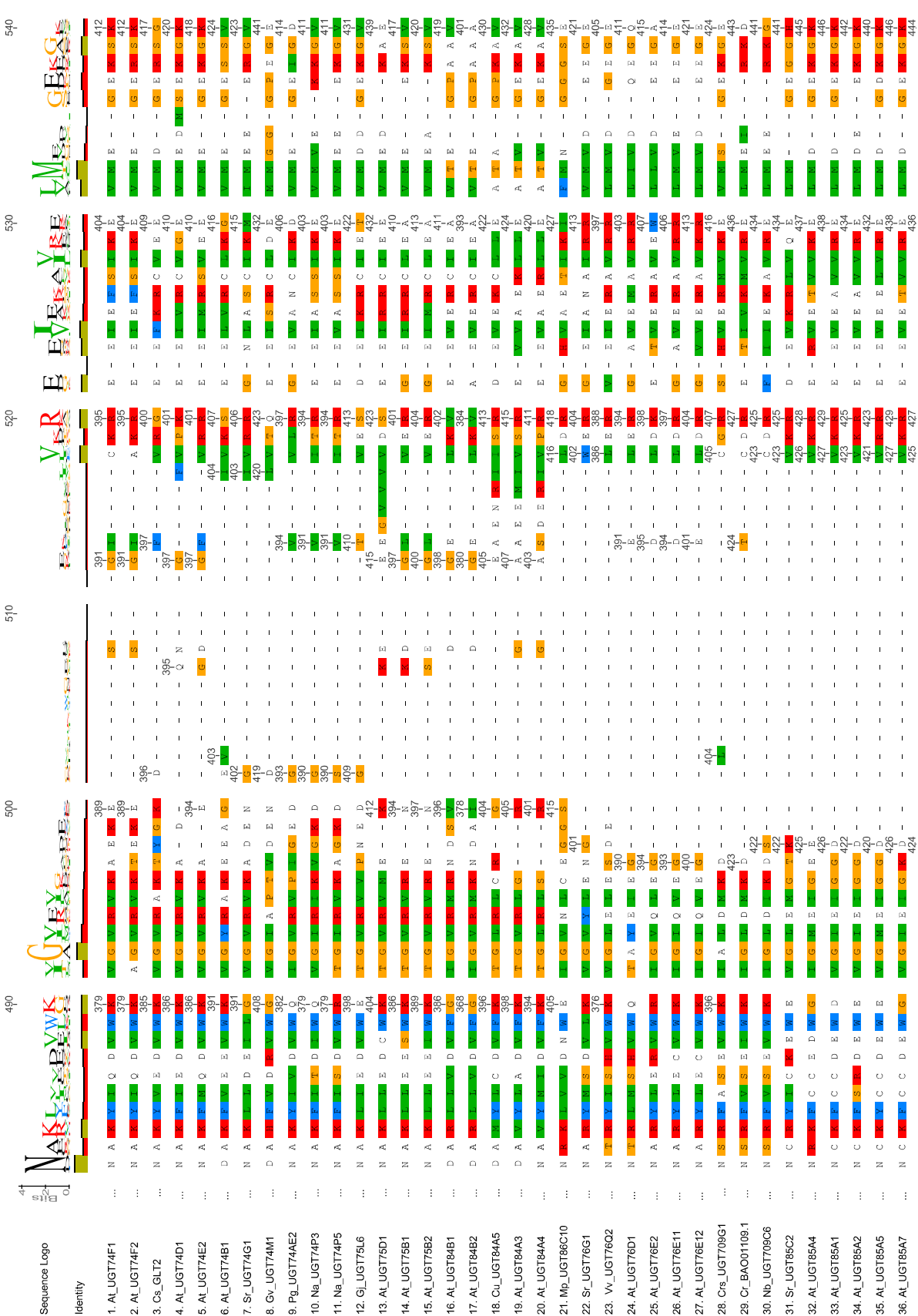


37. Cs_UGT85K11	... G L V T D Q L K S 314	E P A M G G A N S 324	R P S W V V S P D	336	- - - - - G D 337 339	S S A P P E E E E 349
38. Pp_UGT85A2	... T L T N E Q 313	E P S M G A N S 323	R P P W V V P P G	335	- - - - - A G E 336 338	T T A P P P P E E E 348
39. Cf_UGT85A84	... A V T A Q Q 314	E P A M G G A N S 324	R S S W V V P P D	338	- - - - - A G D 337 339	A W S P P P E E E 349
40. Gj_UGT85A24	... T T P G Q 315	E P A M G G A N S 324	Q T T S W V V P D	337	- - - - - S S G D 338 340	S S A P P P P E E E 349
41. Nb_UGT85A73	... T T N Q 314	E P A M G G A N S 324	Q T T S W V V P D	336	- - - - - G G S 337 339	A S P P P E E E E 349
42. Ad_UGT85A38	... T T N Q 307	E P A M G G A N S 317	Q S S W V V P D	337	- - - - - S S E 331 327	S S A P P P P E E E 342
43. Vv_UGT85A69	... V V P Q 285	E P A M G G A N S 318	Q S S W V V P D	308	- - - - - S - - - - - 328	S S A P P P P E E E 338
44. Nb_UGT7A49	... T S T Q 289	E P A M G G E S Q 299	Q K P S W V V P P	309	N S A G K D T R D 315	S S E V P P E G E E 329
45. Al_UGT88A1	... F S L E Q 297	E P A M G G E S G 307	Q R S W V V V N P	317	- - - - - E D 326	K K S P P P E G E E 334
46. Vv_UGT88A20	... S S E Q 303	E P A M G G E S G 307	Q R S W V V V S P	323	- - - - - A P P E P D 324	N E T U P D G P P D 340
47. Al_UGT1C2	... S A A S Q 296	E P A Q A E E 306	R S S W V V S T D	311	- - - - - D E V A S 314 316	N E C P P D E P P 326
48. Ml_UGT1G1	... S G P S Q 285	E P A M G G E S S 288	R S S W V V S - - - 308	- - - - - - - - - - -	314	K K S P P P E G P P 333
49. Pg_UGT1A27	... S S E Q 285	E P A M G G E S S 295	R S S W V V S S P 305	- - - - - P K E - - - -	311	K K E V S N 320
50. Al_UGT1B6	... G F S E Q 298	E T A A A D P S S A 318	R S S W V V S S R A	- - - - - S P N - - - -	323	E P P G E F T N 332
51. Fv_UGT1A49	... C F G E D Q 269	E P A A A E Q G G 279	R P S W V S Q P	318	- - - - - G P S D Y V D 296	K K A P P E G E P D 305
52. Gj_UGT94E5	... F V K E E E 278	E P A M G G E S E 288	N N W V V V F A	- - - - - G Q - - - -	295	D E A P P E - G E 314
53. Cs_UGT94P1	... F S L E E 271	E P A M G G E S S 281	N N W V V V F P	- - - - - E E - - - -	304	E E A P P E - G E 314
54. Pp_UGT94Q2	... S S N E E 254	E P A M G G E S S 304	N N W V V A 314	- - - - - G E - - - -	296	- - - - - - - - - - - 287
55. Sf_UGT91D2	... S S Q V L E 301	E P A M G G E S S 311	R P S W V A K P	- - - - - K - - - -	316	- - - - - P A S S D S 323
56. Gm_UGT91H4	... S S Q E D 297	E P A M G G E S N 307	R P S W A S K P	- - - - - E - - - -	327	- - - - - P P E - G E 325
57. Cs_UGT91O2	... S S N Q 303	E P A M G G E S S 313	R P S W A S K P	- - - - - A E D - - - -	323	- - - - - - - - - - - 324
58. Na_UGT1T1	... S S N Q 307	E P A M G G E S G 317	R P S W V Q K - -	- - - - - - - - - - -	329	D S V P P E E E 332
59. Sa_UGT73L1	... R P P E A Q 297	E P A M A E A S S 307	R P P W V V V K D	- - - - - S A E D - - - -	332	D A P S G E F A 339
60. Nb_UGT73A24	... N T A S Q 297	E P A M G G E A S 307	R P P W V V V K D	- - - - - S A E D - - - -	322	- - - - - C - - - - - 323
61. Nb_UGT73A25	... T A S Q 287	E P A M G G E A S 287	Q E S W V V V T E	- - - - - D N E - - - -	342	- - - - - P E E - G E 319
62. Fv_UGT73AC3	... S S S Q 301	E P A M G G E S S 311	N C S S W V V G K P	- - - - - S E N D G Q 327	314	- - - - - W P P E - G E 326
63. Gm_UGT73P2	... S S S Q 310	E P A M G G E D S 320	R D S W V V S K N	- - - - - D G E G D - - - -	336	E N K S S D - - - 334
64. Gu_UGT73P12	... S S S Q 292	E P A M G G E D S 302	R D S W V V G K P	- - - - - E G E G G - - - -	318	A D S S E - - - - 344
65. Ml_UGT73K1	... S S N E Q 296	E P A M G E A S S 306	Q S W V V V G G N	- - - - - G E D E D - - - -	327	- - - - - N K P K - G E 326
66. Ml_UGT73F3	... T P S D Q 280	E P A C A E A S G 290	R P P S W V V P E	- - - - - G K E D E - - - -	316	E E W P P P - G E 336
67. Gm_UGT73F2	... T P D Q 280	E P A C A E Q S 290	R S S W V V V P E	- - - - - G E E E - - - -	307	E E W P P P - G E 342
68. Gm_UGT73F4	... P P D Q 283	E P A C A E Q S 303	R K P S W V V P E	- - - - - G K E E V E - - - -	319	E E W P P P - G E 322
69. Gh_UGT73C14	... T S C P E 302	E P A M G G E A S N 312	R P S W V S G N	- - - - - N P T A S E 320	- - - - - - - - - - -	V T W K R R N E E 330
70. Al_UGT73C1	... N P S Q 307	E P A M G G E S Q 317	R S P S W V V S G W	- - - - - K Y N E E 333	328	E W S S E S G Y K 338
71. Al_UGT73C3	... N P S Q 306	E P A M G G E S Q 316	R S P S W V V S G S	- - - - - K Y N E E 332	- - - - - - - - - - -	E W S S E S G Y E 343
72. Bv_UGT73C10	... S P S Q 306	E P A M G G E S Q 316	R P P W V V V G W	- - - - - N E E - - - -	332	E W P S E S O E 342
73. Bv_UGT73C11	... S P S Q 306	E P A M G G E S Q 316	R P S W V V V G W	- - - - - K N K E E 332	- - - - - - - - - - -	E W P S E S E S G 342
74. Al_UGT73C5	... N P S Q 306	E P A M G G E S Q 316	R P S W V V V G W	- - - - - K Y N E E 332	- - - - - - - - - - -	E W P S E S E S G 342
75. Al_UGT73C6	... N P S Q 306	E P A M G G E S Q 316	R P S W V V V G W	- - - - - K Y N E E 332	- - - - - - - - - - -	E W P S E S E S G 342





37. Cs_UGT85K11	...	E	V	R	K	D	E	G	G	-	-	-	-	366	A	S	S	P	S	G	G	V	G	375	E	S	C	I	G	V	V	P	395	C	V	P	F	F	A	E	Q	405					
38. Pp_UGT85A2	...	E	T	R	F	E	G	-	-	-	-	-	-	355	A	S	S	C	P	Q	E	Q	-	-	374	E	A	L	C	I	G	C	P	394	C	V	P	F	F	A	E	Q	404				
39. Cf_UGT85A84	...	E	T	E	D	E	S	-	-	-	-	-	-	346	A	S	S	P	A	G	G	G	-	-	375	E	S	A	I	G	V	V	P	395	C	V	P	F	F	A	E	Q	405				
40. Gj_UGT85A24	...	E	T	R	K	D	E	G	-	-	-	-	-	357	A	S	S	P	A	G	G	G	-	-	376	E	S	C	I	S	G	V	V	P	396	C	V	P	F	F	A	E	Q	406			
41. Nb_UGT85A73	...	E	T	R	K	D	E	G	-	-	-	-	-	356	A	S	S	P	A	G	G	G	-	-	375	E	S	S	S	G	V	V	P	395	C	V	P	F	F	A	E	Q	405				
42. Ad_UGT85A38	...	E	T	R	K	D	E	G	-	-	-	-	-	349	A	S	S	P	A	G	G	G	-	-	378	E	S	S	S	G	V	V	P	395	C	V	P	F	F	A	E	Q	405				
43. Vv_UGT85A69	...	E	T	E	D	E	G	-	-	-	-	-	-	346	A	G	V	Q	A	G	G	G	-	-	388	E	S	C	A	I	G	V	V	P	388	C	V	P	F	F	A	E	Q	398			
44. Nb_UGT72AY1	...	E	T	R	K	D	E	G	-	-	-	-	-	337	A	S	S	P	A	N	Q	E	-	-	375	E	S	T	N	I	G	V	V	P	385	A	V	P	F	F	A	E	Q	395			
45. Al_UGT88A1	...	E	T	E	D	E	G	G	-	-	-	-	-	353	A	S	S	P	A	V	Q	E	-	-	356	E	N	H	K	A	V	G	G	376	A	V	P	F	F	A	E	Q	396				
46. Vv_UGT88A20	...	E	T	R	K	D	E	G	G	-	-	-	-	348	A	S	S	P	A	V	Q	A	-	-	371	E	N	H	K	A	V	G	G	376	A	V	P	F	F	A	E	Q	401				
47. Al_UGT71C2	...	E	T	E	D	E	G	G	-	-	-	-	-	336	C	I	G	V	A	P	Q	A	-	-	376	E	A	L	C	I	G	V	V	P	386	A	V	P	F	F	A	E	Q	396			
48. Mt_UGT71G1	...	E	T	E	D	E	G	G	-	-	-	-	-	341	C	I	G	V	A	P	Q	A	-	-	374	E	S	T	N	I	G	V	V	P	384	T	V	P	F	F	A	E	Q	394			
49. Pg_UGT71A27	...	E	T	R	K	D	E	G	-	-	-	-	-	338	A	S	S	P	A	V	Q	A	-	-	379	E	S	T	N	I	G	V	V	P	379	T	V	P	F	F	A	E	Q	389			
50. Al_UGT71B6	...	E	T	A	N	R	G	X	-	-	-	-	-	350	A	S	S	P	A	E	Q	A	-	-	376	E	S	V	S	D	K	S	A	376	E	V	P	F	F	A	E	Q	386				
51. Fv_UGT71A49	...	E	T	R	K	D	E	G	-	-	-	-	-	323	A	S	S	P	A	V	Q	A	-	-	353	E	S	V	S	D	K	S	A	388	T	V	P	F	F	A	E	Q	398				
52. Gj_UGT94E5	...	E	-	-	-	G	D	R	G	-	-	-	-	313	E	G	V	A	P	Q	E	-	-	342	E	S	E	E	G	V	V	P	362	A	V	P	F	F	A	E	Q	372					
53. Cs_UGT94P1	...	D	-	-	-	G	E	R	G	-	-	-	-	322	E	G	V	A	P	Q	A	-	-	342	E	S	T	N	I	G	V	V	P	362	A	V	P	F	F	A	E	Q	372				
54. Pp_UGT94Q2	...	Q	-	-	-	G	D	R	G	-	-	-	-	322	E	G	V	A	P	Q	A	-	-	352	E	S	T	N	I	G	V	V	P	352	A	V	P	F	F	A	E	Q	392				
55. Sf_UGT91D2	...	E	T	R	K	D	E	G	-	-	-	-	-	348	A	S	S	P	A	V	Q	A	-	-	378	E	S	T	N	I	G	V	V	P	378	T	V	P	F	F	A	E	Q	388			
56. Gm_UGT91H4	...	E	R	-	-	T	E	R	G	-	-	-	-	351	A	S	S	P	A	P	Q	A	-	-	381	E	S	R	C	I	G	S	G	381	E	T	P	V	V	V	D	Q	391				
57. Cs_UGT91Q2	...	D	R	-	-	T	E	R	G	-	-	-	-	350	S	R	F	S	G	G	S	-	-	360	E	R	H	A	I	G	N	S	390	E	T	Q	S	G	H	S	A	390					
58. Na_UGT71T1	...	A	-	E	C	G	-	-	-	-	-	-	-	348	A	S	S	P	A	V	Q	A	-	-	376	E	T	Q	R	E	V	G	S	386	E	T	Q	R	E	V	G	S	386				
59. Sa_UGT73L1	...	E	R	-	-	R	K	N	R	G	-	-	-	346	D	H	S	A	V	G	G	-	-	366	E	A	L	C	I	G	V	V	P	386	A	V	P	F	F	A	E	Q	396				
60. Nb_UGT73A24	...	E	-	-	-	T	R	E	R	G	-	-	-	347	D	H	S	A	V	G	G	-	-	357	E	A	L	C	I	G	V	V	P	377	T	V	P	F	F	A	E	Q	397				
61. Nb_UGT73A25	...	E	-	-	-	T	R	E	R	G	-	-	-	347	D	H	S	A	V	G	G	-	-	367	E	A	L	C	I	G	V	V	P	377	T	V	P	F	F	A	E	Q	397				
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63. Gm_UGT73P2	...	E	R	-	-	E	S	E	R	G	-	-	-	354	E	N	P	A	G	G	G	-	-	374	E	S	V	C	A	I	G	V	V	P	384	T	V	P	F	F	A	E	Q	394			
64. Gu_UGT73P12	...	E	R	-	-	E	R	N	R	G	-	-	-	364	A	S	S	P	A	V	Q	A	-	-	374	E	S	N	A	I	G	V	V	P	394	T	V	P	F	F	A	E	Q	404			
65. Mt_UGT73K1	...	E	R	-	-	E	E	R	E	G	-	-	-	346	D	H	S	A	V	G	G	-	-	356	E	S	N	A	I	G	V	V	P	376	T	V	P	F	F	A	E	Q	396				
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74. At_UGT73C5	...	D	-	-	-	Q	D	R	E	G	-	-	-	360	A	S	S	P	A	V	Q	A	-	-	370	E	E	T	A	I	G	V	V	P	390	E	E	T	A	I	G	V	V	P	390		
75. Al_UGT73C6	...	D	-	-	-	Q	D	R	E	G	-	-	-	360	A	S	S	P	A	V	Q	A	-	-	370	E	E	T	A	I	G	V	V	P	390	E	E	T	A	I	G	V	V	P	390		



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8. Gv_UGT74M1
9. Pg_UGT74E2
10. Na_UGT74P3
11. Na_UGT74P5
12. Gj_UGT75L6
13. AL_UGT75D1
14. AL_UGT75B1
15. AL_UGT75B2
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17. AL_UGT84B2
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19. AL_UGT84A3
20. AL_UGT84A4
21. Mp_UGT86C10
22. Sr_UGT76G1
23. Vv_UGT76Q2
24. AL_UGT76D1
25. AL_UGT76E2
26. AL_UGT76E11
27. AL_UGT76E12
28. Cs_UGT709G1
29. Cr_BAO01109.1
30. Nb_UGT709C6
31. Sr_UGT85C2
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35. AL_UGT85A5
36. AL_UGT85A7

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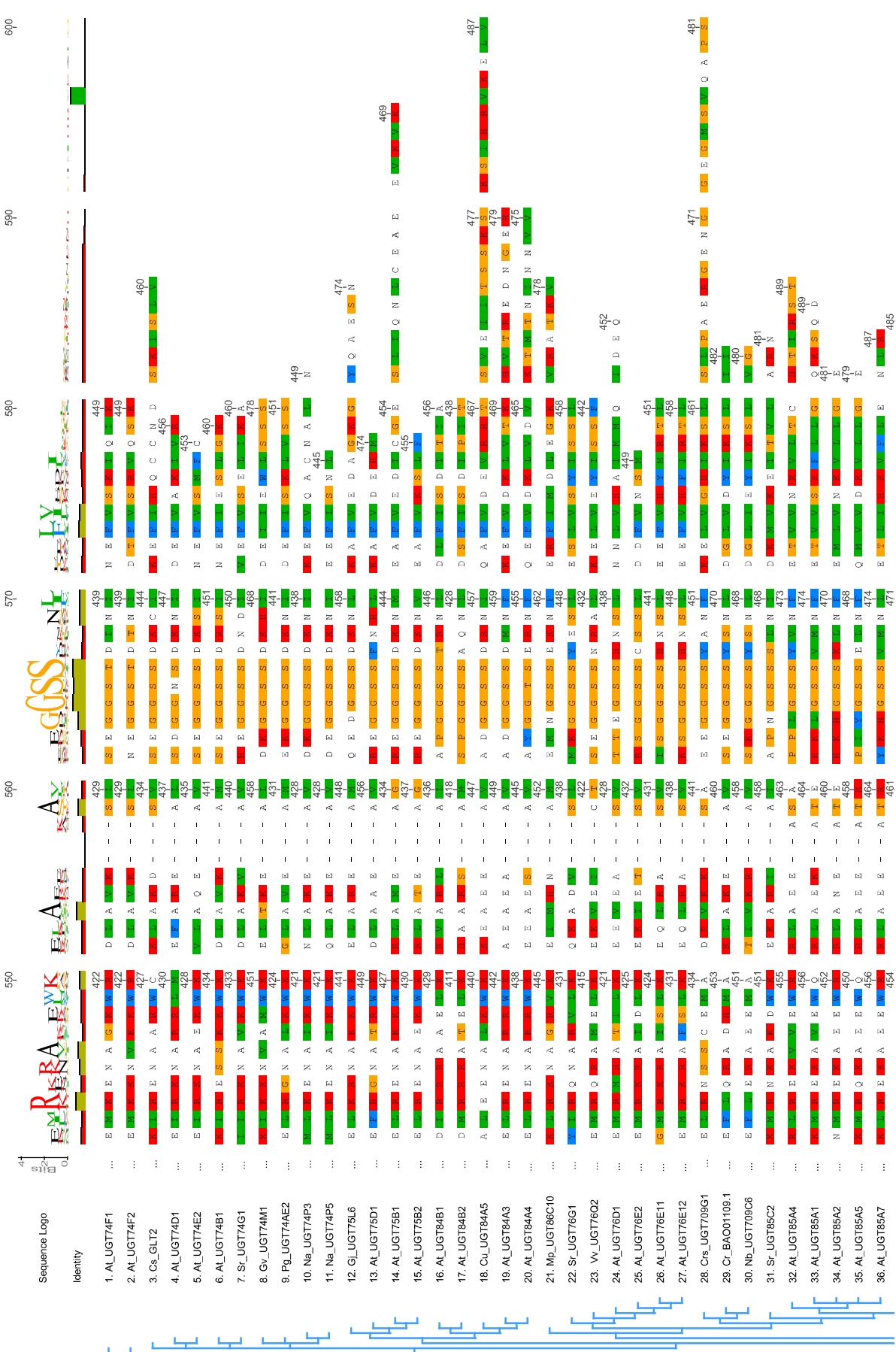
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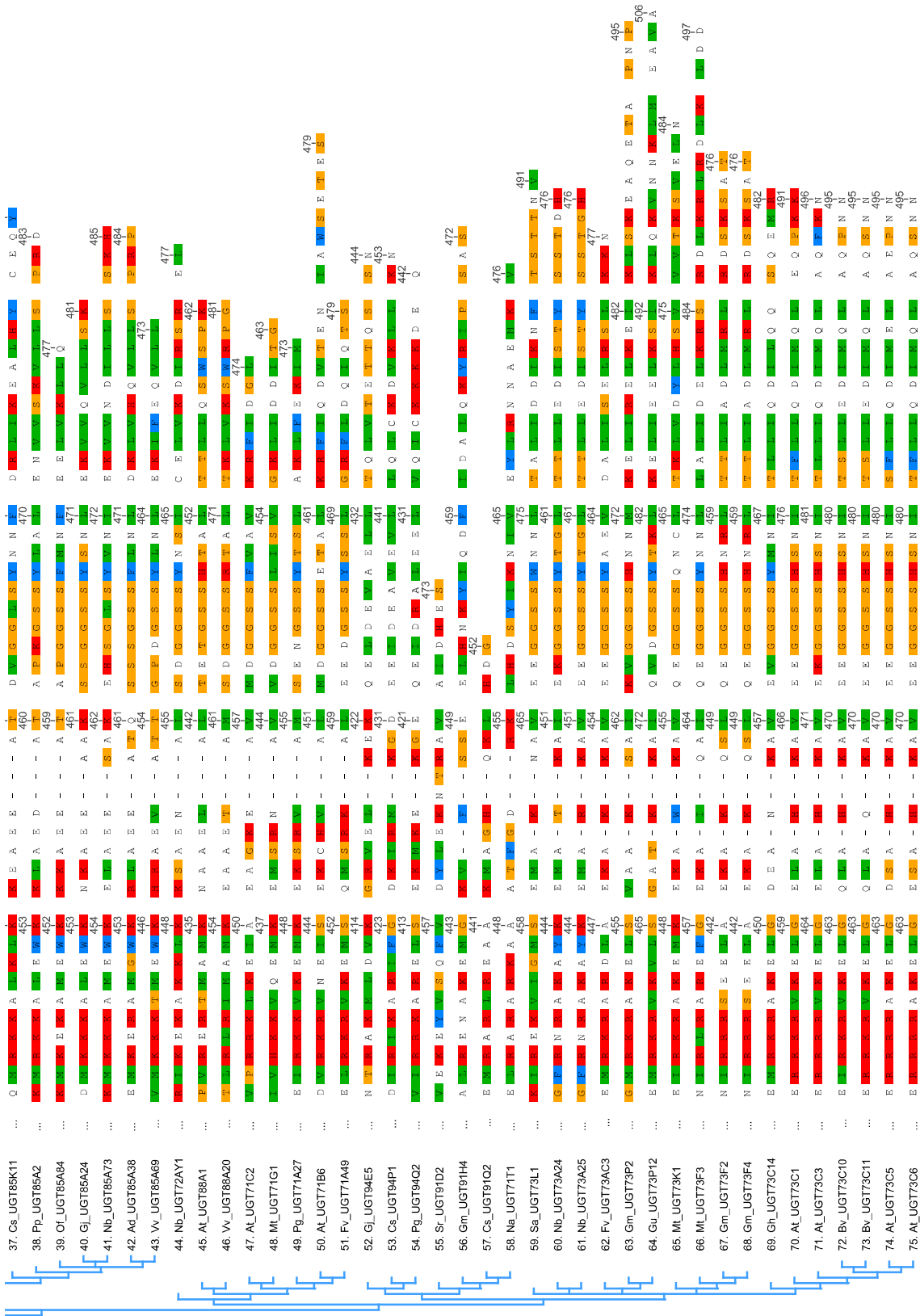
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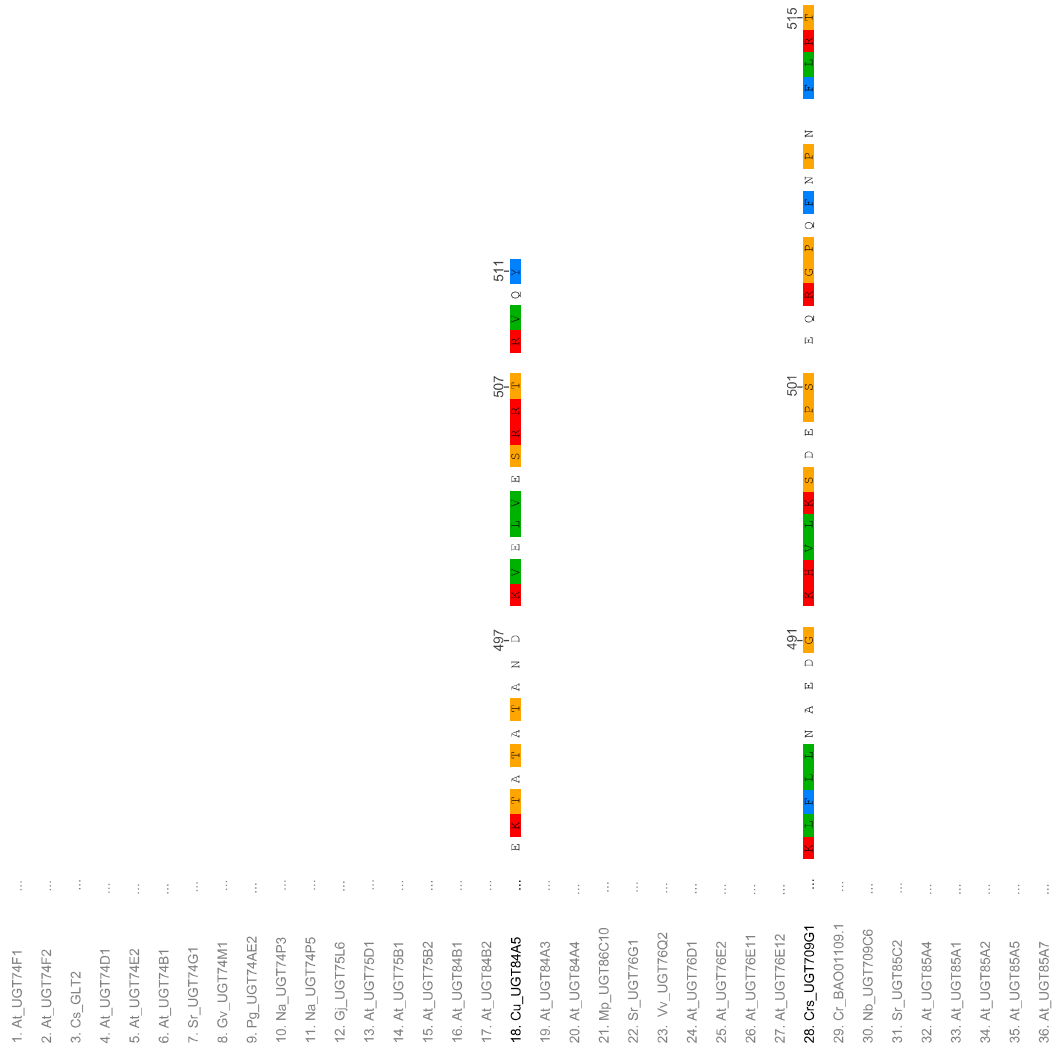




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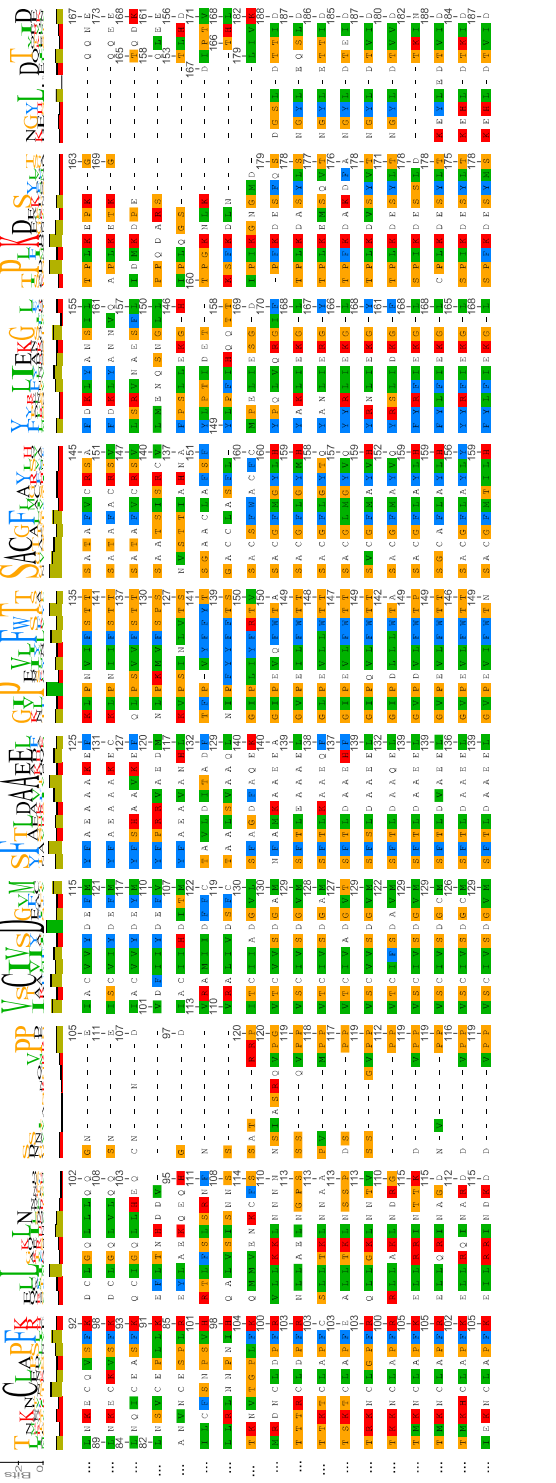
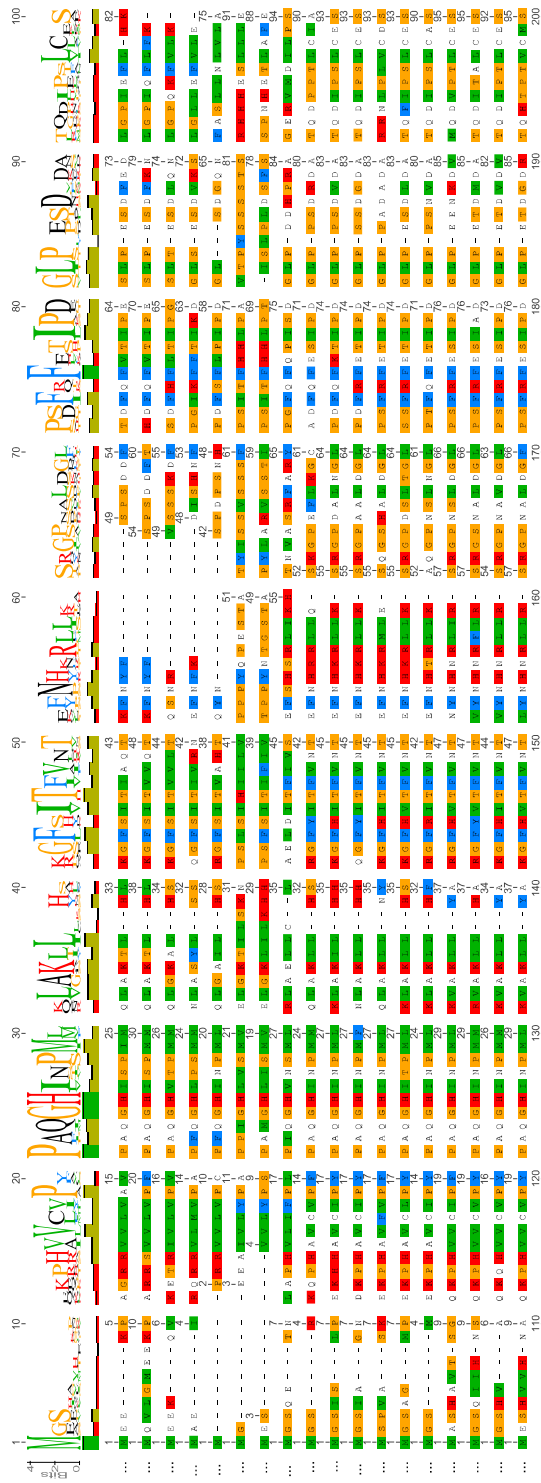
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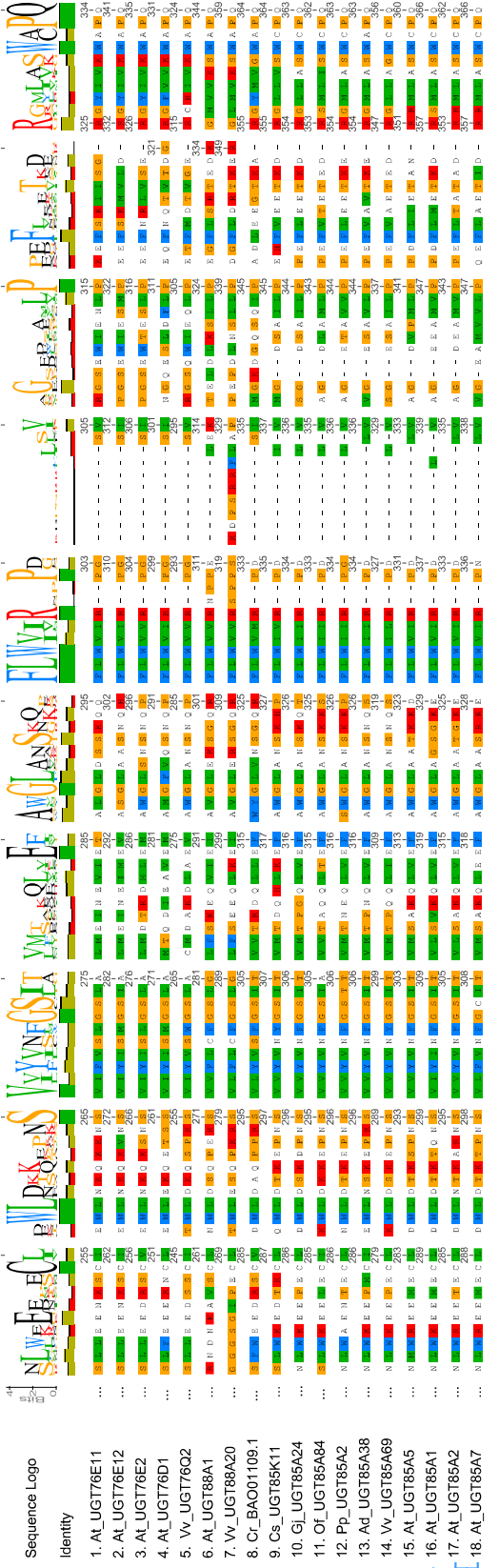
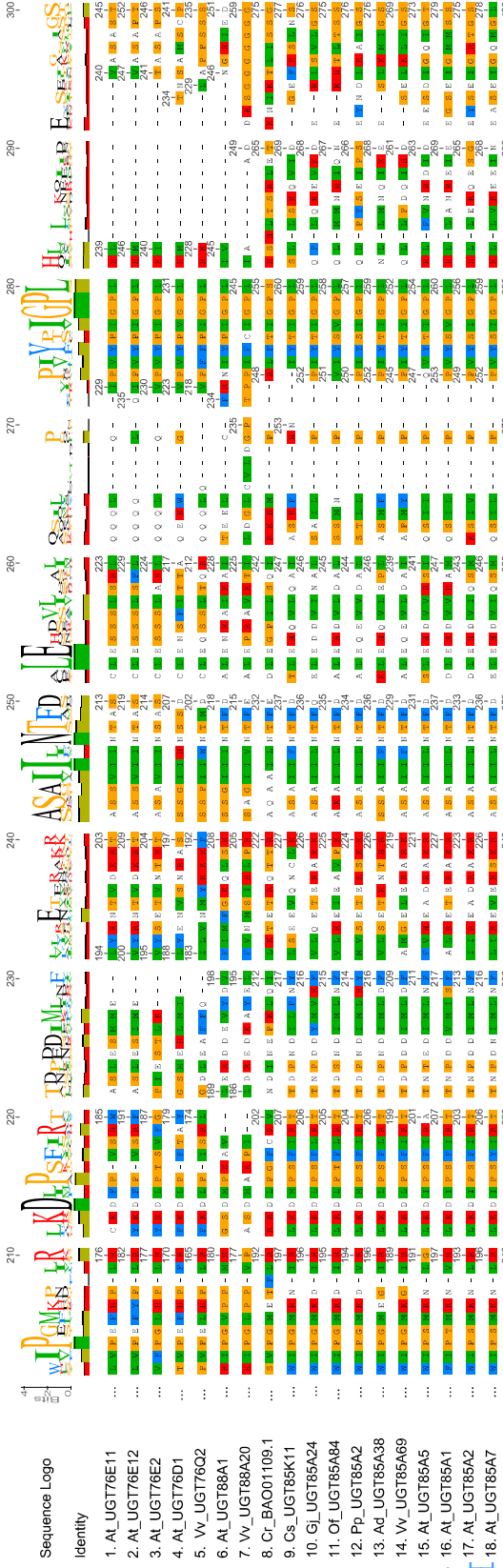


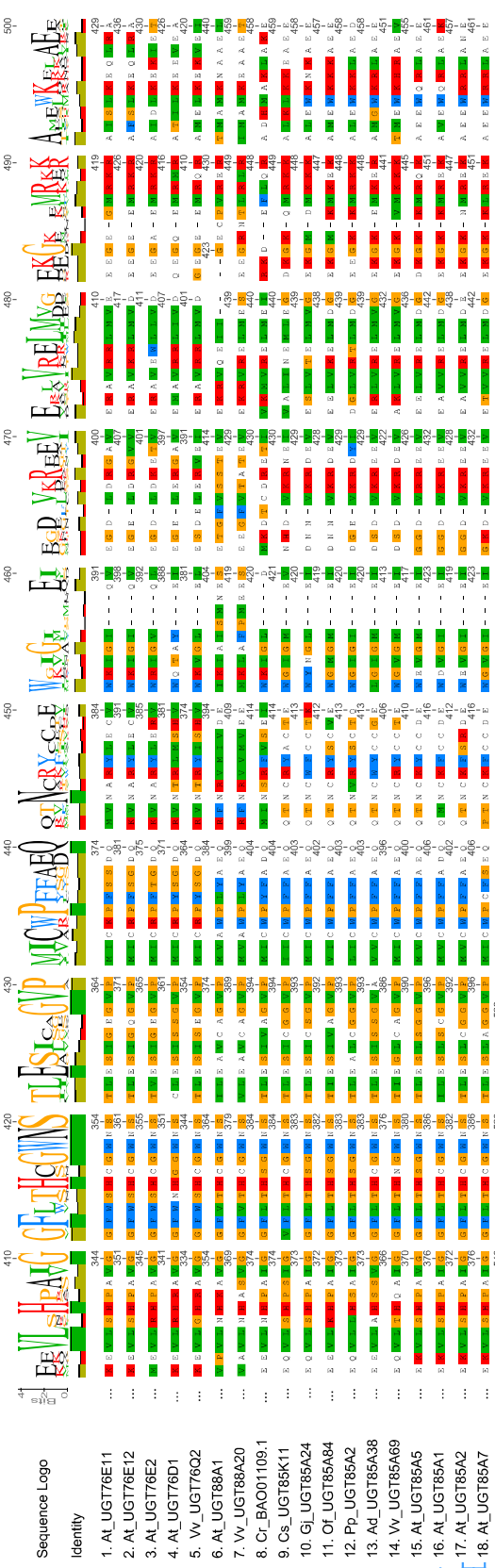
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39. Of_UGT85A84 ...
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41. Nb_UGT85A73 ...
42. Ad_UGT85A38 ...
43. Vv_UGT85A69 ...
44. Nb_UGT72AY1 ...
45. Al_UGT88A1 ...
46. Vv_UGT88A20 ...
47. Al_UGT71C2 ...
48. Ml_UGT71G1 ...
49. Pg_UGT71A27 ...
50. Al_UGT71B6 ...
51. Fv_UGT71A49 ...
52. Gj_UGT94E5 ...
53. Cs_UGT94P1 ...
54. Pg_UGT94Q2 ...
55. Sr_UGT91D2 ...
56. Gm_UGT91H4 ...
57. Cs_UGT91Q2 ...
58. Na_UGT71T1 ...
59. Sa_UGT73L1 ...
60. Nb_UGT73A24 ...
61. Nb_UGT73A25 ...
62. Fv_UGT73AC3 ...
63. Gm_UGT73P2 ...
64. Gu_UGT73P12 ...
65. Ml_UGT73K1 ...
66. Ml_UGT73F3 ...
67. Gm_UGT73F2 ...
68. Gm_UGT73F4 ...
69. Gh_UGT73C14 ...
70. Al_UGT73C1 ...
71. Al_UGT73C3 ...
72. Bv_UGT73C10 ...
73. Bv_UGT73C11 ...
74. Al_UGT73C5 ...
75. Al_UGT73C6 ...

Supplemental Figure S1. Amino acid sequence alignment of functionally characterized terpenoid glycosyltransferases. The numbers at the top show the position numbers of the entire sequence alignment. The sequences were aligned with Geneious 5.6.7 using the Geneious alignment tool with default values. The accession numbers of the sequences are as follows.

Ad_UGT85A38_AIL51400.1 glycosyltransferase [Actinidia deliciosa]
 At_UGT71B6_sp|Q9LSY6|U71B6_ARATH UDP-glycosyltransferase 71B6 [Arabidopsis thaliana]
 At_UGT71C2_sp|O82382|U71C2_ARATH UDP-glycosyltransferase 71C2 [Arabidopsis thaliana]
 At_UGT73C1_sp|Q9ZQ99|U73C1_ARATH UDP-glycosyltransferase 73C1 [Arabidopsis thaliana]
 At_UGT73C3_sp|Q9ZQ96|U73C3_ARATH UDP-glycosyltransferase 73C3 [Arabidopsis thaliana]
 At_UGT73C5_sp|Q9ZQ94|U73C5_ARATH_1 UDP-glycosyltransferase 73C5 [Arabidopsis thaliana]
 At_UGT73C6_sp|Q9ZQ95|U73C6_ARATH UDP-glycosyltransferase 73C6 [Arabidopsis thaliana]
 At_UGT74B1_sp|O48676|U74B1_ARATH UDP-glycosyltransferase 74B1 [Arabidopsis thaliana]
 At_UGT74D1_sp|Q9SKC5|U74D1_ARATH UDP-glycosyltransferase 74D1 [Arabidopsis thaliana]
 At_UGT74E2_sp|Q9SYK9|U74E2_ARATH UDP-glycosyltransferase 74E2 [Arabidopsis thaliana]
 At_UGT74F1_sp|O22820|U74F1_ARATH Flavonol 7-O-beta-glucosyltransferase UGT74F1 [Arabidopsis thaliana]
 At_UGT74F2_sp|O22822|U74F2_ARATH UDP-glycosyltransferase 74F2 [Arabidopsis thaliana]
 At_UGT75B1_sp|Q9LRF4|U75B1_ARATH UDP-glycosyltransferase 75B1 [Arabidopsis thaliana]
 At_UGT75B2_sp|Q9ZVY5|U75B2_ARATH UDP-glycosyltransferase 75B2 [Arabidopsis thaliana]
 At_UGT75D1_sp|O23406|U75D1_ARATH UDP-glycosyltransferase 75D1 [Arabidopsis thaliana]
 At_UGT76D1_sp|O48715|U76D1_ARATH UDP-glycosyltransferase 76D1 [Arabidopsis thaliana]
 At_UGT76E11_sp|Q9SNB1|U76E11_ARATH UDP-glycosyltransferase 76E11 [Arabidopsis thaliana]
 At_UGT76E12_sp|Q94AB5|U76E12_ARATH Flavonol 3-O-glucosyltransferase UGT76E12 [Arabidopsis thaliana]
 At_UGT76E2_sp|Q9LTH2|U76E2_ARATH UDP-glycosyltransferase 76E2 [Arabidopsis thaliana]
 At_UGT84A3_sp|O23401|U84A3_ARATH UDP-glycosyltransferase 84A3 [Arabidopsis thaliana]
 At_UGT84A4_sp|O23402|U84A4_ARATH UDP-glycosyltransferase 84A4 [Arabidopsis thaliana]
 At_UGT84B1_sp|O22182|U84B1_ARATH UDP-glycosyltransferase 84B1 [Arabidopsis thaliana]
 At_UGT84B2_sp|O22183|U84B2_ARATH UDP-glycosyltransferase 84B2 [Arabidopsis thaliana]
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 At_UGT85A4_sp|Q9M9E7|U85A4_ARATH UDP-glycosyltransferase 85A4 [Arabidopsis thaliana]
 At_UGT85A5_sp|Q9LRF0|U85A5_ARATH UDP-glycosyltransferase 85A5 [Arabidopsis thaliana]
 At_UGT85A7_sp|Q9LME8|U85A7_ARATH UDP-glycosyltransferase 85A7 [Arabidopsis thaliana]
 At_UGT88A1_sp|Q9LK73|U88A1_ARATH UDP-glycosyltransferase 88A1 [Arabidopsis thaliana]
 Bv_UGT73C10_AFN26666.1 UGT73C10 [Barbarea vulgaris subsp. arcuata]
 Bv_UGT73C11_AFN26667.1 UGT73C11 [Barbarea vulgaris subsp. arcuata]
 Cr_BAO01109.1 UDP-glucose iridoid glucosyltransferase [Catharanthus roseus]
 Crs_GLT2_sp|Q6X1C0.1|GLT2_CROSA RecName: Full=Crocetin glucosyltransferase 2 [Crocus sativus]
 Crs_UGT709G1_APU54677.1 UGT709G1_picrocrocinidin GT [Crocus sativus]
 Cs_UGT85K11_BAO51834.1 UDP-glycosyltransferase 85K11 [Camellia sinensis]
 Cs_UGT91Q2_TEA006435_XP_028067029.1_nerolidol GT_Scaffold2042:976232-977590+ [Camellia sinensis]
 Cs_UGT94P1_BAO51835.1 UDP-glycosyltransferase 94P1 [Camellia sinensis]
 Cu_UGT84A5_sp|Q9MB73|LGT_CITUN Limonoid UDP-glucosyltransferase [Citrus unshiu]
 Fv_UGT71A49_XP_004303956.1 ABA GT PREDICTED: UDP-glucose flavonoid 3-O-glucosyltransferase 6 [Fragaria vesca subsp. vesca]
 Fv_UGT73AC3_XP_004304020.1 PREDICTED: absicisate beta-glucosyltransferase-like [Fragaria vesca subsp. vesca]
 Gh_UGT73C14_NP_001314468.1 absicisic acid GT UDP-glycosyltransferase 73C6-like [Gossypium hirsutum]
 Gj_UGT75L6_sp|F8WKW0|UGT1_GARJA Crocetin glucosyltransferase, chloroplastic [Gardenia jasminoides]
 Gj_UGT85A24_sp|F8WKW1|UGT2_GARJA 7-deoxyloganetin glucosyltransferase [Gardenia jasminoides]
 Gj_UGT94E5_sp|F8WKW8|UGT9_GARJA Beta-D-glucosyl crocetin beta-1,6-glucosyltransferase [Gardenia jasminoides]
 Gm_UGT73F2_BAM29362.1 UDP-glycosyltransferase UGT73F2 [Glycine max]
 Gm_UGT73F4_BAM29363.1 UDP-glycosyltransferase UGT73F4 [Glycine max]
 Gm_UGT73P2_sp|D4Q9Z4|SGT2_SOYBN Soyasapogenol B glucuronide galactosyltransferase [Glycine max]
 Gm_UGT91H4_sp|D4Q9Z5|SGT3_SOYBN Soyasapogenin III rhamnosyltransferase [Glycine max]
 Gu_UGT73P12_tr|A0A5A4WN00|A0A5A4WN00_GLYUR Glycosyltransferase [Glycyrrhiza uralensis]
 Gv_UGT74M1_tr|A3E7Y9|A3E7Y9_9CARY Glycosyltransferase [Gypsophila vaccaria]
 Mp_UGT86C10_apocarotenoid GT [Mentha x piperita]
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 Mt_UGT73F3_ACT34898.1 GT3 [Medicago truncatula]
 Mt_UGT73K1_AAW56091.1 triterpene UDP-glucosyl transferase UGT73K1 [Medicago truncatula]
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 Na_UGT74P3_AQQ16730.1 17-hydroxygeranylinalool diterpene glycoside UDP-glucosyltransferase 74P3 [Nicotiana attenuata]
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 Nb_UGT73A25_Niben101Scf06344g00005.1 AT2G36770.1_apocarotenoid GT [Nicotiana benthamiana]
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 Pg_UGT94Q2_sp|A0A0A6ZF4|UGT29_PANGI UDP-glycosyltransferase 29 [Panax ginseng]
 Pp_UGT85A2_XP_007227474.1 Linalool GT 7-deoxyloganetin glucosyltransferase [Prunus persica]
 Sa_UGT73L1_BAD89042.1 saponin GT SaGT4a__UDP-glucose glucosyltransferase [Solanum aculeatissimum]
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 Sr_UGT85C2_sp|Q6VAB0.1|U85C2_STERE Steviol GT_RecName: Full=UDP-glycosyltransferase 85C2 [Stevia rebaudiana]
 Sr_UGT91D2_sp|B3VI56|U91D2_STERE UDP-glycosyltransferase 91D2 [Stevia rebaudiana]
 Vv_UGT76Q2_CAN70169.1_VvGT15a [Vitis vinifera]
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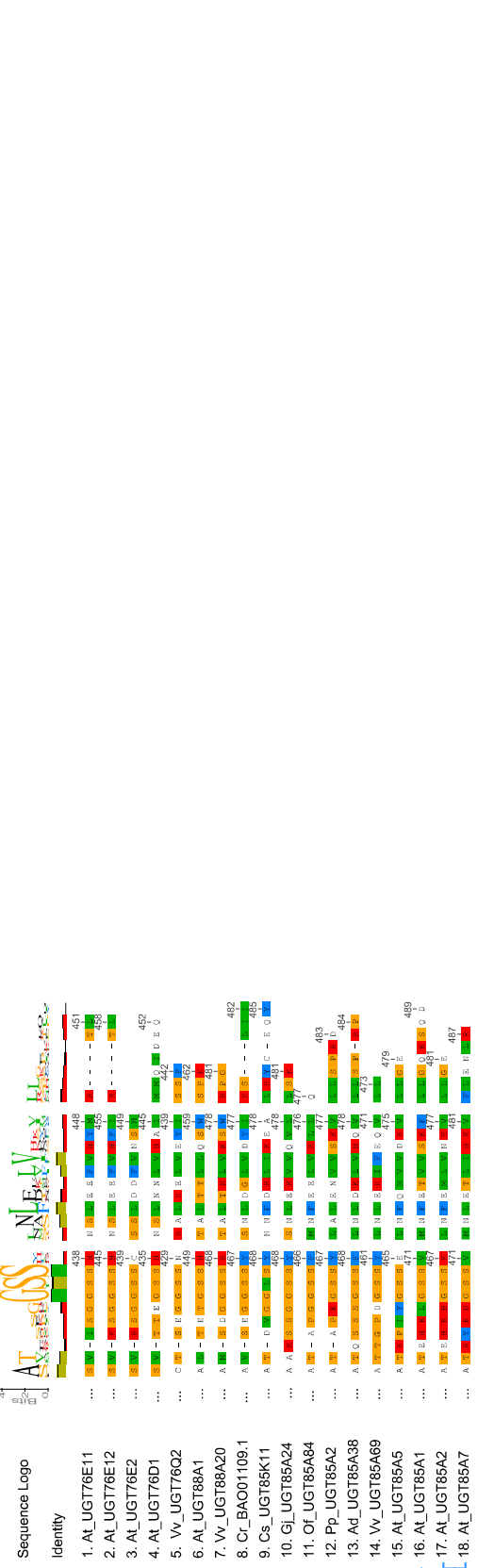






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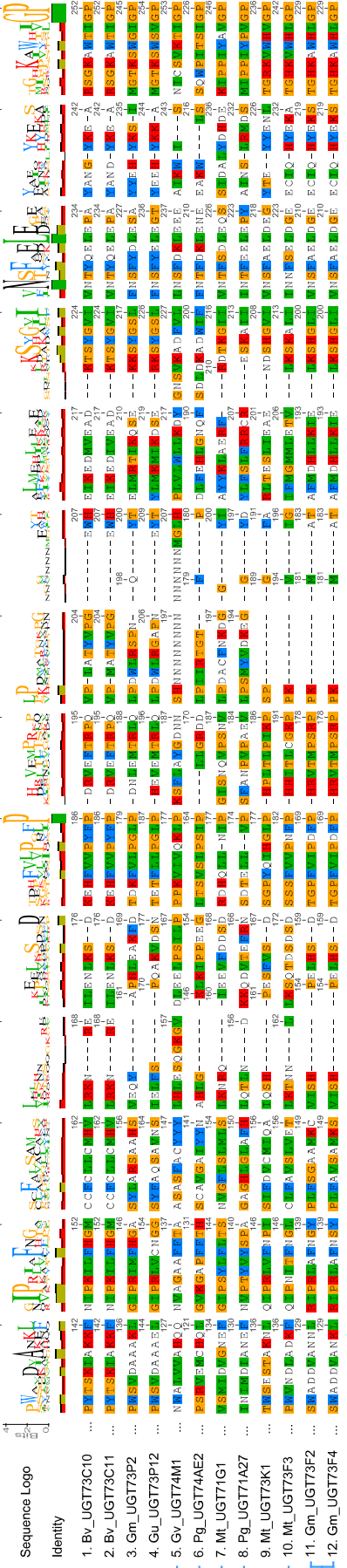
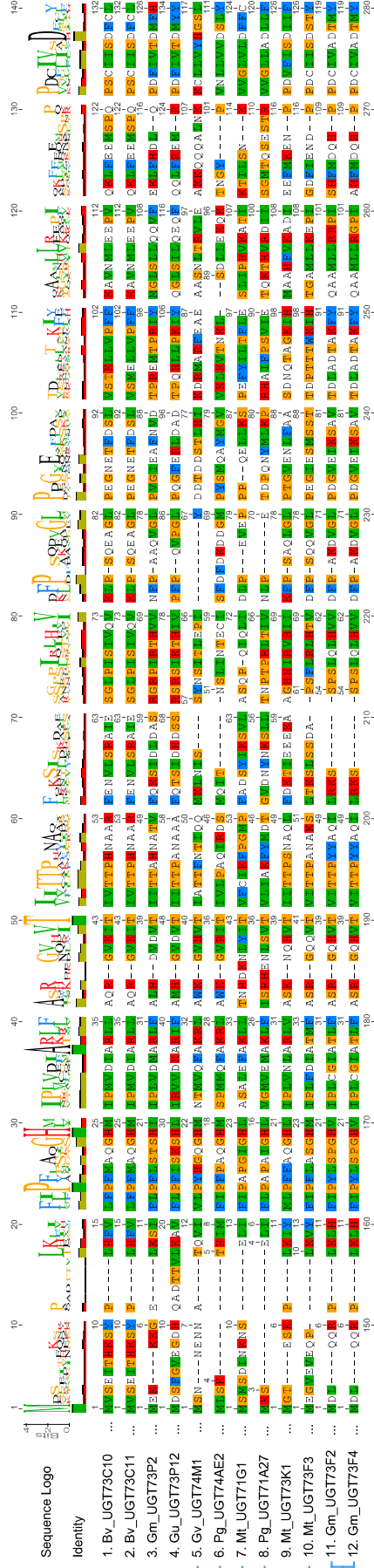
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10. G_LUGT85A24
11. LUGT85A84
12. Pp_UGT85A2
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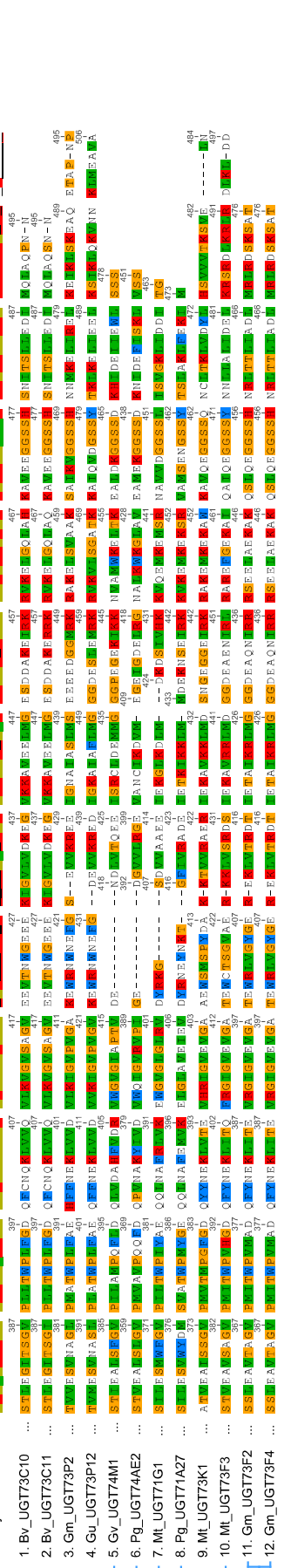
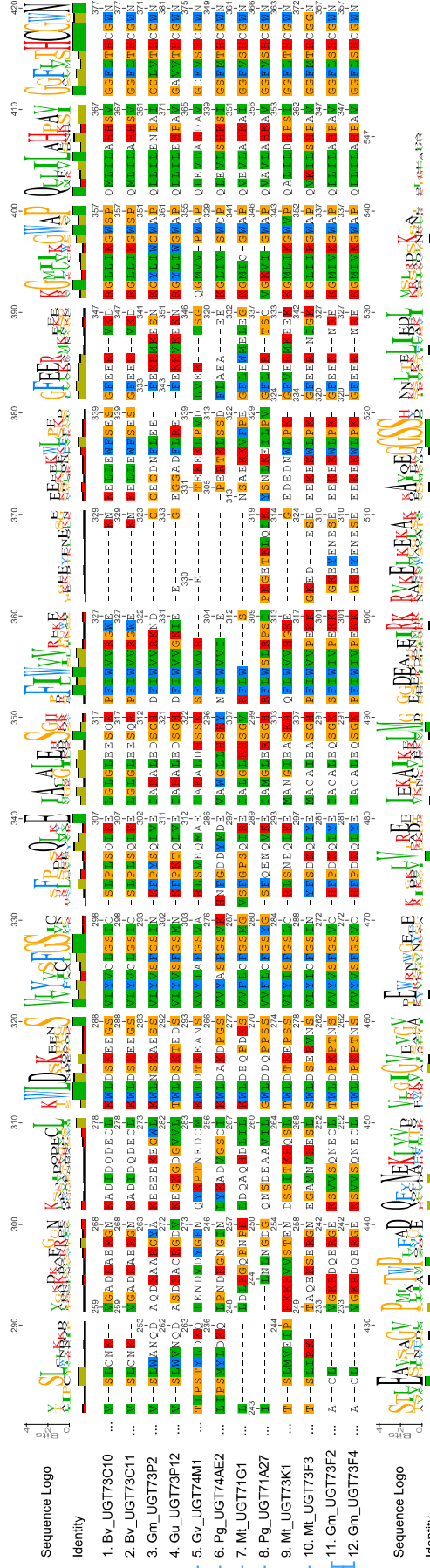


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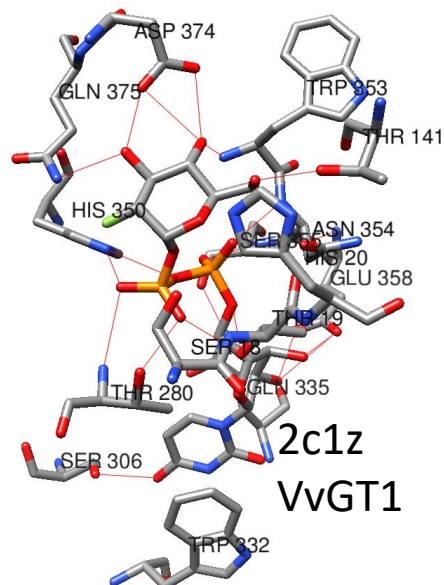
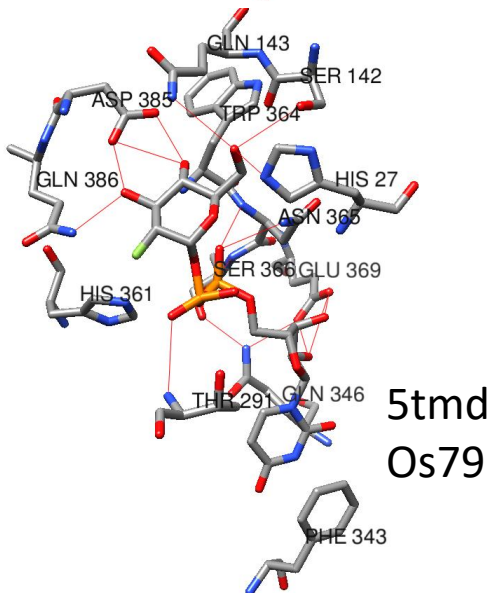
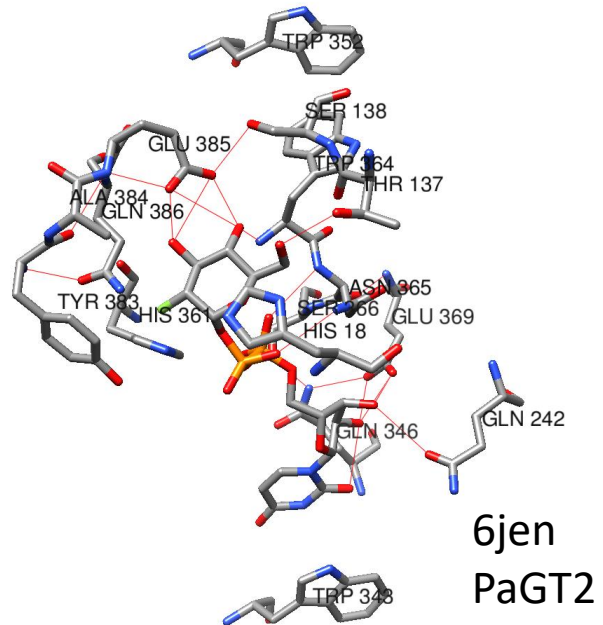
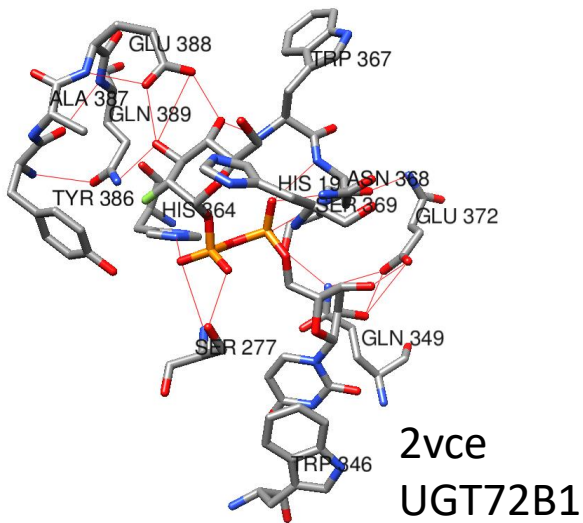
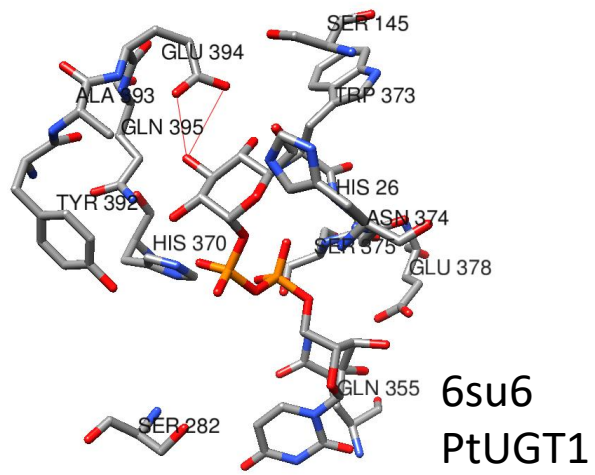
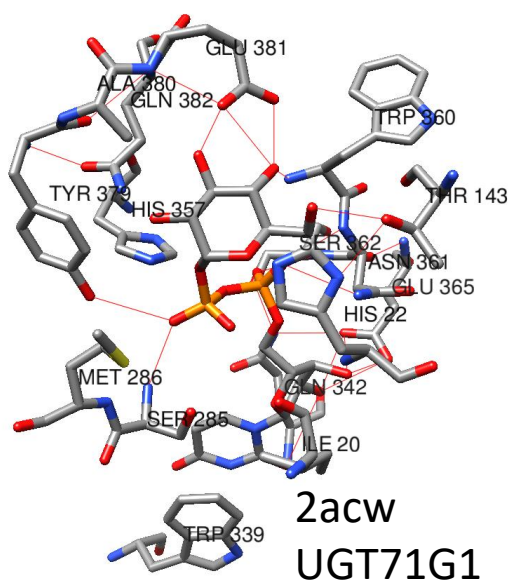
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7. Vv_UGT88A20
8. Cr_BAO01109.1
9. Cs_UGT85K11
10. G_LUGT85A24
11. LUGT85A84
12. Pp_UGT85A2
13. Ad_UGT85A38
14. Vv_UGT85A89
15. AL_UGT85A5
16. AL_UGT85A1
17. AL_UGT85A2
18. AL_UGT85A7

Supplemental Figure S2. Amino acid sequence alignment of functionally characterized monoterpenoid glycosyltransferases. The sequences were aligned with Geneious 5.6.7 using the Geneious alignment tool with default values. The accession numbers of the sequences are shown in the legend of Supplemental Figure S1.





Supplemental Figure S3. Amino acid sequence alignment of functionally characterized triterpenoid glycosyltransferases. The sequences were aligned with Geneious 5.6.7 using the Geneious alignment tool with default values. The accession numbers of the sequences are shown in the legend of Supplemental Figure S1.



Supplemental Figure S4. Sugar donor binding site in UGT71G1, PtUGT1, UGT72B1, PaGT, Os79, and VvGT1. Amino acids in the vicinity of 5 Å are shown. Images were generated with UCSF Chimera 1.15.