

Supplementary Information for:

Hongbin Shen and James J. Chou, “MemBrain: Improving the Accuracy of Predicting Transmembrane Helices”

Table 1. The Swiss-Prot accession codes of the 50 proteins in the training dataset ^a

P00396	P00404	P00415	P00423	P00430	P00844
P02699	P02724	P02945	P03617	P03621	P03805
P03806	P03989	P04038	P06008	P06009	P07470
P07471	P10175	P13183	P26789	P26790	Q54397
P07371	O53898	P77921	P00804	P02786	P02916
P08187	P08188	P08716	P15877	P17448	P18783
P19568	P21865	P22306	P22519	P23462	P23889
P24282	P25525	P25737	P37310	Q53068	P36574
P09130	P08336				

^a The dataset is from <ftp://ftp.ebi.ac.uk/pub/databases/testsets/transmembrane>, in which the proteins labeled with grade ‘A’ or ‘B’ were used.

Table 2. The PDB accession codes of the 70 proteins in the testing dataset

1AP9_A	1AR1_A	1AT9_A	1BCC_C	1EHK_A	1EYS_L
1EYS_M	1EYS_H	1FX8_A	1IH5_A	1IWG_A	1JGJ_A
1KQG_B	1KQG_C	1L7V_A	1LGH_A	1LGH_B	1NEK_C
1NEK_D	1NKZ_A	1OCC_D	1OCC_G	1OCC_J	1OCC_K
1OCC_L	1OCC_M	1OED_A	1OED_B	1OED_C	1OED_E
1OKC_A	1PRC_M	1PSS_L	1PSS_M	1PV7_A	1PW4_A
1Q90_D	1QHJ_A	1QLB_C	1RC2_B	1RHZ_A	1RWT_A
1SOR_A	1U7G_A	1UAZ_A	1VF5_C	1VF5_D	1VGO_A
1XIO_A	1XQF_A	1YCE_A	1ZCD_A	2A65_A	2AHZ_A
2B2J_A	2B5F_A	2BBJ_A	2BL2_A	2BRD_A	2H8A_A
2HI7_B	2IRV_A	2IUB_A	2J7A_C	2JO1_A	2NQ2_A
2ONK_C	2PNO_A	2Q7M_A	2QTS_A		

Listed below are details of observed and predicted TMHs for the 70 membrane proteins in the testing dataset.

PDB code: 1AP9_A

Observed	10-30; 39-62; 77-101; 105-127; 134-157; 169-191; 202-224
MEMBRAIN	10-29; 43-63; 78-97; 107-127; 134-154; 172-191; 203-224
THUMBU	16-27; 49-65; 85-106; 126-155; 179-194; 202-217
SOSUI	11-33; 46-68; 78-100; 107-129; 137-159; 177-199; 204-225
DAS-TMfilter	14-28; 47-67; 88-101; 110-123; 139-156; 178-190; 203-223
TOP-PRED	9-29; 44-64; 83-103; 106-126; 138-158; 176-196; 204-224
TMHMM 2.0	10-29; 42-64; 79-101; 108-130; 135-157; 177-199
Phobius	12-29; 41-63; 83-101; 108-129; 135-156; 177-199; 205-224

PDB code: 1AR1_A

Observed	27-59; 84-121; 130-151; 178-206; 218-251; 263-298; 304-322; 334-362; 370-395; 404-430; 441-468; 483-513
MEMBRAIN	28-55; 86-118; 129-151; 177-205; 217-248; 264-294; 305-324; 334-361; 370-392; 406-435; 442-467; 482-512
THUMBU	36-51; 89-113; 133-146; 185-200; 216-244; 272-290; 308-327; 346-356; 371-390; 409-429; 449-459; 491-511
SOSUI	32-53; 90-112; 133-155; 181-203; 221-243; 276-298; 304-326; 339-361; 374-396; 408-430; 441-463; 492-514
DAS-TMfilter	32-52; 90-112; 137-150; 182-204; 215-246; 272-294; 303-325; 341-357; 373-392; 409-430; 450-460; 492-513
TOP-PRED	31-51; 93-113; 134-154; 157-177; 181-201; 217-237; 278-298; 305-325; 337-357; 372-392; 413-433; 446-466; 493-513
TMHMM 2.0	31-53; 90-112; 132-154; 183-205; 225-247; 272-294; 301-323; 338-360; 373-395; 410-432; 445-467; 491-513
Phobius	31-53; 91-115; 135-154; 181-207; 219-246; 266-290; 302-326; 338-361; 373-392; 412-432; 444-465; 491-512

PDB code: 1AT9_A

Observed	9-31; 37-62; 80-100; 106-126; 131-155; 165-191; 201-224
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MEMBRAIN	10-30; 43-63; 78-97; 107-127; 134-154; 172-191; 203-224
THUMBU	16-27; 49-65; 85-106; 126-155; 179-194; 202-217
SOSUI	10-32; 45-67; 77-99; 106-128; 136-158; 176-198; 203-224
DAS-TMfilter	14-28; 46-67; 88-101; 109-124; 138-156; 178-190; 203-223
TOP-PRED	8-28; 43-63; 82-102; 105-125; 137-157; 175-195; 203-223
TMHMM 2.0	10-29; 42-64; 79-101; 108-130; 135-157; 177-199
Phobius	12-29; 41-63; 83-101; 108-129; 135-156; 177-199; 205-224

PDB code: 1BCC_C

Observed	33-54; 76-106; 112-135; 172-204; 221-245; 289-309; 321-340; 346-379
MEMBRAIN	33-54; 88-102; 114-134; 142-152; 179-200; 228-248; 291-307; 321-338; 351-372
THUMBU	33-51; 83-102; 121-139; 147-160; 180-197; 233-244; 293-303; 324-337; 353-366
SOSUI	33-55; 82-104; 114-136; 140-162; 179-201; 230-252; 280-302; 321-343; 349-371
DAS-TMfilter	36-55; 89-101; 117-133; 179-199; 231-247; 291-308; 324-339; 354-370
TOP-PRED	34-54; 82-102; 116-136; 150-170; 179-199; 230-250; 289-309; 321-341; 353-373
TMHMM 2.0	34-56; 83-105; 117-139; 144-166; 179-201; 230-252; 289-308; 323-341; 348-370
Phobius	31-53; 88-108; 114-134; 141-159; 179-201; 230-251; 289-309; 321-341; 347-367

PDB code: 1EHK_A

Observed	17-48; 65-97; 103-125; 143-173; 180-212; 220-254; 262-283; 292-326; 344-366; 380-409; 415-444; 461-493; 527-550
MEMBRAIN	19-48; 66-96; 103-127; 142-169; 177-210; 221-252; 262-285; 292-325; 329-337; 344-365; 379-408; 419-444; 461-492; 529-545
THUMBU	24-40; 74-88; 105-128; 147-163; 182-216; 228-247; 265-279; 301-315; 352-360; 392-401; 421-445; 467-489; 526-547
SOSUI	21-43; 71-93; 109-131; 145-167; 189-211; 233-255; 262-284; 299-321; 341-363; 385-407; 421-443; 467-489; 527-549

DAS-TMfilter	21-39; 72-88; 108-126; 145-164; 181-216; 234-249; 265-279; 298-316; 347-359; 389-403; 422-441; 466-493; 527-547
TOP-PRED	21-41; 74-94; 103-123; 144-164; 182-202; 232-252; 264-284; 299-319; 345-365; 387-407; 420-440; 473-493; 527-547
TMHMM 2.0	21-43; 70-92; 105-127; 142-164; 187-209; 229-251; 264-286; 301-323; 343-365; 385-407; 420-442; 471-493; 527-549
Phobius	21-44; 64-92; 104-125; 145-164; 184-207; 227-251; 263-281; 301-324; 345-365; 385-408; 420-443; 463-489; 527-551

PDB code: 1EYS_L

Observed	32-56; 91-118; 123-141; 178-206; 233-258
MEMBRAIN	30-56; 90-118; 122-146; 177-202; 233-260
THUMBU	22-53; 96-108; 127-151; 177-198; 231-259
SOSUI	12-34; 36-58; 93-115; 124-146; 235-257
DAS-TMfilter	24-54; 97-105; 123-148; 183-200; 232-259
TOP-PRED	31-51; 91-111; 122-142; 179-199; 240-260
TMHMM 2.0	29-51; 91-110; 123-145; 183-205; 240-262
Phobius	21-51; 92-110; 122-142; 182-205; 240-263

PDB code: 1EYS_M

Observed	53-77; 111-138; 143-161; 198-225; 262-285
MEMBRAIN	52-76; 110-138; 142-166; 197-223; 266-288
THUMBU	53-79; 114-128; 145-167; 199-222; 264-292
SOSUI	51-73; 110-132; 145-167; 202-224; 268-290
DAS-TMfilter	50-76; 113-129; 147-165; 202-222; 271-289
TOP-PRED	52-72; 110-130; 143-163; 200-220; 268-288
TMHMM 2.0	50-72; 111-133; 145-167; 203-225; 267-289
Phobius	50-76; 113-133; 145-166; 200-223; 267-290

PDB code: 1EYS_H

Observed	10-34
MEMBRAIN	11-29
THUMBU	10-26
SOSUI	9-30
DAS-TMfilter	16-27
TOP-PRED	11-31; 83-103
TMHMM 2.0	13-30
Phobius	12-30

PDB code: 1FX8_A

Observed	6-35; 40-64; 68-79; 85-109; 144-168; 178-199; 203-217; 233-255
MEMBRRAIN	10-31; 40-62; 68-78; 84-108; 146-165; 178-198; 211-219; 232-254
THUMBU	15-33; 43-74; 94-110; 149-164; 180-195; 236-247
SOSUI	15-37; 43-65; 86-108; 145-167; 178-200; 230-251
DAS-TMfilter	15-32; 46-61; 70-79; 94-110; 150-166; 178-194; 233-249
TOP-PRED	12-32; 44-64; 86-106; 148-168; 177-197; 230-250
TMHMM 2.0	12-34; 44-66; 87-109; 143-165; 178-200; 229-251
Phobius	12-34; 46-79; 86-108; 145-166; 178-202; 230-251

PDB code: 1IH5_A

Observed	10-34; 47-64; 77-88; 96-112; 140-159; 169-184; 189-202; 210-229
MEMBRRAIN	12-35; 48-69; 76-87; 91-117; 138-156; 166-187; 209-230
THUMBU	16-32; 82-112; 173-183; 213-227
SOSUI	13-35; 87-109; 134-155; 167-189; 205-227
DAS-TMfilter	15-33; 78-115; 78-115; 143-153; 170-184; 214-231
TOP-PRED	15-35; 52-72; 75-95; 101-121; 138-158; 164-184; 207- 227
TMHMM 2.0	13-35; 65-87; 94-116; 136-155; 167-189; 209-231
Phobius	9-33; 53-73; 94-119; 139-157; 164-184; 210-231

PDB code: 1IWG_A

Observed	9-28; 335-360; 365-385; 392-413; 440-460; 472-495; 541-560; 863-888; 894-916; 927-949; 976-996; 1011-1029
MEMBRRAIN	9-28; 341-361; 364-387; 391-410; 438-464; 466-495; 538-560; 873-893; 895-922; 923-943; 971-992; 1001-1029
THUMBU	10-27; 341-359; 390-408; 443-459; 471-492; 538-557; 877-914; 974-991; 1010-1026
SOSUI	9-31; 335-357; 367-389; 396-418; 441-463; 475-497; 541-563; 872-894; 897-919; 973-995; 1007-1029
DAS-TMfilter	10-29; 342-362; 365-410; 365-410; 442-459; 472-494; 540-558; 876-917; 876-917; 975-992; 1010-1029
TOP-PRED	9-29; 32-52; 131-151; 342-362; 370-390; 441-461; 470- 490; 541-561; 660-680; 872-892; 898-918; 926-946; 974- 994; 1009-1029
TMHMM 2.0	10-32; 340-359; 369-391; 438-460; 470-492; 542-564; 873-892; 899-921; 926-948; 975-997; 1007-1029
Phobius	12-32; 340-359; 366-390; 396-416; 437-458; 470-493; 541-557; 875-892; 899-919; 925-946; 975-995; 1007-1029

PDB code: 1JGJ_A

Observed	1-27; 33-56; 70-92; 94-118; 121-150; 153-181; 189-216
MEMBRAIN	6-25; 36-60; 70-88; 97-119; 122-144; 161-181; 190-211
THUMBU	10-22; 43-62; 75-95; 104-113; 122-141; 164-183; 185-208
SOSUI	4-26; 39-61; 74-95; 98-120; 126-148; 156-178; 189-211
DAS-TMfilter	8-20; 41-58; 77-92; 101-114; 128-142; 167-182; 184-206
TOP-PRED	4-24; 38-58; 74-94; 98-118; 124-144; 165-185; 193-213
TMHMM 2.0	4-26; 39-61; 76-93; 98-120; 124-146; 167-189; 194-213
Phobius	6-25; 37-61; 73-91; 98-118; 124-142; 163-182; 194-213

PDB code: 1KQG_B

Observed	256-280
MEMBRAIN	257-275
THUMBU	264-274
SOSUI	258-280
DAS-TMfilter	262-275
TOP-PRED	130-150; 259-279
TMHMM 2.0	260-279
Phobius	260-279

PDB code: 1KQG_C

Observed	11-37; 49-76; 110-135; 144-176
MEMBRAIN	17-40; 57-75; 115-136; 146-177
THUMBU	15-38; 56-74; 118-141; 151-176
SOSUI	18-40; 55-77; 115-137; 150-172
DAS-TMfilter	18-39; 56-76; 117-137; 149-175
TOP-PRED	20-40; 55-75; 115-135; 156-176
TMHMM 2.0	21-40; 55-77; 117-139; 154-176
Phobius	21-43; 55-76; 117-138; 150-174

PDB code: 1L7V_A

Observed	2-32; 47-81; 93-107; 114-138; 142-166; 191-206; 229-249; 258-267; 272-296; 305-324
MEMBRAIN	14-34; 55-77; 94-111; 114-136; 144-164; 191-208; 231-256; 274-295; 300-320
THUMBU	18-32; 57-74; 118-134; 147-164; 192-207; 232-267; 280-305; 307-317
SOSUI	13-34; 52-74; 102-124; 141-163; 184-200; 228-250; 265-287; 292-314
DAS-TMfilter	16-33; 59-74; 97-107; 117-135; 145-163; 193-204; 242-266; 279-319; 279-319
TOP-PRED	12-32; 58-78; 85-105; 110-130; 142-162; 181-201; 230-250; 263-283; 292-312

TMHMM 2.0	13-35; 55-77; 89-111; 115-137; 144-166; 239-261; 274-296; 300-322
Phobius	58-77; 89-109; 115-133; 145-168; 188-206; 213-231; 243-263; 275-297; 303-322

PDB code: 1LGH_A

Observed	15-39
MEMBRAIN	15-38
THUMBU	15-42
SOSUI	9-31; 34-56
DAS-TMfilter	16-43
TOP-PRED	16-36
TMHMM 2.0	21-43
Phobius	20-48

PDB code: 1LGH_B

Observed	10-41
MEMBRAIN	20-39
THUMBU	27-36
SOSUI	20-42
DAS-TMfilter	26-41
TOP-PRED	22-42
TMHMM 2.0	22-41
Phobius	20-41

PDB code: 1NEK_C

Observed	21-54; 67-97; 102-129
MEMBRAIN	27-59; 63-99; 109-123
THUMBU	26-49; 66-91
SOSUI	25-47; 65-87; 109-129
DAS-TMfilter	26-50; 68-88; 113-125
TOP-PRED	32-52; 62-82; 109-129
TMHMM 2.0	27-49; 64-86; 112-128
Phobius	20-48; 68-89; 110-128

PDB code: 1NEK_D

Observed	11-38; 54-84; 86-114
MEMBRAIN	19-40; 49-78; 91-109
THUMBU	19-45; 51-80; 88-106
SOSUI	16-38; 51-73; 89-111
DAS-TMfilter	18-37; 54-74; 88-111
TOP-PRED	21-41; 59-79; 95-115
TMHMM 2.0	16-38; 48-70; 91-113

Phobius 17-39; 59-80; 92-113

PDB code: 1NKZ_A

Observed	11-36
MEMBRAIN	13-35
THUMBU	15-40
SOSUI	11-33
DAS-TMfilter	13-38
TOP-PRED	12-32
TMHMM 2.0	13-35
Phobius	14-35

PDB code: 1OCC_D

Observed	77-103
MEMBRAIN	77-101
THUMBU	85-98
SOSUI	79-101
DAS-TMfilter	84-97
TOP-PRED	79-99
TMHMM 2.0	81-98
Phobius	80-98

PDB code: 1OCC_G

Observed	13-37
MEMBRAIN	14-36
THUMBU	21-32
SOSUI	16-37
DAS-TMfilter	21-30
TOP-PRED	18-38
TMHMM 2.0	15-37
Phobius	16-37

PDB code: 1OCC_J

Observed	26-54
MEMBRAIN	26-52
THUMBU	38-48
SOSUI	33-54
DAS-TMfilter	35-48
TOP-PRED	34-54
TMHMM 2.0	30-52
Phobius	30-53

PDB code: 1OCC_K

Observed	9-35
MEMBRAIN	10-34
THUMBU	21-34
SOSUI	14-36
DAS-TMfilter	18-34
TOP-PRED	14-34
TMHMM 2.0	13-35
Phobius	12-32

PDB code: 1OCC_L

Observed	18-44
MEMBRAIN	18-41
THUMBU	26-36
SOSUI	20-42
DAS-TMfilter	24-35
TOP-PRED	20-40
TMHMM 2.0	20-42
Phobius	20-40

PDB code: 1OCC_M

Observed	12-35
MEMBRAIN	12-34
THUMBU	23-32
SOSUI	15-37
DAS-TMfilter	19-34
TOP-PRED	15-35
TMHMM 2.0	15-37
Phobius	16-35

PDB code: 1OED_A

Observed	2-29; 32-61; 65-92; 194-227
MEMBRAIN	6-24; 35-50; 61-87; 194-219
THUMBU	10-22; 39-56; 65-84; 194-216
SOSUI	3-25; 35-57; 64-86; 196-218
DAS-TMfilter	6-25; 35-57; 63-86; 194-217
TOP-PRED	7-27; 33-53; 67-87; 198-218
TMHMM 2.0	4-26; 35-57; 67-89; 199-221
Phobius	6-25; 37-55; 67-86; 199-221

PDB code: 1OED_B

Observed	2-29; 32-61; 67-91; 216-246
MEMBRAIN	6-25; 35-50; 61-87; 217-241

THUMBU	10-22; 38-50; 63-84; 219-238
SOSUI	3-25; 32-54; 63-85; 218-240
DAS-TMfilter	6-26; 36-52; 60-87; 218-238
TOP-PRED	5-25; 32-52; 67-87; 222-242
TMHMM 2.0	4-26; 33-51; 66-88; 222-240
Phobius	6-26; 33-51; 63-88; 222-240

PDB code: 1OED_C

Observed	2-29; 32-61; 65-92; 228-260
MEMBRAIN	6-24; 35-50; 61-87; 227-252
THUMBU	10-22; 65-84; 233-250
SOSUI	4-26; 32-54; 64-86; 231-253
DAS-TMfilter	8-24; 37-50; 61-86; 233-251
TOP-PRED	7-27; 32-52; 67-87; 232-252
TMHMM 2.0	5-27; 34-53; 68-90; 232-254
Phobius	6-25; 37-55; 67-88; 232-254

PDB code: 1OED_E

Observed	3-28; 32-62; 67-93; 227-260
MEMBRAIN	6-25; 36-51; 62-88; 227-251
THUMBU	10-23; 66-87; 229-249
SOSUI	4-26; 35-57; 67-89; 229-251
DAS-TMfilter	7-26; 38-52; 64-89; 232-251
TOP-PRED	7-27; 33-53; 68-88; 232-252
TMHMM 2.0	5-27; 34-53; 68-90; 232-254
Phobius	6-24; 36-56; 68-91; 232-254

PDB code: 1OKC_A

Observed	8-27; 66-89; 108-136; 169-197; 206-230; 266-290
MEMBRAIN	10-29; 70-89; 112-134; 173-193; 211-230; 270-290
THUMBU	214-222
SOSUI	NONE
DAS-TMfilter	NONE
TOP-PRED	9-29; 113-133; 207-227
TMHMM 2.0	111-133; 171-193; 208-230
Phobius	171-189; 209-230

PDB code: 1PRC_M

Observed	52-76; 111-137; 143-166; 198-223; 260-284
MEMBRAIN	50-76; 110-137; 141-165; 196-222; 265-287
THUMBU	52-77; 109-127; 143-164; 200-221; 265-292
SOSUI	52-74; 108-130; 141-163; 202-224; 267-289
DAS-TMfilter	51-74; 114-125; 144-164; 204-222; 269-288

TOP-PRED	54-74; 109-129; 144-164; 199-219; 266-286
TMHMM 2.0	49-71; 110-132; 144-166; 203-225; 267-289
Phobius	49-75; 112-132; 144-165; 202-225; 266-289

PDB code: 1PSS_L

Observed	32-55; 83-111; 116-138; 171-198; 225-250
MEMBRAIN	27-51; 78-106; 110-134; 165-192; 221-249
THUMBU	18-53; 85-95; 112-146; 172-187; 223-254
SOSUI	24-46; 78-100; 111-133; 170-192; 225-247
DAS-TMfilter	19-50; 85-93; 111-136; 171-191; 220-249
TOP-PRED	27-47; 79-99; 110-130; 168-188; 229-249
TMHMM 2.0	25-47; 79-101; 108-130; 171-193; 230-252
Phobius	21-47; 80-98; 110-130; 170-194; 228-252

PDB code: 1PSS_M

Observed	54-78; 109-139; 147-168; 200-226; 262-286
MEMBRAIN	41-71; 108-134; 138-162; 193-219; 262-284
THUMBU	41-80; 107-128; 142-163; 193-218; 260-286
SOSUI	47-69; 106-127; 141-163; 200-222; 267-289
DAS-TMfilter	45-69; 109-122; 144-162; 198-219; 265-284
TOP-PRED	25-45; 50-70; 106-126; 140-160; 196-216; 263-283
TMHMM 2.0	49-71; 107-129; 141-163; 199-221; 263-285
Phobius	45-71; 108-130; 142-162; 199-221; 263-286

PDB code: 1PV7_A

Observed	6-39; 41-59; 74-101; 103-137; 139-165; 165-186; 220-248; 253-277; 287-308; 311-341; 357-377; 377-400
MEMBRAIN	8-33; 45-64; 74-100; 102-125; 141-163; 167-187; 211-241; 256-281; 290-307; 312-335; 349-372; 379-399
THUMBU	10-32; 49-59; 77-95; 103-121; 149-187; 268-279; 320-330; 345-365; 379-397
SOSUI	11-33; 44-66; 75-97; 106-128; 144-166; 174-196; 215-237; 260-282; 288-310; 313-335; 346-368; 379-401
DAS-TMfilter	11-30; 48-64; 76-116; 76-116; 153-162; 171-187; 224-232; 294-302; 320-332; 348-367; 381-400
TOP-PRED	7-27; 45-65; 78-98; 102-122; 167-187; 219-239; 263-283; 291-311; 315-335; 349-369; 382-402
TMHMM 2.0	13-35; 45-67; 76-98; 103-125; 145-164; 168-187; 222-239; 261-283; 304-326; 346-368; 380-402
Phobius	12-34; 46-66; 75-95; 101-122; 143-162; 168-187; 222-239; 259-279; 291-310; 316-337; 349-369; 381-401

PDB code: 1PW4_A

Observed	19-58; 63-89; 93-113; 120-148; 152-181; 189-208; 252-283; 287-317; 321-342; 346-375; 379-410; 414-449
MEMBRAIN	26-53; 62-84; 93-114; 116-144; 156-182; 185-206; 253-279; 286-313; 320-344; 346-371; 381-408; 412-434
THUMBU	30-46; 98-133; 165-207; 251-271; 327-337; 345-368; 388-406; 415-433
SOSUI	26-43; 102-124; 160-181; 187-208; 251-273; 290-312; 320-342; 350-372; 384-406; 414-435
DAS-TMfilter	29-42; 68-77; 94-132; 94-132; 170-181; 189-206; 252-271; 324-338; 349-371; 387-406; 415-436
TOP-PRED	25-45; 66-86; 94-114; 163-183; 187-207; 252-272; 292-312; 321-341; 350-370; 384-404; 415-435
TMHMM 2.0	27-44; 64-86; 93-115; 119-141; 154-176; 186-205; 253-272; 292-311; 318-340; 350-372; 385-407; 417-436
Phobius	25-43; 63-81; 93-112; 118-137; 158-182; 188-207; 253-271; 291-310; 322-341; 347-372; 384-404; 416-436

PDB code: 1Q90_D

Observed	38-58; 93-109; 126-147
MEMBRAIN	34-57; 95-113; 128-146
THUMBU	39-54; 88-109; 132-150
SOSUI	36-58; 89-111; 131-153
DAS-TMfilter	38-55; 94-110; 129-147
TOP-PRED	37-57; 94-114; 127-147
TMHMM 2.0	36-58; 95-117; 129-151
Phobius	36-57; 95-114; 126-145

PDB code: 1QHJ_A

Observed	6-32; 37-58; 80-100; 105-127; 131-160; 165-191; 201-224
MEMBRAIN	10-29; 43-63; 78-97; 107-127; 134-154; 172-191; 203-224
THUMBU	16-27; 49-65; 85-106; 126-155; 179-194; 202-217
SOSUI	11-33; 46-68; 78-100; 107-129; 137-159; 177-199; 204-225
DAS-TMfilter	14-28; 47-67; 88-101; 109-124; 138-156; 178-190; 203-223
TOP-PRED	9-29; 44-64; 83-103; 106-126; 138-158; 176-196; 204-224
TMHMM 2.0	10-29; 42-64; 79-101; 108-130; 135-157; 177-199
Phobius	12-29; 41-63; 83-101; 108-129; 135-156; 177-199; 205-224

PDB code: 1QLB_C

Observed	22-52; 77-100; 121-149; 169-194; 202-237
MEMBRAIN	32-55; 78-95; 128-145; 166-181; 214-229
THUMBU	33-54; 76-96; 129-146; 166-185; 218-228
SOSUI	33-55; 77-98; 129-151; 171-193; 213-232
DAS-TMfilter	33-57; 76-97; 131-147; 167-186; 214-231
TOP-PRED	32-52; 76-96; 123-143; 163-183; 212-232
TMHMM 2.0	31-53; 76-98; 125-147; 167-189; 215-232
Phobius	28-53; 77-98; 125-147; 167-191; 212-232

PDB code: 1RC2_B

Observed	3-26; 34-54; 63-73; 79-104; 130-154; 161-182; 186-198; 206-225
MEMBRAIN	6-24; 35-57; 64-73; 79-104; 132-151; 161-182; 204-224
THUMBU	13-25; 28-54; 87-103; 134-145; 164-177; 199-219
SOSUI	5-27; 35-57; 81-103; 131-153; 161-183; 205-227
DAS-TMfilter	13-26; 32-55; 85-103; 132-150; 162-179; 206-221
TOP-PRED	9-29; 35-55; 85-105; 130-150; 156-176; 203-223
TMHMM 2.0	7-29; 33-55; 81-103; 127-149; 156-178; 205-227
Phobius	36-60; 81-103; 129-149; 161-180; 206-226

PDB code: 1RHZ_A

Observed	22-41; 59-89; 105-129; 136-161; 168-188; 206-229; 255- 276; 312-333; 375-396; 400-415
MEMBRAIN	26-44; 56-66; 71-90; 111-132; 136-159; 167-192; 205- 227; 253-282; 313-336; 375-396; 398-413
THUMBU	34-50; 74-92; 114-132; 140-158; 173-181; 209-229; 256- 280; 312-333; 381-407
SOSUI	31-53; 71-93; 110-132; 138-160; 167-189; 208-230; 258- 280; 313-335; 384-406
DAS-TMfilter	31-44; 69-90; 115-157; 115-157; 170-179; 211-226; 255- 271; 314-333; 381-410
TOP-PRED	27-47; 67-87; 125-145; 168-188; 209-229; 257-277; 292- 312; 315-335; 374-394
TMHMM 2.0	33-55; 70-92; 113-135; 139-157; 164-186; 209-231; 252- 274; 313-335; 383-405
Phobius	29-47; 67-93; 113-132; 138-157; 169-189; 209-226; 247- 269; 316-335; 373-391; 397-415

PDB code: 1RWT_A

Observed	55-87; 124-144; 170-201
MEMBRAIN	56-87; 122-141; 179-198
THUMBU	124-137
SOSUI	118-140
DAS-TMfilter	NONE

TOP-PRED 66-86; 120-140; 184-204
 TMHMM 2.0 NONE
 Phobius NONE

PDB code: 1SOR_A

Observed 5-32; 40-63; 68-78; 82-108; 126-150; 159-180; 184-194;
 200-222
 MEMBRAIN 8-29; 35-57; 64-75; 77-106; 125-144; 154-175; 197-219
 THUMBU 10-29; 37-55; 74-96; 129-140; 160-171; 202-214
 SOSUI 5-27; 35-57; 75-97; 122-143; 154-174; 193-215
 DAS-TMfilter 11-26; 37-54; 78-101; 128-142; 157-170; 205-218
 TOP-PRED 8-28; 36-56; 82-102; 126-146; 153-173; 197-217
 TMHMM 2.0 5-27; 37-59; 79-101; 121-143; 156-178; 198-220
 Phobius 9-31; 37-58; 79-103; 123-144; 156-175; 198-220

PDB code: 1U7G_A

Observed 6-34; 37-69; 96-120; 124-149; 163-182; 194-221; 224-
 254; 257-273; 280-307; 310-333; 347-381
 MEMBRAIN 12-34; 45-68; 97-118; 125-149; 165-181; 199-216; 225-
 249; 260-275; 277-301; 317-337; 347-379
 THUMBU 17-29; 48-66; 99-117; 129-147; 165-180; 204-215; 231-
 254; 266-299; 319-335; 355-374
 SOSUI 11-33; 41-63; 111-133; 155-176; 187-209; 217-239; 245-
 267; 270-292; 307-329; 347-369
 DAS-TMfilter 16-32; 48-64; 107-119; 124-144; 169-180; 230-247; 262-
 271; 277-297; 321-333; 359-373
 TOP-PRED 11-31; 41-61; 94-114; 119-139; 154-174; 190-210; 219-
 239; 246-266; 273-293; 310-330; 345-365
 TMHMM 2.0 10-32; 41-63; 98-120; 127-149; 164-183; 196-215; 225-
 247; 254-276; 280-302; 315-337; 352-374
 Phobius 12-32; 44-64; 98-120; 127-149; 161-183; 195-214; 226-
 247; 254-272; 278-302; 314-338; 358-377

PDB code: 1UAZ_A

Observed 15-38; 44-69; 86-106; 110-133; 136-160; 170-198; 206-
 231
 MEMBRAIN 17-36; 49-71; 85-104; 112-134; 139-161; 178-198; 209-
 230
 THUMBU 22-34; 55-70; 90-103; 118-132; 141-159; 179-197; 205-
 223
 SOSUI 17-39; 50-72; 89-111; 113-135; 142-164; 177-199; 210-
 231
 DAS-TMfilter 19-35; 54-70; 94-107; 117-132; 144-161; 179-197; 205-
 229

TOP-PRED	16-36; 53-73; 89-109; 114-134; 142-162; 179-199; 210-230
TMHMM 2.0	15-35; 48-70; 85-107; 114-133; 143-162; 175-197; 207-229
Phobius	17-35; 47-69; 89-107; 114-135; 141-159; 180-198; 204-230

PDB code: 1VF5_C

Observed	251-280
MEMBRAIN	255-271
THUMBU	256-270
SOSUI	NONE
DAS-TMfilter	260-270
TOP-PRED	255-275
TMHMM 2.0	257-274
Phobius	257-274

PDB code: 1VF5_D

Observed	18-43
MEMBRAIN	19-41
THUMBU	25-36
SOSUI	NONE
DAS-TMfilter	24-37
TOP-PRED	18-38; 101-121
TMHMM 2.0	21-43
Phobius	21-39

PDB code: 1VGO_A

Observed	13-36; 40-66; 85-107; 109-132; 135-159; 169-196; 205-230
MEMBRAIN	15-34; 47-68; 84-102; 111-133; 138-159; 177-197; 207-229
THUMBU	20-32; 52-72; 88-102; 116-126; 143-159; 181-204
SOSUI	12-34; 55-77; 88-110; 112-134; 141-163; 175-197; 209-230
DAS-TMfilter	17-32; 51-69; 92-106; 114-130; 143-160; 179-196; 206-228
TOP-PRED	13-33; 51-71; 88-108; 112-132; 140-160; 178-198; 209-229
TMHMM 2.0	15-33; 46-68; 83-105; 110-132; 142-161; 174-196; 206-228
Phobius	15-33; 45-68; 88-106; 113-134; 140-158; 179-197; 203-229

PDB code: 1XIO_A

Observed	2-27; 33-57; 69-92; 98-122; 124-148; 158-186; 194-224
MEMBRAIN	6-25; 36-58; 69-89; 99-122; 127-149; 166-186; 196-219
THUMBU	40-50; 75-87; 130-146; 168-186; 196-212
SOSUI	4-26; 33-55; 74-95; 101-123; 127-149; 169-191
DAS-TMfilter	39-50; 78-89; 103-116; 131-146; 169-185; 199-212
TOP-PRED	5-25; 37-57; 75-95; 99-119; 129-149; 168-188; 196-216
TMHMM 2.0	5-24; 37-56; 76-95; 100-119; 129-147; 168-187; 197-216
Phobius	6-25; 37-56; 76-92; 99-117; 129-147; 168-193; 199-218

PDB code: 1XQF_A

Observed	6-36; 43-69; 97-120; 124-149; 167-181; 197-218; 224-254; 257-273; 280-301; 313-333; 347-381
MEMBRAIN	9-33; 44-66; 96-118; 126-148; 164-181; 198-216; 225-249; 260-274; 277-301; 317-334; 349-380
THUMBU	12-30; 47-67; 97-115; 137-155; 165-180; 204-215; 231-245; 266-299; 319-337; 354-374
SOSUI	12-34; 44-66; 118-140; 162-183; 194-216; 225-247; 278-300; 318-340; 357-379
DAS-TMfilter	13-33; 45-66; 107-120; 123-148; 169-181; 202-212; 229-246; 276-299; 320-335; 358-374
TOP-PRED	11-31; 44-64; 100-120; 125-145; 161-181; 197-217; 227-247; 256-276; 282-302; 319-339; 356-376
TMHMM 2.0	10-32; 45-67; 98-120; 127-149; 164-183; 196-215; 225-247; 259-281; 285-302; 315-337; 352-374
Phobius	12-32; 44-64; 98-120; 127-149; 161-183; 195-214; 226-246; 258-275; 281-302; 314-334; 354-374

PDB code: 1YCE_A

Observed	2-46; 49-81
MEMBRAIN	8-37; 55-83
THUMBU	65-80
SOSUI	5-27; 67-89
DAS-TMfilter	69-82
TOP-PRED	8-28; 69-89
TMHMM 2.0	9-31; 66-88
Phobius	69-88

PDB code: 1ZCD_A

Observed	12-30; 59-85; 95-116; 121-143; 150-175; 182-200; 205-218; 223-236; 247-271; 290-311; 327-350; 357-382
MEMBRAIN	15-28; 63-77; 98-115; 131-144; 150-178; 183-199; 204-219; 225-235; 257-269; 285-312; 328-348; 363-379

THUMBU	12-30; 62-72; 96-114; 133-151; 173-191; 214-232; 258-272; 287-307; 330-346; 366-375
SOSUI	11-32; 58-79; 93-115; 126-148; 153-175; 181-202; 212-234; 253-274; 291-313; 327-349; 357-379
DAS-TMfilter	14-28; 65-77; 98-114; 134-176; 134-176; 183-199; 207-220; 226-236; 258-270; 285-312; 330-349; 365-374
TOP-PRED	12-32; 58-78; 95-115; 126-146; 154-174; 179-199; 220-240; 254-274; 282-302; 328-348; 360-380
TMHMM 2.0	7-29; 60-77; 94-116; 126-145; 152-174; 179-201; 206-237; 257-279; 291-313; 328-350; 357-379
Phobius	12-39; 59-79; 91-114; 126-145; 154-175; 181-200; 207-238; 258-276; 288-312; 324-351; 363-380

PDB code: 2A65_A

Observed	10-38; 40-71; 87-125; 165-184; 190-214; 240-267; 275-307; 336-370; 374-396; 398-425; 446-478; 482-514
MEMBRAIN	14-27; 42-63; 77-123; 163-188; 196-218; 249-265; 277-304; 334-366; 378-400; 405-428; 445-471; 485-502
THUMBU	16-24; 42-62; 87-119; 167-182; 199-215; 249-261; 297-318; 333-359; 382-394; 411-425; 453-468; 484-501
SOSUI	6-28; 41-63; 88-110; 112-133; 164-186; 196-218; 243-265; 292-314; 340-362; 377-399; 407-429; 453-475; 483-504
DAS-TMfilter	43-60; 92-124; 165-184; 198-216; 247-264; 297-309; 337-358; 380-395; 409-427; 452-468; 485-503
TOP-PRED	9-29; 41-61; 91-111; 164-184; 194-214; 247-267; 291-311; 335-355; 377-397; 409-429; 449-469; 485-505
TMHMM 2.0	7-29; 39-61; 89-111; 165-187; 194-216; 243-265; 293-315; 335-357; 378-395; 405-427; 447-469; 484-503
Phobius	12-29; 41-61; 92-111; 166-185; 197-215; 243-268; 289-314; 342-367; 379-399; 405-427; 447-469; 481-503

PDB code: 2AHZ_A

Observed	21-45; 49-62; 73-103
MEMBRAIN	21-44; 51-74; 78-103
THUMBU	31-39; 81-100
SOSUI	1-20; 24-46; 81-103
DAS-TMfilter	27-40; 79-96
TOP-PRED	24-44; 50-70; 76-96
TMHMM 2.0	26-48; 78-100
Phobius	26-45; 78-100

PDB code: 2B2J_A

Observed	2-29; 35-64; 84-105; 113-138; 156-172; 186-208; 213-241; 245-261; 268-293; 300-320; 334-367
MEMBRAIN	7-29; 38-63; 86-107; 114-137; 146-170; 187-206; 213-239; 248-263; 266-289; 305-320; 338-366
THUMBU	10-25; 42-63; 90-103; 116-139; 154-164; 189-206; 223-234; 268-284; 344-363
SOSUI	7-29; 38-60; 62-84; 88-110; 113-135; 148-170; 182-203; 215-237; 258-280; 306-328; 343-365
DAS-TMfilter	9-26; 39-61; 93-106; 116-133; 154-167; 189-201; 227-237; 251-260; 270-286; 342-363
TOP-PRED	6-26; 39-59; 64-84; 87-107; 114-134; 152-172; 186-206; 220-240; 245-265; 269-289; 301-321; 340-360
TMHMM 2.0	6-28; 35-57; 87-109; 116-138; 153-172; 185-204; 219-238; 245-267; 272-289; 301-323; 338-360
Phobius	6-28; 40-59; 87-105; 117-138; 150-172; 184-204; 216-240; 247-265; 271-287; 299-319; 339-360

PDB code: 2B5F_A

Observed	39-64; 73-92; 101-110; 115-139; 160-182; 198-218; 222-234; 243-260
MEMBRAIN	40-60; 72-95; 101-111; 117-141; 163-182; 195-218; 241-263
THUMBU	40-56; 72-97; 111-133; 200-215; 246-260
SOSUI	40-62; 70-92; 114-136; 163-185; 192-214; 240-262
DAS-TMfilter	41-60; 70-95; 105-135; 167-180; 197-215; 248-257
TOP-PRED	43-63; 71-91; 119-139; 164-184; 194-214; 241-261
TMHMM 2.0	40-62; 72-94; 115-137; 162-181; 194-216; 242-264
Phobius	37-60; 72-95; 115-137; 196-216; 243-264

PDB code: 2BBJ_A

Observed	293-312; 326-345
MEMBRAIN	295-313; 327-347
THUMBU	299-313; 332-342
SOSUI	295-317; 328-347
DAS-TMfilter	297-311; 332-345
TOP-PRED	296-316; 328-348
TMHMM 2.0	296-318; 328-348
Phobius	296-316; 328-348

PDB code: 2BL2_A

Observed	11-46; 51-79; 87-122; 127-155
MEMBRAIN	13-40; 55-80; 89-114; 127-150
THUMBU	10-23; 63-85; 92-102; 136-147
SOSUI	7-29; 63-85; 94-116; 131-153

DAS-TMfilter	14-23; 67-80; 138-151
TOP-PRED	10-30; 62-82; 89-109; 136-156
TMHMM 2.0	13-35; 55-77; 89-111; 131-153
Phobius	55-78; 90-111; 131-154

PDB code: 2BRD_A

Observed	9-31; 38-62; 77-100; 105-127; 134-157; 166-191; 203-226
MEMBRAIN	10-30; 43-63; 78-97; 107-127; 134-154; 172-191; 203-224
THUMBU	16-27; 49-65; 85-106; 126-155; 179-194; 202-217
SOSUI	10-32; 45-67; 77-99; 106-128; 136-158; 176-198; 203-224
DAS-TMfilter	14-28; 46-67; 88-102; 109-124; 138-156; 178-191; 203-223
TOP-PRED	8-28; 43-63; 82-102; 105-125; 137-157; 175-195; 203-223
TMHMM 2.0	10-29; 42-64; 79-101; 108-130; 135-157; 177-199
Phobius	12-29; 41-63; 83-101; 108-129; 135-156; 177-199; 205-224

PDB code: 2H8A_A

Observed	9-32; 62-95; 99-122; 128-147
MEMBRAIN	13-33; 83-95; 101-117; 133-143
THUMBU	18-27; 106-117
SOSUI	NONE
DAS-TMfilter	18-26; 85-93
TOP-PRED	11-31; 80-100; 128-148
TMHMM 2.0	10-32; 82-104; 130-148
Phobius	12-35; 82-110; 130-148

PDB code: 2HI7_B

Observed	14-36; 43-64; 71-96; 144-162
MEMBRAIN	13-33; 39-64; 69-91; 140-164
THUMBU	18-60; 76-85; 142-160
SOSUI	12-34; 41-63; 144-165
DAS-TMfilter	16-38; 41-62; 72-80; 145-163
TOP-PRED	13-33; 48-68; 144-164
TMHMM 2.0	13-35; 45-64; 71-89; 145-162
Phobius	12-33; 45-64; 71-89; 145-166

PDB code: 2IRV_A

Observed	3-24; 56-79; 79-103; 109-127; 137-150; 161-178
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MEMBRAIN	6-21; 46-74; 79-103; 106-123; 132-156; 162-175
THUMBU	10-27; 51-70; 136-173
SOSUI	2-24; 47-69; 78-100; 102-123; 134-156; 159-180
DAS-TMfilter	8-22; 52-69; 83-94; 110-118; 136-153; 165-173
TOP-PRED	3-23; 51-71; 78-98; 102-122; 137-157
TMHMM 2.0	5-24; 44-66; 78-97; 101-123; 132-154; 159-181
Phobius	7-24; 44-69; 81-97; 103-121; 133-151; 157-176

PDB code: 2IUB_A

Observed	291-312; 327-349
MEMBRAIN	304-322; 336-356
THUMBU	308-322; 341-351
SOSUI	304-326; 337-356
DAS-TMfilter	306-320; 341-354
TOP-PRED	305-325; 337-357
TMHMM 2.0	305-327; 337-357
Phobius	305-325; 337-357

PDB code: 2J7A_C

Observed	14-38
MEMBRAIN	13-32
THUMBU	19-29
SOSUI	14-34
DAS-TMfilter	16-31
TOP-PRED	15-35
TMHMM 2.0	13-32
Phobius	NONE

PDB code: 2J01_A

Observed	18-38
MEMBRAIN	19-36
THUMBU	18-36
SOSUI	16-37
DAS-TMfilter	16-38
TOP-PRED	17-37
TMHMM 2.0	15-37
Phobius	16-36

PDB code: 2NQ2_A

Observed	7-24; 57-87; 99-113; 119-138; 147-171; 199-213; 236-256; 265-274; 279-303; 311-329
MEMBRAIN	8-29; 62-84; 100-118; 120-141; 148-170; 196-215; 238-262; 281-301; 307-327

THUMBU	13-26; 65-80; 103-136; 138-165; 197-215; 239-270; 286-296
SOSUI	7-29; 65-87; 93-115; 119-141; 149-171; 196-218; 239-261; 281-303; 308-329
DAS-TMfilter	10-27; 67-82; 107-139; 146-167; 198-215; 240-252; 287-295; 312-326
TOP-PRED	8-28; 66-86; 120-140; 146-166; 196-216; 240-260; 279-299; 308-328
TMHMM 2.0	10-32; 66-88; 108-139; 146-168; 198-220; 241-263; 309-328
Phobius	6-27; 66-87; 107-140; 147-171; 197-219; 240-267; 279-297; 309-328

PDB code: 2ONK_C

Observed	24-53; 67-101; 106-134; 150-177; 199-228; 252-273
MEMBRAIN	23-58; 70-100; 110-136; 142-172; 203-236; 249-273
THUMBU	25-53; 77-96; 118-139; 150-163; 200-208; 217-237; 252-271
SOSUI	28-50; 75-97; 113-135; 148-170; 192-214; 221-243; 251-273
DAS-TMfilter	25-53; 74-98; 116-140; 149-165; 195-209; 224-237; 251-273
TOP-PRED	26-46; 80-100; 123-143; 148-168; 195-215; 221-241; 250-270
TMHMM 2.0	27-49; 78-100; 113-135; 150-167; 219-241; 251-273
Phobius	26-56; 76-100; 112-135; 147-167; 195-217; 223-241; 253-274

PDB code: 2PNO_A

Observed	5-33; 43-74; 75-100; 104-147
MEMBRAIN	6-21; 59-77; 80-92; 108-132
THUMBU	10-24; 61-90; 109-135
SOSUI	5-27; 64-86; 116-138
DAS-TMfilter	7-23; 61-75; 77-89; 111-140
TOP-PRED	5-25; 58-78; 114-134
TMHMM 2.0	7-29; 67-89; 109-131
Phobius	67-89; 110-131

PDB code: 2Q7M_A

Observed	10-37; 48-77; 81-101; 116-138
MEMBRAIN	7-25; 63-79; 84-97; 112-138
THUMBU	10-21; 67-86; 116-143
SOSUI	5-27; 67-89; 118-140
DAS-TMfilter	8-21; 67-78; 84-92; 116-139

TOP-PRED	5-25; 63-83; 118-138; 141-161
TMHMM 2.0	7-26; 71-93; 118-140
Phobius	7-26; 69-93; 114-137; 143-160

PDB code: 2QTS_A

Observed	19-45; 401-433
MEMBRAIN	19-41; 410-431
THUMBU	23-42; 411-426
SOSUI	20-42
DAS-TMfilter	23-36; 416-425
TOP-PRED	19-39; 233-253; 408-428
TMHMM 2.0	20-42
Phobius	20-38