

HsM_C1_cdf_BAC77356 M----P-----FAEDKTYKYICRNFSN-FCNVD---VVEILPYLP---CLTA-
-RDQDRP-R--ATCTLSGNRDTLWHL-FNTLQR-----RPGWVEYFIAALRGCE----LVDLADEVASV-YQSYQ-
[96]
MaM_C1M_NP001040588 ----SNG-YST---DENFRYLISCFRARV-KMYIQ---VEPVLDYLT---FLPA-
-EVKEQI-Q--RTVATSGNMQAVELL-LSTLEKG--VWHLGWTREFVEALRRAG----SPLAARYMNPILT-----
[99]
MaM_C1R_NP001036133 -----TTEQ----RRSLLAFQDYI-RKTLD---PTYILSYMAP--WFRE-
-EEVQYI-Q--AEKNNKGPMEAAATLF-LKFLLEL--Q-EEGWFRGFLDALDHAGY---SGLY-----
[85]
MdM_C1M_126326479 ----SFE-SSQ---EKNFLNLIQCFRPRL-KQYIR---VEPVLDYLT---FLDR-
-EKKEHI-R--QTAATQGNAAAEFL-LSTLEKG--TWGPGWAQEFLLTGLNHGG----CTLAARYMNPDLA-----
[99]
MdM_helR_XP_001366879 -----MGDDSQ---VPTNQAGQLLPRAVLSLSSFVS-
-PAVREELDSQPGGPGGGSG-----RSCTRACDTESNLSLLTSFSPKSH-----
[71]
MmM_C1M_BAE31652 ----SIV-CSA---EDSFRNLILFFRPRL-KMYIQ---VEPVLDHLI---FLSA-
-ETKEQI-L--KKINTCGNTSAAELL-LSTLEQG--QWPLGWTQMFVEALEHSG----NPLAARYVKPTLT-----
[99]
MmM_C1R_Q6Q899 -----TAAQ----RQNLQAFRDYI-KKILD---PTYILSYMSS--WLED-
-EEVQYI-Q--AEKNNKGPMEAAASLF-LQYLLKL--Q-SEGWFQAFLDALYHAGY---CGLC-----
[85]
MmM_C1_cardif_Q8VCF0 M----T-----FAEDKTYKYIRDNHSK-FCCVD---VLEILPYLS---CLTA-
-SDQDRL-R--ASYRQIGNRDTLWGL-FNNLQR-----RPGWVEVFIRALQICE----LPGLADQVTRV-YQSYLP
[97]
MmM_N2_C1_30017211 SL--EG-----FESILDWLLSVDVLSR-
-EDYEGE-----SLPGQPLSHSARRL-LDTVWNK----GVWGCQKLLLEAVQEAQ----ANSHTF-----
[69]
MmM_C2M_BAE33716 D---LPS-PSSETAHDECLHLLTLLQPTL-VDKLL---INDVLDTCFEKGLLTV-
-EDRNR--I--SAAGNSGNESGVREL-LGRIVQ-----KENWFSTFLDVLQRQTG----NDALFQELTGG-----
[100]
MmM_C2R_Q6Q899_MOUSE D---FOK-IE---KLEEHRLLLRRLEPEF-KATVD---PNDILSELSE--CLIN-
-QECEEI-R--QIRDTKGRMAGAEKM-AECLIRS--DKENWPKVLQALALEKDN-----SKFSEL-----
[93]
MmM_Csp_86198305 D-----KILRAKRKQF-INSVSIQTINGLLDELLEKRVLNQ-
-EEMDKI-----KLANITAMDKARDL-CDHVSKK----GPQASQIFITYICNED----C-YLAGILELQ-----
[88]
MmM_N1_C2_37196420 K-----LLKINREHLVTNIRN---TQCLVDNLLLENGYFSA-
-EDAEIV-----CACPTKPKDKVRKI-LDLVQSK----GEEVSEFFLYVLQOLE----DAYVDLRLWLS-----
[85]
MmM_N2_C2_30017211 R-----D-----LQSHRPAI-VRRLY-NHVEAMLELAREGGFLSQ-
-YECEEI-----RLPIFTSSQRARRL-LDLAAVK----ANGLAA-----FLLQHVR-----
[73]
SmE_C1_CAJ00235 L-----NRLRICYTNA-QSLLNKLP-----
-ELGVQIDSTRPDIIAVTETWLTSPSIDSRELDF-----EGFTLVRADRTQTR----KGGGVALFIRNAIP-FTI
[82]
SsM_C1R_Q9GLV6 -----TAEQ----RRNLHAFGDYV-RKTLD---PTFILSYMAP--WFRD-
-DEVQHI-Q--AEKNNKGPTEAAASLF-LQFLLEL--Q-EEGWFRGFLDALNQAGY---CGLC-----
[85]
SsM_C1M_NP_001093664 MS--SDG-YSA---DQNFICYLISCFRARV-KRYIQ---VEPVLDYLT---FLPA-
-EVKEQI-Q--RAVATTGNINAAELL-LNTLEKG--VWPPGWTMFMVQALRETG----NSLAARYVNPDLTDLPS-
[105]
TnV_C1_CAG09339 -----MAADSDEIHERLIEYFMPRL-RNLIV---VQQVLDLFD--FIEP-
-DQKERI-R--QRNISRGNLAAADAL-ITAVTQK--PHQAGWFRFVDALEQSG----CGHAADYIQN-----
[95]

AcV_C2M_AAWZ01028814 L---MPS-PSLEAAGDEGAFLLGLFEFVL-VEQLR---ATQVAMACLEEGLFHD-
-EDLERVGV--KAEDARGNCPAVREL-LCRIVQ-----KDWFSFVKVLRKTG----HEKAADALCGQ-----
[102]

BtM_C2M_XP615590 D---LPS-PSSENAHDECLQLLNLLQPTL-VDKLL---VADVLDKCVEEKLLTI-
-EDRNR--V--SAAENNGNEAGVREL-LKRIVQ-----KENWFSTFLTILRQTG----NDALAREFTGT-----
[100]

BtM_C2R_XP878993 D---FQK-LE---KLEEYRLLLKRLQPEF-KTTIN---PEDILPEISG--CLLN-
-QECEEI-I--QISSNKGLMAGAEM-VECLLRS---DKENWPKTLKLALKEE-----SKFSEL-----
[93]

CfM_C2M_XP545493.. D---LPS-PSAENAHDQCLQLLHLLQPTL-VDRLL---VKDVLDKCVKLLTD-
-EDRDR--I--SAAENNGNQSIVREL-LKRIVQ-----KENWFSFLTVLNQTE----NYALVQELTGT-----
[100]

CfM_C2R_a11WGA39 N---FQK-IE---SLEEYRLLLKRLQPEF-KTTVN---PNDILPKISE--CLIS-
-QECEEI-I--QVCSNKGLMAGAEM-VECLLRS---DKENWPKTLKLALETEE-----SK-----
[89]

DrV_C2M_AAH97103 E-----QKHRQILQRHRLNL-VKALN---PEDVCDKLLSKGVFTQ-
-DMIDEI-----QSKATRRDQARQL-VKDLETR----GSLAFPFLDSLRETG----HNDLAELL-----
[86]

DrV_C2R_XP001339107 R---PPE-PDEEAHDSVCVRLIDLLHLSL-VN-MK---TRDVCVQCVTLGLLTQ-
-EDQEN-----ALEGRE----HRDLMRELGE-----
[67]

DrV_C2M_NP001074053 M---GR-----FATD-----IK---VREILPYLQ---CLTI-
-SDREEI-E--AKKEQYGNYNVAVQTL-LDNLRR-----RENWIDEFITALRKCE----LGSLANEM-----
[74]

EcM_C2M_XP_001494380 D---LPS-PSFESAHDECLQLLNLLQPTL-VDRLL---VRDVLDKCVAVDLLTL-
-EDRNR--I--AAAENNGNESGVREL-LKRIVQ-----KENWFSTFLAVLSQTG----NDALVQELTGT-----
[100]

EcM_C2R_XP_001497895 D---FQK-IE---KLEEHRALLRRLQPVF-KTRVN---PKDILPDISE--CLID-
-QECEEI-I--QVCSNKGLMAGAEM-VECLLRS---DKENWPKTLKLALKEE-----SV-----
[89]

GgV_C2_XP422031 Q---LPS-PQEEDDHDLCVHLVQLLHGTL-VDNMQ---TRQVAEKCLELGFQFQ-
-EDLVGI-E--TVIESRGNRDGAREL-LSRIVQ-----KDWFSQFLVALRETQ----HESLADDSGN-----
[101]

HsM_C2R_AAD19826 D---FKK-IE---KLEEYRLLLKRLQPEF-KTRII---PTDIISDLSE--CLIN-
-QECEEI-L--QICSTKGMMAGAEM-VECLLRS---DKENWPKTLKLALKEE-----NKFSEL-----
[93]

HsM_C2M_AAG54076 D---LPS-PSFENAHDEYLQLLNLLQPTL-VDKLL---VRDVLDKCMEEELLTI-
-EDRNR--I--AAAENNGNESGVREL-LKRIVQ-----KENWFSFLNVLVLRQTG----NNELVQELTGS-----
[100]

HsM_C2_cdf_BAC77356 -----P-----FAEDKTYKYICRNFSN-FCNVD---VVEILPYLP---CLTA-
-RDQDRP-R--ATCTLSGNRDTLWHL-FNTLQR-----RPGWVEYFIAALRGCE----LVDLADEV-----
[87]

HsM_C2nacht_110665740 L-----HF---MDQHREQL-VARVT-S-VDPLLDKLH-GLVLNE-
-ESYEAV-----R-AENTNQDKMRKL-FNLSRSW----SRACKDLFYQALKETH----PHLVMDL-----
[81]

MaM_C2R_NP001036133 D---FKK-IE---KLEEYRLLLKRLQPEF-KTRII---PTDILSDLSE--CLIN-
-QECEEI-L--QICSTKGMMAGAEM-VECLLRS---DKENWPKTLKLALERER-----NKFSEL-----
[93]

MaM_C2M_NP001040588 D---LPS-PSFENAHDECLQLLNLLQPTL-VDKLL---VRDVLDKCMEEELLTI-
-EDRNR--I--AAAENNGNESGVREL-LKRIVQ-----KENWFSFLDVLVLRQTG----NDELVQELTGT-----
[100]

MdM_C2M_XP001374256 D---LPS-PSLETICYDQCVQLLDILQPTL-VDKLQ---ATAVVDKCLEKALLTK-
-EDTNRV-I--NLNENYGNHNAVREL-LNRIVQ-----KEDWFSKFLSILRETE----HIKLAEDFIAV-----
[101]

Mdm_C2R_XP_001366879 EFRQMEQ-LEEHSSGDLKLMDEIQDRLEMPELSRDDLEDILEELFSSHMTQT-
-EQREVIQRFI SMMQARGRARASQSMAL EALMRE---EKEQWSKVPFQVADLDY----VQDCVSQLTQE-----
[114]
NF_C2_XP_001261296 -----RRSQRITSKKQSQATPVNQT--YLPTPLTELDSTA-
-TDVRNEVTATP--PDSPSQALSTV----EQCSSPPGDTQALSQFV-YP-PRAF-----
[78]
Oam_C2R_XP_001509166 -----RLHRVPPRNDSSQLLSGE-----NGKLQYFSE--NFTP-
-LKNLVC-V--QVQLHYGPMVSVVEKI-TECLLRS--DKENWPKILKTALDMGD-----CDV-----
[80]
RrM_C2M_XP001055482 D---LPS-PSSETAHDECLHLLNLLQPTL-VGKLL---INDVLDTCSEKGLVTV-
-EDRNR--I--SAAGNSGNESGVREL-LRRIVQ----KENWFSTFLDVL RQTG----NDALVQELTGV-----
[100]
RrM_C2R_XP001067411 D---FQK-LE---KLEEHRL L LRRLEPEF-KATVS---PTDILSEISE--CLIN-
-QECEEI-R--QICFTKGRMAGAEKM-VQCLLRS--DKENWPKVLQFALEKDN-----SKFSEL-----
[93]
RrM_C1M_P575141 ----STV-CSA---EDSFRNLISIFRPRV-KMNIQ---VEPVLDYLV---FLPA-
-ETKEQI-L--RKVTTGNTSAAELL-LSTLEQG--QWPLGWTQMFVEALEHSG----NPLAARYVKPSLT-----
[99]
RrM_C1R_P00106741 -----TAEQ----RQNLQAFRDYI-KKILD---PTYILSYMSS--WLRD-
-DEVQCI-Q--AEKNNKGPIEAASLF-LRYLLEL--Q-TEGWFR AFLDALYHAGY---CGL-----
[84]
SpD_C2_XP001176626 E---GTS-EFNTKKREHYRSFLWL YAHRL-ED-IE---PLSLLTSLEE--HLTK-
-RDVEKI-R--KTVREGNCAGASEL-LLRLDRK----SEDCFGEFIKALDRNG----SPKLAKEM-----
[96]
SpD_C2_XP001180482 D-----LQRP GTDVR SKLYT---
ILKELGH HKAADV LVTGDDDFDKK-SLLRTVEVCTPSESSASI-TKNMDLQ--SDLADEVSMVSSAMSQSD----
YMSVKKDSKF----- [93]
Ssm_C2R_Q9GLV6 D---FQK-IE---KLEEYRSL LRR LQPEF-KTTIN---PKDILPEIAE--CLIS-
-QECEEI-L--QICSSKGLMAGAEKM-VECLLRS--DKENWPKTLKLALEKEE-----SRFSEL-----
[93]
Ssm_C2M_NP_001093664 D---LPS-PSFESSHDECLQLLNLLQPTV-VDKLL---VTDVLDKCVEEQLLTG-
-EDRNR--V--SAAENDGNESGVREL-LKRIVQ----KENWFSTFLTVLRQTG----NDALARELTGTDCCESNA
[107]
TcE_C2_XP807714 ASIRANE-----NVYKFLRVS-----ESFE---GNEVLEKAMLS-
GLEKILTTLAYV-KSYHILGEELARFAHTKLKS NESKEQ----CEGILRPSKSSFLESY-----
- [85]
TnV_C2_CAG09339 K---IPE-PEVEAENDYCIRLIQLLSPSL-VD-MK---TSAVCVQCLSQDLITE-
-DDSEN I-E--AATRNOGAKAGAREL-LGRIVRG----RPGWFSKFLDILLKTE----HKNLYSEL TGG-----
[101]
TnV_C2_CAG10454 L-----WP-EISQKSA-Q-----
-----NQVRTETHHPAFEDD-VAVYEA EKT LQLDHARSFNGANPAGTGSNAS--PSSCPDLPG
[66]
;
END;

BEGIN ASSUMPTIONS;

USERTYPE GI (STEPMATRIX) = 20
A C D E F G H I K L M N P Q R S T V W Y
[A] 3 1 2 2 1 2 1 1 1 1 1 1 2 1 1 2 2 2 1 1

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[C] 1 3 1 0 2 2 1 1 0 1 0 1 1 0 2 2 1 1 2 2
[D] 2 1 3 2 1 2 2 1 1 1 0 2 1 1 1 1 1 2 0 2
[E] 2 0 2 3 0 2 1 1 2 1 1 1 1 2 1 1 1 2 1 1
[F] 1 2 1 0 3 1 1 2 0 2 1 1 1 0 1 2 1 2 1 2
[G] 2 2 2 2 1 3 1 1 1 1 1 1 1 1 2 2 1 2 2 1
[H] 1 1 2 1 1 1 3 1 1 2 0 2 2 2 2 1 1 1 0 2
[I] 1 1 1 1 2 1 1 3 2 2 2 2 1 1 2 2 2 2 0 1
[K] 1 0 1 2 0 1 1 2 3 1 2 2 1 2 2 1 2 1 1 1
[L] 1 1 1 1 2 1 2 2 1 3 2 1 2 2 2 2 1 2 2 1
[M] 1 0 0 1 1 1 0 2 2 2 3 1 1 1 2 1 2 2 1 0
[N] 1 1 2 1 1 1 2 2 2 1 1 3 1 1 1 2 2 1 0 2
[P] 2 1 1 1 1 1 2 1 1 2 1 1 3 2 2 2 2 1 1 1
[Q] 1 0 1 2 0 1 2 1 2 2 1 1 2 3 2 1 1 1 1 1
[R] 1 2 1 1 1 2 2 2 2 2 2 1 2 2 3 2 2 1 2 1
[S] 2 2 1 1 2 2 1 2 1 2 1 2 2 1 2 3 2 1 2 2
[T] 2 1 1 1 1 1 1 2 2 1 2 2 2 1 2 2 3 1 1 1
[V] 2 1 2 2 2 2 1 2 1 2 2 1 1 1 1 1 1 3 1 1
[W] 1 2 0 1 1 2 0 0 1 2 1 0 1 1 2 2 1 1 3 1
[Y] 1 2 2 1 2 1 2 1 1 1 0 2 1 1 1 2 1 1 1 3

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i

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USERTYPE PAM (STEPMATRIX) = 20
  A C D E F G H I K L M N P Q R S T V W Y
[A] 10 6 8 8 4 9 7 7 7 6 7 8 9 8 6 9 9 8 2 5
[C] 6 20 3 3 4 5 5 6 3 2 3 4 5 3 4 8 6 6 0 8
[D] 8 3 12 11 2 9 9 6 8 4 5 10 7 10 7 8 8 6 1 4
[E] 8 3 11 12 3 8 9 6 8 5 6 9 7 10 7 8 8 6 1 4
[F] 4 4 2 3 17 3 6 9 3 10 8 4 3 3 4 5 5 7 8 15
[G] 9 5 9 8 3 13 6 5 6 4 5 8 7 7 5 9 8 7 1 3
[H] 7 5 9 9 6 6 14 6 8 6 6 10 8 11 10 8 7 6 5 8
[I] 7 6 6 6 9 5 6 13 6 10 10 6 6 6 6 8 8 12 3 7
[K] 7 3 8 8 3 6 8 6 13 5 8 9 7 9 11 8 8 6 5 4
[L] 6 2 4 5 10 4 6 10 5 14 12 5 5 6 5 5 6 10 6 7
[M] 7 3 5 6 8 5 6 10 8 12 14 6 6 7 8 6 7 10 4 6
[N] 8 4 10 9 4 8 10 6 9 5 6 10 7 9 8 9 8 6 4 6
[P] 9 5 7 7 3 7 8 6 7 5 6 7 14 8 8 9 8 7 2 3
[Q] 8 3 10 10 3 7 11 6 9 6 7 9 8 12 9 7 7 6 3 4
[R] 6 4 7 7 4 5 10 6 11 5 8 8 8 9 14 8 7 6 10 4
[S] 9 8 8 8 5 9 7 7 8 5 6 9 9 7 8 10 9 7 6 5
[T] 9 6 8 8 5 8 7 8 8 6 7 8 8 7 7 9 11 8 3 5
[V] 8 6 6 6 7 7 6 12 6 10 10 6 7 6 6 7 8 12 2 6
[W] 2 0 1 1 8 1 5 3 5 6 4 4 2 3 10 6 3 2 25 8
[Y] 5 8 4 4 15 3 8 7 4 7 6 6 3 4 4 5 5 6 8 18

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i

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USERTYPE gonnett (STEPMATRIX) = 20
  A C D E F G H I K L M N P Q R S T V
W Y
[A] . 6.3 8.8 8.5 15.1 5.9 10.9 9.9 9.5 10.9 10.1 9.3 6.5 9.4 9.7 6.9
7.6 8.2 16.3 15.3
[C] 7.7 . 17.1 16.9 10.7 10.4 12.3 10.6 16.5 11.7 10.6 13.2 14.2 15.6
14.0 8.7 9.8 8.4 8.9 10.4
[D] 9.3 14.7 . 4.6 25.1 6.0 8.3 19.7 7.7 20.7 17.2 5.2 8.2 7.3 9.0 7.9
8.7 16.3 23.5 17.6

```

[E] 8.6 14.0 4.4 . 21.9 7.9 8.3 15.3 6.6 15.7 13.7 7.1 7.8 6.1 7.7 8.5
8.9 12.9 19.1 17.2
[F] 14.7 8.4 23.1 20.8 . 21.8 9.3 6.5 18.6 5.2 6.0 17.8 16.7 16.3 17.6
16.9 14.5 8.2 3.1 2.9
[G] 7.7 11.1 7.5 10.2 29.5 . 12.5 23.2 11.2 22.7 19.3 7.9 10.1 11.3 10.6
8.1 11.2 17.9 17.8 23.2
[H] 10.4 9.5 7.5 7.7 9.1 9.1 . 13.7 7.6 12.8 11.7 6.6 9.0 6.8 7.3 9.3
9.3 13.2 8.5 5.6
[I] 10.4 9.1 19.7 15.8 7.1 18.5 15.1 . 14.1 4.3 4.9 16.6 12.7 13.9 14.6
13.4 10.0 4.1 10.7 10.8
[K] 9.5 13.4 7.3 6.4 19.1 8.5 7.9 13.3 . 13.4 11.9 7.2 8.0 6.4 4.5 8.7
8.5 12.4 15.9 15.0
[L] 11.4 9.9 20.6 16.2 5.6 18.1 14.1 4.3 14.1 . 4.5 17.4 11.8 13.0 14.0
14.4 11.8 5.5 8.3 9.2
[M] 10.2 8.6 16.4 13.5 6.2 14.7 12.3 4.6 12.0 4.3 . 14.4 12.1 11.3 12.4
12.2 10.0 5.8 8.9 9.7
[N] 9.3 10.6 4.9 6.9 18.2 6.0 6.9 15.7 7.2 16.5 14.3 . 8.6 7.6 7.9 7.2
7.8 13.9 16.3 12.7
[P] 8.1 14.3 9.6 9.5 21.4 9.5 11.7 15.0 10.0 14.0 15.0 10.7 . 9.4 10.4
8.1 8.5 12.6 22.4 18.8
[Q] 9.0 12.2 6.7 5.7 16.2 8.3 6.9 12.7 6.1 11.9 10.9 7.4 7.3 . 6.0 8.5
8.7 11.8 13.2 13.7
[R] 9.9 11.7 8.8 7.7 18.6 8.3 7.9 14.3 4.7 13.7 12.8 8.1 8.6 6.4 . 9.3
9.1 13.2 10.3 14.0
[S] 6.7 6.9 7.3 8.1 17.0 6.0 9.5 12.5 8.5 13.4 11.9 7.1 6.4 8.6 8.8 .
6.2 10.5 15.2 14.3
[T] 7.5 7.9 8.2 8.7 14.8 8.5 9.7 9.4 8.5 11.1 9.9 7.8 6.8 9.0 8.8 6.3 .
8.4 15.9 14.3
[V] 8.4 7.0 16.0 13.2 8.7 14.1 14.4 4.0 12.8 5.5 6.0 14.4 10.5 12.7 13.3
11.2 8.7 . 12.9 11.9
[W] 19.8 8.8 27.1 22.9 3.9 16.5 10.9 12.5 19.4 9.7 10.9 19.9 22.0 16.7
12.2 19.0 19.5 15.2 . 3.6
[Y] 14.3 7.9 15.6 15.8 2.8 16.5 5.5 9.7 14.1 8.3 9.0 12.0 14.2 13.3 12.7
13.7 13.5 10.8 2.8 .

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END;