

Information of the data source is available from the following sources:
1. Information of the data source is available from the following sources:

Information of the data source is available from the following sources:

ID	Author	Title	Year
0001	0001	0001	0001
0002	0002	0002	0002
0003	0003	0003	0003
0004	0004	0004	0004
0005	0005	0005	0005
0006	0006	0006	0006
0007	0007	0007	0007
0008	0008	0008	0008
0009	0009	0009	0009
0010	0010	0010	0010
0011	0011	0011	0011
0012	0012	0012	0012
0013	0013	0013	0013
0014	0014	0014	0014
0015	0015	0015	0015
0016	0016	0016	0016
0017	0017	0017	0017
0018	0018	0018	0018
0019	0019	0019	0019
0020	0020	0020	0020
0021	0021	0021	0021
0022	0022	0022	0022
0023	0023	0023	0023
0024	0024	0024	0024
0025	0025	0025	0025
0026	0026	0026	0026
0027	0027	0027	0027
0028	0028	0028	0028
0029	0029	0029	0029
0030	0030	0030	0030
0031	0031	0031	0031
0032	0032	0032	0032
0033	0033	0033	0033
0034	0034	0034	0034
0035	0035	0035	0035
0036	0036	0036	0036
0037	0037	0037	0037
0038	0038	0038	0038
0039	0039	0039	0039
0040	0040	0040	0040
0041	0041	0041	0041
0042	0042	0042	0042
0043	0043	0043	0043
0044	0044	0044	0044
0045	0045	0045	0045
0046	0046	0046	0046
0047	0047	0047	0047
0048	0048	0048	0048
0049	0049	0049	0049
0050	0050	0050	0050
0051	0051	0051	0051
0052	0052	0052	0052
0053	0053	0053	0053
0054	0054	0054	0054
0055	0055	0055	0055
0056	0056	0056	0056
0057	0057	0057	0057
0058	0058	0058	0058
0059	0059	0059	0059
0060	0060	0060	0060
0061	0061	0061	0061
0062	0062	0062	0062
0063	0063	0063	0063
0064	0064	0064	0064
0065	0065	0065	0065
0066	0066	0066	0066
0067	0067	0067	0067
0068	0068	0068	0068
0069	0069	0069	0069
0070	0070	0070	0070
0071	0071	0071	0071
0072	0072	0072	0072
0073	0073	0073	0073
0074	0074	0074	0074
0075	0075	0075	0075
0076	0076	0076	0076
0077	0077	0077	0077
0078	0078	0078	0078
0079	0079	0079	0079
0080	0080	0080	0080
0081	0081	0081	0081
0082	0082	0082	0082
0083	0083	0083	0083
0084	0084	0084	0084
0085	0085	0085	0085
0086	0086	0086	0086
0087	0087	0087	0087
0088	0088	0088	0088
0089	0089	0089	0089
0090	0090	0090	0090
0091	0091	0091	0091
0092	0092	0092	0092
0093	0093	0093	0093
0094	0094	0094	0094
0095	0095	0095	0095
0096	0096	0096	0096
0097	0097	0097	0097
0098	0098	0098	0098
0099	0099	0099	0099
0100	0100	0100	0100

52 dataset: details of the six enzyme categories

ECs-lyases

EC_number	Enzyme name	Protein names
F21396	K23_HUMAN	40S ribosomal protein S3 [EC 4.2.99.38] [Small ribosomal subunit protein uS3]
F01595	PLD4_HUMAN	Adenylsuccinate lyase [ADSL] [EC 4.3.2.2] [Adenylsuccinate lyase]
F06713	EMD4_HUMAN	Alpha-endonuclease [EC 4.2.1.11] [2-phospho-5'-phosphate hydro-lyase] [C-myc promoter-binding protein] [Endonuclease 1] [MBP-1] [MFB-1] [Non-neural enolase] [NNE] [Phosphopyruvate hydratase] [Rasmenagen binding protein]
P04424	AKL1_HUMAN	Argininosuccinate lyase [AKL1] [EC 4.3.2.1] [Argininosuccinate]
Q9B261	CAT11_HUMAN	Carbonic anhydrase 13 [EC 4.2.1.3] [Carbonate dehydratase 10] [Carbonic anhydrase XIII] [CA-XIII]
F21399	ACDC_HUMAN	Cytoplasmic aspartate lyase [ALKBH5] [EC 4.2.1.3] [Cytate hydro-lyase] [Purinos regulator protein] [Iron regulatory protein 1] [IRP1] [Iron-responsive element binding protein 1] [IRE-BP 1]
F01604	DDP1_HUMAN	D-diphosphonate decarboxylase [EC 4.1.1.6] [D-hydroxyisone. hydratase] [Phosphopyruvate hydratase 9]
F13176	HEM2_HUMAN	Delta-aminolevulinic acid dehydratase [ALA2] [EC 4.2.1.24] [Porphobilinogen synthase]
F01715	DDC1_HUMAN	Dibenzofuran-phosphate aldolase [DBA1] [EC 4.2.1.2] [D-benzofuran-5-phosphate aldolase] [Phosphohydroxybenzaldolase] [Dibenzofuranaldolase]
Q91Y03	EDCD1_HUMAN	Ethylmalonyl-CoA decarboxylase [EC 4.1.1.14] [Ethyl-CoA hydratase domain-containing protein 1] [Methylmalonyl-CoA decarboxylase] [MMDC] [EC 4.1.1.41]
P41527	FAL1_HUMAN	Fatty acid synthase [EC 2.3.1.4] [Includes: Fatty acyl-carrier-protein] [5-acetyltransferase [EC 2.3.1.36], 3-oxoacyl-[acyl-carrier-protein] synthase [EC 2.3.1.41], 3-oxoacyl-[acyl-carrier-protein] reductase [EC 1.1.1.30], 3-hydroxyacyl-[acyl-carrier-protein] dehydratase [EC 4.2.1.29], 3-oxoacyl-[acyl-carrier-protein] hydratase [EC 4.2.1.24]]
P06205	ALDA_HUMAN	Fructose biphosphate aldolase A [EC 4.1.2.13] [Large cancer antigen NY-U1-1] [Muscle type aldolase]
P09172	ALDOA_HUMAN	Fructose biphosphate aldolase C [EC 4.1.2.13] [Brain-type aldolase]
P07954	FUM1_HUMAN	Fumarate hydratase, mitochondrial [Fumarate] [EC 4.2.1.2]
Q75213	GCT1_HUMAN	Gamma-glutamyltransferase [EC 4.2.1.9] [Cystosarcoma c-releasing factor 21]
Q51547	CDP_HUMAN	CDP-mecanase 4-like dehydratase [EC 4.2.1.47] [CDP-mecanase dehydratase] [CDME]
F01504	GSM1_HUMAN	Citramalate synthase [GSI] [EC 4.1.3.1] [Citramalate dehydratase] [EC 4.1.1.25] [Citramalate-aminase lyase]
Q91268	UGL1_HUMAN	Leucylglutathione lyase [EC 4.2.1.2] [Aspartate-aminase] [EC 4.1.1.1] [Leucine-aminase] [Leucyl-glutathione] [5-O-D-lactoylglutathione methyl[lyase]
F21234	PLM1_HUMAN	Multifunctional protein A2E2 [includes: Phosphoribosyltransferase-uracil-succinocarboxamide synthase [EC 6.3.2.6] [SACAR synthetase], Phosphoribosylaminoimidazole carboxylase [EC 4.1.1.23] [ARI carboxylase] [ARIC], Leucylglutathione lyase [EC 4.2.1.2] [Aspartate-aminase] [EC 4.1.1.1] [Leucine-aminase] [Leucyl-glutathione] [5-O-D-lactoylglutathione methyl[lyase]
F01021	APC1_HUMAN	Peptidyl-glycine alpha-aminating monooxygenase [PAM] [includes: Peptidyl-glycine alpha-hydroxylating monooxygenase] [PAM] [EC 1.10.17.6], Peptidyl-alpha-hydroxyglycine alpha-aminating lyase [EC 4.1.1.51] [Peptidyl-alpha-hydroxyglycine lyase] [PAL]]
P01487	PH1_HUMAN	Phenyl-alpha-carbonolamine dehydratase [PH1] [EC 4.2.1.26] [6-alpha-hydroxytryptophan tetrahydroopton dehydratase] [Dimerization cofactor of hepatocytic nuclear factor 3 alpha] [DCN3]
Q91996	PDCL1_HUMAN	Pyridoxal-dependent decarboxylase domain-containing protein 1 [EC 4.1.1.3]
Q13443	TKM1_HUMAN	Troloxin/TMN cyclase [Bifunctional ATP-dependent dithyrosyltransferase/AD-AMP lyase] [cyclin] [includes: ATP-dependent dithyrosyltransferase kinase [DHR kinase] [EC 2.7.1.26] [EC 2.7.2.26] [Dihyrosyl kinase] [Troloxinase] [Troloxin kinase], FAD-AMP lyase [cyclin] [EC 4.1.1.15] [FAD-AMP lyase] [cyclic-TMN formyl] [TMN cyclase]]
F11172	USP11_HUMAN	Uridine 5'-monophosphate synthase [UMP synthase] [includes: Oxidase phosphoribosyltransferase [OPRT] [OPRTase] [EC 2.4.2.20], Oxidase 5'-phosphate decarboxylase [DSC] [EC 4.1.1.23] [DAMPase]]

S2 dataset: details of the six enzyme categories
ECs: isomerases

AC_number	Entry name	Protein name(s)
Q0623	GALE_HUMAN	Galactose 4-epimerase (EC 5.1.3.1) (Galactose mutarotase)
P03744	GDP_HUMAN	Glucose 6-phosphate isomerase (GPI) (EC 5.3.1.9) (Aldolase mobility factor) [AMF] (Neuroleukin) [NLK] (Phosphoglucose isomerase) [PGI] (Phosphoglucose isomerase) [PHI] (Sperm antigen 36) [SA-36]
Q06942	IND1_HUMAN	Indole 3-phosphatase synthase 1 [IPS1] (EC 5.1.4) (Myo-inositol 3-phosphate synthase) [M3-S-P synthase] (MIP synthase) [MIP3] (Myo-inositol 3-phosphate synthase A1) [MNC1]
Q13907	IDI1_HUMAN	Isopentenyl-diphosphate Delta isomerase 1 (EC 5.3.2.1) (isopentenyl pyrophosphate isomerase 1) [IPP isomerase 1] [IPP1]
Q14708	IMM4_HUMAN	Mannylsuccinate isomerase [IMM4] (EC 5.2.1.2) (G2T2-3) (G2T2ase 3) (transferrase sub 3) (EC 2.5.1.38)
P34949	MPI_HUMAN	Mannose-6-phosphate isomerase (EC 5.1.3.8) (Phosphohexose isomerase) (Phosphomannose isomerase) [PMI]
Q08920	MTN1_HUMAN	Methylthioribose-1-phosphate isomerase [MTP] [MTR-1-P isomerase] (EC 5.1.3.13) (Mediator of RhoA-dependent invasion) [5-methyl-5-thioribose-1-phosphate isomerase] (Translation initiation factor eIF-2B subunit alpha/beta/delta/like protein)
Q08945	NNIE_HUMAN	NAD(P) pyridate epimerase (EC 5.1.0.6) (Euplophobos A-binding protein) [A-BP] [NAD(P)Pase epimerase] [YFP N-terminal domain-containing protein 3] [YFP_N3]
P02317	PP1A_HUMAN	Peptidyl prolyl cis-trans isomerase A [PP1ase A] (EC 5.2.1.8) (Cyclophilin A) (Cyclosporin A-binding protein) (Rotamase A) [Cleaved into Peptidyl-prolyl cis-trans isomerase A, N-terminally processed]
P12384	PP1B_HUMAN	Peptidyl-prolyl cis-trans isomerase B [PP1ase B] (EC 5.2.1.8) (Cyclophilin B) (Rotamase B) (Cyclophilin) [CYPB]
P02942	PP2B_HUMAN	Peptidyl-prolyl cis-trans isomerase PP2B [PP1ase PP2B] (EC 5.2.1.8) (12 kDa FK506-binding protein) (12 kDa FKBP) (FKBP-12) (Calcitriol-1) (FK506-binding protein 1A) (FKBP-1A) (Immunophilin FKBP12) (Rotamase)
Q03080	PP2C_HUMAN	Peptidyl-prolyl cis-trans isomerase PP2C [PP1ase PP2C] (EC 5.2.1.8) (25 kDa FK506-binding protein) (25 kDa FKBP) (FKBP-25) (FK506-binding protein 1) (FKBP-1) (Immunophilin FKBP25) (Rapamycin-sensitive 25 kDa immunophilin) (Rotamase)
Q02700	PP2R_HUMAN	Peptidyl-prolyl cis-trans isomerase PP2R [PP1ase PP2R] (EC 5.2.1.8) (51 kDa FK506-binding protein) (FKBP51) (51 kDa FK506-binding protein) (51 kDa FKBP) (FKBP-51) (51 kDa immunophilin) (50 kDa FK506-binding protein 4) (FKBP5) (HSP-binding immunophilin) [HBI] (Immunophilin FKBP5) (Rotamase) [Cleaved into: Peptidyl-prolyl cis-trans isomerase PP2R, N-terminally processed]
Q07305	PP2L_HUMAN	Peptidyl-prolyl cis-trans isomerase-like 1 [PP1ase] (EC 5.2.1.8) (Rotamase PP1L)
Q03384	PGAM1_HUMAN	Phosphoglucoaminate mutase [PGAM] (EC 5.4.3.3) (N-acetylglucosamine-phosphate mutase) (Phosphoglucosamine-3) [PGM 3]
P06871	PGAM2_HUMAN	Phosphoglucosamine-1 [PGM 1] (EC 5.4.2.2) (Glucose phosphomutase 1)
Q06603	PGAM3_HUMAN	Phosphoglucosamine-2 [PGM 2] (EC 5.4.2.2) (Glucose phosphomutase 2) (Phosphobutyrylthiomutase) (Phosphoglucoaminate) [EC 5.4.2.7]
P18669	PGAM4_HUMAN	Phosphoglycerate mutase 1 [EC 5.4.2.11] (EC 5.4.2.4) (BPG-dependent PGAM 1) (Phosphoglycerate mutase isozyme B) [PGAM-B]
Q15805	PGAM5_HUMAN	Phosphoglucomutase 2 [PGM 2] (EC 5.4.2.8)
Q15851	TPST_HUMAN	Prostaglandin-H synthase 1 [EC 5.3.9.1] (Cyclo-oxygenase) (Prostaglandin synthase) [EP4] (Hsp90 co-chaperone) (Prostaglandin receptor complex p23) (Telomerase-binding protein p23)
P01222	PGDS_HUMAN	Prostaglandin-H2 synthase (EC 5.3.9.2) (Beta trace protein) (Cereberin-26) (Glutathione-independent PGD synthase) (Lipoic acid-type prostaglandin-D synthase) (Prostaglandin-D2 synthase) (PGD2 synthase) (PGDS2)
P01223	PDIAL1_HUMAN	Protein disulfide-isomerase [PDI] (EC 5.3.4.1) (Cellular thyroid hormone-binding protein) (Prolyl 4-hydroxylase subunit beta) [p55]
P01201	PDIAL2_HUMAN	Protein disulfide-isomerase A3 [EC 5.3.4.1] (58 kDa glucose-regulated protein) (58 kDa microsomal protein) [p58] (Disulfide isomerase ER-60) (Endoplasmic reticulum resident protein 57) (ER protein 57) (ERp57) (Endoplasmic reticulum resident protein 60) (ER protein 60) [ERp60]
P13657	PDIAL3_HUMAN	Protein disulfide-isomerase A6 [EC 5.3.4.1] (Endoplasmic reticulum resident protein 70) (ER protein 70) (ERp70) (Endoplasmic reticulum resident protein 72) (ER protein 72) (ERp-72) (ERp-72)
P04347	PI4A_HUMAN	Ribose-5-phosphate isomerase (EC 5.3.1.6) (Phosphoriboisomerase)
Q12527	PI3K_HUMAN	Serine/threonine-protein phosphatase 2A activator (EC 5.2.1.8) (PP2A, subunit B', PI33 isoform) (Phosphotyrosyl phosphatase activator) [PFA] (Serine/threonine-protein phosphatase 2A regulatory subunit A) (Serine/threonine-protein phosphatase 2A regulatory subunit B')
P01274	PI3K_HUMAN	Triisophosphate isomerase [PI3] (EC 5.3.1.1) (Triose-phosphate isomerase)
Q04376	GALE_HUMAN	UDP-glucose 4-epimerase [UDP-glucose 4-epimerase] (UDP-N-acetylglucosamine 4-epimerase) [UDP-GalNAc 4-epimerase] (UDP-N-acetylglucosamine 4-epimerase) (EC 5.1.3.1) (UDP-galactose 4-epimerase)

