

Table 1. One protein – many functions (1p-nf)

Serial No.	Primary identity	Other activities
1	Protein disulfide isomerase (58 kDa)	<ul style="list-style-type: none"> – Prolyl hydroxylase (a subunit) – Thyroxine-binding protein – Peptide-binding (sequence non-specific) – Oligosaccharyl transferase (a subunit) – Triglyceride transfer protein (a subunit) – Thioredoxin-like activity
2	Pyruvate kinase (58 kDa)	T ₃ -binding protein
3	Lipid-transfer protein (58 kDa)	Sterol carrier protein 2
4	Fermodulin (58 kDa, HMGCoA reductase inhibitor)	Fe-binding protein (low affinity)
5	Peptidyl-prolyl <i>cis-trans</i> isomerase (17 kDa)	<ul style="list-style-type: none"> – Cyclophilin – Cyclosporin A-binding protein
6	Glyceraldehyde-3-phosphate dehydrogenase (37 kDa) (a house keeping enzyme, occurs in large concentration)	<ul style="list-style-type: none"> – Acyl phosphatase – Esterase – ADP-ribosylation – Microtubule-binding protein – Protein kinase – Uracil-DNA glycosylase – t-RNA-binding protein(sequence specific) – Amyloid protein (Amy c)-binding protein – Membrane binding protein
7	Lens crystallins <ul style="list-style-type: none"> – alpha – delta – epsilon – eta – lambda – mu – rho – tau – sigma 	<ul style="list-style-type: none"> – Chaperone-like activity⁶ – Arginine-succinate lyase – Lactate dehydrogenase B – Aldehyde dehydrogenase – Hydroxyacyl CoA dehydrogenase – Ornithine cyclodeaminase – NADPH-quinone reductase – Enolase – GSH-S-transferase
8	Aconitase (with Fe-S cluster, mitochondrial, also in cytosol)	Iron-response element (IRE)-binding protein (no Fe cluster) (coexists in cytosol with active aconitase form)
9	Isocitrate dehydrogenase <ul style="list-style-type: none"> – Mitochondrial, NAD-specific – Cytosolic, NADP-specific 	<ul style="list-style-type: none"> – Mitochondrial mRNA-binding protein – NADH-decavanadate reductase
10	Lactoferrin (Fe-binding, 80 kDa)	Ribonuclease
11	α -subunit of F1-ATPase (mitochondrial, 57 kDa)	Heat-shock protein in peroxisomes
12	Peroxidase (Mn-dependent, <i>N. crassa</i> protein)	Heat shock protein
13	Separate non-overlapping active sites <ul style="list-style-type: none"> – <i>Pseudomonas syringe</i> protein – Mitochondrial signal peptidase – Amylase/Trypsin inhibitor 	<ul style="list-style-type: none"> – Oxygenase and dioxygenase – Two catalytic subunits of non overlapping specificities – Independent inhibition of two activities
14	Leukocyte antigen CD 38 (46 kDa)	<ul style="list-style-type: none"> – NAD-glycohydrolase – ADP-ribose cyclase – Cyclic ADP-ribose hydrolase
15	Put A proline dehydrogenase(plasma membrane)	DNA-binding transcriptional repressor in cytoplasm
16	Phosphoglucose isomerase (cytosolic)	Neuroleukin, autocrine motility factor, differentiation and maturity mediator (extracellular)
17	Thymidine phosphorylase (cytosolic)	Platelet-derived growth factor (PDGF) of endothelial cells (extracellular)
18	Carbinolamine dehydratase (converts 4 α -hydroxy H ₂ to quinonoid H ₂ -biopterin)	Dimerization cofactor (DCoH) of hepatic nuclear transcription factor (HNF-1 α)
19	Thioredoxin of <i>E. coli</i>	T ₇ -DNA polymerase subunit (heterodimeric)
20	Aspartate receptor of <i>E. coli</i>	Maltose-binding protein receptor (different binding site)
21	PMS2 mismatch repair enzyme	Blood cell protein for hypermutation of antibody variable chain
22	Cystic fibrosis transmembrane conductance channel regulator (CFTR), cAMP-dependent Cl ⁻ channel	Epithelial sodium channel regulator protein

Contd. . .

(Table 1. Contd)

Serial No.	Primary identity	Other activities
23	Multidrug resistance transmembrane transporter (MDR ATPase, p-glycoprotein)	Cell swelling ion channel regulator protein
24	Thrombin (protease in blood clotting cascade)	Ligand for cell surface receptor, PAR-1 (G-protein coupled)
25	Thymidylate synthetase	Binding protein of own mRNA, inhibits translation
26	Biotin-5'-adenylate synthetase (<i>E. coli</i>)	Repressor protein of Bio operon
27	LON protease (ATP-dependent) (mitochondrial)	Mitochondrial chaperone
28	Ftsh protein (assists protein transport across membranes in bacteria)	Metalloprotease (ATP-dependent)
29	Afg 31/Rcalp protein (facilitates assembly of F ₀ F ₁ -ATPase)	Protease, degrades improperly folded proteins
30	Band 3 protein (RBC plasma membrane)-anion exchanger	Glycolysis inhibitor protein (acts by N-terminal domain binding to aldolase, glyceraldehyde-3-phosphate dehydrogenase and phosphofructokinase)
31	L-Asparaginase	Nitrilase (3-diazo-4-oxo-L-norvaline → N ₂)
32	A-Esterase	Phosphotriesterase
33	Carbonic anhydrase-III	Esterase, phosphotriesterase, phospho monoesterase (P-tyrosine preferred)
34	Chymotrypsin	Phosphotriesterase; acylation of own His57 (from p-nitrobenzene sulfonate)
35	Cytosine methyltransferase	Cytosine deamination
36	Myoglobin	Sulfoxidation of thioanisole
37	Pepsin A	Phenyl sulfite hydrolysis
38	Phytase (an acid phosphatase)	Sulfoxidation (vanadate-dependent peroxidation reaction)
39	Serum albumin (general binding protein)	Esterase (p-nitrophenyl acetate substrate)
40	Urease	Phosphoramidate hydrolysis
41	Adenylate kinase	Sulfuryl transfer from ADP-sulfate to acceptor
42	Alkaline phosphatase	Sulfatase; phosphodiesterase (substrates: sulfate and phosphate esters of p-nitrophenol)
43	Arylsulfatase A	Cyclic phosphodiesterase (cAMP hydrolysis)
44	Aspartate aminotransferase	β-Elimination – sulfate from L-serine-O-sulfate – chloride from β-chloro-L-alanine – β-carboxyl group of aspartate
45	Pyruvate oxidase	Acetohydroxy acid synthetase
46	Chloroperoxidase (vanadium-dependent)	Phosphomonoesterase (p-nitrophenyl phosphate hydrolysis)
47	RNA-binding enzymes ⁷ – Catalase – Dihydrofolate reductase – Glutamate dehydrogenase – Lactate dehydrogenase	– own mRNA – own mRNA – mRNA of cytochrome oxidase – homopolymeric RNA
48	Lectin (<i>V. faba</i> seeds) ⁸	α-Galactosidase
49	Non-histone protein BA ⁹	Glutathione-S-transferase
50	Apoprotein B-100 of LDL ¹⁰	Phospholipase A ₂
51	H ⁺ -ATPase (reticulocyte endosomes) ¹¹	Iron-binding protein
52	G-protein βγ-subunits (HEK 293 cells) ¹²	MAP kinase activator
53	DNAase (bovine pancreatic) ¹³	Phosphatase (intrinsic; not phosphodiesterase)
54	Lipoamide dehydrogenase (part of pyruvate dehydrogenase complex-NAD specific) ¹⁴	NADPH-ubiquinone reductase (Zn-activated)
55	Cytochrome P450 2C (coronary arteries) ¹⁵	Endothelium-dependent hyperpolarization factor (EDHF) synthase
56	Hemoglobin (<i>ascaris</i>) ¹⁶	Nitric oxide activated dioxygenase

Pooled information available on alternative functions of some proteins: 1–14 from ref. 2; 15–30 from ref. 3; 31–45 from ref. 4 (original references are given in these three reviews).