Proteins grouped according to biological function

**Biological functions in detail (n = 73)**

* Structure
* structural\_proteins\_hair\_nail\_epidermis
* cell\_adhesion
* cell\_organization
* cell\_migration
* ECM\_organization
* Cell growth/division\_&\_Apoptosis
  1. Growth
* cell\_growth\_control
* cell\_cycle\_regulation
* cell\_division (mitosis, meiosis → -DNA replication!)
* cell\_proliferation
* cell\_differentiation
* angiogenesis\_regulation
  1. Death
* apoptosis\_regulation
* autophagy\_mitophagy
* DNA\_&\_RNA\_metabolism
  1. DNA
* DNA\_packaging (e.g. Histones)
* DNA\_repair
* DNA\_replication
* further\_DNA\_metabolism (e.g. degradation)
* nucleotide/-side\_metabolism
  1. RNA
* RNA\_processing (capping, splicing, adding the poly a tail, editing)
* tRNA\_metabolism
* mRNA\_metabolism (→ only degradation?! Then change to “mRNA-degradation”)
* furter\_RNA\_metabolism
* Energy\_Metabolism (→ carbohydrate, protein, lipid)
  1. Carbs
* glycolysis
* anaerobic\_respiration
* additional\_carb\_catabolic\_process
  + other than glycolysis, citric acid cycle, respiratory chain and anaerobic respiration
  1. Proteins
* AA\_catabolic\_process (AA → amino acid)
* extracellular\_proteolysis
* intracellular\_proteolysis
  1. Lipids
* beta\_oxidation
* additional\_lipid\_catabolic\_process
  1. General/central energy metabolism
* citric\_acid\_cycle
* oxidative\_phosphorylation
* Biosynthetic\_Process (carbohydrate, protein, lipid)
  1. Carbs
* carb\_anabolic\_process (e.g. gluconeogenesis)
  1. Lipids
* lipid\_anabolic\_process
  1. Proteins
* transcription
* translation
* protein\_modification
* protein\_folding
* protein\_quality\_control
* AA\_biosynthesis
* Immune\_System\_&\_Inflammation
  1. Immune\_System
* innate\_immune\_system (-inflammation)
* adaptive\_immune\_system
  1. Inflammation
* Inflammation\_regulation
* Signaling (→ extracellular, intracellular)
  1. intracellular
* intracellular\_signalling
  1. extracellular
* neurotransmitter\_&\_modulator\_metabolism
* hormone\_metabolism
* extracellular\_signalling (other than hormones & neurotransmitters/modulators)
* Transport (→ extracellular, intracellular, transmembrane)
  1. extracellular
* apolipoproteins\_lipid\_transport
* oxygen\_transport
* other\_extracellular\_transport
  1. intracellular
* mRNA\_transport
* nuclear\_transport
* intracellular\_transport (- nuclear & mRNA transport): vesicle- / microtubule-based
  1. transmembrane
* protone\_transmembrane\_transport
* ion\_transmembrane\_transport
* other\_transmembrane\_transport
* Cell\_Protection: Detoxification\_&\_Stress
  1. Detoxification
* xenobiotics\_&\_alcohol\_metabolism
  1. Stress
* oxidative\_stress\_response
* glutathione\_metabolism
* stress\_response (stress other than oxidative stress)
* Other
* membrane\_lipid\_metabolism
* spermatic\_development\_function
* pain\_perception
* taste\_perception
* blood\_coagulation\_regulation
* cholesterol\_homeostasis
* melanin\_metabolism
* keratinization
* iron\_homeostasis
* retinol\_homeostasis
* calcium\_ion\_binding
* colloid\_osmotic\_pressure\_regulation

Remove:

* Mitochondrial functions → integrated into subcellular location
* Enzyme (extra column)
* Anti-x → instead regulation: anti/pro

Extra collums:

* Pro / Anti for
  + Transcription
  + Apoptosis
  + Coagulation
  + Inflammation
* Enzyme? S100-Protein? Hsp-Protein (→ immer als (very) broad function in „Cell\_Protection” / “Stress”, NOT Proteinsynthesis!)?
* Intracellular transport: vesicle- / microtubule-based; other?

**Broad functions (n = 25):**

|  |
| --- |
| * Structure |
| * Cell\_growth>death * Cell\_death>growth * DNA\_metabolism |
| * RNA\_metabolism * Both\_RNA&DNA * Carbohydrate\_catabolism * Protein/AA\_catabolism * Lipid\_catabolism * General/Central\_Energy\_Metabolism |
| * Carbohydrate\_synthesis * Protein/AA\_synthesis * Lipid\_synthesis * Protein\_Regulation |
| * Immune\_system |
| * Inflammation>Immune\_system |
| * Intracellular\_signalling |
| * Extracellular\_signalling |
| * Intracellular\_transport |
| * Extracellular\_transport |
| * Transmembrane\_transport |
| * Detoxification |
| * Stress\_response |
| * Other * Unknown |

**Very broad functions (n = 13):**

* Structure
* Energy\_Metabolism
* non\_Energy-generating\_Catabolism
* Biosynthetic\_Process
* Protein\_Regulation
* Cell\_Growth/Division\_&\_Apoptosis
* DNA\_&\_RNA\_metabolism
* Immune\_System\_&\_Inflammation
* Signalling
* Transport
* Cell\_Protection
* Other
* Unknown

**Final number of groups:**

* **In Detail (all): 72 specified + “none/unknown” = 73 in total**
* **Broad functions: 23 specified + “other” and “unknown” = 25 in total**
* **Very broad functions: 11 specified + “other” and “unknown” = 13 in total**

evtl. Ergänzen:

* Transmembrane signalling
* Cell-cell signalling
* Endo/Exocytosis
* Intracellular motility via/along microtubules
* Detoxification of endogen substances (e.g. urea cycle)
* Protein phosphorylation > protein modification