PolarProtDB: A database for apical-basal polarity

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Short abstract

Specialized subcellular compartments are an essential feature of life and transmembrane (TM) proteins are no exception. In the epithelial cells of multicellular organisms the apical (or luminal) and the basolateral domains differ greatly in their protein composition. Despite the enormous number of previous publications, no concise database is available, where one could find details of polarized protein distribution in the apical - basolateral membranes. To remedy the situation, we present PolarProtDB as a freely accessible, online resource, where one can find all details of mammalian transmembrane proteins by cells, tissues and experiments and even potential traffic-regulating motifs. We found the data stored in our database has a strong predictive power and can be utilized for in silico prediction of protein localization in polarized cells. Thanks to its easy-to-use interfaces, we expect PolarProtDB to become a useful resource for cell biologists.

The database is available at [http://polarprotdb.enzim.hu](http://polarprotdb.enzim.hu).

Background

The apical and basolateral domains are generated and maintained by active sorting. Despite having some signals already described, prediction has not yet been possible.

Several filters available

- **Polarizable**
- **Genes**
- **Species**
- **Experiments**
- **Organ**
- **Cell**
- **Glyco**

THE DATABASE

Currently including data from 384 original research articles describing 950 experiments

### Polarity determining short linear motifs

- Short linear motifs, including modification sites are known to direct polarized sorting of many proteins
- We include all experimentally-identified polarity determinants in our database, but many more can also be predicted indirectly

### Glycosylation represents another signal involved in sorting

- O-glycans and complex N-glycans can be a signal for apical sorting
- We curated and included all glycosylation information in our database

### Tissue-dependent protein distribution in mammals

- Polarized sorting of transmembrane proteins happens in all epithelial tissues
- Although the absolute majority of proteins sort similarly, about 7% shows a complex behaviour (usually conserved in orthologs)

### References and acknowledgments

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**References:**