Aquaporins

Overview: Aquaporins and aquaglyceroporins are membrane channels that allow the permeation of water and certain other small solutes across the cell membrane. Since the isolation and cloning of the first aquaporin (AQP1) (Preston *et al*., 1992), 12 additional members of the family have been identified, although little is known about the functional properties of two of these [AQP11 (ENSG00000178301) and AQP12 (ENSG00000184945)]. The other 11 aquaporins can be divided into two families (aquaporins and aquaglyceroporins) depending on whether they are permeable to glycerol (King *et al*., 2004). One or more members of this family of proteins have been found to be expressed in almost all tissues of the body. Individual AQP subunits have six transmembrane domains with an inverted symmetry between the first three and last three domains (Castle, 2005). Functional AQPs exist as tetramers but, unusually, each subunit contains a separate pore, so each channel has four pores.

Nomenclature	AQP0	AQP1	AQP2	AQP3
Ensembl ID	ENSG00000135517	ENSG00000106125	ENSG00000167580	ENSG00000165272
Activators	–	cGMP	–	–
Inhibitors	Hg^{2+}	Hg^{2+}, TEA, Ag^{+}	Hg^{2+}	Hg^{2+}, acid pH
Permeability	Water (low)	Water (high)	Water (high)	Water (high), glycerol

Nomenclature	AQP4	AQP5	AQP6	AQP7
Ensembl ID	ENSG00000171885	ENSG00000161798	ENSG00000086159	ENSG00000165269
Activators	–	–	Acid pH	–
Inhibitors	PKC activation	Hg^{2+}	Hg^{2+}	Hg^{2+}
Permeability	Water (high)	Water (high)	Water (low), anions	Water (high), glycerol

Nomenclature	AQP8	AQP9	AQP10
Ensembl ID	ENSG00000103375	ENSG00000103569	ENSG00000143595
Activators	–	–	–
Inhibitors	Hg^{2+}	Hg^{2+}, phloretin	Hg^{2+}
Permeability	Water (high)	Water (low), glycerol	Water (low), glycerol

AQP6 is an intracellular channel permeable to anions as well as water (Yasui *et al*., 1999).

Further Reading

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