



Recent patents related to aquaporins

Aquaporins are a class of membrane proteins that facilitate water transport across the plasma membranes of cells and are involved in epithelial fluid secretion, cell migration, brain oedema and adipocyte metabolism. As Verkman and colleagues

discuss on page 259, these channels hold potential for the treatment of several disorders, including oedema, cancer, obesity and brain injury, but identifying modulators of these channels has posed a considerable challenge.

Here in TABLE 1 we highlight selected patent applications published in the past 2 years related to aquaporins. Data were researched using the [Espacenet](#) database.

Table 1 | **Published patent applications related to aquaporins**

Publication numbers	Applicants	Subject
US 2013268060	A*STAR	A method for differentiating embryonic stem cells so that they express AQP1; the cells can be used to treat renal disorders such as renal failure, nephrosis, Bright's disease and glomerulitis
CN 103356521	CSPC-NBP Pharmaceutical company	The application of butylphthalide for treating or preventing radiation-induced brain damage; the compound acts on vascular endothelial cells to modulate AQP4 so as to protect the blood-brain barrier
US 2013323754	EUROIMMUM	A diagnostic kit and method that enables the detection of neuromyelitis optica-specific antibodies in samples from a patient
US 2013137766	Fu Jen Catholic University	An 18 β -glycyrrhetic acid derivative that can be used to prevent diseases caused by AQP deficiency, such as urine-concentration defects, slow wound healing and slow corneal re-epithelialization
CN 103099801	Fujian Medical University	The application of 13-methyl-tetradecanoic acid to downregulate the expression of AQP4 and upregulate the expression of zona occludens protein 1 (ZO1) in brain tissue in order to protect the blood-brain barrier and treat focal cerebral ischaemia
CN 103169638	Guangzhou Baiyun Lianjia Fine Chemical Factory	A long-lasting skin-moisturizing and skin-repairing system, based on natural products, that promotes the synthesis of AQPs in cell membranes
CN 103239471	Guangzhou University	The use of a polysaccharide isolated from the orchid <i>Dendrobium officinale</i> that increases the expression of AQP3 in the skin and is useful for promoting water retention in the skin
JP 2013087058	Ichimaru Pharcos	A new preparation based on specific plant extracts that enhances the production of AQPs; useful for preventing and ameliorating skin drying or ageing
US 2012282198	ISP Investments	A cosmetic and/or pharmaceutical composition that consists of an extract of carob and activates AQP expression
WO 2013116537	Mount Sinai School of Medicine	A method to distinguish benign tissue from malignant oncocyctic cell tissue by detecting the presence or expression of AQP4 and/or histone H1.5
CN 102743577	Nanjing University	A traditional Chinese medicine composite that promotes the expression of AQP5 and that improves salivary gland atrophy and lymphocytic infiltration, and can be used to treat salivary gland dysfunction in Sjögren's syndrome
WO 2013057599	S. Tzartos	A biomarker of autoimmune disease that involves the detection of AQP1, AQP2, AQP5, AQP7 and/or AQP8 autoantibodies
CN 103275987	BGI-Shenzhen	A mutant form of AQP5 that can be used to screen biological samples to determine susceptibility to the skin disorder palmoplantar keratoderma (Bothnia type)
KR 20130058669	University of Florida; University of Melbourne	A method of modulating the expression of AQP1, AQP2, AQP3, AQP4 and AQP5 with relaxin; useful for treating oedema and nephrogenic diabetes insipidus
WO 2013177116	University of California	A method of treating neuromyelitis optica involving an antibody against AQP4 that is deglycosylated at Asn297
CA 2833785 AU 2012245205	University of California; University of Colorado	Antibodies binding to AQP4 and methods of using such antibodies to treat neuromyelitis optica, either as monotherapies or in combination with immunosuppressive agents or plasmapheresis
US 2012101162	University of Colorado	Methods and compositions, based on combinations of fatty acids, that induce AQP7 and can be used to induce physiological hypertrophy; useful for treating or preventing cardiovascular disease
WO 2013005170	University of Lisbon	Metal-based inhibitors of AQP3, AQP7 and AQP9 that are useful for treating wound healing defects, tumour and cancer growth, angiogenesis, pathological skin conditions, obesity, kidney disorders, salivary gland disorders, allergic diseases, glaucoma, brain oedema and epilepsy
WO 2014036468	US Government	An adeno-associated viral vector that encodes AQP1, and its use for treating Sjogren's syndrome
CN 103173468	Zhejiang University	A method of preparing AqpZ (found in <i>Escherichia coli</i>)

AQP, aquaporin; A*STAR, Agency for Science, Technology and Research; BGI, Beijing Genomics Institute.