Recent patents related to PI3K

The activation of signalling pathways involving phosphoinositide 3-kinase (PI3K) has a key role in tumour cell biology, but clinical trials of PI3K inhibitors have had limited success. In their Review on page 140, Fruman and Rommel highlight how lessons learned from clinical trial failures and an improved understanding of PI3K signalling pathways could bolster the field. In particular, they advocate that patient selection, a better understanding of immune modulation and improved use of combination therapies could advance therapeutics that target PI3K. Here in TABLE 1 we highlight international patent applications published in the past year related to PI3K. Data were researched using the Espacenet database.

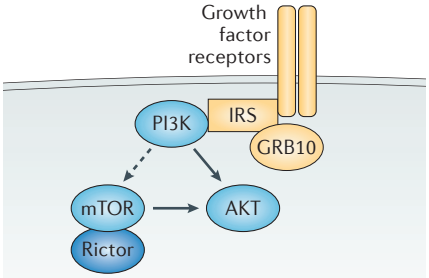

Table 1 | **Selected patent applications related to PI3K**

Publication numbers	Applicants	Subject
WO 2013165320	A*STAR	Increasing the expression of SOCS6 through the use of an inhibitor of the CD19–PI3K interaction
WO 2013141586	Asan Foundation	Novel pyridopyrimidine derivatives that inhibit PI3K; useful for treating inflammatory diseases, cancer, cardiovascular diseases, allergy, asthma and autoimmune disorders
WO 2013104611	Bayer	Substituted pyrazolopyrimidines that are PI3K and AKT inhibitors
WO 2013104610	Bayer	Substituted imidazopyrazines that are PI3K and AKT inhibitors
WO 2013049581	BIDMC	A PI3K inhibitor and a poly(ADP-ribose) polymerase inhibitor; useful for treating cancer
WO 2013140417	CSIR	Compounds with a liphagane meroterpenoid scaffold and boronic acid functionality that inhibit PI3Kα and PI3Kβ
WO 2013018733	Fujifilm	A 1,5-naphthyridine derivative that inhibits the PI3K–AKT pathway and the RAS–RAF–MEK–ERK pathway
WO 2013052699	Gilead	Novel quinoxaline inhibitors of PI3K; useful for treating cancer and inflammatory diseases
WO 2013095761	GlaxoSmithKline	Imidazopyridine derivatives that are selective PI3Kβ inhibitors and can be used to treat cancer
WO 2013028263	GlaxoSmithKline	Pyrazolopyrimidine derivatives that selectively inhibit PI3Kβ activity
WO 2013033569	Incyte	Heterocyclylamines that are PI3K inhibitors; useful for treating inflammatory disorders and cancer
WO 2013151930	Incyte	Bicyclic azaheterocyclobenzylamines that are PI3K inhibitors; useful for treating immune disorders and cancer
WO 2013071272	Takeda	Polymorphs of kinase inhibitors (including PI3K inhibitors) that can be used to treat proliferative diseases
WO 2013151026	JFCR	A diagnostic for PI3K inhibitor resistance that comprises mRNA or cDNA for IGFR1
WO 2013132270	Karus Therapeutics	PI3K inhibitors that are useful for treating leukaemia or PTEN-negative solid tumours
WO 2013096642	Millennium	Heteroaryl compounds that are inhibitors of VPS34 and/or PI3K; useful for treating proliferative disorders
WO 2013033623	Nestlé	Methods for quantitating the activation states of components of the PI3K signalling pathway in tumour cells
WO 2013093850	Novartis	Quinoline derivatives that are selective PI3Kβ inhibitors; useful for treating cancer
WO 2013093849	Novartis	Dihydro-benzo-oxazine and dihydro-pyrido-oxazine derivatives that are PI3Kβ inhibitors
WO 2013066483	Novartis	Synergistic combinations of PI3K and MEK inhibitors that can be used to treat proliferative disease
WO 2013053833	Novartis	2-carboxamide cycloamino urea derivatives combined with HSP90 inhibitors; useful for treating PI3Kα-dependent diseases
WO 2013006532	Novartis	A combination cancer therapy comprising a CDK4 and/or CDK6 inhibitor and a PI3K inhibitor
WO 2013182668	Genentech	Treatment of hyperproliferative disorders using the PI3K inhibitor GDC-0032
WO 2013037943	Sanofi	Combination therapy for treating cancer using a PI3Kβ inhibitor and a MAPK pathway inhibitor
WO 2013053273	Jiangsu Hengrui	An imidazoquinoline derivative that inhibits mTOR and/or PI3K
WO 2013177983	SIMM	A pyrrolo[2,1-f][1,2,4]triazine compound that inhibits the PI3K pathway and can be used to treat cancer
WO 2013097266	Suzhou Pharma	A controlled-release formulation of LY294002 that can be used to treat lymphocytic tumours
WO 2013097017	University of Minas Gerais	A combination of angiotensin 1–7 and PI3K–AKT inhibitors that inhibits the progression of cancer by inhibiting cell growth or proliferation or by activating cell death by apoptosis
WO 2013047509	Tohoku University	A depsipeptide-based PI3K inhibitor that is effective against intractable cancer
WO 2013071698	Xuanzhu Pharma	A three-ring PI3K and/or mTOR inhibitor that is useful for treating proliferative diseases

A*STAR, Agency for Science, Technology and Research; BIDMC, Beth Israel Deaconess Medical Center; CDK, cyclin-dependent kinase; CSIR, Council for Scientific and Industrial Research; ERK, extracellular signal-regulated kinase; HSP90, heat shock protein 90; IGFR1, insulin-like growth factor 1 receptor; JFCR, Japan Foundation for Cancer Research; MAPK, mitogen-activated protein kinase; MEK, MAPK/ERK kinase; mTOR mammalian target of rapamycin; PI3K, phosphoinositide 3-kinase; PTEN, phosphatase and tensin homolog; SIMM, Shanghai Institute of Materia Medica; SOCS6, suppressor of cytokine signalling 6; VPS34, vacuolar protein sorting 34.