Recent patent applications in antibody fragments: an academic update from the EU

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The feature “Recent patent applications in antibody fragments” (*Nat. Biotechnol.* **29**, 231, 2011) focused mainly on patents from US-based companies dealing in molecular engineering. This is a challenging area with applications and potential for basic research and immunodiagnostic (protein affinity reagent for *in vitro* detection and noninvasive imaging) as well as modern biotherapeutic (*in vivo* targeting). Furthermore, US 20100330661 claims

some peptide sequences that dramatically differ from antibody fragment motifs, including complementary-determining regions (CDRs), which are not directly related to the design, generation or characterization of antibody fragments.

Therefore, an up-to-date table reviewing recently patented antibody fragments is presented, with a focus on European, state-of-the-art (e.g., affinity reagent, highly stable, fully human) antibody fragment molecules isolated

in both academia and industry (**Table 1**). The examples below add to our understanding of the research and development of engineered antibody fragments and also serve to demonstrate how academic research in Europe and elsewhere can be as productive in terms of patenting as biotech companies in this potential multi-billion dollar market.

COMPETING FINANCIAL INTERESTS

The author declares no competing financial interests.

Table 1 Recent patent applications in antibody fragments: an academic update from the EU

Patent number	Description	Assignee	Inventor	Priority application date	Publication date
EP 2343318	A human antibody fragment that specifically binds to the ApoE C-terminal domain; used in the diagnosis and treatment of Alzheimer's disease, systemic amyloidosis and other amyloid disorders.	AstraZeneca AB (Södertälje, Sweden), Dyax (Cambridge, MA, USA)	Norstedt C, Goldschmidt T, Henderikx M, Hoet R, Hoogenboom H, Hufton S, Andersson CV, Lindquist J, Sunnemark D, Leonov S	11/28/2003	7/13/2011
US 2011165592	An antibody binding to human EPO receptor with a subnanomolar affinity. It allows a specific detection and analysis of the EPO-receptor in human tissues (biopsies or tissues).	Hoffmann La Roche (Basel, Switzerland)	Jarsch M, Kubbies M, Mundigil O, Torres-Nagel N	8/28/2009	7/7/2011
US 2011165062	A functional fragment that is capable of binding to the CD151 protein. It inhibits tumor growth and metastasis-promoting activity for the early treatment of cancer.	Pierre Fabre Medicament (Boulogne, France)	Haeuw JF	4/4/2008	7/7/2011
WO 2011073943	Antibody and antibody fragments against the transferrin receptor for immunotherapy of iron-dependent tumors.	Centre Nat. Recherche Scientifique (Paris), University of California (Oakland, CA, USA)	Poul MA, Crepin RP, Marks JD	12/16/2009	6/23/2011
EP 2336179	Stabilized single-domain therapeutic antibodies.	Ablynx (Ghent, Belgium)	Silence K, Lauwereys M, Dreier T	11/8/2002	6/22/2011
WO 2011058517	A single-chain variable fragment (scFv) able to recognize an epitope of the extracellular domain of CD99 human protein. The fragment can thus be used for the diagnosis and treatment of Ewing sarcoma.	Istituto Ortopedico Rizzoli (Bologna, Italy), Istituto Superiore di Sanità (Rome)	Picci P, Scotlandi K, Ascione A, Cianfriglia M, Dupuis ML, Flego M, Gellini M, Mallano A	11/13/2009	5/19/2011
US 2011081350	An antibody or its fragment (scFv) targeting the angiotensin II type 1 receptor. Specific <i>in vivo</i> imaging of cancer (e.g., laryngeal, kidney, brain) and treatment of hypertension or other smooth muscle cell contraction.	Queen Mary Westfield College (London)	Vinson GP, Barker S, Puddefoot JR	2/18/2008	4/7/2011
EP 2261258	Single-chain fragment variable (scFv) antibody fragment directed against melanoma-associated chondroitin sulfate proteoglycan (MCSP).	Schuler G (Spardorf, Germany)	Schuler G, Schwenkert M, Doerrie J, Schaft N	6/8/2009	12/15/2010
WO 2008049928, US 20110182899	A fully humanized antglycoprotein VI antibody fragment for treatment of thrombosis <i>in vivo</i> in humans.	INSERM (Paris)	Jandrot-Perrus M, Billiald P, Muzard J	10/26/2006	5/2/2008, 7/28/2011

Source: US Patent and Trademark Office, Espacenet, JP and EP patent offices. The status of each application is slightly different from country to country.

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