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(54) **ANTIGEN BINDING PROTEINS TO PROPROTEIN CONVERTASE SUBTILISIN KEXIN TYPE 9 (PCSK9)**

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(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,545,807	A	8/1996	Surani et al.
5,766,886	A	6/1998	Studnicka et al.
5,869,619	A	2/1999	Studnicka
6,875,432	B2	4/2005	Liu et al.
7,029,895	B2	4/2006	Glucksmann et al.
7,261,893	B2	8/2007	Veldman et al.
7,300,754	B2	11/2007	Abi Fadel et al.
7,368,531	B2	5/2008	Rosen et al.
7,411,051	B2	8/2008	Rosen et al.
7,456,264	B2	11/2008	Keler et al.
7,482,147	B2	1/2009	Glucksmann et al.
7,572,618	B2	8/2009	Mintier et al.
7,776,577	B2	8/2010	Kapeller-Libermann et al.
7,968,689	B2	6/2011	Rosen et al.
8,030,457	B2	10/2011	Jackson et al.
8,062,640	B2	11/2011	Sleeman et al.
8,080,243	B2	12/2011	Liang et al.
8,168,762	B2	5/2012	Jackson et al.
8,188,233	B2	5/2012	Condra et al.
8,188,234	B2	5/2012	Condra et al.
8,344,114	B2	1/2013	Sparrow et al.
8,357,371	B2	1/2013	Sleeman et al.
8,399,646	B2	3/2013	Liang et al.
8,420,098	B2	4/2013	Camphausen et al.
8,426,363	B2	4/2013	Liang et al.
8,501,184	B2	8/2013	Sleeman et al.
8,530,414	B2	9/2013	Davies et al.
8,563,698	B2	10/2013	Jackson et al.
8,598,320	B2	12/2013	Hedrick et al.
8,697,070	B2	4/2014	Condra et al.
8,748,582	B2	6/2014	Jackson et al.
2002/0045571	A1	4/2002	Liu et al.
2002/0081679	A1	6/2002	Chiang et al.
2003/0119038	A1	6/2003	Bingham et al.
2004/0009553	A1	1/2004	Glucksmann et al.
2004/0023243	A1	2/2004	Henry et al.
2004/0038242	A1	2/2004	Edmonds et al.
2004/0248177	A1	12/2004	Abi Fadel et al.
2005/0101529	A1	5/2005	Yue et al.
2005/0118625	A1	6/2005	Mounts

(Continued)

FOREIGN PATENT DOCUMENTS

EP	2481758	8/2012
EP	2650016	10/2013
EP	2703009	3/2014
EP	2706070	3/2014
JP	2005-130764	5/2005

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 13/918,755, filed Dec. 26, 2013, Wu et al.
Office Action dated May 7, 2014 in Japanese Application No. 2013-195240 with English Translation.
U.S. Appl. No. 09/499,235, filed Feb. 7, 2000, Chiang et al.
U.S. Appl. No. 09/517,906, filed Mar. 3, 2000, Chiang et al.

(Continued)

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(57) **ABSTRACT**

Antigen binding proteins that interact with Proprotein Convertase Subtilisin Kexin Type 9 (PCSK9) are described. Methods of treating hypercholesterolemia and other disorders by administering a pharmaceutically effective amount of an antigen binding protein to PCSK9 are described. Methods of detecting the amount of PCSK9 in a sample using an antigen binding protein to PCSK9 are described.

20 Claims, 152 Drawing Sheets