US009511055B2

(12) **United States Patent**
Franklin

(10) **Patent No.: US 9,511,055 B2**
(45) **Date of Patent: *Dec. 6, 2016**

(54) **ANGIOTENSIN IN TREATING BRAIN CONDITIONS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 308 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/897,051**

(22) Filed: **May 17, 2013**

(65) **Prior Publication Data**

US 2014/0094497 A1 Apr. 3, 2014

Related U.S. Application Data

(62) Division of application No. 13/752,202, filed on Jan. 28, 2013, now Pat. No. 8,633,158.

(60) Provisional application No. 61/708,793, filed on Oct. 2, 2012, provisional application No. 61/720,299, filed on Oct. 30, 2012.

(51) **Int. Cl.**

C07K 7/14	(2006.01)
A61K 31/4178	(2006.01)
A61K 38/08	(2006.01)

(52) **U.S. Cl.**

CPC ***A61K 31/4178*** (2013.01); ***A61K 38/085*** (2013.01); ***C07K 7/14*** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,244,946	A	1/1981	Rivier et al.
4,305,872	A	12/1981	Johnston et al.
4,316,891	A	2/1982	Guillemin et al.
5,629,292	A	5/1997	Rodgers et al.
5,716,935	A	2/1998	Rodgers et al.
5,834,432	A	11/1998	Rodgers et al.
5,955,430	A	9/1999	Rodgers et al.
6,096,709	A	8/2000	Rodgers et al.
6,110,895	A	8/2000	Rodgers et al.
6,177,407	B1	1/2001	Rodgers et al.
6,235,766	B1	5/2001	Heitsch et al.
6,239,109	B1	5/2001	Rodgers et al.
6,248,587	B1	6/2001	Rodgers et al.
6,258,778	B1	7/2001	Rodgers et al.
6,335,195	B1	1/2002	Rodgers et al.
6,444,646	B1	9/2002	Rodgers et al.
6,455,500	B1	9/2002	Rodgers et al.
6,475,988	B1	11/2002	Rodgers et al.
6,482,800	B1	11/2002	Rodgers et al.
6,498,138	B1	12/2002	Rodgers et al.
6,566,335	B1	5/2003	Rodgers et al.
6,730,775	B1	5/2004	Rodgers et al.
6,747,008	B1	6/2004	Rodgers et al.
6,762,167	B1	7/2004	Rodgers et al.
6,821,953	B1	11/2004	Rodgers et al.
6,916,783	B2	7/2005	Rodgers et al.
7,118,748	B1	10/2006	Rodgers et al.
7,122,523	B2	10/2006	Rodgers et al.
7,173,011	B2	2/2007	Rodgers et al.
7,176,183	B2	2/2007	Rodgers et al.
7,288,522	B1	10/2007	Rodgers et al.
7,338,938	B2	3/2008	Rodgers et al.
7,723,304	B2 *	5/2010	Millan A61K 9/1271 514/16.3
7,744,927	B2	6/2010	Rodgers et al.
7,745,411	B2	6/2010	Rodgers et al.
7,776,828	B2	8/2010	Rodgers et al.
7,786,085	B2	8/2010	Rodgers et al.
8,633,158	B1	1/2014	Franklin
2001/0018449	A1	8/2001	Heitsch et al.
2005/0009893	A1	1/2005	Schrader
2005/0069533	A1	3/2005	Millan et al.
2008/0312129	A1 *	12/2008	Souza Dos Santos et al. .. 514/2
2009/0221498	A1	9/2009	Souza Dos Santos et al.
2009/0227507	A1	9/2009	Rodgers et al.
2010/0055146	A1	3/2010	Haas et al.
2010/0316624	A1	12/2010	Loibner et al.
2011/0020315	A1	1/2011	Loibner et al.
2011/0033524	A1	2/2011	Janzek-Hawlat et al.
2011/0281805	A1	11/2011	Walther et al.
2012/0070403	A1	3/2012	Fisher et al.

(Continued)

FOREIGN PATENT DOCUMENTS

AU	723373 B2	8/2000
CA	2205092 A1	5/1996

(Continued)

OTHER PUBLICATIONS

Lee et al (J Clin Invest 106: 723-731, 2000).*

Amaro et al (Stroke 42: 1495-1499, 2011).*

Braga et al (Am J Physiol Reg Integ Comp Physiol 282: R1663-R1671, 2002).*

Brasnjevic, I. et al., Delivery of peptide and protein drugs over the blood-brain barrier, Prog. Neurobiol., 87(4):212-251 (2009).

Brass et al., Parental therapy with lipo-ecraprost, a lipid-based formulation of a PGEI analog does not alter six-month outcomes in patients with critical leg ischemia, J. Vasc. Surg., 43:752-759 (2006).

(Continued)

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(57) **ABSTRACT**

The present invention provides, among other things, methods and compositions for treating brain conditions. In some embodiments, the methods include administering to a subject suffering from or susceptible to a brain condition an angiotensin (1-7) peptide via either an intravenous or subcutaneous route of administration.

18 Claims, 9 Drawing Sheets