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(54) **CONJUGATES FOR TREATING DISEASES CAUSED BY PSMA EXPRESSING CELLS**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,691,024	A	9/1987	Shirahata et al.
4,713,249	A	12/1987	Schroder
5,103,018	A	4/1992	Motomichi et al.
5,266,333	A	11/1993	Cady et al.
5,418,982	A	5/1995	Kishi
5,627,165	A	5/1997	Glazier
5,795,877	A	8/1998	Jackson et al.
5,863,536	A	1/1999	Jackson et al.
5,866,679	A	2/1999	DeFeo-Jones et al.
5,902,817	A	5/1999	Jackson et al.
5,948,750	A	9/1999	Garsky et al.
5,962,237	A	10/1999	Ts'o et al.
5,962,521	A	10/1999	Jackson et al.
5,968,915	A	10/1999	Jackson et al.
5,998,362	A	12/1999	Feng et al.
6,054,444	A	4/2000	Jackson et al.
6,127,333	A	10/2000	Brady et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2606138	10/2005
EP	0116208	8/1984

(Continued)

OTHER PUBLICATIONS

Banerjee, S.R. et al. "Synthesis and Evaluation of Technetium-99m- and Rhenium-Labeled Inhibitors of the Prostate-Specific Membrane Antigen (PSMA)," J Med Chem. Aug. 14, 2008; 51(15): 4504-4517.

(Continued)

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(57) **ABSTRACT**

The invention described herein pertains to the diagnosis, imaging, and/or treatment of pathogenic cell populations. In particular, the invention described herein pertains to the diagnosis, imaging, and/or treatment of diseases caused by PSMA expressing cells, such as prostate cancer cells, using compounds capable of targeting PSMA expressing cells.

10 Claims, 6 Drawing Sheets