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(54) **FLUORESCENT SENSOR COMPOUNDS FOR DETECTING SACCHARIDES**

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(52) **U.S. Cl.** **436/63**; 436/64; 436/94; 436/95; 436/172

(58) **Field of Search** 436/63, 64, 94, 436/95, 172; 250/458.1, 459.1; 600/316, 317, 319

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,503,770	A	4/1996	James et al.	252/301.16
5,512,246	A *	4/1996	Russell et al.	422/57
5,939,290	A	8/1999	Venot et al.	435/74
6,030,815	A	2/2000	DeFrees et al.	435/97
6,183,994	B1	2/2001	Nilsson	435/75
6,319,540	B1	11/2001	Van Antwerp et al.	427/2.13
6,366,793	B1	4/2002	Bell et al.	600/317
6,387,672	B1	5/2002	Arimori et al.	435/183
6,534,316	B2 *	3/2003	Strongin et al.	436/94
6,627,316	B1 *	9/2003	Matsuki et al.	428/413
6,766,183	B2 *	7/2004	Walsh et al.	600/317
2002/0043651	A1 *	4/2002	Darrow et al.	252/408.1
2002/0094586	A1 *	7/2002	Daniloff et al.	436/518
2002/0164671	A1	11/2002	James et al.	435/14

FOREIGN PATENT DOCUMENTS

WO	WO01/18543	3/2001
WO	WO01/20334	3/2001
WO	WO02/72588	9/2002

OTHER PUBLICATIONS

Prokai–Tatrai et al., "Design, Synthesis and Biological Evaluation of Novel, Centrally–Acting Thyrotropin–Releasing Hormone Analogues," *Bioorganic & Medicinal Chemistry Letters*, vol. 12, pp. 2171–2174 (Aug. 19, 2002).

Eggert et al., "A New Glucose–Selective Fluorescent Bisboronic Acid. First Report of Strong α–Furanose Complexation in Aqueous Solution at Physiological pH," *J. Org. Chem.*, vol. 64, pp. 3846–3852 (1999).

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* cited by examiner

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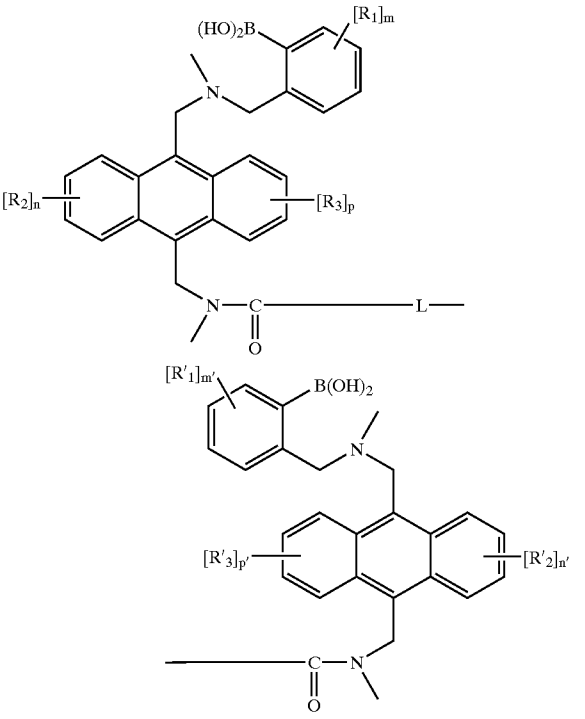
(57) **ABSTRACT**

Fluorescent sensor compounds having the formula:



wherein L is selected from the group consisting of alkyl, alkylene, aryl, cycloalkyl, alkoxy, aryloxy, arylalkyl, and arylalkyloxyl;

each m, m', n, n', p, and p' is independently an integer from 0 to 4, inclusive; and

each R_1, R'_1, R_2, R'_2, R_3 and R'_3 is independently selected from the group consisting of hydrogen, alkyl, alkylene, aryl, cycloalkyl, alkoxy, aryloxy, arylalkyl, arylalkyloxyl, halo, substituted and unsubstituted amino, and substituted and unsubstituted thiol, are useful for the selective detection of saccharides such as glucose and sialyl Lewis X. The compounds find particular use in detecting saccharides in biological samples, and in detecting cancer cells that express cell surface polysaccharides such as sialyl Lewis X.

25 Claims, 8 Drawing Sheets