

#### US007544192B2

# (12) United States Patent

#### Eaton et al.

# (10) Patent No.: US 7,544,192 B2

## (45) **Date of Patent: Jun. 9, 2009**

# (54) SINUS DELIVERY OF SUSTAINED RELEASE THERAPEUTICS

(75) Inventors: **Donald J. Eaton**, Woodside, CA (US); **Mary L. Moran**, Woodside, CA (US); **Rodney Brenneman**, San Juan

Capistrano, CA (US)

(73) Assignee: Sinexus, Inc., Palo Alto, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 992 days.

(21) Appl. No.: 10/800,162

(22) Filed: Mar. 12, 2004

(65) Prior Publication Data

US 2005/0043706 A1 Feb. 24, 2005

#### Related U.S. Application Data

- (60) Provisional application No. 60/454,918, filed on Mar. 14, 2003.
- (51) **Int. Cl.** *A61M 31/00* (2006.01)
- (52) **U.S. Cl.** ...... **604/506**; 604/510; 604/514

### (56) References Cited

### U.S. PATENT DOCUMENTS

4,580,568 A	4/1986	Gianturco
4,753,636 A	6/1988	Free
5,035,706 A	7/1991	Giantureo et al.
5,116,311 A	5/1992	Lofstedt
5,139,832 A	8/1992	Hayashi et al.
5,189,110 A	2/1993	Ikematu et al.
5,246,455 A	9/1993	Shikani
5,342,296 A	8/1994	Persson et al.

 5,443,498 A
 8/1995 Fontaine

 5,512,055 A
 4/1996 Domb et al.

 5,664,567 A
 9/1997 Linder

 5,693,065 A
 12/1997 Rains, III

 5,792,100 A
 8/1998 Shantha

#### (Continued)

#### FOREIGN PATENT DOCUMENTS

WO WO 01/02024 1/2001

#### (Continued)

#### OTHER PUBLICATIONS

Hosemann, W. et al. (Mar. 2003, e-pub. Oct. 10, 2002). "Innovative Frontal Sinus Stent Acting as a Local Drug-Releasing System," *Eur. Arch. Otorhinolarynolo*. 260:131-134.

### (Continued)

Primary Examiner—Kevin C Sirmons
Assistant Examiner—Catherine N Witczak
(74) Attorney, Agent, or Firm—Morrison & Foerster LLP

#### (57) ABSTRACT

The invention provides biodegradable implants for treating sinusitis. The biodegradable implants have a size, shape, density, viscosity, and/or mucoadhesiveness that prevents them from being substantially cleared by the mucociliary lining of the sinuses during the intended treatment period. The biodegradable implants include a sustained release therapeutic, e.g., an antibiotic, a steroidal anti-inflammatory agent, or both. The biodegradable implants may take various forms, such as rods, pellets, beads, strips, or microparticles, and may be delivered into a sinus in various pharmaceutically acceptable carriers.

#### 15 Claims, 2 Drawing Sheets

