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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A61K 49/00 — A2

(11) International Publication Number: WO 98/04292

(43) International Publication Date: 5 February 1998 (05.02.98)

(21) International Application Number: PCT/US97/03007

(22) International Filing Date: 27 February 1997 (27.02.97)

(30) Priority Data:
08/681,710 29 July 1996 (29.07.96) US

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(81) Designated States: AU, BR, CA, CN, CZ, HU, IL, JP, KR, NO, NZ, PL, RU, SG, SK, VN, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: POLYMER-LIPID MICROENCAPSULATED GASES FOR USE AS IMAGING AGENTS

(57) Abstract

It has been discovered that the incorporation of gases, especially fluorinated gases such as perfluorocarbons, into microparticles formed from the combination of a natural or synthetic polymer and lipid have significantly enhanced echogenicity as compared with microparticles not including the lipid. Compounds other than lipids which are hydrophobic and limit the penetration and/or uptake of water into the microparticles can also be incorporated into the microparticles to enhance echogenicity. In the preferred embodiment, the polymers are synthetic biodegradable polymers. The microparticles are manufactured with a diameter suitable for the targeted tissue to be imaged, for example, with a diameter of between 0.5 and 8 microns for intravascular administration, and a diameter of between 0.5 and 5 mm for oral administration for imaging of the gastrointestinal tract or other lumens. Preferred polymers are polyhydroxy acids such as polylactic acid-co-glycolic acid, most preferably conjugated to polyethylene glycol or other materials inhibiting uptake by the reticuloendothelial system (RES). The most preferred lipids are phospholipids, preferably dipalmitoylphosphatidylcholine (DPPC), distearoylphosphatidylcholine (DSPC), diarachidoylphosphatidylcholine (DAPC), dibehenoylphosphatidylcholine (DBPC), ditricosanoylphosphatidylcholine, dilignoceroylphatidylcholine (DLPC), incorporated at a ratio of between 0.01-30 (w lipid/w polymer), most preferably between 0.1-10 (w lipid/w polymer). Microparticles for imaging using other detectable agents can be similarly manufactured.