SUSTAINED-RELEASE IMPLANTS FOR LOWERING INTRAOCULAR PRESSURE WITH EXTENDED DURATION OF EFFECT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 62/583,967 filed on November 9, 2018 and U.S. Provisional Application No. 62/683,337 filed on June 11, 2018, the entire content of which are incorporated herein by reference.

BACKGROUND

Field

The disclosure of the present application generally relates to drug delivery implants, and more specifically, drug delivery implants used to treat ocular conditions.

Description of the Related Art

Poor adherence to topical intraocular pressure (IOP)–lowering medication is common in glaucoma, associated with worse outcomes.[1] Because of these limitations, biodegradable sustained-release implant containing bimatoprost, such as those described in U.S. Patent Application Publication No. 2015-0118279, which is herein incorporated by reference in its entirety (including disclosures of formulations, implant dimensions, methods of use, and polymer compositions and properties), has developed to address nonadherence in the glaucoma population. Other bimatoprost-containing intraocular implants have been described in U.S. Patent No. 7,799,336, which is incorporated by reference in its entirety. While these publications describe implants which deliver drug to a patient's eye over an extended period of time, it is desirable to develop a drug which has an extended duration of clinical effect, for example, an implant that can reduce a patient's intraocular pressure over at least one year.

SUMMARY

In one aspect, provided herein is a use of a single intraocular implant in the manufacture of a medicament for treating glaucoma or ocular hypertension in an eye of a human patient, wherein the intraocular implant is to be injected into the anterior chamber of the eye; wherein the intraocular implant comprises a biodegradable polymer matrix, 3.5 wt% to 6.5 wt% of polyethylene glycol, and 18 wt% to 22 wt% of bimatoprost or a salt thereof, the polyethylene glycol and the bimatoprost or a salt thereof being associated with the biodegradable polymer matrix, which comprises

a) 18 wt% to 22 wt% of an ester end poly(D,L-lactide) having an inherent viscosity of 0.25-0.35 dl/g,b) 13.5 wt% to 16.5 wt% of an acid end poly(D,L-lactide) having an inherent viscosity of 0.16-0.24 dl/g, and

c) 36 wt% to 44 wt% of an ester end poly(D,L-lactide-co-glycolide) having an inherent viscosity of 0.16-0.24 dl/g and a D,L-lactide to glycolide molar ratio of about 73:27-77:23,

wherein the amounts are percentages by weight of the implant, and the inherent viscosity of each of the poly(D,L-lactide) and poly(D,L-lactide-co-glycolide) polymers is determined for a 0.1% solution of the polymer in chloroform at 25°C; and wherein the intraocular pressure is reduced for a period of at least 24 months after injection of the intraocular implant.

Accordingly, an example provides a method of reducing intraocular pressure (IOP) in an eye of a patient including injecting a single intraocular implant comprising bimatoprost or a salt thereof and a biodegradable polymer into the anterior chamber of a patient in need thereof, where the intraocular implant is effective to reduce the IOP of the patient in need thereof over a period of time between about 12 months and about 24 months. In some examples, the intraocular implant is effective to reduce the IOP of the patient in need thereof of a period of time of about 24

WHAT IS CLAIMED IS:

1. Use of a single intraocular implant in the manufacture of a medicament for treating glaucoma or ocular hypertension in an eye of a human patient,

wherein the intraocular implant is to be injected into the anterior chamber of the eye;

wherein the intraocular implant comprises a biodegradable polymer matrix, 3.5 wt% to 6.5 wt% of polyethylene glycol, and 18 wt % to 22 wt% of bimatoprost or a salt thereof, the polyethylene glycol and the bimatoprost or a salt thereof being associated with the biodegradable polymer matrix, which comprises

(a) 18 wt% to 22 wt% of an ester end poly(D,L-lactide) having an inherent viscosity of 0.25-0.35 dl/g,

(b) 13.5 wt% to 16.5 wt% of an acid end poly(D,L-lactide) having an inherent viscosity of 0.16-0.24 dl/g, and

(c) 36 wt% to 44 wt% of an ester end poly(D,L-lactide-co-glycolide) having an inherent viscosity of 0.16-0.24 dl/g and a D,L-lactide to glycolide molar ratio of about 73:27-77:23,

wherein the amounts are percentages by weight of the implant, and the inherent viscosity of each of the poly(D,L-lactide) and poly(D,L-lactide-co-glycolide) polymers is determined for a 0.1% solution of the polymer in chloroform at 25°C; and

wherein the intraocular pressure is reduced for a period of at least 24 months after injection of the intraocular implant.

2. The use of claim 1, wherein the intraocular implant comprises a biodegradable polymer matrix, 5 wt% of polyethylene glycol 3350, and 20 wt% of bimatoprost or the salt thereof, and wherein the biodegradable polymer matrix comprises

(a) 20 wt% of the ester end poly(D,L-lactide) having an inherent viscosity of 0.25-0.35 dl/g,

(b) 15 wt% of the acid end poly(D,L-lactide) having an inherent viscosity of 0.16-0.24 dl/g, and

(c) 40 wt% of the ester end poly(D,L-lactide-co-glycolide) having an inherent viscosity of 0.16-0.24 dl/g and a D,L-lactide to glycolide molar ratio of 75:25.

3. The use of claim 1 or 2, wherein the intraocular implant comprises 10 μg of bimatoprost or a salt thereof.

4. The use of claim 1 or 2, wherein the intraocular implant comprises 6 μg of bimatoprost or a salt thereof.

5. The use of claim 1 or 2, wherein the intraocular implant comprise 15 μg of bimatoprost or a salt thereof.

6. The use of claim 1 or 2, wherein the intraocular implant comprise 20 μg of bimatoprost or a salt thereof.

7. The use of any one of claims 1 to 6, wherein the patient is to receive one intraocular implant every twenty-four months.