particles. There is a need for developing particle control strategies that take into consideration the impact of particles on patient safety.

Summary

[0004] Provided herein are methods for making injectable pharmaceutical composition by leveraging information of particles historically detected in injectable compositions (e.g., size and materials composition of particles) and the corresponding toxicology and safety evaluations on patients. In one aspect, the present disclosure refers to a method of making an injectable pharmaceutical composition comprising etanercept, the method comprises: detecting the presence of one or more particles in the composition, wherein the particles are not from etanercept; and wherein the one or more particles comprise acrylic, polyurethane, polyether ether ketone, polytetrafluoroethylene (PTFE), polyoxymethylene (POM), polystyrene, or silicon carbide; analyzing the size of the particles and the materials comprised in the particles; and accepting the injectable pharmaceutical composition if: (i) the largest particle of the one or more particles has a L of no more than 257 μm, a W of no more than 133 μm, and a M of no more than 5.4 μg, and the one or more particles comprise acrylic; (ii) the largest particle of the one or more particles has a L of no more than 359 μm, a W of no more than 306 μm, and a M of no more than 21 μg, and the one or more particles comprise polyurethane; (iii) the largest particle of the one or more particles has a L of no more than 5,150 μm, a W of no more than 300 μm, and a M of no more than 2,330 μg, and the one or more particles comprise polyether ether ketone; (iv) the largest particle of the one or more particles has a L of no more than 700 μm, a W of no more than 250 μm, and a M of no more than 45.9 μg, and the one or more particles comprise PTFE; (v) the largest particle of the one or more particles has a L of no more than of 1,891 μm, a W of no more than 596.8 μm, and a M of no more than 1,010 μg, and the one or more particles comprise POM; (vi) the largest particle of the one or more particles has a L of no more than of 6,154 μm, a W of no more than 2,454 μm, and a M of no more than 39,300 μg, and the one or more particles comprise polystyrene; or (vii) the largest particle of the one or more particles has a L of no more than of 359 μm, a W of no more than 306 μm, and a M of no more than 48.7 μg, and the one or more particles comprise silicon carbide. In one example, the disclosure as disclosed herein comprises a method of making an injectable pharmaceutical composition comprising etanercept, the method comprises detecting the presence of one or more particles in the composition, analyzing the size of the particles and the materials comprised in the particles, and accepting the injectable pharmaceutical composition if the largest particle of the one or more particles has a size and a mass within certain range disclosed herein. In one example, the disclosure as disclosed herein comprises a method of making an injectable pharmaceutical composition comprising etanercept, the method comprises detecting the presence of one or more particles in the composition, analyzing the size of the particles and the materials comprised in the particles, and accepting the injectable pharmaceutical composition if the largest particle of the one or more particles has a length (L) of no more than 19,200 μm, a width (W) of no more than 2,939 μm, and a mass (M) of no more than 97,200 μg, and wherein the one or more particles comprise acrylic, aluminum, aliphatic hydrocarbon, charcoal, borosilicate glass, wool, silk, polyester (PET), polyurethane, polyether ether, polytetrafluoroethylene (PTFE), polyoxymethylene (POM), polystyrene, silicon carbide, or stainless steel.

Claims

1. A method of making an injectable pharmaceutical composition comprising etanercept, the method comprises:

detecting the presence of one or more particles in the composition, wherein the particles are not from etanercept; and

wherein the one or more particles comprise acrylic, polyurethane, polyether ether ketone, polytetrafluoroethylene (PTFE), polyoxymethylene (POM), polystyrene, or silicon carbide;

analyzing the size of the particles and the materials comprised in the particles; and

accepting the injectable pharmaceutical composition if:

(i) the largest particle of the one or more particles has a L of no more than 257 μm, a W of no more than 133 μm, and a M of no more than 5.4 μg, and the one or more particles comprise acrylic;

(ii) the largest particle of the one or more particles has a L of no more than 359 μm, a W of no more than 306 μm, and a M of no more than 21 μg, and the one or more particles comprise polyurethane;

(iii) the largest particle of the one or more particles has a L of no more than 5,150 μm, a W of no more than 300 μm, and a M of no more than 2,330 μg, and the one or more particles comprise polyether ether ketone;

(iv) the largest particle of the one or more particles has a L of no more than 700 μm, a W of no more than 250 μm, and a M of no more than 45.9 μg, and the one or more particles comprise PTFE;

(v) the largest particle of the one or more particles has a L of no more than of 1,891 μm, a W of no more than 596.8 μm, and a M of no more than 1,010 μg, and the one or more particles comprise POM;

(vi) the largest particle of the one or more particles has a L of no more than of 6,154 μm, a W of no more than 2,454 μm, and a M of no more than 39,300 μg, and the one or more particles comprise polystyrene; or

(vii) the largest particle of the one or more particles has a L of no more than of 359 μm, a W of no more than 306 μm, and a M of no more than 48.7 μg, and the one or more particles comprise silicon carbide.

2. The method of claim 1, wherein the composition is suitable for subcutaneous administration.