CLAIMS

1. A powder composition comprising microparticles with a volume diameter of less than 10μm comprising a matrix of at least one water-soluble pharmaceutically acceptable carrier embedding at least one nanoparticle with a volume diameter of less than 300nm of calcium phosphate comprising one or more therapeutic/diagnostic compounds, for use as a medicinal product in which the powder composition is to be administered by inhalation, wherein said at least one pharmaceutically acceptable carrier is a polyalcohol.

2. The powder composition for use according to claim 1, wherein said one or more therapeutic/diagnostic compounds are selected from the group consisting of: a nucleic acid, a peptide, a protein, an antibody, and a synthetic compound having a molecular weight not exceeding 700 Daltons.

3. The powder composition for use according to claim 1 or 2, wherein the weight ratio (calcium phosphate):(pharmaceutically acceptable carrier) is between 1:2.5 and 1:7.

4. The powder composition for use according to any one of claims 1 to 3, wherein the composition has a fraction of microparticles with an aerodynamic diameter of less than 5.0 microns (FPF) greater than 0.5, wherein FPF is the FPD/ED ratio, in which:

- "aerodynamic diameter" is the diameter of a sphere of unit density that has the same sedimentation rate as the actual particle under consideration, measured by applying the method described in the European Pharmacopoeia 9.0 chapter 2.9.18;

- FPD is the quantity of fine particles (particles with an aerodynamic diameter of less than 5.0μm) of the powder composition; and

- ED is the amount of pre-dosed dose emitted, measured according to the method of the European Pharmacopoeia 9.0 chapter 2.9.18,

5. The powder composition for use according to any one of claims 1 to 4, wherein the composition has a median volume diameter (Dv_{50}) of less than 5.0 μm, wherein

“volume diameter” is the diameter of a perfect sphere having the same volume as the particle, measured by a laser light diffraction method.

6. The powder composition for use according to any one of claims 1 to 5, wherein said microparticles has a porous internal structure.

7. The powder composition for use according to claim 6, wherein said microparticles with a porous structure has pores having a projection diameter less than 50 nm, wherein "projection diameter" is the equivalent spherical diameter corresponding to the diameter of the circle having the same projection area on a plane as the particle, determined by Scanning Electron Microscopy.

8. Use of a powder composition according to any one of claims 1 to 7, for the preparation of a medicament for the treatment of cardiovascular diseases.

9. Use of a powder composition according to any one of claims 1 to 7, for the preparation of a medicament for the treatment of respiratory diseases.

10. Use of a powder composition according to any one of claims 1 to 7, for the preparation of a medicament for use as an immunostimulant substance.

11. An inhalation device comprising a container containing a powder composition comprising microparticles with a volume diameter of less than 10μm comprising a matrix of at least one water-soluble pharmaceutically acceptable carrier embedding at least one nanoparticle with a volume diameter of less than 300nm of calcium phosphate comprising one or more therapeutic/diagnostic compounds.

12. A powder composition comprising microparticles with a volume diameter of less than 10μm comprising a matrix of at least one water-soluble pharmaceutically acceptable carrier embedding at least one nanoparticle with a volume diameter of less than 300nm of calcium phosphate, in which the ratio by weight of calcium phosphate to said at least one pharmaceutically acceptable carrier is between 1:2.5 and 1:7, wherein said at least one pharmaceutically acceptable carrier is a polyalcohol.

13. A method for the preparation of a powder composition comprising microparticles with a volume diameter of less than 10μm comprising a matrix of at least one water-

soluble pharmaceutically acceptable carrier embedding at least one nanoparticle with a volume diameter of less than 300nm of calcium phosphate comprising one or more therapeutic/diagnostic compounds, comprising the steps of:

a) providing a first aqueous dispersion of calcium phosphate nanoparticles comprising of one or more therapeutic/diagnostic compounds;

b) dissolving in the dispersion of step a) at least one pharmaceutically acceptable water-soluble carrier in order to obtain a second aqueous dispersion; and

c) spray drying the second aqueous dispersion of step b).

14. The method according to claim 13, wherein said step a) comprises the steps of:

1) providing a mixture having a pH in the range of 7 to 10 and comprising of an aqueous solution of calcium ions, an aqueous solution of phosphate ions, a solution of citrate ions, and an aqueous solution of one or more therapeutic/diagnostic compounds at a temperature in the range of 20°C to 40°C for a period of 30 seconds to 10 minutes;

2) removing the non-reacted ions from the solution obtained in step 1) by obtaining a suspension of calcium phosphate nanoparticles; and

3) recovering the product of one or more calcium phosphate nanoparticles from the suspension of step 2).