sectional areas, which results in a substantial increase in the total hole area available for dose emission from the capsule.

[0012a] In one aspect of the present disclosure, there is provided a device for puncturing a capsule to release a powdered medicament therefrom, the device comprising:

a chamber for receiving a capsule comprising opposing domes, ~~and~~ a cylindrical wall portion defined by a capsule wall radius r measured from a central axis of the opposing domes, a volume of at least 0.50 cm^3, and a thickness between 0.08 mm and 0.12 mm; and

a mechanism for puncturing at least one hole in at least one dome of the capsule, a center of each hole located within an annular puncture region ~~situated at no less than~~bounded and defined in the at least one by 0.4r and 0.8r,

wherein a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

[0012b] In another aspect of the present disclosure, there is provided a punctured capsule, comprising:

opposing domes; ~~and~~

a cylindrical wall portion defined by a radius r measured from a central axis of the opposing domes, ~~,~~ ;

a volume of at least 0.50 cm^3; and

a thickness between 0.08 mm and 0.12 mm,

wherein at least one dome ~~being~~ is punctured with at least one hole, a center of each hole is located within an annular region ~~situated at no less than~~bounded and defined in the at least one dome by 0.4r and 0.8r,

~~wherein~~ and a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

[0012c] In a further aspect of the present disclosure, there is provided a method for puncturing a capsule to release a powdered medicament therefrom, the method comprising:

receiving, within a chamber, a capsule comprising opposing domes, ~~and~~ a cylindrical wall portion defined by a capsule wall radius r measured from a central axis of the opposing domes, a volume of at least 0.50 cm^3, and a thickness between 0.08 mm and 0.12 mm; and

puncturing at least one hole in at least one dome of the capsule, a center of each hole located within an annular puncture region ~~situated at no less than~~bounded and defined in the at least one dome by 0.4r and 0.8r,

wherein a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

[0013] In one embodiment, the preferred location for the center of each puncture hole is in an annular region on the dome's surface that is positioned at no less than 40% (e.g., between about 40% and about 80%, or between about 40% and about 60%) of the dome's radius away from a central axis of the dome. In addition, in one such embodiment, the preferred total surface area of all puncture holes is between about 0.5% and about 2.2% of the total surface area of the capsule, or between about 3% and about 15% of the total surface area of a single dome. It has been determined that these particular combinations of puncture hole location and

Claims

1. A device for puncturing a capsule to release a powdered medicament therefrom, the device comprising:

a chamber for receiving a capsule comprising opposing domes, ~~and~~ a cylindrical wall portion defined by a capsule wall radius r measured from a central axis of the opposing domes, a volume of at least 0.50 cm^3, and a thickness between 0.08 mm and 0.12 mm; and

a mechanism for puncturing at least one hole in at least one dome of the capsule, a center of each hole located within an annular puncture region ~~situated at no less than~~bounded and defined in the at least one dome by 0.4r and 0.8r,

wherein a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

~~2. The device of claim 1, wherein the annular puncture region is situated between about 0.4r and about 0.8r.~~

~~3~~2. The device of claim 1, wherein the mechanism is configured to puncture only a single dome.

~~4~~3. The device of claim ~~3~~2, wherein the total surface area of all puncture holes is between ~~about~~ 3% and ~~about~~ 15% of a total surface area of the single dome.

~~5. The device of claim 1, wherein the capsule has a volume of at least 0.50 cm^3.~~

~~6~~4. The device of claim 1, wherein the capsule houses a powdered medicament comprising levodopa as an active drug.

~~7~~5. The device of claim 1, wherein the capsule houses a powdered medicament having a density below 0.10 g/cm^3.

~~8. The device of claim 1, wherein an outer surface of the capsule comprises a thickness between about 0.08 mm and about 0.12 mm.~~

~~9~~6. The device of claim 1, wherein the opposing domes and the cylindrical wall portion each comprise a material selected from the group consisting of hydroxy propyl methyl cellulose and gelatin.

~~10~~7. The device of claim 1 further comprising an inhalation portion coupled to the chamber, the inhalation portion defining at least one aperture for emitting the powdered medicament therethrough.

~~11~~8. The device of claim 1, wherein the chamber comprises a wall defining a plurality of vents for introducing air into the chamber to disperse the powdered medicament released from the capsule.

~~12~~9. The device of claim 1, wherein the mechanism for puncturing the at least one hole in the at least one dome comprises a plurality of prongs.

~~13~~10. The device of claim 1, wherein the mechanism for puncturing the at least one hole in the at least one dome is moveable between a non-puncturing position and a puncturing position.

~~14~~11. A punctured capsule, comprising:

opposing domes; ~~and~~

a cylindrical wall portion defined by a radius r measured from a central axis of the opposing domes;;

a volume of at least 0.50 cm^3; and

a thickness between 0.08 mm and 0.12 mm,

wherein at least one dome ~~being~~ is punctured with at least one hole, a center of each hole is located within an annular region ~~situated at no less than~~bounded and defined in the at least one dome by 0.4r and 0.8r,

~~wherein~~ and a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

~~15~~12. The punctured capsule of claim ~~14~~11, wherein only a single dome is punctured.

~~16~~13. The punctured capsule of claim ~~15~~12, wherein the total surface area of all puncture holes is between ~~about~~ 3% and ~~about 15~~% of a total surface area of the single dome.

~~17. The punctured capsule of claim 14, wherein the capsule has a volume of at least 0.50 cm^3.~~

~~18~~14. The punctured capsule of claim ~~14~~ 11 further comprising therein a powdered medicament comprising levodopa as an active drug.

~~19~~15. The punctured capsule of claim ~~14~~ 11 further comprising therein a powdered medicament having a density below 0.10 g/cm^3.

~~20. The punctured capsule of claim 14, wherein an outer surface of the capsule comprises a thickness between about 0.08 mm and about 0.12 mm.~~

~~21~~16. The punctured capsule of claim ~~14~~11, wherein the opposing domes and the cylindrical wall portion each comprise a material selected from the group consisting of hydroxy propyl methyl cellulose and gelatin.

~~22~~17. A method for puncturing a capsule to release a powdered medicament therefrom, the method comprising:

receiving, within a chamber, a capsule comprising opposing domes, ~~and~~ a cylindrical wall portion defined by a capsule wall radius r measured from a central axis of the opposing domes, a volume of at least 0.50 cm^3, and a thickness between 0.08 mm and 0.12 mm; and

puncturing at least one hole in at least one dome of the capsule, a center of each hole located within an annular puncture region ~~situated at no less than~~bounded and defined in the at least one dome by 0.4r and 0.8r,

wherein a total surface area of all puncture holes is between ~~about~~ 0.5% and ~~about~~ 2.2% of a total surface area of the capsule.

~~23~~18. The method of claim ~~22~~17, wherein puncturing the at least one hole in the at least one dome comprises puncturing only a single dome.

~~24~~19. The method of claim ~~23~~18, wherein the total surface area of all puncture holes is between ~~about~~ 3% and ~~about~~ 15% of a total surface area of the single dome.

~~25. The method of claim 22, wherein the capsule has a volume of at least 0.50 cm^3.~~

~~26~~20. The method of claim ~~22~~17, wherein puncturing the at least one hole in the at least one dome causes the powdered medicament to be released from the capsule.

~~27~~21. The method of claim ~~22~~17, wherein the powdered medicament comprises levodopa as an active drug.

~~28~~22. The method of claim ~~22~~17, wherein the powdered medicament comprises a density below 0.10 g/cm^3.

~~29. The method of claim 22, wherein an outer surface of the capsule comprises a thickness between about 0.08 mm and about 0.12 mm.~~

~~30~~23. The method of claim ~~22~~17, wherein the opposing domes and the cylindrical wall portion each comprise a material selected from the group consisting of hydroxy propyl methyl cellulose and gelatin.