[0010] In another aspect, the present pharmaceutical formulation maximizes the bioavailability of the clostridial derivative by preventing or minimizing the adsorption of the clostridial derivative to catheters, deliver device surfaces (syringe, patch, microneedle, engineered injector (Bioject, etc.), tubing and containers.

[0011] According to another aspect, the present disclosure provides methods for treating medical disorders in a patient, the methods comprise the step of administering a pharmaceutical composition provided in accordance with the present disclosure, thereby treating the medical disorders. In one embodiment, the present methods alleviate one or more symptoms of the medical disorders. In one embodiment, the medical disorders include neurogenic idiopathic bladder dysfunction, or bladder pain. In some aspects, a method is provided for treating a patient with a neurogenic or idiopathic bladder dysfunction, bladder pain, comprising: intravesically instilling into the bladder of the patient a pharmaceutical composition comprising a therapeutically effective amount of a clostridial derivative and at least one permeabilizing agent present in an amount effective to substantially increase the permeability of the bladder wall to the clostridial derivative at a therapeutically effective rate.

[0011a] In another aspect, the present disclosure provides a pharmaceutical composition comprising a therapeutically effective amount of a clostridial derivative and at least one permeabilizing agent, wherein the at least one permeabilizing agent comprises a surfactant and a mucoadhesive, wherein the mucoadhesive is present in an amount of 0.005-10% w/v to substantially and reversibly increase the permeability of the bladder wall to the clostridial derivative, wherein the clostridial derivative is a botulinum toxin, and wherein the surfactant is a non-ionic surfactant and the mucoadhesive is a cationic polymer.

[0011b] In another aspect, the present disclosure provides a use of the pharmaceutical composition according to claim 1 in the manufacture of a medicament for treating a patient with a neurogenic bladder dysfunction, wherein the medicament is to be intravesically instilled to the bladder wall of the patient.

[0012] Other aspects and variations of the present pharmaceutical formulations and methods summarized above are also contemplated and will be more fully understood when considered with respect to the following disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] **FIG. 1** shows a prior art intracystinal injection of a botulinum toxin to the bladder wall;

[0014] **FIGS. 2A-2C** are schematics of the urothelium, wherein:

A) The urothelium consists of three cell layers: basal, intermediate, and superficial umbrella cells.

WE CLAIM:

1. A pharmaceutical composition comprising a therapeutically effective amount of a clostridial derivative and at least one permeabilizing agent, wherein the at least one permeabilizing agent comprises a surfactant and a mucoadhesive, wherein the mucoadhesive is present in an amount of 0.005-10% w/v to substantially and reversibly increase the permeability of the bladder wall to the clostridial derivative, wherein the clostridial derivative is a botulinum toxin, and wherein the surfactant is a non-ionic surfactant and the mucoadhesive is a cationic polymer.
2. The pharmaceutical composition of claim 1, wherein the surfactant comprises an alkyl aryl polyether.
3. The pharmaceutical composition of claim 1, wherein the mucoadhesive comprises chitosan, chitosan derivatives or combinations thereof.
4. The pharmaceutical composition of claim 1, wherein the surfactant is present in an amount ranging from 0. 01% to 0.5% (w/v).
5. The pharmaceutical composition of claim 2, wherein the mucoadhesive is present in an amount ranging from 0.01% to 5% (w/v).
6. The pharmaceutical composition of claim 2, wherein the surfactant comprises octoxynol-9.
7. The pharmaceutical composition of claim 2, wherein the surfactant comprises nonoxynol-9.
8. The pharmaceutical composition of claim 6, wherein the surfactant is present in an amount of about 0.1% (w/v).
9. The pharmaceutical composition of claim 7, wherein the surfactant is present in an amount of about 0.1% (w/v).
10. Use of the pharmaceutical composition according to claim 1 in the manufacture of a medicament for treating a patient with a neurogenic bladder dysfunction, wherein the medicament is to be intravesically instilled to the bladder wall of the patient.
11. The use according to claim 10, wherein the surfactant comprises an alkyl aryl polyether.
12. The use according to claim 10, wherein the mucoadhesive comprises chitosan, chitosan derivatives or combinations thereof.

13. The use according to claim 10, wherein the surfactant is present in an amount ranging from 0.01% to 0.5% (w/v).
14. The use according to claim 12, wherein the mucoadhesive is present in an amount ranging from 0.01% to 5% (w/v).
15. The use according to claim 11, wherein the surfactant comprises octoxynol-9.