CLAIMS

What is claimed is:

1. A composition comprising:

a carrier molecule; and ~~comprising at least one cell penetrating peptide (CPP), the carrier molecule comprising at least one hydrophobic domain;~~

a biologically active molecule,

wherein the carrier is non-covalently associated with the~~a~~ biologically active molecule in one of a micelle and a liposome.~~,~~

~~2. The composition of claim 1, wherein the carrier molecule is amphiphilic.~~

~~3. The composition of claim 1, wherein the carrier molecule comprises at least one carbohydrate moiety.~~

~~4. The composition of claim 1, wherein the carrier molecule comprises at least one alkyl chain.~~

~~5. The composition of claim 1, wherein the carrier molecule comprises at least three hydrophobic amino acids.~~

~~6. The composition of claim 1, wherein the carrier molecule comprises at least one phenylalanine.~~

~~7. The composition of claim 1,~~ wherein the carrier molecule comprises one of palmitoyl-~~-~~gly_p-KKRPKPG (SEQ ID NO: 5), octanoyl-gly_p-KKRPKPG (SEQ ID NO: 6),

oleyl-gly$_p$-KKRPKPG (SEQ ID NO: 7) and any combinations thereof~~, where p is an integer from 0 to 20.~~

~~8. The composition of claim 1,~~ or wherein the carrier molecule is selected from the group consisting of FFFIL_VF-gly$_p$-KKRPKPG (SEQ ID NO: 1), FL_VFFF-gly$_p$-KKRPKPG (SEQ ID NO: 2), KKRPKPG -gly$_p$- FL_VFFF (SEQ ID NO: 3)~~,~~ and any combination thereof, where p is an integer from 0 to 10.

~~9. The composition of claim 1, wherein the at least one CPP is selected from the group consisting of: an HIV-TAT fragment selected from the group consisting of a fragment that has the formula (gly)$_p$-RGRDDRRQRRR-(gly)$_q$ (SEQ ID NO: 8), a fragment that has the formula (gly)$_p$-YGRKKRRQRRR-(gly)$_q$ (SEQ ID NO: 9), a fragment that has the formula (gly)$_p$-RKKRRQRRR-(gly)$_q$ (SEQ ID NO: 10), wherein the subscripts p and q are each independently an integer from 0 to 20; KKRPKPG (SEQ ID NO: 17); AAVLLPVLLAAP (SEQ ID NO: 15), and any combination thereof.~~

2~~10~~. The composition of claim 1, wherein the biologically active molecule is selected from the group consisting of VGVAPG (SEQ ID NO: 26); palmitoyl-TTS; retinyl retinoate; retinoic acid; steroid and steroidal compounds; hydroquinone; hyalonuric acid; non-steroidal anti-inflammatory drugs (NSAIDs) including naproxen, ibuprofen, and acetaminophen; skin-tightening peptides; light activatable moieties and compounds; ultraviolet (UV) light absorbing, blocking, or reflecting compounds; vitamins; cholesterol; drugs which block, influence, or interfere with neurotransmitter ~~(such as acetylcholine)~~ function; and any combination thereof.

~~11~~3. The composition of claim 1, wherein the biologically active molecule is selected from the group consisting of: a botulinum toxin serotype selected from the group consisting of A, B, C, D, E, F, and G; recombinant botulinum toxin; a modified botulinum toxin; a fragment of a botulinum toxin; and any combination thereof.

~~12. A composition comprising:~~

~~a biologically active molecule; and~~

~~a carrier molecule comprising at least one lipophilic domain and at least one cell penetrating peptide (CPP), the carrier molecule further comprising one of:~~

~~at least one carbohydrate moiety;~~

~~at least one alkyl chain;~~

~~at least three hydrophobic amino acids; and~~

~~any combination thereof; and~~

~~wherein the carrier molecule and biologically active molecule associate non-covalently.~~

~~13. The composition of claim 12, wherein the carrier molecule comprises one of palmitoyl-gly_p-KKRPKPG (SEQ ID NO: 5), octanoyl-gly_p-KKRPKPG (SEQ ID NO: 6), oleyl-gly_p-KKRPKPG (SEQ ID NO: 7) and any combination thereof, where p is an integer from 0 to 20.~~

~~14. The composition of claim 12, wherein the carrier molecule is selected from the group consisting of FFFILVF-gly_p-KKRPKPG (SEQ ID NO: 1), FLVFFF-gly_p-KKRPKPG (SEQ ID NO: 2), KKRPKPG-gly_p-FLVFFF (SEQ ID NO: 3), and any combination thereof, where p is an integer from 0 to 10.~~

~~15. The composition of claim 12, wherein the at least one CPP is selected from the group consisting of: an HIV-TAT fragment selected from the group consisting of a fragment that has the formula $(gly)_p$-RGRDDRRQRRR-$(gly)_q$ (SEQ ID NO: 8), a fragment that has the formula $(gly)_p$-YGRKKRRQRRR-$(gly)_q$ (SEQ ID NO: 9), a fragment that has the formula $(gly)_p$-RKKRRQRRR-$(gly)_q$ (SEQ ID NO: 10), wherein the subscripts p and q are each independently an integer from 0 to 20; KKRPKPG (SEQ ID NO: 17); AAVLLPVLLAAP (SEQ ID NO: 15), and any combination thereof.~~

~~16. The composition of claim 12, wherein the biologically active molecule is selected from the group consisting of VGVAPG (SEQ ID NO: 26); palmitoyl-TTS; retinyl retinoate; retinoic acid; steroid and steroidal compounds; hydroquinone; hyalonuric acid; non-steroidal anti-inflammatory drugs (NSAIDs) including naproxen, ibuprofen, and acetaminophen; skin-tightening peptides; light activatable moieties and compounds; ultraviolet (UV) light absorbing, blocking, or reflecting compounds; vitamins; cholesterol; drugs which block, influence, or interfere with neurotransmitter (such as acetylcholine) function; and any combination thereof.~~

~~17. The composition of claim 12, wherein the biologically active molecule is selected from the group consisting of: a botulinum toxin serotype selected from the group consisting of A, B, C, D, E, F, and G; recombinant botulinum toxin; a modified botulinum toxin; a fragment of a botulinum toxin; and any combination thereof.~~

4~~18~~. A kit for administration of a botulinum toxin to a patient, the kit comprising:

a botulinum toxin;

an effective amount for transdermal delivery thereof of a carrier molecule; ~~comprising at least one cell penetrating peptide (CPP), the carrier molecule comprising at least one hydrophobic domain;~~

a pH buffer system adapted to maintain pH between 4.0 to 8.3; and

a device comprising the botulinum toxin, the carrier molecule, and the pH buffer system, the device adapted to administer the botulinum toxin to a patient via the patient's skin;

wherein the carrier molecule is non-covalently associated with the botulinum toxin in one of a micelle and a liposome; and

wherein one of the device, the carrier molecule, the pH buffer system, and any combination thereof are adapted to provide a controlled release of the botulinum toxin, and wherein the carrier molecule comprises one of palmitoylgly$_p$-KKRPKPG (SEQ ID NO: 5), octanoyl-gly$_p$-KKRPKPG (SEQ ID NO: 6), oleyl-gly$_p$KKRPKPG (SEQ ID NO: 7) and any combinations thereof or wherein the carrier molecule is selected from the group consisting of FFFIL VF-gly$_p$-KKRPKPG (SEQ ID NO: 1), FL VFFF-gly$_p$KKRPKPG (SEQ ID NO: 2), KKRPKPG -gly$_p$- FL VFFF (SEQ ID NO: 3) and any combination thereof, where p is an integer from 0 to 10.

5~~19~~. The kit of claim ~~418~~, wherein the device is a skin patch.

6~~20~~. The kit of claim ~~418~~ or claim 5, wherein the botulinum toxin, the carrier molecule, and the pH buffer system are comprised in a liquid, gel, cream, lotion, and ointment coupled with the device.