38. An enclosure comprising a compartment and a wall separating the compartment from an environment external to the compartment, wherein the wall comprises:

a perforated graphene-based material layer and a means for enhancing integration of the enclosure into tissue and/or vascularization to the enclosure, wherein the enclosure is not cytotoxic when implanted into a subject.

39. A method of preparing an enclosure that is not cytotoxic when implanted into a subject comprising a compartment and a wall separating the compartment from an environment external to the compartment, wherein the wall comprises:

a perforated graphene-based material layer and

a substrate layer.

40. A method of improving biocompatibility of an enclosure comprising a perforated graphene-based material, wherein the method comprises affixing a substrate layer to the outside of the enclosure, wherein the enclosure is not cytotoxic when implanted into a subject.

41. A method of reducing cytotoxicity of a device comprising encapsulating the device with a composite structure comprising (a) a perforated graphene-based material layer and (b) a substrate layer affixed directly or indirectly to at least one surface of the perforated graphene-based material, wherein the device has a reduced cytotoxicity as compared to a comparable device not encapsulated by the composite structure.

42. A coated therapeutic device comprising:

(i) a therapeutic device and

(ii) a coating on the therapeutic device, wherein the coating comprises a composite structure comprising (a) a perforated graphene-based material layer and (b) a substrate layer affixed directly or indirectly to at least one surface of the perforated graphene-based material.

43. The coated therapeutic device of claim 42, wherein the coated therapeutic device has a lower toxicity than a comparable therapeutic device that is not coated with the composite structure.

44. A coated therapeutic device comprising:

(iii) a therapeutic device and

(iv) a coating on the therapeutic device, wherein the coating comprises a perforated graphene-based material layer.

45. The coated therapeutic device of claim 44, wherein the coated therapeutic device has a lower toxicity than a comparable therapeutic device that is not coated with the composite structure.