CLAIMS

What is claimed is:

1. A gastric residence structure comprising:

a loadable polymeric component;

an elastic polymeric component; and

a separate linker component, said linker connecting the loadable polymeric component with the elastic polymeric component;

wherein the gastric residence structure has a first configuration and is configured to be mechanically deformed such that the gastric residence structure obtains a second configuration and is restrained, and is configured to assume the first configuration upon removal of the restraint,

wherein change between the second configuration and the first configuration is mediated by the elastic polymeric component that undergoes elastic deformation when the residence structure is in the second configuration and recoils such that the gastric residence structure assumes the first configuration, and

wherein said linker degrades, dissolves, disassociates, or mechanically weakens in a gastric environment which results in loss of retention shape integrity and passage out of a gastric cavity.

2. The gastric residence structure of claim 1, wherein the loadable polymeric component comprises at least 60 wt% of the total structure weight.

3. The gastric residence structure of claim 1 or 2, wherein the gastric residence structure has a folding force of at least 0.2 N.

4. The gastric residence structure of any one of claims 1-3, wherein the residence structure has an open cross-sectional dimension of at least 2 cm.

5. The gastric residence structure of any one of claims 1-4, wherein the residence structure is configured such that it is retained in the gastric cavity for at least 24 hours.

6. The gastric residence structure of any one of claims 1-5, wherein the loadable polymeric component comprises an active substance.

7. The gastric residence structure of claim 6, wherein the gastric residence structure is configured such that the active substance is released from the loadable polymeric component at a particular initial average rate as determined over the first 24 hours of release, and wherein the active substance is released at an average rate of at least 1% of the initwial average rate over a 24 hour period after the first 24 hours of release.

8. The gastric residence structure of any one of claims 1-7, wherein the first configuration is a multi-armed star shape.

9. The gastric residence structure of any one of claims 1-8, wherein the elastic polymeric component comprises a polymer selected from the group consisting of polyesters, polyethers, polysiloxanes, polyamides, polyacrylates, polymethacrylates, polyanhydrides, and polyurethanes.

10. The gastric residence structure of any one of claims 1-9, wherein the loadable polymeric component comprises polycaprolactone (PCL), poly(ethylene-co-vinyl acetate), or polyethylene glycol (PEG).

11. The gastric residence structure of any one of claims 1-10, wherein the second configuration has a convex hull at least 10% less than a convex hull of the first configuration.

12. The gastric residence structure of any one of claims 1-11, wherein the second configuration has a largest cross-sectional dimension at least 10% less than a largest cross-sectional dimension of the first configuration.

13. A gastric residence structure comprising:

two or more loadable polymeric components; and

a central elastic polymeric component;

wherein the two or more loadable polymeric components are each connected to the central elastic polymeric component via a separate linker component,

wherein the gastric residence structure has a first configuration and is configured to be mechanically deformed such that the gastric residence structure obtains a second configuration and is restrained, and is configured to assume the first configuration upon removal of the restraint,

wherein change between the second configuration and the first configuration is mediated by the elastic polymeric component that undergoes elastic deformation when the residence structure is in the second configuration and recoils such that the gastric residence structure assumes the first configuration, and

wherein said linker degrades, dissolves, disassociates, or mechanically weakens in a gastric environment which results in loss of retention shape integrity and passage out of a gastric cavity.

14. The gastric residence structure of claim 13, wherein the two or more loadable polymeric components comprise at least 60 wt% of the total structure weight.

15. The gastric residence structure of claim 13 or 14, wherein the gastric residence structure has a folding force of at least 0.2 N.

16. The gastric residence structure of any one of claims 13-15, wherein the residence structure has an open cross-sectional dimension of at least 2 cm.

17. The gastric residence structure of any one of claims 13-16, wherein the residence structure is configured such that it is retained in the gastric cavity for at least 24 hours.

18. The gastric residence structure of any one of claims 13-17, wherein one or more of the two or more loadable polymeric components comprise an active substance.

19. The gastric residence structure of claim 18, wherein the gastric residence structure is configured such that the active substance is released from the two or more loadable polymeric components at a particular initial average rate as determined over the first 24 hours of release; and

wherein the active substance is released at an average rate of at least 1% of the initial average rate over a 24 hour period after the first 24 hours of release.

20. The gastric residence structure of any one of claims 13-19, wherein the first configuration is a multi-armed star shape.

21. The gastric residence structure of any one of claims 13-20, wherein the central elastic polymeric component comprises a polymer selected from the group consisting of polyesters, polyethers, polysiloxanes, polyamides, polyacrylates, polymethacrylates, polyanhydrides, and polyurethanes.

22. The gastric residence structure of any one of claims 13-21, wherein the two or more loadable polymeric components comprise polycaprolactone (PCL), poly(ethylene-co-vinyl acetate), or polyethylene glycol (PEG).

23. The gastric residence structure of any one of claims 13-22, wherein the second configuration has a convex hull at least 10% less than a convex hull of the first configuration.

24. The gastric residence structure of any one of claims 13-23, wherein the second configuration has a largest cross-sectional dimension at least 10% less than a largest cross-sectional dimension of the first configuration.

25. A gastric residence structure comprising:

two or more loadable polymeric components; and

a central elastic polymeric component;

wherein the two or more loadable polymeric components are connected to the central elastic polymeric component via separate linker components,

wherein the gastric residence structure has a first configuration and is configured to be mechanically deformed such that the gastric residence structure obtains a second configuration and is restrained, and is configured to assume the first configuration upon removal of the restraint,

wherein change between the second configuration and the first configuration is mediated by the elastic polymeric component that undergoes elastic deformation when the residence structure is in the second configuration and recoils such that the gastric residence structure assumes the first configuration, and

wherein one or more of said separate linker components degrades, dissolves, disassociates, or mechanically weakens in a gastric environment which results in loss of retention shape and passage out of a gastric cavity.

26. The gastric residence structure of claim 25, wherein the two or more loadable polymeric components comprise at least 60 wt% of the total structure weight.

27. The gastric residence structure of claim 25 or 26, wherein the gastric residence structure has a folding force of at least 0.2 N.

28. The gastric residence structure of any one of claims 25-27, wherein the residence structure has an open cross-sectional dimension of at least 2 cm.

29. The gastric residence structure of any one of claims 25-28, wherein the residence structure is configured such that it is retained in the gastric cavity for at least 24 hours.

30. The gastric residence structure of any one of claims 25-29, wherein one or more of the two or more loadable polymeric components comprise an active substance.

31. The gastric residence structure of claim 30, wherein the gastric residence structure is configured such that the active substance is released from the two or more loadable polymeric components at a particular initial average rate as determined over the first 24 hours of release, and

wherein the active substance is released at an average rate of at least 1% of the initial average rate over a 24 hour period after the first 24 hours of release.

32. The gastric residence structure of any one of claims 25-31, wherein the first configuration is a multi-armed star shape.

33. The gastric residence structure of any one of claims 25-32, wherein the central elastic polymeric component comprises a polymer selected from the group consisting of polyesters, polyethers, polysiloxanes, polyamides, polyacrylates, polymethacrylates, polyanhydrides, and polyurethanes.

34. The gastric residence structure of any one of claims 25-33, wherein the two or more loadable polymeric components comprise polycaprolactone (PCL), poly(ethylene-co-vinyl acetate), or polyethylene glycol (PEG).

35. The gastric residence structure of any one of claims 25-34, wherein the second configuration has a convex hull at least 10% less than a convex hull of the first configuration.

36. The gastric residence structure of any one of claims 25-35, wherein the second configuration has a largest cross-sectional dimension at least 10% less than a largest cross-sectional dimension of the first configuration.

37. The gastric residence structure of any one of claims 25-36, wherein the structure is mechanically deformed using bending, twisting, folding, molding, expanding, compressing, and/or wrinkling.

38. The gastric residence structure of any one of claims 25-37, wherein the gastric residence structure is placed in a capsule or restrained by a soluble retaining element.

39. The gastric residence structure of any one of claims 25-38, wherein the gastric residence structure comprises between three and eight loadable polymeric components.

40. The gastric residence structure of claim 6, wherein the active substance is a therapeutic agent, a prophylactic agent, a diagnostic agent, a biological macromolecule, a vitamin, or a supplement.

41. The gastric residence structure of claim 40, wherein the active substance is a nonsteroidal anti-inflammatory drug, a selective serotonin reuptake inhibitor, a blood thinning agent, a steroid, an antipsychotic, an antagonist, a cardiac glycoside, an alpha blocker, a cholesterol absorption inhibitor, a metabolite, an antihistamine, an opioid, a proton-pump inhibitor, an antiviral agent, an antibiotic, an anti-malarial agent, sulfonamides, a substance abuse treatment, a contraceptive, a stimulant, an analgesic, an anti-analgesic, an anti-inflammatory drug, an antipyretic, an antidepressant, an antiepileptic, an antipsychotic agent, a neuroprotective agent, an anti-proliferative, an anti-cancer agent, an antimigraine drug, an antimicrobial, an antifungal, an antiviral, an antiparasitic, an antimuscarinic, an anxioltyic, a bacteriostatic, an immunosuppressant agent, a sedative, a hypnotic, a bronchodilator, an anti-asthma drug, a cardiovascular drug, an anesthetic, an anti–coagulant, a dopaminergic, an electrolyte, a gastro-intestinal drug, a muscle relaxant, a parasympathomimetic, an anorectic, an anti-narcoleptic, a protein, a peptide, a horomone, a nucleic acid, a gene construct, an HMG co-A reductase inhibitor, a mineral, a prostaglandin, a nutritional supplement, a corticosteroid, a nutraceutical, a plant extract, or a phytohormone.

42. The gastric residence structure of claim 41, wherein the active substance is rosuvastatin, meloxicam, escitalopram, clopidogrel, prasugrel, prednisone, aripiprazole, risperidone, buprenorphine, naloxone, montelukast, memantine, digoxin, tamsulosin, ezetimibe, colchicine, loratadine, cetirizine, loperamide, omeprazole, entecavir, doxycycline, ciprofloxacin, azithromycin, quinine, lumefantrine, chloroquine, amodiaquine, pyrimethamine, proguanil, chlorproguanil-dapsone, sulfadoxine, sulfamethoxypyridazine, mefloquine, atovaquone, primaquine, halofantrine, doxycycline, clindamycin, artemisinin, artemisinin derivatives, artemether, dihydroartemisinin, arteether, artesunate, synthroid/levothyroxine, methadone, varenicline, caffeine, folic acid, calcium, iodine, iron, zinc, thiamine, niacin, vitamin C, or vitamin D.

43. The gastric residence structure of claim 6, wherein the active substance is an antipsychotic, a selective serotonin reuptake inhibitor, an antidepressant, a neuroprotective agent, an anxiolytic, a sedative, a hypnotic, an analgesic, an opioid, an antimigraine drug, a cholesterol absorption inhibitor, a substance abuse treatment, or an immunosuppressant agent.

44. The gastric residence structure of claim 6 wherein the active substance is an HMG co-A reductase inhibitor, a blood thinning agent, a cardiac glycoside, an alpha blocker, a cholesterol absorption inhibitor, or a cardiovascular drug.

45. The gastric residence structure of claim 6 wherein the active substance is buprenorphine, methadonearipiprazole, , doxycycline, rosuvastatin, memantine, or risperidone.

46. The gastric residence structure of claim 18, wherein the active substance is a therapeutic agent, a prophylactic agent, a diagnostic agent, a biological macromolecule, a vitamin, or a supplement.

47. The gastric residence structure of claim 46, wherein the active substance is a nonsteroidal anti-inflammatory drug, a selective serotonin reuptake inhibitor, a blood thinning agent, a steroid, an antipsychotic, an antagonist, a cardiac

glycoside, an alpha blocker, a cholesterol absorption inhibitor, a metabolite, an antihistamine, an opioid, a proton-pump inhibitor, an antiviral agent, an antibiotic, an anti-malarial agent, sulfonamides, a substance abuse treatment, a contraceptive, a stimulant, an analgesic, an anti-analgesic, an anti-inflammatory drug, an antipyretic, an antidepressant, an antiepileptic, an antipsychotic agent, a neuroprotective agent, an anti-proliferative, an anti-cancer agent, an antimigraine drug, an antimicrobial, an antifungal, an antiviral, an antiparasitic, an antimuscarinic, an anxioltyic, a bacteriostatic, an immunosuppressant agent, a sedative, a hypnotic, a bronchodilator, an anti-asthma drug, a cardiovascular drug, an anesthetic, an anti–coagulant, a dopaminergic, an electrolyte, a gastro-intestinal drug, a muscle relaxant, a parasympathomimetic, an anorectic, an anti-narcoleptic, a protein, a peptide, a horomone, a nucleic acid, a gene construct, an HMG co-A reductase inhibitor, a mineral, a prostaglandin, a nutritional supplement, a corticosteroid, a nutraceutical, a plant extract, or a phytohormone.

48. The gastric residence structure of claim 47, wherein the active substance is rosuvastatin, meloxicam, escitalopram, clopidogrel, prasugrel, prednisone, aripiprazole, risperidone, buprenorphine, naloxone, montelukast, memantine, digoxin, tamsulosin, ezetimibe, colchicine, loratadine, cetirizine, loperamide, omeprazole, entecavir, doxycycline, ciprofloxacin, azithromycin, quinine, lumefantrine, chloroquine, amodiaquine, pyrimethamine, proguanil, chlorproguanil-dapsone, sulfadoxine, sulfamethoxypyridazine, mefloquine, atovaquone, primaquine, halofantrine, doxycycline, clindamycin, artemisinin, artemisinin derivatives, artemether, dihydroartemisinin, arteether, artesunate, synthroid/levothyroxine, methadone, varenicline, caffeine, folic acid, calcium, iodine, iron, zinc, thiamine, niacin, vitamin C, or vitamin D.

49. The gastric residence structure of claim 18, wherein the active substance is an antipsychotic, a selective serotonin reuptake inhibitor, an antidepressant, a neuroprotective agent, an anxiolytic, a sedative, a hypnotic, an analgesic, an opioid, an antimigraine drug, a cholesterol absorption inhibitor, a substance abuse treatment, or an immunosuppressant agent.

50. The gastric residence structure of claim 18 wherein the active substance is an HMG co-A reductase inhibitor, a blood thinning agent, a cardiac glycoside, an alpha blocker, a cholesterol absorption inhibitor, or a cardiovascular drug.

51. The gastric residence structure of claim 18 wherein the active substance is buprenorphine, methadone, aripiprazole, doxycycline, rosuvastatin, memantine, or risperidone.

52. The gastric residence structure of claim 30, wherein the active substance is a therapeutic agent, a prophylactic agent, a diagnostic agent, a biological macromolecule, a vitamin, or a supplement.

53. The gastric residence structure of claim 52, wherein the active substance is a nonsteroidal anti-inflammatory drug, a selective serotonin reuptake inhibitor, a blood thinning agent, a steroid, an antipsychotic, an antagonist, a cardiac glycoside, an alpha blocker, a cholesterol absorption inhibitor, a metabolite, an antihistamine, an opioid, a proton-pump inhibitor, an antiviral agent, an antibiotic, an anti-malarial agent, sulfonamides, a substance abuse treatment, a contraceptive, a stimulant, an analgesic, an anti-analgesic, an anti-inflammatory drug, an antipyretic, an antidepressant, an antiepileptic, an antipsychotic agent, a neuroprotective agent, an anti-proliferative, an anti-cancer agent, an antimigraine drug, an antimicrobial, an antifungal, an antiviral, an antiparasitic, an antimuscarinic, an anxioltyic, a bacteriostatic, an immunosuppressant agent, a sedative, a hypnotic, a bronchodilator, an anti-asthma drug, a cardiovascular drug, an anesthetic, an anti–coagulant, a dopaminergic, an electrolyte, a gastro-intestinal drug, a muscle relaxant, a parasympathomimetic, an anorectic, an anti-narcoleptic, a protein, a peptide, a horomone, a nucleic acid, a gene construct, an HMG co-A reductase inhibitor, a mineral, a prostaglandin, a nutritional supplement, a corticosteroid, a nutraceutical, a plant extract, or a phytohormone.

54. The gastric residence structure of claim 53, wherein the active substance is rosuvastatin, meloxicam, escitalopram, clopidogrel, prasugrel, prednisone, aripiprazole, risperidone, buprenorphine, naloxone, montelukast, memantine,

digoxin, tamsulosin, ezetimibe, colchicine, loratadine, cetirizine, loperamide, omeprazole, entecavir, doxycycline, ciprofloxacin, azithromycin, quinine, lumefantrine, chloroquine, amodiaquine, pyrimethamine, proguanil, chlorproguanil-dapsone, sulfadoxine, sulfamethoxypyridazine, mefloquine, atovaquone, primaquine, halofantrine, doxycycline, clindamycin, artemisinin, artemisinin derivatives, artemether, dihydroartemisinin, arteether, artesunate, synthroid/levothyroxine, methadone, varenicline, caffeine, folic acid, calcium, iodine, iron, zinc, thiamine, niacin, vitamin C, or vitamin D.

55. The gastric residence structure of claim 30, wherein the active substance is an antipsychotic, a selective serotonin reuptake inhibitor, an antidepressant, a neuroprotective agent, an anxiolytic, a sedative, a hypnotic, an analgesic, an opioid, an antimigraine drug, a cholesterol absorption inhibitor, a substance abuse treatment, or an immunosuppressant agent.

56. The gastric residence structure of claim 30 wherein the active substance is an HMG co-A reductase inhibitor, a blood thinning agent, a cardiac glycoside, an alpha blocker, a cholesterol absorption inhibitor, or a cardiovascular drug.

57. The gastric residence structure of claim 30 wherein the active substance is buprenorphine, methadone, aripiprazole, doxycycline, rosuvastatin, memantine, or risperidone.

58. A containing structure for delivering a residence structure comprising:

the gastric residence structure as in any one of claims 1-57, characterized in that the containing structure is to be administered to a subject.

59. The containing structure of claim 58, wherein the subject is human.

60. The containing structure of claim 58, wherein the subject is a mammal.

61. The gastric residence structure as in any one of claims 1-57 or the containing structure as in any one of claims 58-60, wherein the gastric residence structure comprises an arm comprising the loadable polymeric component.