

WHAT IS CLAIMED IS:

1. A method for detecting an element, the method comprising:
coupling a first element-sugar complex to a first substrate, the first element-sugar complex comprising a first element coupled to a first sugar;
coupling a first lectin to the first sugar; and
detecting the first element using at least detection of the first lectin.
2. The method of claim 1, wherein the first element comprises an analyte.
3. The method of claim 2, wherein the analyte comprises a first nucleotide.
4. The method of claim 3, wherein coupling the first element-sugar complex to the first substrate comprises incorporating the first nucleotide into a first oligonucleotide coupled to the first substrate.
5. The method of claim 4, wherein the first oligonucleotide is hybridized to a second oligonucleotide, and wherein incorporating the first nucleotide into the first oligonucleotide comprises extending the first oligonucleotide using at least a sequence of the second oligonucleotide.
6. The method of any one of claims 1 to 5, wherein coupling the first element-sugar complex to the first substrate comprises flowing a solution over the substrate, the solution comprising:
the first element-sugar complex; and
a second element-sugar complex comprising a second element coupled to a second sugar,
wherein the first lectin selectively binds the first sugar and does not bind the second sugar.
7. The method of claim 6, wherein the first and second elements comprise different nucleotide types than one another.

8. The method of claim 6 or claim 7, wherein the first and second sugars comprise different sugar types than one another.
9. The method of any one of claims 6 to 8, further comprising:
 - coupling the second element-sugar complex to the first substrate or to a second substrate;
 - coupling a second lectin to the second sugar; and
 - detecting the second element using at least detection of the second lectin.
10. The method of claim 9, wherein the solution further comprises:
 - a third element-sugar complex comprising a third element coupled to a third sugar;and
 - a fourth element-sugar complex comprising a fourth element coupled to a fourth sugar, the method further comprising:
 - coupling the third element-sugar complex to the first substrate, to the second substrate, or to a third substrate;
 - coupling a third lectin to the third sugar;
 - detecting the third element using at least detection of the third lectin;
 - coupling the fourth element-sugar complex to the first substrate, to the second substrate, to the third substrate, or to a fourth substrate;
 - coupling a fourth lectin to the fourth sugar; and
 - detecting the fourth element using at least detection of the fourth lectin.
11. The method of any one of claims 1 to 10, wherein the first element sugar-complex further comprises a fifth sugar coupled to the element.
12. The method of claim 11, further comprising coupling the first lectin to the fifth sugar.
13. The method of any one of claims 1 to 12, further comprising coupling a first fluorophore to the first lectin, wherein detection of the first lectin comprises detecting fluorescence from the first fluorophore.
14. The method of claim 13, wherein the first fluorophore comprises a first plurality of fluorophores.

15. The method of claim 13 or claim 14, wherein coupling the first fluorophore to the first lectin comprises coupling a polymer to the first lectin, wherein the polymer comprises the first fluorophore and a sixth sugar, wherein the first lectin couples to the sixth sugar.
16. The method of claim 15, wherein the polymer comprises a bead.
17. The method of claim 15, wherein the polymer comprises a polypeptide.
18. The method of any one of claims 13 to 17, wherein the first fluorophore is coupled to the first lectin before coupling the first lectin to the first sugar.
19. The method of any one of claims 13 to 17, wherein the first fluorophore is coupled to the first lectin after coupling the first lectin to the first sugar.
20. The method of any one of claims 1 to 19, wherein:
 - a seventh sugar is coupled to the first lectin,
 - a second lectin is coupled to the seventh sugar, and
 - detection of the first lectin comprises detection of the second lectin.
21. The method of claim 20, wherein a second fluorophore is coupled to the second lectin, and wherein detection of the first lectin comprises detecting fluorescence from the second fluorophore.
22. The method of claim 21, wherein the first fluorophore is a different type of fluorophore than the second fluorophore.
23. The method of any one of claims 20 to 22, wherein the first lectin comprises Concanavalin A (Con A), the seventh sugar comprises N-acetyl-galactosamine (GalNAc), and the second lectin comprises soybean agglutinin (SBA).
24. The method of any one of claims 1 to 22, wherein:
 - the first lectin comprises Concanavalin A (Con A) and the first sugar comprises mannose (Man) or glucose (Glc);

the first lectin comprises wheat germ agglutinin (WGA) and the first sugar comprises N-acetyl-glucosamine (GlcNAc) or N-acetyl-neuraminic acid (Neu5Ac);

the first lectin comprises soybean agglutinin (SBA) and the first sugar comprises galactose (Gal) or N-acetyl-galactosamine (GalNAc);

the first lectin comprises *Dolichos bifloris* (DBA) and the first sugar comprises GalNAc α 3GalNAc or GalNAc;

the first lectin comprises Ricin and the first sugar comprises galactose;

the first lectin comprises peanut agglutinin (PNA) and the first sugar comprises galactose or Gal β 3GalNAc α (T-antigen);

the first lectin comprises *Pisum sativum* (PSA) and the first sugar comprises mannose or glucose;

the first lectin comprises *Lens culinaris* (LCA) and the first sugar comprises mannose or glucose;

the first lectin comprises *Galanthus nivalis* (GNA) and the first sugar comprises mannose;

the first lectin comprises *Solanum tuberosum* (STA) and the first sugar comprises (GlcNAc)_n;

the first lectin comprises Asialoglycoprotein receptor (ASGPR) H1 and the first sugar comprises galactose;

the first lectin comprises Galectin-3 and the first sugar comprises galactose;

the first lectin comprises Sialoadhesin and the first sugar comprises Neu5Ac;

the first lectin comprises Cation-dependent mannose-6-phosphate receptor (CD-MPR) and the first sugar comprises Man6P; or

the first lectin comprises C-reactive protein (CRP) and the first sugar comprises galactose, Gal6P, or galacturonic acid.

25. The method of any one of claims 1 to 24, wherein the first substrate comprises a bead.

26. The method of any one of claims 1 to 25, wherein the first sugar comprises an alkyl sugar.

27. The method of any one of claims 1 to 26, wherein the first sugar comprises a monosaccharide.

28. The method of any one of claims 1 to 27, wherein the first sugar comprises a disaccharide.
29. A system, comprising:
a substrate;
a first element-sugar complex coupled to the substrate, the first element-sugar complex comprising a first element coupled to a first sugar;
a first lectin coupled to the first sugar; and
detection circuitry to detect the first element using at least detection of the first lectin.
30. The system of claim 29, wherein the first element comprises an analyte.
31. The system of claim 30, wherein the analyte comprises a first nucleotide.
32. The system of claim 31, wherein the first element-sugar complex is coupled to the first substrate via incorporation of the first nucleotide into a first oligonucleotide coupled to the first substrate.
33. The system of claim 32, wherein the first oligonucleotide is hybridized to a second oligonucleotide, and wherein the incorporation of the first nucleotide into the first oligonucleotide comprises extending the first oligonucleotide using at least a sequence of the second oligonucleotide.
34. The system of any one of claims 29 to 33, further comprising a solution to flow over the substrate, the solution comprising:
the first element-sugar complex; and
a second element-sugar complex comprising a second element coupled to a second sugar,
wherein the first lectin selectively binds the first sugar and does not bind the second sugar.
35. The system of claim 34, wherein the first and second elements comprise different nucleotide types than one another.

36. The system of claim 34 or claim 35, wherein the first and second sugars comprise different sugar types than one another.
37. The system of any one of claims 34 to 36, wherein:
the second element-sugar complex is coupled to the first substrate or to a second substrate;
a second lectin is coupled to the second sugar; and
the detection circuitry is to detect the second element using at least detection of the second lectin.
38. The system of claim 37, wherein:
the solution further comprises:
a third element-sugar complex comprising a third element coupled to a third sugar, and a fourth element-sugar complex comprising a fourth element coupled to a fourth sugar;
the third element-sugar complex is coupled to the first substrate, to the second substrate, or to a third substrate;
a third lectin is coupled to the third sugar;
the detection circuitry is to detect the third element using at least detection of the third lectin;
the fourth element-sugar complex is coupled to the first substrate, to the second substrate, to the third substrate, or to a fourth substrate;
a fourth lectin is coupled to the fourth sugar; and
the detection circuitry is to detect the fourth element using at least detection of the fourth lectin.
39. The system of any one of claims 29 to 38, wherein the first element sugar-complex further comprises a fifth sugar coupled to the element.
40. The system of claim 39, wherein the first lectin is coupled to the fifth sugar.
41. The system of any one of claims 29 to 40, wherein a first fluorophore is coupled to the first lectin, wherein the detection circuitry is to detect the first lectin using at least detection of fluorescence from the first fluorophore.

42. The system of claim 41, wherein the first fluorophore comprises a first plurality of fluorophores.
43. The system of claim 41 or claim 42, wherein the first fluorophore is coupled to the first lectin using a polymer, wherein the polymer comprises the first fluorophore and a sixth sugar, wherein the first lectin couples to the sixth sugar.
44. The system of claim 43, wherein the polymer comprises a bead.
45. The system of claim 43, wherein the polymer comprises a polypeptide.
46. The system of any one of claims 41 to 45, wherein the first fluorophore is coupled to the first lectin before the first lectin is coupled to the first sugar.
47. The system of any one of claims 41 to 45, wherein the first fluorophore is coupled to the first lectin after the first lectin is coupled to the first sugar.
48. The system of any one of claims 29 to 47, wherein:
a seventh sugar is coupled to the first lectin,
a second lectin is coupled to the seventh sugar, and
the detection circuitry is to detect the first lectin using at least detection of the second lectin.
49. The system of claim 48, wherein a second fluorophore is coupled to the second lectin, and wherein the detection circuitry is to detect the first lectin using at least detecting fluorescence from the second fluorophore.
50. The system of claim 49, wherein the first fluorophore is a different type of fluorophore than the second fluorophore.
51. The system of any one of claims 48 to 50, wherein the first lectin comprises Concanavalin A (Con A), the seventh sugar comprises N-acetyl-galactosamine (GalNAc), and the second lectin comprises soybean agglutinin (SBA).

52. The system of any one of claims 29 to 50, wherein:
- the first lectin comprises Concanavalin A (Con A) and the first sugar comprises mannose (Man) or glucose (Glc);
 - the first lectin comprises wheat germ agglutinin (WGA) and the first sugar comprises N-acetyl-glucosamine (GlcNAc) or N-acetyl-neuraminic acid (Neu5Ac);
 - the first lectin comprises soybean agglutinin (SBA) and the first sugar comprises galactose (Gal) or N-acetyl-galactosamine (GalNAc);
 - the first lectin comprises *Dolichos bifloris* (DBA) and the first sugar comprises GalNAc α 3GalNAc or GalNAc;
 - the first lectin comprises Ricin and the first sugar comprises galactose;
 - the first lectin comprises peanut agglutinin (PNA) and the first sugar comprises galactose or Gal β 3GalNAc α (T-antigen);
 - the first lectin comprises *Pisum sativum* (PSA) and the first sugar comprises mannose or glucose;
 - the first lectin comprises *Lens culinaris* (LCA) and the first sugar comprises mannose or glucose;
 - the first lectin comprises *Galanthus nivalis* (GNA) and the first sugar comprises mannose;
 - the first lectin comprises *Solanum tuberosum* (STA) and the first sugar comprises (GlcNAc)_n;
 - the first lectin comprises Asialoglycoprotein receptor (ASGPR) H1 and the first sugar comprises galactose;
 - the first lectin comprises Galectin-3 and the first sugar comprises galactose;
 - the first lectin comprises Sialoadhesin and the first sugar comprises Neu5Ac;
 - the first lectin comprises Cation-dependent mannose-6-phosphate receptor (CD-MPR) and the first sugar comprises Man6P; or
 - the first lectin comprises C-reactive protein (CRP) and the first sugar comprises galactose, Gal6P, or galacturonic acid.
53. The system of any one of claims 29 to 52, wherein the first substrate comprises a bead.
54. The system of any one of claims 29 to 53, wherein the first sugar comprises an alkyl sugar.

55. The system of any one of claims 29 to 54, wherein the first sugar comprises a monosaccharide.

56. The system of any one of claims 29 to 55, wherein the first sugar comprises a disaccharide.