WHAT IS CLAIMED IS:

1. A plurality of addressable polypeptides, a portion of each polypeptide having known amino acid sequence, wherein each polypeptide reacts with a substrate to produce a product, and wherein at least two members of the plurality are related to a parent polypeptide and react with different substrates.

2. A plurality of addressable polypeptides, a portion of each polypeptide having known amino acid sequence, wherein each polypeptide reacts with a substrate to produce a product, and wherein at least two members of the plurality are related to a parent polypeptide and react with differing levels of activity upon a given substrate.

3. The plurality of claim 1 in which each member acts on a different substrate.

4. The plurality of claim 1 or claim 2 in which some members act on one substrate and other members act on at least one other substrate.

5. The plurality of claim 1 or claim 2 in which at least two members of the plurality differ with respect to one or more of the following properties: substrate specificity, chemoselectivity, regioselectivity, stereoselectivity, stereospecificity, ligand specificity, receptor agonism, receptor antagonism, conversion of a cofactor.

6. The plurality of claim 4 in which the members of the plurality that act on the same substrate differ with respect to one or more of the following properties: rate of product formation, percent conversion of a substrate to a product, or percent conversion of a cofactor.

7. The plurality of claim 1 or claim 2 in which at least two members are operable over a pH range from about pH 5 to about pH 10.

8. The plurality of claim 1 or claim 2 in which at least two members are operable over a range of temperatures ranging from about 4°C to about 50°C.

9. The plurality of claim 1 or claim 2 in which at least two members are operable in a solution containing from about 10 to about 50% organic solvent.

10. The plurality of claim 1 or claim 2 in which each member of the plurality is an evolvant of the same parent enzyme and contains at least one mutation as compared to the parent enzyme.

11. The plurality of claim 1 or claim 2 in which the plurality comprises subsets of members and each subset comprises evolvants from a separate parent enzyme.

12. A plurality of pluralities in which each plurality acts on a different class of substrate.

13. A plurality of enzymes made by a process of:

(i) generating variants of at least one parent enzyme, wherein at least a portion of the amino acid sequence of each variant is known, and wherein each variant comprises at least one mutation known to affect reactivity with a substrate to produce a product; and

(ii) selecting two or more variants wherein at least two of the selected variants react with different substrates.

14. A plurality of enzymes made by a process of:

(i) generating variants of at least one parent enzyme, wherein at least a portion of the amino acid sequence of each variant is known, and wherein each variant comprises at least one mutation known to affect reactivity with a substrate to produce a product; and

(ii) selecting two or more variants wherein at least two of the selected variants react with differing levels of activity upon a given substrate.

15. The plurality of claim 13 in which each of the selected variants acts on a different substrate.

16. The plurality of claim 13 or 14 in which some members of the plurality act on one substrate and other members of the plurality act on at least one other substrate.

17. The plurality of claim 13 or 14 in which at least two members of the plurality differ with respect to one or more of the following properties: substrate specificity, chemoselectivity, regioselectivity, stereoselectivity, stereospecificity, ligand specificity, receptor agonism, receptor antagonism, conversion of a cofactor.

18. The plurality of claim 16 in which the members of the plurality that act on the same substrate differ with respect to one or more of the following properties: rate of product formation, percent conversion of a substrate to a product, or percent conversion of a cofactor.

19. The plurality of claim 13 or 14 in which at least two members of the plurality are operable over a pH range from about pH 5 to about pH 10.

20. The plurality of claim 13 or 14 in which at least two members of the plurality are operable over a range of temperatures ranging from about 4°C to about 50°C.

21. The plurality of claim 13 or 14 in which at least two members of the plurality are operable in a solution containing from about 10 to about 50% organic solvent.

22. The plurality of claim 13 or 14 in which each member of the plurality is an evolvant of the same ancestor enzyme and contains at least one mutation as compared to the ancestor enzyme.

23. The plurality of claim 13 or 14 in which the plurality comprises subsets of members and each subset comprises evolvants from a separate ancestor enzyme.

24. The plurality of claim 13 or 14 in which the selected variants are placed onto a surface.

25. The plurality of claim 13 or 14 in which the surface comprises a microtiter plate.

26. The plurality of claim 13 or 14 in which the surface comprises a set of 2 to 4 microtiter plates.

27. The plurality of claim 13 or 14 in which the surface comprises a microchip.

28. The plurality of claim 13 or 14 in which the surface comprises glass.

29. The plurality of claim 13 or 14 in which the surface comprises plastic.

30. The plurality of claim 13 or 14 in which the variants are expressed from polynucleotides.

31. The plurality of claim 13 or 14 in which the variants are chemically synthesized.

32. A plurality of addressable polypeptide variants made by a process of:

(i) generating a plurality of polypeptide variants related to a parent polypeptide, each variant having a different amino acid sequence, wherein each variant comprises at least one mutation that enhances reactivity with a ligand as compared to the reactivity of the parent polypeptide with said ligand; and wherein at least two variants of the plurality react with different ligands; and

(ii) assigning an address to each of the variants.

33. A plurality of addressable polypeptide variants made by a process of:

(i) generating a plurality of polypeptide variants related to a parent polypeptide, each variant having a different amino acid sequence, wherein each variant comprises at least one mutation that enhances reactivity with a ligand as compared to the reactivity of the parent polypeptide with said ligand, and wherein at least two variants of the plurality react with differing levels of activity upon a given ligand; and

(ii) assigning an address to each of the variants.

34. A method useful for identifying at least one polypeptide having a desired activity, comprising:

(i) screening a plurality of polypeptide variants against a ligand of interest, wherein each variant reacts with at least one ligand to produce a detectable signal, and wherein at least two members of the plurality are related to a parent polypeptide and react with different ligands; and

(ii) identifying at least one variant that produces a signal upon reaction with the ligand of interest.

35. A method useful for identifying at least one polypeptide having a desired activity, comprising:

(i) screening a plurality of polypeptide variants against a ligand of interest,

wherein each variant reacts with at least one ligand to produce a detectable signal, and wherein at least two members of the plurality are related to a parent polypeptide and react with differing levels of activity upon a given ligand; and

(ii) identifying at least one variant that produces a signal upon reaction with the ligand of interest.

36. The method of claim 34 or 35, further comprising:

(iii) identifying at least a second variant that produces a signal upon reaction with the ligand of interest;

(iv) postulating a sequence-activity relationship between the amino acid residues within the identified variants of claim 34 or 35 and the ability of each variant to produce a detectable signal;

(v) generating a second plurality of polypeptide variants based on the sequence-activity relationship;

(vi) screening the second plurality against the ligand of interest; and

(vii) identifying at least one variant from the second plurality that produces an enhanced signal of interest as compared to the identified variants of claim 34 or 35.

37. The method of claim 34 or 35, in which the identity of the ligand of interest is unknown.

38. The method of claim 36, in which the identity of the ligand of interest is unknown.

39. The method of claim 34 or 35, in which each variant is an enzyme and the ligand of interest is a candidate substrate for the enzyme.

40. The method of claim 34 or 35, in which each variant is a receptor and the ligand of interest is a candidate ligand for the receptor.

41. The method of claim 34 or 35, in which two or more members of the plurality differ in the kind of signal produced.

42. The method of claim 34 or 35, in which the kind of signal produced is selected from a signal indicating substrate specificity, chemoselectivity, regioselectivity,

stereoselectivity, stereospecificity, ligand specificity, receptor agonism, receptor antagonism, conversion of a cofactor, or any combination thereof.

43. The method of claim 34 or 35, in which two or more members of the plurality differ in the level of signal produced.

44. The method of claim 43 in which the difference in level is a difference in rate of product formation, percent conversion of a substrate to a product, or percent conversion of a cofactor.

45. A host cell which produces the at least one variant identified in the method of claim 34 or claim 35.

46. A plurality of host cell colonies, wherein each colony expresses a member of the plurality of claim 34 or 35.

47. A method of making a plurality of addressable polypeptide variants, comprising:

(i) generating a plurality of polypeptide variants related to a parent polypeptide, a portion of each variant having known amino acid sequence, wherein each variant comprises at least one mutation that enhances reactivity with a substrate as compared to the reactivity of the parent polypeptide with said substrate, and wherein at least two members of the plurality react with different substrates; and

(ii) assigning an address to each of the variants.

48. A method of making a plurality of addressable polypeptide variants, comprising:

(i) generating a plurality of polypeptide variants related to a parent polypeptide, a portion of each variant having known amino acid sequence, wherein each variant comprises at least one mutation that enhances reactivity with a substrate as compared to the reactivity of the parent polypeptide with said substrate, and wherein at least two members of the plurality react with differing levels of activity upon a given substrate; and

(ii) assigning an address to each of the variants.

49. The method of claim 47 in which each member of the plurality acts on a different substrate.

50. The method of claim 47 or claim 48 in which some members act on one substrate and other members act on at least one other substrate.

51. The method of claim 47 or claim 48 in which at least two members of the plurality differ with respect to one or more of the following properties: substrate specificity, chemoselectivity, regioselectivity, stereoselectivity, stereospecificity, ligand specificity, receptor agonism, receptor antagonism, conversion of a cofactor.

52. The method of claim 50 in which the members of the plurality that act on the same substrate differ with respect to one or more of the following properties: rate of product formation, percent conversion of a substrate to a product, or percent conversion of a cofactor.

53. The method of claim 47 or claim 48 in which at least two members of the plurality are operable over a pH range from about pH 5 to about pH 10.

54. The method of claim 47 or claim 48 in which at least two members of the plurality are operable over a range of temperatures ranging from about 4°C to about 50°C.

55. The method of claim 47 or claim 48 in which at least two members of the plurality are operable in a solution containing from about 10 to about 50% organic solvent.

56. The method of claim 47 or claim 48 in which each member of the plurality is an evolvant of the same parent enzyme and contains at least one mutation as compared to the parent enzyme.

57. The method of claim 47 or claim 48 in which the plurality comprises subsets of members and each subset comprises evolvants from a separate parent enzyme.

58. The method of claim 47 or claim 48 in which each member of each plurality is an enzyme and the at least one ligand is a substrate for the enzyme.

59. The method of claim 47 or claim 48 in which each member of each plurality is a receptor and the at least one ligand is a ligand for the receptor.

60. A method of making a plurality of addressable pluralities, comprising:

(i) generating a first and a second addressable plurality of polypeptide variants, wherein the members of the first plurality are related to one parent polypeptide and the members of the second plurality are related to a second parent polypeptide, wherein at least a portion of the amino acid sequence of each variant is known, wherein each member of each plurality reacts with a substrate to produce a product, and wherein at least one member of the first plurality and at least one member of the second plurality react with different substrates.

61. A kit for identifying at least one polypeptide having a desired activity, comprising:

(i) at least one plurality of addressable polypeptides, wherein each member of each plurality reacts with at least one ligand to produce a detectable signal, and wherein at least two members of each plurality are related to a parent polypeptide and react with different ligands; and

(ii) instructions for use.

62. A kit for identifying at least one polypeptide having a desired activity, comprising:

(i) at least one plurality of addressable polypeptides, wherein each member of each plurality reacts with at least one ligand to produce a detectable signal, and wherein at least two members of each plurality are related to a parent polypeptide and react with differing levels of activity upon a given ligands; and

(ii) instructions for use.

WHAT IS CLAIMED IS:

1. A kit for identifying at least one polypeptide having a desired activity for a ligand of interest, containing:

(i) at least one plurality of active addressable polypeptide variants, wherein each member of each plurality of the active polypeptide variants reacts with at least one ligand to produce a detectable signal, and wherein at least two members of each plurality of the active polypeptide variants are related to a parent polypeptide and react with different ligands, wherein the different ligand does not react with the parent polypeptide;

(ii) at least one ligand, wherein said ligand is placed within the wells of a microtiter plate;

and

(iii) instructions for use.

2. The kit of Claim 1, wherein said at least one ligand is immobilized in the wells of said microtiter plate.

3. The kit of Claim 1, wherein each of the wells of said microtiter plate contain different ligands.

4. A kit for identifying at least one polypeptide having a desired activity for a ligand of interest, containing:

(i) at least one plurality of active addressable polypeptide variants, wherein each member of each plurality of the active polypeptide variants reacts with at least one ligand to produce a detectable signal, and wherein at least two members of each plurality of the active polypeptide variants are related to a parent polypeptide and react with different ligands, wherein the different ligand does not react with the parent polypeptide wherein each member of said plurality of active polypeptide variants is placed within a well of a microtiter plate;

(ii) at least one ligand;

and

(iii) instructions for use.

5. The kit of Claim 4, wherein each member of said plurality of polypeptide variants is immobilized in the wells of said microtiter plate.

6. The kit of Claim 4, wherein at least two members of each plurality of active addressable polypeptide variants are related to a parent polypeptide and react with differing levels of activity upon said at least one ligand.

7. The kit of Claim 4, further comprising at least one means of generating a signal.

8. The kit of Claim 8, further comprising at least one means of detecting said signal.

9. The kit of Claim 1, wherein the plurality of active addressable polypeptide variants are operable under conditions in which the parent polypeptide is inactive or rendered inactive.

10. The kit of Claim 4, wherein the plurality of active addressable polypeptide variants are operable under conditions in which the parent polypeptide is inactive or rendered inactive.

11. The kit of Claim 1, wherein the plurality of active addressable polypeptide variants are enzymes, and the ligands correspond to substrates for the enzymes.

12. The kit of Claim 4, wherein the plurality of active addressable polypeptide variants are enzymes, and the ligands correspond to substrates for the enzymes.

13. The kit of Claim 1, wherein the parent polypeptide is a wild-type enzyme.

14. The kit of Claim 4, wherein the parent polypeptide is a wild-type enzyme.

15. A kit for identifying at least one polypeptide having a desired activity for a ligand of interest, containing:

(i) at least one plurality of active addressable polypeptide variants, wherein

each member of the plurality of active addressable polypeptide variants reacts with at least one ligand of a plurality of ligands and at least two members of the plurality of the active addressable polypeptide variants are related to a parent polypeptide, wherein one member has been selected for improved activity for one ligand and the other member has been selected for improved activity for a different ligand in the plurality of ligands as compared to the parent polypeptide;

(ii) a plurality of ligands;

and

(ii) instructions for use.