What is claimed is:

1. A method of characterizing candidate agents, comprising

(a) combinatorially synthesizing a library of candidate agents, wherein individual reactions of the combinatorial synthesis that are carried out on each candidate agent are tracked by addition of a unique signature of one or more nucleotides to a nucleic acid tag that is attached to each of the candidate agents, thereby providing a library of candidate agents, wherein each candidate agent is attached to a unique nucleic acid tag having a tag sequence;

(b) contacting the library of candidate agents with a solid support to attach the candidate agents to the solid support, whereby an array of candidate agents is formed comprising individual features on the solid support that each attach to an individual candidate agent from the library;

(c) contacting the array of candidate agents with a screening agent, wherein one or more candidate agents in the array react with the screening agent;

(d) detecting the array during or after the contacting of the array with the screening agent, thereby determining that at least one candidate agent in the array reacts with the screening agent;

(e) sequencing the nucleic acid tags on the array to determine the tag sequence that is attached to each of the candidate agents; and

(f) identifying the at least one candidate agent in the array that reacts with the screening agent based on the tag sequence that is attached to the at least one candidate agent.

2. The method of claim 1, wherein the candidate agents are selected from the group consisting of proteins, nucleic acids, cells, and small molecules.

3. The method of claim 2, wherein the proteins are selected from the group consisting of antibodies, enzymes, receptors, kinases, phosphatases, polymerases, proteases, esterases, histone modifying enzymes and nuclear hormone receptors.

4. The method of claim 2, wherein the cells are selected from the group consisting of genetically natural cells isolated from a multicellular organism, genetically natural cells that comprise single cell organisms, genetically engineered cells, and cultured cells, optionally wherein the cells are stem cells or immune cells.

5. The method of claim 2, wherein the small molecules are selected from the group consisting of candidate enzyme inhibitors, candidate antibiotics, candidate antiviral agents,

candidate pesticides, candidate hormones, candidate activators of cell signalling, candidate inhibitors of cell signalling, and candidate enzyme activators.

6. The method of claim 1, wherein the solid support comprises nucleic acid primers and the candidate agents attach to the solid support via hybridization of the nucleic acid tags to the nucleic acid primers, optionally wherein the nucleic acid tags comprise a universal primer binding sequence, the nucleic acid primers comprise a universal primer sequence, and the candidate agents attach to the solid support via hybridization of the universal primer binding sequence to the universal primer sequence.

7. The method of claim 1, wherein the screening agent reacts with the one or more candidate agent by binding to the one or more candidate agent or by blocking binding between the candidate agent and an analyte having affinity for the candidate agent, optionally wherein the detecting of the array comprises detecting the screening agent that is bound to the one or more candidate agent, optionally wherein the screening agent is luminescent and the detecting comprises detecting luminescence on the array.

8. The method of claim 1, wherein the screening agent reacts with the one or more candidate agent by chemically modifying the one or more candidate agent, optionally wherein the detecting of the array comprises detecting the one or more modified candidate agent, optionally wherein the one or more modified candidate agent is luminescent and the detecting comprises detecting luminescence on the array.

9. The method of claim 1, wherein the screening agent reacts with the one or more candidate agent by producing an analyte product, optionally wherein the detecting of the array comprises detecting the analyte product, optionally wherein the analyte product is luminescent and the detecting comprises detecting luminescence on the array.

10. The method of claim 1, wherein the detecting of the array comprises acquiring signals at several time points for one or more of the individual features on the array.

11. The method of claim 1, wherein the signals comprise optical signals.

12. The method of claim 1, further comprising amplifying the nucleic acid tags to produce amplicons of the nucleic acid tags at the individual features, optionally wherein the sequencing of the nucleic acid tags comprises sequencing the amplicons of the nucleic acid tags at the

individual features, optionally wherein the sequencing of the nucleic acid tags comprises detecting optical signals indicative of the sequence.

13. The method of claim 1, wherein the solid support is located within a flow cell.