

said cover holder comprises one or more barriers for preventing movement of the cover relative to the cover holder when the agitator is agitating the substrate holder and the cover holder.

**12.** The microarray apparatus of claim 1, further comprising:

a liquid confinement coating on the cover, said liquid confinement coating comprising a hydrophilic region aligned with the array of probes on the substrate and a hydrophobic region surrounding the hydrophilic region.

**13.** The microarray apparatus of claim 1, wherein:

said cover further comprises protrusions extending into the reaction chamber for agitating the target liquid when the cover and the substrate are moved relative to each other.

**14.** The microarray apparatus of claim 13, wherein:

each of said protrusions is shaped to preferably induce flow in one direction as the cover is agitated.

**15.** The microarray apparatus of claim 14, wherein:

each of said protrusions comprises a shaped ridge.

**16.** The microarray apparatus of claim 1, further comprising:

an agitator for moving the cover relative to the substrate.

**17.** The microarray apparatus of claim 16, wherein:

said agitator mechanically moves the cover relative to the substrate.

**18.** The microarray apparatus of claim 16, wherein:

said cover is magnetically reactive; and

said agitator generates a movable magnetic field for moving the cover.

**19.** The microarray apparatus of claim 18, wherein:

said movable magnetic field generated by the agitator moves the cover in a circular motion.

**20.** The microarray apparatus of claim 1, wherein the substrate is a carrier having the array of probes deposited on a surface of the carrier, and the cover has risers on a surface that form a container having a size slightly larger than the carrier so that when the carrier is placed in the container and a target liquid is placed in the container the array of probes deposited on the surface of the carrier is in contact with the target liquid, and wherein the carrier or the cover is attached to a motor so that a relative motion between the carrier and the cover can be introduced.

**21.** The microarray apparatus of claim 5, comprising:

a second array of probes deposited on the surface of the substrate;

wherein the first liquid confinement coating is further configured to retain a second quantity of target liquid in a second predetermined region encompassing the second array of probes and to prevent mixing of the target liquid retained in the first predetermined region with the second quantity of target liquid in the second predetermined region.

**22.** The microarray apparatus of claim 21, wherein:

said first liquid confinement coating comprises:

a first hydrophilic region containing the array of probes and a first hydrophobic region surrounding the first hydrophilic region; and

a second hydrophilic region containing the second array of probes and a second hydrophobic region surrounding the second hydrophilic region.

**23.** The microarray apparatus of claim 22, further comprising:

a second liquid confinement coating on the cover, said second liquid confinement coating comprising:

a third hydrophilic region aligned with the first hydrophilic region on the substrate;

a third hydrophobic region aligned with the first hydrophobic region on the substrate;

a fourth hydrophilic region aligned with the second hydrophilic region on the substrate; and

a fourth hydrophobic region aligned with the second hydrophobic region on the substrate.

**24.** The microarray apparatus of claim 1, wherein:

said array of probes comprises an array of suspected antimicrobial compounds; and

said target molecules comprise bacterial microbes.

**25.** A microarray apparatus, comprising:

a reaction chamber having an interior cavity and an array of probes deposited on an inner surface of the interior cavity for reaction with a target molecule in a target liquid; and

**26.** The microarray apparatus of claim 25, further comprising:

a magnetically reactive mixing member contained in the reaction chamber; and

a magnetic field generator for moving the magnetically reactive mixing member through the target liquid.

**27.** The microarray apparatus of claim 26, wherein said reaction chamber further comprises:

a substrate having the array of probes deposited thereon; and

a cover coupled to the substrate to form the interior cavity of the reaction chamber.

**28.** The microarray apparatus of claim 27, further comprising:

a sealing layer coupled between the substrate and the cover, said sealing layer defining an aperture such that the cover, the aperture in the sealing layer, and the substrate form the interior cavity of the reaction chamber.

**29.** The microarray apparatus of claim 26, wherein the magnetically reactive mixing member comprises one or more magnetic particles.

**30.** The microarray apparatus of claim 26, wherein the magnetically reactive mixing member comprises a magnetic volume exclusion liquid.